Procurement
300 Turner Street NW
North End Center, Ste 2100
Blacksburg, Virginia 24061
P: (540) 231-6221 F: (540) 231-9628
www.procurement.vt.edu

September 20, 2023

Keystone Certification
Skeet Becker
PO Box 16461
Chesapeake, VA 23328

Dear Skeet,

Subject: Contract Renewal Letter

Virginia Tech Contract #:	VTS-1474-2021
Commodity/Service:	Laboratory Engineering Controls Maintenance & Technical Services
Renewal Period:	2/1/24 - 1/31/27
Renewal #:	(1 of 3) three-year renewals

In accordance with the renewal provision of the original contract, the university would like to renew the contract for an additional term. Please advise concerning your intention by signing in the appropriate space below. A signed copy of this letter should be received in Procurement by 11/15/23.

If allowed by the contract, price adjustments must be requested at the time of renewal in accordance with the contract documents. Price adjustments are not automatic or retroactive and are only implemented upon request by the vendor at the time of renewal.

In addition, review the attached form which shows your company information as listed in the university's vendor database. If any of this information has changed, make corrections directly on the form, and return with this letter. It is essential this information be accurate for payments to be processed in a timely manner.

Virginia Tech recommends that our vendors utilize the Wells One AP Control Payment System for payment of all invoices and strongly encourages all vendors under contract with the university to participate in this program. If your firm is not enrolled in the program, refer to our website: http://www.procurement.vt.edu/Vendor/WellsOne.html or contact me directly for more information.

Sincerely,

Chad Dalton
Procurement Contract Support Specialist
(540) 231-9129

Keystone Certification **agrees** to renew the contract under the terms and conditions of the subject contract.

Authorized Signature: DocuSigned by: 4585C100EB0E413... Date: 12/8/2023

Name: Skeet Becker (please print) Title: Client Relationship Mana_ger

We currently participate in the Wells One Program: _____

We would like to participate in the Wells One Program: _____

Approved: DocuSigned by: Reed Nagel 5EF51DA320D049B...
Associate Director for Goods and Services

Date: 12/11/2023

Attachment F
Schedule of Prices

Provide the amount that the owner will be billed for each of the services listed below. Pricing must include travel and labor costs. Virginia Tech will reimburse the vendor for any parts at vendor cost. Documentation is required.

Equipment Certification	Price for routine task Blacksburg	Price for emergency response Blacksburg	Price for routine task ARECS	Price for emergency response ARECS	Price for routine task Leesburg	Price for emergency response Leesburg	Price for routine task Roanoke	Price for emergency response Roanoke
Nuaire Model 425-600, Class II-A2 Biosafety Cabinet	$150	$225	$150	$225	$150	$225	$150	$225
Nuaire Model 430-400, Class II-B2 Biosafety Cabinet	$150	$225	$150	$225	$150	$225	$150	$225
Nuaire Model 201630-20 Laminar Flow hood	$120	$180	$120	$180	$120	$180	$120	$180
Esco Model AHS6AZ Laminar Flow hood	$120	$180	$120	$180	$120	$180	$120	$180
Allentown Model 3490000 Animal Transfer Station	$125	$190	$125	$190	$125	$190	$125	$190
Ace Model 3820007 Animal Transfer Station	$125	$190	$125	$190	$125	$190	$125	$190
Thoren animal rack blower/filters: dual (supply and exhaust) HEPA filters ---Price to certify both units/HEPA filters on one animal rack	$200	$300	$200	$300	$200	$300	$200	$300

*(Center AREC) Agricultural Research and Extension

Equipment Certification	Price for Routine task Blacksburg	Price for Emergency Response Blacksburg	Price for Routine Task ARECS	Price for Emergency Response ARECS	Price for Routine Task Leesburg	Price for Emergency Response Leesburg	Price for Routine Task Roanoke	Price for Emergency Response Roanoke

filtered BSL-3 room exhaust (Bag in/bag out), Filtration group model BB1020G202F26HIJ10VX, flow of 4000 cubic feet per minute (cfm). It uses an array of two 24 inches by 24 inches by 12 inches 99.97 % HEPA filters and two 24 inches by 24 inches by 2 inches 30% pre-filters. **Prefilters provided by owner ---**Price to include removal and installation of new HEPA filters and certification	$500 for certification/ labor $1150 for decon, certification/ labor	$750 for certification/ labor $1725 for decon, certification/ labor	$500 for certification/ labor $1150 for decon, certification/ labor	$750 for certification/ labor $1725 for decon, certification/ labor	$500 for certification/ labor $1150 for decon, certification/ labor	$750 for certification/ labor $1725 for decon, certification/ labor	$500 for certification/ labor $1150 for decon, certification/ labor	$750 for certification/ labor $1725 for decon, certification/ labor
B - ABSL-3 room exhaust HEPA filter. Each filter bank is in its own locked mechanical closet. Each filter bank uses one 24 inches by 24 inches by 12 inches 99.97 % HEPA filter and one 24 inches by 24 inches by 2 inch 30% pre-filter. The air exhausts through the filter banks and is blown out on top of the roof through exhaust stacks.	$350 for certification	$525 for certification	$350 for certification	$525 for certification	$350 for certification	$525 for certification	$350 for certification	$525 for certification
Differential for multiple units serviced in one trip								
1 additional unit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5 additional units	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15 additional units	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Decontamination of equipment	**Specify type: Formaldehyde (F), VHP (V), ClO2 (C)**	**Price for routine task Blacksburg**	**Price for emergency response Blacksburg**	**Price for routine task ARECS**	**Price for emergency response ARECS**	**Price for routine task Leesburg**	**Price for emergency response Leesburg**	**Price for routine task Roanoke**	**Price for emergency response Roanoke**
Nuaire Model 425-600, Class II-A2 Biosafety Cabinet	C	$650	$975	$650	$975	$650	$975	$650	$975
Allentown Model 3490000 Animal Transfer Station	C	$650	$975	$650	$975	$650	$975	$650	$975

HEPA filtered BSL-3 room exhaust as described above	C				$975	$650	$975	$650	$975
B - ABSL-3 room exhaust HEPA filter as described above	C	$650	$975	$650	$975	$650	$975	$650	$975
Differential for multiple units serviced in one trip									
1 additional unit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5 additional units	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15 additional units	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Decontamination of Rooms	**Specify type: formaldehyde (F), VHP (V), ClO2 (C)**	**Price for routine task Blacksburg**	**Price for emergency response Blacksburg**	**Price for routine task ARECS**	**Price for emergency response ARECS**	**Price for routine task Leesburg**	**Price for emergency response Leesburg**	**Price for routine task Roanoke**	**Price for emergency response Roanoke**
12'X 15 'X 10' (2400 cu.ft.) room	C	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing
Suite of three rooms. Each room 12' X 20' X 10'	C	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing
Same suite of three rooms (above) if they are Biosafety Level -3	C	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing
One very large room: 30' X 70' X 25' (52,000 cu. ft.)	C	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing
Animal facility: multiple rooms and hallways. (216,000 cu. ft.)	C	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing	Call for Pricing
Differential for multiple units services in one trip									
1 additional unit	TBD at time of request.								
5 additional units	TBD at time of request.								
15 additional units	TBD at time of request.								

Labor cost/hour	**Price for routine task**	**Price for emergency response**
Equipment repair and maintenance	$150/manhr	$225/manhr
Telephone consultation: cost/1/2 hour	No Charge	No Charge
Email consultation: cost/1/2 hour	No Charge	No Charge
Educational seminar/training – 2 hour seminar on biosafety cabinet use and operation. Specify cost/location		N/A
Blacksburg	$900 Virtual	N/A

	Circled area $900 Virtual other areas	N/A
Leesburg	$900 Virtual	N/A
Roanoke	$900 Virtual	N/A

COMMONWEALTH OF VIRGINIA

STANDARD CONTRACT

Contract Number: VTS-1474-2021

This contract entered into this 14th day of January 2021 by IAM Enterprising Corp DBA Keystone Certification hereinafter called the "Contractor" and Commonwealth of Virginia, Virginia Polytechnic Institute and State University called "Virginia Tech."

WITNESSETH that the Contractor and Virginia Tech, in consideration of the mutual covenants, promises and agreements herein contained, agree as follows:

SCOPE OF CONTRACT: The Contractor shall provide the Laboratory Engineering Controls Maintenance and Technical Services to Virginia Tech as set forth in the Contract Documents.

PERIOD OF CONTRACT: From February 1st 2021 through January 31st 2024 with the option for two (2) three-year renewals.

COMPENSATION AND METHOD OF PAYMENT: The Contractor shall be paid by Virginia Tech in accordance with the Contract Documents.

CONTRACT DOCUMENTS: The Contract Documents shall consist of this signed contract, Request for Proposal (RFP) number 0061452 dated 09/10/2020, the proposal submitted by the Contractor dated 10/14/2020 and Attachment 1 Summary of Negotiations, all of which Contract Documents are incorporated herein.

In WITNESS WHEREOF, the parties have caused this Contract to be duly executed intending to be bound thereby.

Contractor
By: _____
(Signature)
Russell S Pittman certification Manager
Name and Title

Virginia Tech
By: Jordan Stump
Jordan Stump
Assistant Director of Procurement

Request for Proposal # 0061452

For

Laboratory Engineering Controls Maintenance and Technical Services: Biological Safety Cabinets, Glove Boxes, Laminar Flow Cabinets, and other HEPA Filtered Equipment

09/10/2020

Note: This public body does not discriminate against faith-based organizations in accordance with the *Code of Virginia*, § 2.2-4343.1 or against a bidder or offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

RFP 0061452
GENERAL INFORMATION FORM

QUESTIONS: All inquiries for information regarding this solicitation should be directed to: Levi Henry, Phone: (540) 231-7852 e-mail: lhenry29@vt.edu

DUE DATE: Proposals will be received until 10/15/2020 at 3:00 PM. Failure to submit proposals to the correct location by the designated date and hour will result in disqualification.

PROPOSAL SUBMISSION:
Bids or Proposals may NOT be hand deliver to the Procurement Office.

Due to the COVID-19 Emergency Declaration, Virginia Tech will be accepting electronic submission of proposals. All submissions should be submitted to procurement@vt.edu with the RFP number, due date, and time in the subject line of the email.

Virginia Tech will not confirm receipt of proposals. It is the responsibility of the proposers to make sure their proposal is delivered on time. Delivery Confirmation functionality is recommended from the proposer's email system.

Attachments must not exceed 25MB to avoid delivery issues thru email servers.

TYPE OF BUSINESS: (Please check all applicable classifications). If your classification is certified by the Virginia Department of Small Business and Supplier Diversity (SBSD), provide your certification number: _____. For assistance with SWaM certification, visit the SBSD website at http://sbsd.virginia.gov/ .

____ **Large**

____ **Small business** – An independently owned and operated business which, together with affiliates, has 250 or fewer employees or average annual gross receipts of $10 million or less averaged over the previous three years. Commonwealth of Virginia Department of Small Business and Supplier Diversity (SBSD) certified women-owned and minority-owned business shall also be considered small business when they have received SBSD small business certification.

____ **Women-owned business** – A business concern that is at least 51% owned by one or more women who are U. S. citizens or legal resident aliens, or in the case of a corporation, partnership, or limited liability company or other entity, at least 51% of the equity ownership interest is owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with the United States immigration law, and both the management and daily business operations are controlled by one or more women who are U. S. citizens or legal resident aliens.

____ **Minority-owned business** – A business concern that is at least 51% owned by one or more minority individuals (see Section 2.2-1401, Code of Virginia) or in the case of a corporation, partnership, or limited liability company or other entity, at least 51% of the equity ownership interest in the corporation, partnership, or limited liability company or other entity is owned by one or more minority individuals and both the management and daily business operations are controlled by one or more minority individuals.

COMPANY INFORMATION/SIGNATURE: In compliance with this Request For Proposal and to all the conditions imposed therein and hereby incorporated by reference, the undersigned offers and agrees to furnish the goods or services in accordance with the attached signed proposal and as mutually agreed upon by subsequent negotiation.

<table>
<tr><td colspan="2">FULL LEGAL NAME (PRINT)
(Company name as it appears with your Federal Taxpayer Number)</td><td colspan="2">FEDERAL TAXPAYER NUMBER (ID#)</td></tr>
<tr><td colspan="2">BUSINESS NAME/DBA NAME/TA NAME
(If different than the Full Legal Name)</td><td colspan="2">BILLING NAME
(Company name as it appears on your invoice)</td></tr>
<tr><td colspan="2">PURCHASE ORDER ADDRESS</td><td colspan="2">PAYMENT ADDRESS</td></tr>
<tr><td colspan="3">CONTACT NAME/TITLE (PRINT)</td><td>E-MAIL ADDRESS</td></tr>
<tr><td>TELEPHONE NUMBER</td><td>TOLL FREE TELEPHONE NUMBER</td><td>FAX NUMBER TO RECEIVE
E-PROCUREMENT ORDERS</td><td></td></tr>
</table>

I acknowledge that I have received the following addendums posted for this solicitation.

1 _____ 2 _____ 3 _____ 4 _____ 5_____ 6_____ (Please check all that apply)

Is any member of the firm an employee of the Commonwealth of Virginia who has a personal interest in this contract pursuant to the Code of Virginia, 2.2 – 3102 - 3112

YES_____ NO_____

SIGNATURE _____ Date: _____

03/17/2020

I. PURPOSE:

The purpose of this Request for Proposal (RFP) is to solicit proposals to establish a contract through competitive negotiations for Laboratory Engineering Controls Maintenance and Technical Services: Biological Safety Cabinets, Glove Boxes, Laminar Flow Cabinets, and other HEPA Filtered Equipment by Virginia Polytechnic Institute and State University (Virginia Tech), an agency of the Commonwealth of Virginia.

II. SMALL, WOMAN-OWNED AND MINORITY (SWAM) BUSINESS PARTICIPATION:

The mission of the Virginia Tech supplier opportunity program is to foster inclusion in the university supply chain and accelerate economic growth in our local communities through the engagement and empowerment of high quality and cost competitive small, minority-owned, women-owned, and local suppliers. Virginia Tech encourages prime suppliers, contractors, and service providers to facilitate the participation of small businesses, and businesses owned by women and minorities through partnerships, joint ventures, subcontracts, and other inclusive and innovative relationships.

III. CONTRACT PERIOD:

The term of this contract is for three year(s), or as negotiated. There will be an option for two (2) three-year renewals, or as negotiated.

IV. BACKGROUND:

Virginia Polytechnic Institute and State University (Virginia Tech) is located in Blacksburg, Virginia, approximately 40 miles southwest of Roanoke, Virginia, the major commercial hub of the area. In addition to the university's main campus in Blacksburg, major off campus locations include twelve agriculture experiment research stations, the Marion duPont Scott Equine Medical Center and graduate centers in Roanoke and Fairfax, Virginia. Regularly scheduled air service is provided at the Roanoke Regional Airport.

Dedicated to its motto, Ut Prosim (That I May Serve), Virginia Tech takes a hands-on, engaging approach to education, preparing scholars to be leaders in their fields and communities. As the Commonwealth's most comprehensive university and its leading research institution, Virginia Tech offers 240 undergraduate degree programs to more than 31,000 students and manages a research portfolio of nearly $513 million. The university fulfills its land-grant mission of transforming knowledge to practice through technological leadership and by fueling economic growth and job creation locally, regionally, and across Virginia.

Virginia Tech's Environmental Health and Safety (EHS) primary function is to help provide a safe and healthy living, learning, and working environment for every member of the university community by assuring safe work practices.

One of the responsibilities of EHS is to ensure that laboratory operations are conducted in accordance with federal, state, and local regulations/guidelines and university policies and procedures. Included in this is oversight of the proper functioning of laboratory engineering controls.

For purposes of this RFP, Virginia Tech owns/operates over 200 Biological safety cabinets (Class I, II, and /or III), and approximately 75 other HEPA filtered pieces of equipment. The use of biosafety cabinets and other containment equipment is increasing as university research continues to grow.

V. EVA BUSINESS-TO-GOVERNMENT ELECTRONIC PROCUREMENT SYSTEM:

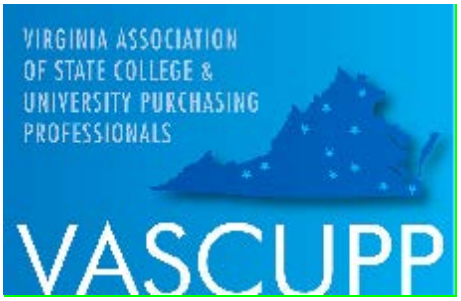
The eVA Internet electronic procurement solution streamlines and automates government purchasing activities within the Commonwealth of Virginia. Virginia Tech, and other state agencies and institutions, have been directed by the Governor to maximize the use of this system in the procurement of goods and services. *We are, therefore, requesting that your firm register as a vendor within the eVA system.*

There are transaction fees involved with the use of eVA. These fees must be considered in the provision of quotes, bids and price proposals offered to Virginia Tech. Failure to register within the eVA system may result in the quote, bid or proposal from your firm being rejected and the award made to another vendor who is registered in the eVA system.

Registration in the eVA system is accomplished on-line. Your firm must provide the necessary information. Please visit the eVA website portal at http://www.eva.virginia.gov/pages/eva-registration-buyer-vendor.htm and **register both with eVA and Ariba**. *This process needs to be completed before Virginia Tech can issue your firm a Purchase Order or contract.* If your firm conducts business from multiple geographic locations, please register these locations in your initial registration.

For registration and technical assistance, reference the eVA website at: http://www.eva.virginia.gov, or call 866-289-7367 or 804-371-2525.

VI. CONTRACT PARTICIPATION:



It is the intent of this solicitation and resulting contract to allow for cooperative procurement. Accordingly, any public body, public or private health or educational institutions, or Virginia Tech's affiliated corporations and/or partnerships may access any resulting contract if authorized by the contractor.

Participation in this cooperative procurement is strictly voluntary. If authorized by the Contractor, the resultant contract may be extended to the entities indicated above to purchase at contract prices in accordance with contract terms. The Contractor shall notify Virginia Tech in writing of any such entities accessing the contract, if requested. No modification of this contract or execution of a separate contract is required to participate. The Contractor will provide semi-annual usage reports for all entities accessing the Contract, as requested. Participating entities shall place their own orders directly with the Contractor and shall fully and independently administer their use of the contract to include contractual disputes, invoicing and payments without direct administration from Virginia Tech. Virginia Tech shall not be held liable for any costs or damages incurred by any other participating entity as a result of any authorization by the Contractor to extend the contract. It is understood and agreed that Virginia Tech is not responsible for the acts or omissions of any entity, and will not be considered in default of the contract no matter the circumstances.

Please refer to Attachment B, Zone Map, if the offeror wishes to submit separate pricing structure based on approved zones for cooperative institutions. Refer to Attachment B for the approved Zone Map. If no other prices are offered, pricing provided will apply to all zones in the Commonwealth. If you wish to provide pricing for a zone other than which this solicitation originated, please indicate you are doing so in the response. If you anticipate pricing differentials for different zones, a separate pricing sheet must be submitted for each zone that includes appropriate pricing for that zone.

Use of this contract does not preclude any participating entity from using other contracts or competitive processes as the need may be.

VII. STATEMENT OF NEEDS:

A. Overview:
The Contractor should provide services in the following areas: biological safety cabinet, glove box, laminar flow cabinet and other HEPA filtered equipment certification, maintenance and repair, decontamination, training, and technical services. Services will include equipment and spaces for BSL-2 and BSL-3 containment. See Attachment A for a current list of Virginia Tech equipment.

B. Biological Safety Cabinet, Glove Box, Laminar Flow Cabinet and HEPA filtered equipment services should include, but are not limited to:

1. **Routine:** Service normally scheduled (e.g., annual certifications and maintenance) certifications and certifications/maintenance made on request basis (e.g., equipment that is new, moved, or discovered to be out-of-date on its certification).

2. **Non-Routine:** Service that is not included under 'routine' above such as repairs, parts replacement, decontamination prior to moving, or certification after a move.

3. **Emergency:** Service immediately needed when the user or EHS identifies an urgent need for service on equipment covered by this contract.

C. Decontamination services should include, but are not limited to:

Decontamination of biological safety cabinet, glove box, other equipment, room, or designated area as needed or in the event that a release of a biological agent is discovered.

D. Training services should include, but are not limited to:

Customized training to increase awareness in the following areas: proper biological safety cabinet use and maintenance; contamination problems and proper decontamination procedures; procurement and installation.

E. Technical services should include, but are not limited to:

1. Biological safety cabinet use and maintenance.

2. Proper decontamination procedures.

4. HEPA filter use and maintenance

5. Consulting with university personnel and/or contractors concerning building HVAC systems that may affect containment equipment function

F. In providing services, the contractor shall:

1. Provide and submit all certification, decontamination, and repair reports electronically. All submitted electronic files should utilize the naming convention listed in the example below:

   "BSC EHS #115952062607 VT-Animal Resources and Care Division 072920.pdf" (the 3 or 4 digit # should go after the acronym BSC and if the equipment is new, use the word 'new' in lieu of the number)

2. Furnish all materials, tools, equipment, containment systems, labor, travel, and supplies required to complete scheduled work. Virginia Tech will reimburse the vendor for any parts at vendor cost. Documentation is required.

3. Provide contract administrator a list of the appointments that have been confirmed for work to be done **at least one week prior** to work taking place. If it is non-routine or an emergency service call, notify contract administrator as soon as work is scheduled. Schedule all work to be done with the laboratory personnel or Principle Investigator (PI) in order to minimize the disruption to work routines and avoid peak work hours.

4. Conform to the appropriate standard/guideline (e.g., National Sanitation Foundation (NSF) International Standard 49, International Air Filtration Certifiers Association, CDC/NIH Primary Containment for Biohazards: Selection, Installation, and Use of Biological Safety Cabinets).

5. Assume responsibility for any spills/releases that occur during scheduled work. Additionally, the contractor shall be responsible for proper containerization, transportation, and disposal of all clean-up residues in accordance with federal, state, and local regulations. The contractor may utilize Virginia Tech's hazardous waste disposal contracts by coordinating services through Kenny Osborne (kosborne@vt.edu) and Bernadette Mondy (bmondy@vt.edu) If the contractor chooses not to utilize Virginia Tech's current contracts, the contractor shall process and/or dispose of wastes only at a facility that is approved by EHS and permitted by the State in which it is located. Waste shall not be processed or disposed of in states that do not regulate the processing of hazardous waste materials.

6. Provide lab personnel and contract administrator with copies of all test reports or access to electronic database with test report information **within 5 business days** after work is completed.

7. Consider State holidays when scheduling work. Please review and download the attached DHRM State holiday calendar: https://www.dhrm.virginia.gov/payandholidaycalendar

8. Monthly reports **must be received by EHS no later than the last Thursday of the month.** This report must include a summary of work completed including but not limited to certifications, decontaminations, repairs.

9. If the BSC has a magnehelic gauge, clearly highlight this data on the certification report.

G. All work performed shall be subject to inspection and approval by Virginia Tech and federal, state, and local regulatory agencies.

H. Only field experienced and formally trained personnel should perform required certification testing and maintenance. Work on any equipment should be conducted, or at least supervised, by an individual who is accredited by a recognized certifying body.

I. The majority of services will be required on the main campus and the Corporate Research Center (CRC) in Blacksburg. See Attachment D for a current list of Virginia Tech equipment. However, it will be necessary for the Contractor(s) to provide services to off-site facilities as listed in Attachment E.

VIII. PROPOSAL PREPARATION AND SUBMISSION:

A. Specific Requirements

Proposals should be as thorough and detailed as possible so that Virginia Tech may properly evaluate your capabilities to provide the required goods or services. Offerors are required to submit the following information/items as a complete proposal:

1. Specific plans or methodology to be used to provide the services:

    a. Provide a description of the biosafety cabinet, laminar flow hoods, animal transfer station and room HEPA filtered exhaust system certification test procedures.
    b. Provide a description of decontamination procedures for Biosafety cabinets and rooms.
    c. Provide a list of trainings offered and an outline or a full copy of training on “Biosafety Cabinet Use and Operation”.
    d. Provide a copy of the blood borne pathogens exposure control plan.
    e. Provide a copy of the Hazard Communication Program.
    f. Provide copies of other appropriate on-site safety plans.
    g. Provide a list of Personal Protective Equipment used for each procedure.
    h. Provide a list of equipment used.
    i. Provide a description of waste disposal methods.
    j. Provide SDSs for all chemicals used in procedures.
    k. Provide a sample test report.
    l. Provide a description of the database software used to maintain records.
    m. Provide an estimate of the response times to campus and off-site facilities as listed in Attachment E, Off Site Facilities, in case of an emergency.
    n. Describe your firm’s ability to provide all certification, decontamination, and repair reports electronically.
    o. Describe your firm’s ability to provide a database where certifications, reports, etc. can be stored and viewed by Virginia Tech EHS electronically.
    p. Describe the firm’s plan for rectifying any deficiencies in service to campus clients or EHS.

2. Qualifications and experiences of Offeror in providing the services:

    a. Provide a description of the qualifications and experience of the individuals that will participate in fulfilling the obligations of this RFP. Include resumes, and/or supporting information such as curriculum vitae.
    b. Describe the qualifications and experience of the firm in providing the services described herein.

c. Provide three (3) recent references, for whom you have provided the types of services described herein. Include the date(s) the services were furnished, the client name, address and the name and phone number of the individual Virginia Tech has your permission to contact.

3. Price:

   Complete the attached Schedule of Prices, see Attachment F, associated with providing the services described herein. Virginia Tech will reimburse the vendor for any parts at vendor cost. Documentation is required.

4. Quality of services offered and suitability for the intended purpose:

   Describe services offered addressing reliability, responsiveness, competence, courtesy, communication, credibility, security and understanding of customer's needs. Include any example of improved service design and delivery that achieved higher levels of service quality and delivery. Define quality customer service offered addressing efficient, timely and friendly services, building strong relationships with customers, handling complaints quickly, and responding to customer issues timely.

5. Quality of Business Practices

   Describe your firm's ability to provide modern-day industry standard business practices. Include your firm's ability of timeliness of communications to emails, ability to send e-reports, consistent submission of pre and post work reports, and ability to provide a searchable database for VT equipment certifications.

6. Participation of Small, Women-owned and Minority-owned Business (SWAM) Business:

   If your business cannot be classified as SWaM, describe your plan for utilizing SWaM subcontractors if awarded a contract. Describe your ability to provide reporting on SWaM subcontracting spend when requested. If your firm or any business that you plan to subcontract with can be classified as SWaM, but has not been certified by the Virginia Department of Small Business and Supplier Diversity (SBSD), it is expected that the certification process will be initiated no later than the time of the award. If your firm is currently certified, you agree to maintain your certification for the life of the contract. For assistance with SWaM certification, visit the SBSD website at http://www.sbsd.virginia.gov/

5. The return of the General Information Form and addenda, if any, signed and filled out as required.

B. General Requirements

1. RFP Response: In order to be considered for selection, Offerors shall submit a complete response to this RFP to include;

   a. **One (1) electronic document** in WORD format or searchable PDF (*flash drive*) of the entire proposal as one document, INCLUDING ALL ATTACHMENTS emailed to **procurement@vt.edu**.

Reference the Due Date and Hour, and RFP Number in the subject line of the email. **No confirmation receipt will be provided by Virginia Tech.**

Any proprietary information should be clearly marked in accordance with 2.d. below.

b. Should the proposal contain **proprietary information**, provide **one (1) redacted electronic copy** of the proposal and attachments **with proprietary portions removed or blacked out**. This copy should be clearly marked *"Redacted Copy"* within the name of the document. The classification of an entire proposal document, line item prices and/or total proposal prices as proprietary or trade secrets is not acceptable. Virginia Tech shall not be responsible for the Contractor's failure to exclude proprietary information from this redacted copy.

No other distribution of the proposals shall be made by the Offeror.

2. Proposal Preparation:

a. Proposals shall be signed by an authorized representative of the Offeror. All information requested should be submitted. Failure to submit all information requested may result in Virginia Tech requiring prompt submission of missing information and/or giving a lowered evaluation of the proposal. Proposals which are substantially incomplete or lack key information may be rejected by Virginia Tech at its discretion. Mandatory requirements are those required by law or regulation or are such that they cannot be waived and are not subject to negotiation.

b. Proposals should be prepared simply and economically providing a straightforward, concise description of capabilities to satisfy the requirements of the RFP. Emphasis should be on completeness and clarity of content.

c. Proposals should be organized in the order in which the requirements are presented in the RFP. All pages of the proposal should be numbered. Each paragraph in the proposal should reference the paragraph number of the corresponding section of the RFP. It is also helpful to cite the paragraph number, subletter, and repeat the text of the requirement as it appears in the RFP. If a response covers more than one page, the paragraph number and subletter should be repeated at the top of the next page. The proposal should contain a table of contents which cross references the RFP requirements. Information which the offeror desires to present that does not fall within any of the requirements of the RFP should be inserted at an appropriate place or be attached at the end of the proposal and designated as additional material. Proposals that are not organized in this manner risk elimination from consideration if the evaluators are unable to find where the RFP requirements are specifically addressed.

d. Ownership of all data, material and documentation originated and prepared for Virginia Tech pursuant to the RFP shall belong exclusively to Virginia Tech and be subject to public inspection in accordance with the Virginia Freedom of Information Act. Trade secrets or proprietary information submitted by an Offeror shall not be subject to public disclosure under the Virginia Freedom of Information Act. However, to prevent disclosure the Offeror must invoke the protections of Section 2.2-4342F of the Code of Virginia, in writing, either before or at the time the data or other materials is submitted. The written request must specifically identify the data or other materials to be protected and state the reasons why protection is necessary. The proprietary or trade secret material submitted must be identified by some distinct method such as highlighting or underlining and must indicate only the specific words, figures, or paragraphs that

constitute trade secret or proprietary information. The classification of an entire proposal document, line item prices and/or total proposal prices as proprietary or trade secrets is not acceptable and may result in rejection of the proposal.

3. Oral Presentation: Offerors who submit a proposal in response to this RFP may be required to give an oral presentation of their proposal to Virginia Tech. This will provide an opportunity for the Offeror to clarify or elaborate on the proposal but will in no way change the original proposal. Virginia Tech will schedule the time and location of these presentations. Oral presentations are an option of Virginia Tech and may not be conducted. Therefore, proposals should be complete.

IX. SELECTION CRITERIA AND AWARD:

A. Selection Criteria

Proposals will be evaluated by Virginia Tech using the following:

Criteria	Maximum Point Value
1. Quality of products/services offered and suitability for the intended purposes	10
2. Qualifications and experiences of Offeror in providing the goods/services	25
3. Specific plans or methodology to be used to provide the Services	30
4. Cost (or Price)	25
5. Participation of Small, Women-Owned and Minority (SWAM) Business	10
Total	100

B. Award

Virginia Tech shall engage in individual discussions with two or more offerors deemed fully qualified, responsible and suitable on the basis of initial responses and with emphasis on professional competence, to provide the required services. Repetitive informal interviews shall be permissible. Such offerors shall be encouraged to elaborate on their qualifications and performance data or staff expertise pertinent to the proposed project, as well as alternate concepts. At the discussion stage Virginia Tech may discuss nonbinding estimates of total project costs, including, but not limited to, life-cycle costing, and, where appropriate, nonbinding estimates of price for services. Proprietary information from competing offerors shall not be disclosed to the public or to competitors. At the conclusion of the informal interviews, on the basis of evaluation factors published in the Request for Proposal and all information developed in the selection process to this point, Virginia Tech shall select, in the order of preference, two or more offerors whose professional qualifications and proposed services are deemed most meritorious. Negotiations shall then be conducted, beginning with the offeror ranked first. If a contract satisfactory and advantageous to Virginia Tech can be negotiated at a price considered fair and reasonable, the award shall be made to that offeror. Otherwise, negotiations with the

offeror ranked first shall be formally terminated and negotiations conducted with the offeror ranked second, and so on, until such a contract can be negotiated at fair and reasonable price. Should Virginia Tech determine in writing and in its sole discretion that only one offeror is fully qualified, or that one offeror is clearly more highly qualified and suitable than the others under consideration, a contract may be negotiated and awarded to that offeror. See Attachment C for sample contract form.

Virginia Tech reserves the right to award more than one contract as a result of this solicitation. Additionally, Virginia Tech reserves the right to award separate contracts to separate contractors for various product categories. Further, Virginia Tech reserves the right to award multiple separate contracts to multiple separate contractors for various product categories.

X. INQUIRIES:

All inquiries concerning this solicitation should be submitted in writing via email, citing the particular RFP section and paragraph number. All inquiries will be answered in the form of an addendum. Inquiries must be submitted by 3:00 PM on 10/08/2020. Inquiries must be submitted to the procurement officer identified in this solicitation.

XI. INVOICES:

Invoices for goods or services provided under any contract resulting from this solicitation shall be submitted by email to vtinvoices@vt.edu or by mail to:

Virginia Polytechnic Institute and State University (Virginia Tech)
Accounts Payable
North End Center, Suite 3300
300 Turner Street NW
Blacksburg, Virginia 24061

XII. METHOD OF PAYMENT:

Virginia Tech will authorize payment to the contractor as negotiated in any resulting contract from the aforementioned Request for Proposal.

Payment can be expedited through the use of the Wells One AP Control Payment System. Virginia Tech strongly encourages participation in this program. For more information on this program please refer to Virginia Tech's Procurement website: http://www.procurement.vt.edu/vendor/wellsone.html or contact the procurement officer identified in the RFP.

XIII. ADDENDUM:

Any **ADDENDUM** issued for this solicitation may be accessed at http://www.apps.vpfin.vt.edu/html.docs/bids.php. Since a paper copy of the addendum will not be mailed to you, we encourage you to check the web site regularly.

XIV. COMMUNICATIONS:

Communications regarding this solicitation shall be formal from the date of issue, until either a Contractor has been selected or the Procurement Department rejects all proposals. Formal communications will be directed to the procurement officer listed on this solicitation. Informal communications, including but not limited to request for information, comments or speculations

regarding this solicitation to any University employee other than a Procurement Department representative may result in the offending Offeror's proposal being rejected.

XV. CONTROLLING VERSION OF SOLICITATION:

The posted version of the solicitation and any addenda issued by Virginia Tech Procurement Services is the mandatory controlling version of the document. Any modification of/or additions to the solicitation by the Offeror shall not modify the official version of the solicitation issued by Virginia Tech Procurement Services. Such modifications or additions to the solicitation by the Offeror may be cause for rejection of the proposal; however, Virginia Tech reserves the right to decide, on a case by case basis, in its sole discretion, whether to reject such a proposal.

XVI. TERMS AND CONDITIONS:

This solicitation and any resulting contract/purchase order shall be governed by the attached terms and conditions, see Attachment A.

XVII. CONTRACT ADMINISTRATION:

A. Sarah Owen, Industrial Hygienist, Environmental Health & Safety, at Virginia Tech or her designee, shall be identified as the Contract Administrator and shall use all powers under the contract to enforce its faithful performance.

B. The Contract Administrator, or their designee, shall determine the amount, quantity, acceptability, fitness of all aspects of the services and shall decide all other questions in connection with the services. The Contract Administrator, or their designee, shall not have authority to approve changes in the services which alter the concept or which call for an extension of time for this contract. Any modifications made must be authorized by the Virginia Tech Procurement Department through a written amendment to the contract.

XIX. ATTACHMENTS:

Attachment A - Terms and Conditions
Attachment B - Zone Map for Cooperative Contracts
Attachment C - Sample of Standard Contract Form
Attachment D - List of Virginia Tech Equipment
Attachment E - Off Site Facilities
Attachment F – Schedule of Prices

ATTACHMENT A

TERMS AND CONDITIONS

RFP GENERAL TERMS AND CONDITIONS

See:
http://procurement.vt.edu/content/dam/procurement_vt_edu/docs/terms/GTC_RFP_08012020.pdf

ADDITIONAL TERMS AND CONDITIONS

A. ADDITIONAL GOODS AND SERVICES: The University may acquire other goods or services that the supplier provides other than those specifically solicited. The University reserves the right, subject to mutual agreement, for the Contractor to provide additional goods and/or services under the same pricing, terms and conditions and to make modifications or enhancements to the existing goods and services. Such additional goods and services may include other products, components, accessories, subsystems, or related services newly introduced during the term of the Agreement.

B. AUDIT: The Contractor hereby agrees to retain all books, records, and other documents relative to this contract for five (5) years after final payment, or until audited by the Commonwealth of Virginia, whichever is sooner. Virginia Tech, its authorized agents, and/or the State auditors shall have full access and the right to examine any of said materials during said period.

C. AVAILABILITY OF FUNDS: It is understood and agreed between the parties herein that Virginia Tech shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.

D. CANCELLATION OF CONTRACT: Virginia Tech reserves the right to cancel and terminate any resulting contract, in part or in whole, without penalty, upon 60 days written notice to the Contractor. In the event the initial contract period is for more than 12 months, the resulting contract may be terminated by either party, without penalty, after the initial 12 months of the contract period upon 60 days written notice to the other party. Any contract cancellation notice shall not relieve the Contractor of the obligation to deliver and/or perform on all outstanding orders issued prior to the effective date of cancellation.

E. CONTRACT DOCUMENTS: The contract entered into by the parties shall consist of the Request for Proposal including all modifications thereof, the proposal submitted by the Contractor, the written results of negotiations, the Commonwealth Standard Contract Form, all of which shall be referred to collectively as the Contract Documents.

F. IDENTIFICATION OF BID/PROPOSAL EMAIL: Due to the COVID-19 emergency declaration, Virginia Tech will be accepting electronic submission of proposals. All submissions should be submitted to procurement@vt.edu with the **RFP number, due date, and time in the subject line of the email**. No confirmation receipt will be provided. It is the responsibility of the proposers to make sure their proposal is delivered on time. Delivery Confirmation receipts are highly recommended from the vendor side. Attachments must be smaller than 25MB in order to be received by the University.

The offeror takes the risk that if the email is not marked as described above, it may be inadvertently opened and the information compromised, which may cause the proposal to be disqualified. Bids or Proposals may **NOT** be hand delivered to the Procurement Office.

G. NOTICES: Any notices to be given by either party to the other pursuant to any contract resulting from this solicitation shall be in writing via email.

H. SEVERAL LIABILITY: Virginia Tech will be severally liable to the extent of its purchases made against any contract resulting from this solicitation. Applicable entities described herein will be severally liable to the extent of their purchases made against any contract resulting from this solicitation.

I. CLOUD OR WEB HOSTED SOFTWARE SOLUTIONS: For agreements involving Cloud-based Web-hosted software/applications refer to link for additional terms and conditions: http://www.ita.vt.edu/purchasing/VT_Cloud_Data_Protection_Addendum_final03102017.pdf

SPECIAL TERMS AND CONDITIONS

1. **COMMUNICATIONS**:
   Communications regarding this Request for Proposals (RFP) shall be formal from the date of issue for this RFP, until either a Contractor has been selected or the Procurement Department rejects all proposals. Formal communications will be directed to the Procurement Department. Informal communications, including but not limited to request for information, comments or speculations regarding this RFP to any University employee other than a Procurement Department representative may result in the offending Offeror's proposal being rejected.

2. **INSURANCE**:
   By signing and submitting a proposal under this solicitation, the Offeror certifies that if awarded the contract, it will have the following insurance coverages at the time the work commences. Additionally, it will maintain these during the entire term of the contract and that all insurance coverages will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.
   During the period of the contract, Virginia Tech reserves the right to require the Contractor to furnish certificates of insurance for the coverage required.

   INSURANCE COVERAGES AND LIMITS REQUIRED:
   A. Worker's Compensation - Statutory requirements and benefits.
   B. Employers Liability - $100,000.00
   C. General Liability - $500,000.00 combined single limit. Virginia Tech and the Commonwealth of Virginia shall be named as an additional insured with respect to goods/services being procured. This coverage is to include Premises/Operations Liability, Products and Completed Operations Coverage, Independent Contractor's Liability, Owner's and Contractor's Protective Liability and Personal Injury Liability.
   D. Automobile Liability - $500,000.00
   E. Builders Risk – For all renovation and new construction projects under $100,000 Virginia Tech will provide All Risk – Builders Risk Insurance. For all renovation contracts, and new construction from $100,000 up to $500,000 the contractor will be required to provide All Risk – Builders Risk Insurance in the amount of the contract and name Virginia Tech as additional insured. All insurance verifications of insurance will be through a valid insurance certificate.

   The contractor agrees to be responsible for, indemnify, defend and hold harmless Virginia Tech, its officers, agents and employees from the payment of all sums of money by reason of any claim against them arising out of any and all occurrences resulting in bodily or mental injury or property damage that may happen to occur in connection with and during the performance of the contract, including but not limited to claims under the Worker's Compensation Act. The contractor agrees that it will, at all times, after the completion of the work, be responsible for, indemnify, defend and hold harmless Virginia Tech, its officers, agents and employees from all liabilities resulting from bodily or mental injury or property damage directly or indirectly arising out of the performance or nonperformance of the contract.

3. **SAFETY DATA SHEETS**:
   Safety Data Sheets and descriptive literature shall be provided with the proposal for each chemical and/or compound offered. Failure on the part of the Offeror to submit such data sheets may be cause for declaring the proposal as nonresponsive.

4. **SAFETY**:
   The Contractor bears sole responsibility for the safety of its employees. The Contractor shall take all steps necessary to establish, administer, and enforce safety rules that meet the regulatory requirements of the Virginia Department of Labor and Industry (VDLI) and the Occupational Safety and Health Administration (OSHA). The contractor shall take steps as necessary to protect the safety and health of university employees, students, and visitors during the performance of their work. In

addition, the contractor must also provide the university with a written safety program that it intends to follow in pursuing work under this contract. By entering into a contract with Virginia Tech, the contractor and its subcontractors agree to abide by the requirements described in Safety Requirements for Contractors and Subcontractors located on Virginia Tech's Environmental, Health and Safety Services (EHS) web site at this URL http://www.ehss.vt.edu/programs/contractor_safety.php. A copy of the publication may also be obtained by contacting EHS at 540/231- 5985. No work under this contract will be permitted until the university is assured that the contractor has an adequate safety program in effect.

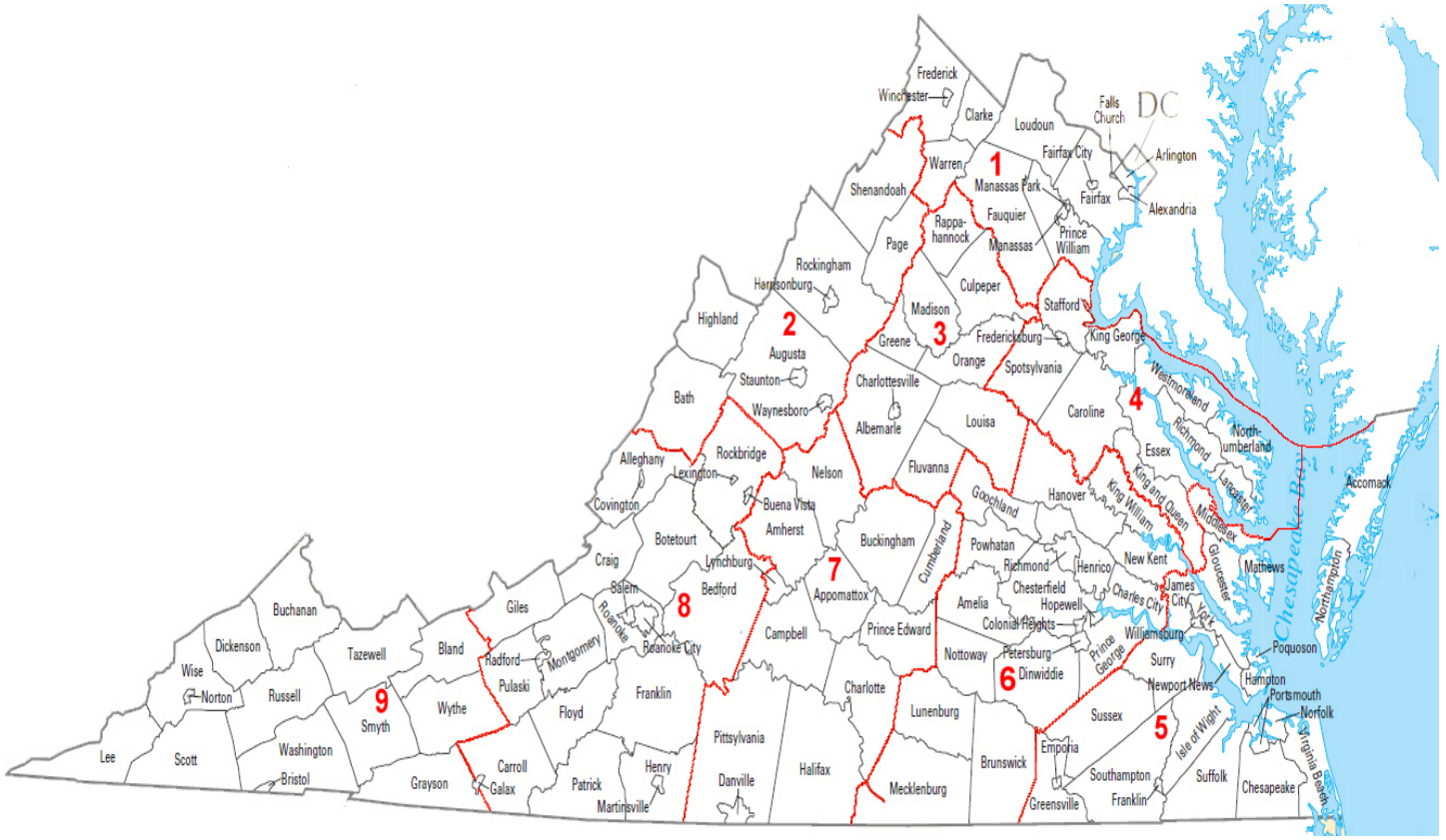
5. **SUBCONTRACTS**:
No portion of the work shall be subcontracted without prior written consent of Virginia Tech. In the event that the Contractor desires to subcontract some part of the work specified herein, the Contractor shall furnish Virginia Tech the names, qualifications and experience of their proposed subcontractors. The Contractor shall, however, remain fully liable and responsible for the work to be done by his subcontractor(s) and shall assure compliance with all requirements of the contract.

6. **WARRANTY**:
All materials and equipment shall be fully guaranteed against defects in material and workmanship for a period of 365 days following date of delivery. Should any defect be noted by Virginia Tech, the Virginia Tech Procurement Department will notify the Contractor of such defect or nonconformance. Notification will state either (1) that the Contractor shall replace or correct, or (2) Virginia Tech does not require replacement or correction, but an equitable adjustment to the contract price will be negotiated. If the Contractor is required to correct or replace, it shall be at no cost to Virginia Tech and shall be subject to all provisions of this clause to the same extent as materials initially delivered. If the Contractor fails or refuses to replace or correct the deficiency, the office issuing the purchase order may have the materials corrected or replaced with similar items and charge the Contractor the costs occasioned thereby or obtain an equitable adjustment in the contract price.

7. **WORK SITE DAMAGES**:
Any damage to existing utilities, equipment or finished surfaces resulting from the performance of this contract shall be repaired to the Owner's satisfaction at the Contractor's expense.

ATTACHMENT B

Zone Map



Virginia Association of State College & University Purchasing Professionals (VASCUPP)

List of member institutions by zones

Zone 1 **George Mason University (Fairfax)**	**Zone 2** **James Madison University (Harrisonburg)**	**Zone 3** **University of Virginia (Charlottesville)**
Zone 4 **University of Mary Washington (Fredericksburg)**	**Zone 5** **College of William and Mary (Williamsburg)** **Old Dominion University (Norfolk)**	**Zone 6** **Virginia Commonwealth University (Richmond)**
Zone 7 **Longwood University (Farmville)**	**Zone 8** **Virginia Military Institute (Lexington)** **Virginia Tech (Blacksburg)** **Radford University (Radford)**	**Zone 9** **University of Virginia - Wise (Wise)**

The zone map is provided for the offeror to determine appropriate pricing structures based on approved zones for cooperative institutions. If no other prices are offered, pricing provided will apply to all zones in the Commonwealth. If you wish to provide pricing for a zone other than which this solicitation originated, please indicate you are doing so in the response. If you anticipate pricing differentials for different zones, a separate pricing sheet must be submitted for each zone that includes appropriate pricing for that zone

ATTACHMENT C

SAMPLE CONTRACT FORM

Standard Contract form for reference only
Offerors do not need to fill in this form

COMMONWEALTH OF VIRGINIA
STANDARD CONTRACT

Contract Number:_____

This contract entered into this ____ day of _____ 20___, by _____, hereinafter called the "Contractor" and Commonwealth of Virginia, Virginia Polytechnic Institute and State University called "Virginia Tech".

WITNESSETH that the Contractor and Virginia Tech, in consideration of the mutual covenants, promises and agreements herein contained, agrees as follows:

SCOPE OF CONTRACT: The Contractor shall provide the _____ to Virginia Tech as set forth in the Contract Documents.

PERIOD OF CONTRACT: From _____ through _____.

COMPENSATION AND METHOD OF PAYMENT: The Contractor shall be paid by Virginia Tech in accordance with the contract documents.

CONTRACT DOCUMENT: The Contract Documents shall consist of this signed contract, Request For Proposal Number _____ dated _____, together with all written modifications thereof and the proposal submitted by the Contractor dated _____ and the Contractor's letter dated _____, all of which Contract Documents are incorporated herein.

In WITNESS WHEREOF, the parties have caused this Contract to be duly executed intending to be bound thereby.

Contractor:	Virginia Tech
By:_____	By: _____
Title:_____	Title:_____

Attachment D
Biosafety Cabinets and Other Containment Equipment Certified From 08/2019 – 08/2020

Service Date	# units/Service type
8/2019	11 BSC's
9/2019	11 BSC's
10/2019	1 BSC + 4 DECON
11/2019	1 BSC + 4 DECON
12/2019	12 BSC's + 1 BCU
1/2020	30 BSC + 1 HLAF
2/2020	16 BSC's + 21 AR + 6 ATS + 3 BCU + 2 VBSE
3/2020	30 BSC's + 8 LFWS + 1 DECON + 1 VBSE
4/2020	23 BSC's +4 DECON
5/2020	6 BSC's
6/2020	29 BSC's + 1 HLAF + 5 HEPA banks + 2 AR DECON
7/2020	59 BSC's + 13 ATS + 6 DECON
8/2020	82 BSC's + 15 ATS + 7 AR + 3 BCU

BSC = Biosafety cabinet **ATS** = Animal transfer station **HLAF** =HEPA Laminar flow cabinet

AR = Animal Rack Enclosure **BCU** = Biocontainment Cage Unit **VBSE** = Vented Balance Safety

DECON = Decontamination Chamber

These cabinets are located in about 24 different buildings on the Virginia Tech campus, Corporate Research Center (CRC), and at the Marion duPont Scott Equine Medical Center in Leesburg, Virginia. The Fralin Biomedical Research Institute (FBRI) in Roanoke.
There are approximately 12 Agricultural Research and Experimental Centers (AREC"S) throughout the state, some of which have biosafety cabinets which require annual certification.

Animal facility Filter Banks: (3 banks)
Each filter bank is in its own locked mechanical closet. Each filter bank uses one 24 inches by 24 inches by 12 inches 99.97 % HEPA filter and a 24 inches by 24 inches by 1 inch 30% pre-filter. These HEPA filter banks filter all the exhausted air from the BSL3 animal area hallways, animal holding rooms and gowning room. The air exhausts through the filter banks and is blown out on top of the roof through exhaust stacks. Each filter bank has its own exhaust fan. Filter integrity testing is performed annually. A written report is required for these units.

Lab roof-top filter bank: (1 bank)
The unit is manufactured by Filtration Group (1-877-344-8326). It is Model # BB1020G202F26HIJ10VX, no Serial number and was installed in 2006. It has a rated flow of 4000 cubic feet per minute (cfm). It uses an array of two 24 inches by 24 inches by 12 inches 99.97 % HEPA filters and two 24 inches by 24 inches by 2 inches 30% pre-filters. This HEPA filter bank filters all the exhausted air from BSL3 Suite before it is exhausted onto the roof.
Filter integrity testing is performed annually. A written report is required for this unit.

Animal racks:
These are biocontainment racks that operate under negative pressure and exhaust all cage air through a HEPA filter. They are made to operate under either negative or positive pressure so they have HEPA

filters on both the supply and exhaust sides. Some units have battery powered back up units. Filter integrity testing is performed annually.

Attachment E
Off Site Facilities

The locations outside of Blacksburg that currently have BSC's are listed below. This list may change if other locations acquire BSC's.

<u>In the circle:</u>

Eastern Shore 2 BSC

Hampton Roads 1 BSC

Tidewater 1 BSC

Virginia Seafood 1 BSC

<u>In the rectangle:</u>

Marion DuPont Equine Medical Center 2 BSC

Located in Leesburg, Va few miles from Middleburg AREC

<u>Roanoke , VA:</u>

Virginia Tech Carilion Research Institute (VTCRI) >20 total BSC and ATS

Approximately 45 miles north from Blacksburg

Attachment F
Schedule of Prices

Provide the amount that the owner will be billed for each of the services listed below. Pricing must include travel and labor costs. Virginia Tech will reimburse the vendor for any parts at vendor cost. Documentation is required.

Equipment Certification	Price for routine task Blacksburg	Price for emergency response Blacksburg	Price for routine task ARECS	Price for emergency response ARECS	Price for routine task Leesburg	Price for emergency response Leesburg	Price for routine task Roanoke	Price for emergency response Roanoke
Nuaire Model 425-600, Class II-A2 Biosafety Cabinet								
Nuaire Model 430-400, Class II-B2 Biosafety Cabinet								
Nuaire Model 201630-20 Laminar Flow hood								
Esco Model AHS6AZ Laminar Flow hood								
Allentown Model 3490000 Animal Transfer Station								
Ace Model 3820007 Animal Transfer Station								
Thoren animal rack blower/filters: dual (supply and exhaust) HEPA filters ---Price to certify both units/HEPA filters on one animal rack								

*(AREC) Agricultural Research and Extension Center

Equipment Certification	Price for Routine task Blacksburg	Price for Emergency Response Blacksburg	Price for Routine Task ARECS	Price for Emergency Response ARECS	Price for Routine Task Leesburg	Price for Emergency Response Leesburg	Price for Routine Task Roanoke	Price for Emergency Response Roanoke
A - Roof top HEPA filtered BSL-3 room exhaust (Bag in/bag out), Filtration group model BB1020G202F26HIJ10VX, flow of 4000 cubic feet per minute (cfm). It uses an array of two 24 inches by 24 inches by 12 inches 99.97 % HEPA filters and two 24 inches by 24 inches by 2 inches 30% pre-filters. **Pre-filters provided by owner** ---Price to include removal and installation of new HEPA filters and certification								
B - ABSL-3 room exhaust HEPA filter. Each filter bank is in its own locked mechanical closet. Each filter bank uses one 24 inches by 24 inches by 12 inches 99.97 % HEPA filter and one 24 inches by 24 inches by 2 inch 30% pre-filter. The air exhausts through the filter banks and is blown out on top of the roof through exhaust stacks.								
Differential for multiple units serviced in one trip								
1 additional unit								
5 additional units								
15 additional units								

Decontamination of equipment	**Specify type: Formaldehyde (F), VHP (V), ClO2 (C)**	**Price for routine task Blacksburg**	**Price for emergency response Blacksburg**	**Price for routine task ARECS**	**Price for emergency response ARECS**	**Price for routine task Leesburg**	**Price for emergency response Leesburg**	**Price for routine task Roanoke**	**Price for emergency response Roanoke**
Nuaire Model 425-600, Class II-A2 Biosafety Cabinet									
Allentown Model 3490000 Animal Transfer Station									
A - Roof top HEPA filtered BSL-3 room exhaust as described above									
B - ABSL-3 room exhaust HEPA filter as described above									
Differential for multiple units serviced in one trip									
1 additional unit									
5 additional units									
15 additional units									

Decontamination of Rooms	Specify type: formaldehyde (F), VHP (V), ClO2 (C)	Price for routine task Blacksburg	Price for emergency response Blacksburg	Price for routine task ARECS	Price for emergency response ARECS	Price for routine task Leesburg	Price for emergency response Leesburg	Price for routine task Roanoke	Price for emergency response Roanoke
12'X 15 'X 10' (2400 cu.ft.) room									
Suite of three rooms. Each room 12' X 20' X 10'									
Same suite of three rooms (above) if they are Biosafety Level -3									
One very large room: 30' X 70' X 25' (52,000 cu. ft.)									
Animal facility: multiple rooms and hallways. (216,000 cu. ft.)									
Differential for multiple units services in one trip									
1 additional unit									
5 additional units									
15 additional units									

Labor cost/hour	Price for routine task	Price for emergency response
Equipment repair and maintenance		
Telephone consultation: cost/1/2 hour		
Email consultation: cost/1/2 hour		
Educational seminar/training – 2 hour seminar on biosafety cabinet use and operation. Specify cost/location		N/A
Blacksburg		N/A
ARECS		N/A
Leesburg		N/A
Roanoke		N/A

Keystone Certification

Bid Submittal for

Request for Proposal #0061452

for

Laboratory Engineering Controls Maintenance and Technical Services: Biological Safety Cabinets, Glove Boxes, Laminar Flow Cabinets, and Other HEPA Filtered Equipment

October 14, 2020

Table of Contents

RFP Section VIII.A.1 Plans for Certification Services

Specific plans or methodology to be used to provide the services.

Virginia Tech and Related Facilities

Upon acceptance of terms, Keystone Certification will seek to set up a meeting or conference call with the contract administrator Sarah Owen for the purpose of establishing protocols that best suit Virginia Tech in the administration of the contracted terms. In general, when conducting certification and service work, Keystone operates on the following basis:

Initial Contact and Scheduling of Services

- Once terms are agreed to, a survey of equipment and equipment due dates is performed
    - This can occur via site survey or client supplied equipment list
- Equipment and due dates are entered into to the Keystone equipment database
    - Client equipment is grouped by location and due date
    - Keystone calendar is populated for future appointments to prevent risk of missing certification due dates
- Clients with equipment due are contacted the prior month to arrange for an acceptable certification date
    - Keystone will determine the number of days, and number of certification personnel required to complete work
    - Typically, one day or several days grouped together will be offered to clients for scheduling work

Onsite for Scheduled Appointment

- Keystone Certification personnel will check in with client POC when arriving onsite to obtain parking pass and any information that pertains to the work to be done
    - Work will be conducted during whatever hours required by client
    - Keystone will work with labs onsite to work around the labs schedule
    - Certifications will be conducted, and new certification sticker will be placed on hood with current certification information, such as date, standard, next certification date, and name of certifier
    - Any failures or potential issues are disclosed to onsite client POC and end user as soon as information is determined
    - Proposals for corrective action are typically submitted within a few hours of failure determination
    - Upon authorization from client, service work is scheduled at the convenience of client

- All services will be conducted or supervised by an NSF Accredited Class II Biosafety Cabinet Field Certifier
    - Reports are available via email and our secured online data base within 5 business days
    - Failure reports are available within 24 hours, if desired by client

Corrective Actions for Service Work, Decontamination, Non routine certifications

- Client will be informed of all expected fees and lead times (on parts orders)
    - Upon authorization from client, work will be scheduled at client's convenience
    - Parts such as HEPA filters are generally delivered to client locations, unless otherwise directed
- Keystone will conduct required service work
    - If decontamination required, all appropriate safety protocols will be met
    - Equipment will be certified and returned to service
    - Keystone will ensure work site is free of debris and dispose of all replaced items (e.g. HEPA filters) as directed by client
- Non-routine certification requirements
    - Non-routine certification will be scheduled in timely manner
    - All scheduling will be done at client's convenience with as little delay as possible

VIII.A.1.a. Testing Procedures

Provide a description of biosafety cabinet, laminar flow hoods, animal transfer station and room HEPA filtered exhaust system certification test procedures.

Biosafety Cabinets

All certification tests will be conducted using the methodology required by the manufacturer and/ or the most pertinent industry guidelines. In the case of biosafety cabinetry, the standard is NSF Standard 49. All primary tests required by NSF standard 49 will be conducted. Secondary test shall be conducted as required. The procedures that will be used for the primary tests, taken directly from NSF Standard 49 can be found below:

Downflow Test

a) The air velocity shall be measured at multiple points across the workspace, using equal points in the horizontal plane 4 in (10 cm) above the bottom edge of the window frame, as specified on the data plate.

b) Removable equipment shall be removed prior to the test to replicate the as-manufactured conditions tested by the testing organization when required.

c) The air measurement probe shall be held rigidly in a freestanding fixture that permits accurate positioning and does not distort the airflow pattern (ring-stand and clamp).

Inflow/ Face Velocity Test

1: DIM (*Primary*)

a) Seal by taping the device to the center of the front opening of a biosafety cabinet. Seal the open areas on either side of the capture hood portion of the DIM as necessary.

b) All cabinet and exhaust blowers must be operating. Take at least five readings and average them to determine inflow volume rate. Care should be taken not to restrict the airflow through the instrument intake area.

c) Calculate the average inflow velocity in feet/minute (meters/second) by dividing the average inflow volume rate in cubic feet/minute (cubic meters/second) by the work access opening area in square feet (square meters).

d) Include the following in reported data: individual inflow volume rate readings, average inflow volume rate, work access opening dimensions and area, directly measured average inflow velocity, and the methods used to determine them.

Alternate Methods:

2: Method for Type A1 and A2 cabinets that use a thermal anemometer to measure exhaust velocity to determine inflow velocity

a) Take air velocity measurements at multiple points across the exhaust filter face on a grid as specified on the data plate.

b) Use the effective open area of the exhaust HEPA filter or exhaust port determined by the manufacturer and validated by the testing organization. Measure the effective exhaust area when the manufacturer has not provided it. Cabinets in which the exhaust filter is not accessible, or exhaust port flow is non-uniform, such as caused by a damper or exhaust filter housing design, shall be tested as approved by the testing organization.

c) To obtain the exhaust flow volume rate in cubic feet/minute (cubic meters/second), multiply the average exhaust air velocity in feet/minute (meters/second) by the effective exhaust area in square feet (square meters).

d) Use the work access opening area as listed by the testing organization. Measure the work access opening area when the manufacturer has not provided it.

e) Calculate the average inflow velocity in feet/minute (meters/second) by dividing the average exhaust volume rate in cubic feet/minute (cubic meters/second) by the work access opening area in square feet (square meters).

f) Include the following in reported data: individual exhaust velocity readings, average exhaust velocity, exhaust volume rate, exhaust opening dimensions and area, work access opening dimensions and area, calculated average inflow velocity, and the methods used to determine them.

3: Method for Type A1, A2, and B2 cabinets using a thermal anemometer to measure velocity through a constricted access opening to determine average inflow velocity

a) Restrict the access opening as specified by the testing organization.

b) Take air velocity measurements at multiple points across the restricted opening as specified on the data plate. No fewer than two readings per 1 ft (0.3 m) of access opening width shall be taken.

c) Average the air velocity measurements. Multiply the average by the listed correction factor to obtain the average inflow velocity.

4: Method for Type B1 cabinets using a thermal anemometer to measure velocity through the access opening to determine average inflow velocity

a) Turn off the blower(s) that recirculate air in the cabinet, if tested that way by the testing organization.

b) Set the sash (viewing window) to the height tested by the testing organization.

c) Take air velocity measurements at multiple points across the work access opening on a grid as specified on the data plate.

d) Include individual inflow velocity readings, average inflow velocity, and methods used to determine them in the reported data.

5: Calculated method for Type B2 cabinets using an anemometer and pitot tube if applicable

a) Turn on the cabinet downflow blower and exhaust system blower.

b) Set the sash (viewing window) at the height specified by the testing organization.

c) Measure and calculate the exhaust volume in accordance with the testing organization's verified methodology, or with ASHRAE standards for air velocity measurements in round or rectangular ducts, or with the Industrial Ventilation Manual.

d) Measure the supply air velocity on a grid as specified on the data plate. The air measurement probe shall be held rigidly in a freestanding fixture (ring-stand and clamp) that permits accurate positioning and does not distort the airflow pattern (see annex A, figure A20). Average the velocity readings and multiply by the area in square feet (square meters) of the plane in which the velocities were measured to determine the total filtered supply air volume flow rate in cubic feet/minute (cubic meters/second).

e) Subtract the supply air volume rate in cubic feet/minute (cubic meters/second) from the total exhaust volume rate in cubic feet/minute (cubic meters/second); the difference represents the calculated inflow volume rate in cubic feet/minute (cubic meters/second).

f) Divide the calculated inflow volume rate by the area of the access opening in square feet (square meters) to determine the average inflow velocity in feet/minute (meters/second).

g) Include the following in reported data: individual exhaust velocity readings, calculated average

exhaust velocity, exhaust duct area, calculated exhaust volume, individual supply velocity readings, average supply velocity, effective supply area, calculated supply air volume, area of the work access opening, calculated inflow air volume, calculated average inflow velocity, and methods used to determine them.

Airflow Smoke Patterns Test

Downflow test

a) Smoke shall be passed from one end of the cabinet to the other, along the centerline of the work surface, at a height of 4 in (10 cm) above the top of the access opening.

View screen retention test

a) Smoke shall be passed from one end of the cabinet to the other, 1.0 in (2.5 cm) behind the view screen, at a height 6.0 in (15 cm) above the top of the access opening.

Work opening edge retention test

a) Smoke shall be passed along the entire perimeter of the work opening edges, approximately 1.5 in (3.8 cm) outside the cabinet. Particular attention should be paid to corners and vertical edges.

Sash/window seal test

a) Smoke shall be passed up the inside of the window 2 in (5 cm) from the sides and along the top of the work area.

HEPA Filter Leak Test

Filters that can be scanned

a) Turn on the cabinet blower and lights (types A1 and A2 and B2 downflow filter test). Remove the filter diffusers and protective covers if any are present. Place the generator so the aerosol is introduced into each cabinet fan upstream of the HEPA filter(s). When the manufacturer has not identified the aerosol introduction point(s), introduce the aerosol in a manner to ensure thorough mixing in the cabinet airflow. For example, a T-connection can be fitted to the aerosol generator output to enable distribution of challenge into both entrances of a single blower or entrances of multiple blowers. The manufacturer shall determine the aerosol introduction point that provides the most uniform distribution.

b) Turn on the photometer and adjust it in accordance with the manufacturer's instructions.

c) Determine the aerosol concentration upstream of the HEPA filter.

– When the challenged airflow is not contaminated, sample the aerosol concentration upstream of the HEPA filter.

– When the challenged airflow is contaminated or when measuring the upstream concentration is not practical, the upstream concentration can be calculated. For example, when DOP is used as the challenge aerosol with a Laskin nozzle aerosol generator at 20 psi (140 kPa), the following formula applies: µg/L = 13,500 x number of nozzles / ft3/min of challenged air

NOTE: Use of DOP substitutes will require modification of this formula unless the photometer is calibrated with the substitutes to yield results equivalent to those of DOP. Use of DOP substitutes will also require pressures different from 20 psig.

– Use an aerosol concentration that is at least equal to the photometric equivalent of 10 µg/L of DOP.

d) Set up the photometer to the upstream challenge in accordance with the photometer manufacturer's instructions to detect leaks greater than or equal to 0.01% of the upstream concentration.

e) With the nozzle of the probe held not more than 1.0 in (2.5 cm) from the area being tested, scan the entire downstream side of the HEPA filter(s) and the perimeter of each filter pack by passing the photometer probe in slightly overlapping strokes at a traverse rate of not more than 2 in/s (5 cm/s). Separate passes shall be made around the entire periphery of the filter, along the bond between the filter pack and frame, and around the seal between the filter and the device.

Filters that cannot be scanned

a) When a cabinet is ducted so that the exhaust filter cannot be scanned, it may be leak tested by drilling a hole approximately 0.3 in (1 cm) in diameter in the duct at a downstream location that will produce a well-mixed aerosol and inserting the photometer sampling probe with rigid extension tubing through the hole.

Laminar Flow Hoods

Laminar (unidirectional) Flow Hoods will be tested to manufacturer specifications and/ or specifications similar to those found in CETA CAG-003-2006.

11.3 **Airflow Velocity Testing**

11.3.1 Because unidirectional airflow equipment utilizes flow control, these should be measured in terms of velocity. Airflow velocities are typically set to a range of 80 to 100 fpm, but the actual range is best established by the device manufacturer and maintained there by the certifier. Uniformity should be confirmed as determined by the device manufacturer. Test procedures are specified in the following document: *IEST-RP-CC002.313 Section 6.1*

11.3.2 It should be noted that section 6.1 referenced above suggests measuring the velocities in a plane 12 inches from the filter, filter protective grille or diffuser screen. Most device manufacturers suggest airflow velocity readings to be taken in a plane 6" from the filter, protective screen or diffuser screen. The actual plane location should be chosen based on the most repeatable position for that particular device. The distance from the filter or screen should be clearly identified on the test report.

11.3.3 Unless otherwise recommended by the device manufacturer, a maximum 12" grid beginning 6" from the inner edge of the filter frame (or LAFW sidewall) positioned 6" from the filter or screen is recommended.

11.3.4 Acceptance criteria should be 80 - 100 fpm unless an alternative velocity range has been supported by smoke pattern studies to be more appropriate.

11.4 **HEPA Filter Leak Test**

11.4.1 All HEPA filters shall be leak tested at every certification utilizing an aerosol photometer and an appropriate aerosol challenge medium. A challenge of 10-90 micrograms per liter should be used. HEPA filters should be certified to be free from leaks in excess of 0.01% of the upstream challenge concentration. Test procedures are specified in the following document: *IEST-RP-CC034.3 Section 6.2.1*

11.5 **Induction Leak/Backstreaming Test**

11.5.1 This test verifies the LAFW is free from unsealed construction joints and that room airflow patterns or bench location do not introduce particulate contamination into the critical work area. Test procedures are specified in the following document: *IEST-RP-CC002.3 Section 6.1.3*

11.6 **Airflow Smoke Pattern Test**

11.6.1 An airflow smoke pattern test should be done at every certification to verify that the device is properly integrated into the facility. Cross drafts caused by traffic patterns, HVAC airflow, opening and closing of doors, and poorly placed products and materials may interfere with the unidirectional airflow. Visual verification that the laminarity of the air is undisturbed should be documented as part of the certification process.

Animal Transfer Stations

Animal Transfer Station certification protocol is not covered under a central industry standard for those types of devices, rather protocols come from the individual manufacturers of these devices. All certification tests will be conducted using the methodology required by the manufacturer and/ or the most pertinent industry guidelines. These protocols typically involve the following tests:

- HEPA Filter Leak Tests
- Downflow Velocity Test
- Inflow Volume Test
- Airflow Smoke Patterns

All HEPA filters shall be leak tested at every certification utilizing an aerosol photometer and an appropriate aerosol challenge medium. A challenge of 10-90 micrograms per liter should be used. HEPA filters should be certified to be free from leaks in excess of 0.01% of the upstream challenge concentration. Test procedures are specified in the following document: *IEST-RP-CC034.3 Section 6.2.1*

HEPA Filter Banks / Room HEPA Filtered Exhaust Systems

Leak Testing for in place HEPA Filters

Filters systems shall be designed and installed so the system can be quantitatively leak tested. The injection port (if necessary) and sampling ports shall be of sufficient size (nominal 1/2 inch in diameter) for insertion of the output line from the aerosol generator or photometer probe. There are two types of leak tests that are permitted: 1) total leak test and 2) scan leak test. For radioactive applications, only the total leak test is allowed. For all other applications, either method is allowed. Both methods require qualification of the testing system to ensure uniform challenge concentration. The total leak test also requires the downstream sample be qualified to ensure the concentration is uniform. The scan test apparatus must be qualified to be capable of traversing the entire filter sealing gasket and the perimeter of the filter support/duct housing structure in addition to the filter. Each test system is qualified only once prior to conducting periodic leak tests. The total leak test is prescribed in ASME N510-1989, Section 10, and the scan leak test is prescribed in IEST-RP-CC034.1.

Qualification to Ensure Uniform Challenge Concentration for Both Tests

Access to Inject Challenge Aerosol

Access is required to permit the injection of challenge aerosol upstream of the filter. The aerosol can be injected at a device served by the filter system or via a port installed in the ductwork upstream of the HEPA filters.

Mixing Devices Upstream of the Filter

Proper configuration is required to mix the challenge aerosol thoroughly. This can be accomplished through elbows installed in the system ductwork, other installed devices that are designed to induce turbulence, or by adding a device to create mixing by inducing turbulence, such as a Stairmand disk.

Adequate Duct Length After Mixing Devices

Adequate duct length is required to allow the flow and concentration of aerosol to become uniform before the upstream aerosol measurement location.

Qualification to Ensure Uniform Downstream Concentration for Total Leak Test

Thorough mixing is required for any leaking aerosol downstream from the filter. This is difficult because the airflow leaving a HEPA filter is laminar. Inducing turbulence in the downstream airflow is one method that produces mixing. There are two approaches for achieving this.

Uniform Aerosol Concentration Using Duct Length

Adequate duct length is required to allow the air velocity and the aerosol concentration to become uniformly distributed. This is ensured by placing the downstream sampling location 7.5 equivalent duct diameters downstream from the closest upstream source of turbulence. This ensures the aerosol concentration is uniform across the duct and the measurement is representative of leakage through the system.

Uniform Aerosol Concentration Using Engineered System

An engineered turbulence induction and sampling manifold system which collects samples at multiple points downstream of all portions of the filter after mixing for concurrent measurement of the average concentration is an alternative. This is accomplished using a segment inserted downstream of the filter that does not need to be 7.5 duct diameters long.

VIII.A.1.b-1. Decontamination Procedures – Biosafety Cabinets

Provide a description of decontamination procedures for Biosafety cabinets and rooms.

Biosafety Cabinet Decontamination Procedure

Chlorine Dioxide (CD) Decontamination Procedures

(as taken from NSF/ANSI 49-2008)

Method 1 – Fixed amount of CD

a) Calculate the total volume (in ft3 or m3) of the cabinet by multiplying the height, width, and depth.
b) Calculate the amount of CD- generating chemical required for the decontamination. Multiply the total volume of the cabinet by 0.13 g/ft3 (4.7 g/m3) to determine the mass of CD required to be generated. Multiply this value by the value of mass of CD per unit mass of generating chemicals, as given by the supplier of the generating chemicals.
c) If the cabinet is equipped with an external duct, fully close the exhaust decontamination damper, while leaving balancing, backdraft, EVAV or other dampers in their original position. This duct and the exhaust decontamination damper must be of a "gas tight" design. Sealing may also be accomplished at the terminal end of the duct. If the exhaust duct is more than 10 ft (3 m) long, additional CD-generating chemical may be needed to compensate for the increased volume. If in the unlikely event the cabinet exhausts into a recirculating building exhaust system or does not have a fully functioning gas-tight decontamination damper, disconnect the cabinet from the building system and form a gas tight seal (plastic film and tape may be used).
d) If the cabinet exhaust air is discharged into the room, tape a plastic cover over and completely seal the exhaust HEPA filter or port.
e) Place the chlorine dioxide generator within the BSC, or attach the external CD gas generator delivery system to the BSC. In either case, a means of recirculation to ensure adequate distribution of CD and humidity within the BSC, including above the exhaust filter, will be provided. (The recirculation loop may include the CD generator within the loop.) The inlet tube will preferably be connected into or beneath the workspace and the return tube shall be connected to a location above the exhaust HEPA filter.
f) Provide a means, either within or external to the BSC, by which the air within the BSC may be humidified and the relative humidity (RH) monitored and maintained within a range of 60 - 85% RH throughout the decontamination process. A hot plate, beaker of water, and temperature and humidity indicators on the cabinet work tray may be used. If using a hot plate within the cabinet, do not connect its electrical cords to the internal cabinet electric supply, as these devices do not generally provide adequate current.
g) Either provide a means, within or external to the BSC, by which the CD gas within the cabinet may be subsequently removed. Such a system might involve either the use of activated carbon granules or pellets or a chemical scrubbing system, through which the air within the cabinet can be circulated.
h) Close the opening to the work area with heavy gauge plastic film and tape. Seal all possible leak areas, such as the exit of electrical cords, around inlet and outlet hoses for the CD gas and/or its recirculation, around the window, and at the junction of the plastic film and cabinet.
i) Determine the temperature and humidity inside the cabinet.
j) The temperature should be 60°F (15°C) or higher, and the humidity should be 60 – 85%RH. Use the hot plate with beaker of water or other means of humidity generation until the desired humidity level is attained. The cabinet blower and/or recirculation blower shall be operating during the entire humidification process.

k) Prior to the generation of CD gas, access to the area or room around the cabinet should be restricted in accordance with applicable federal and state regulation and prudent safety practice. It is recommended that a regulated area of radius of 20 ft be established about the cabinet to be decontaminated with CD, to be so indicated with signs and labels marking the area and access restricted to properly trained personnel. It is recommended that the room or area surrounding the cabinet be under negative relative pressure to prevent gas drifting in the event of leakage.

l) Begin generation and injection of CD gas into cabinet. Use the amount of CD – generating chemical as determined in step (b) above.

m) The cabinet blower (if available) and CD recirculation blower shall be operating during the entire CD gas generation period. Following the completion of CD gas generation, the cabinet blower and/or CD recirculation blower should be energized for at least 1 min during every 15 min of contact time.

n) Allow the cabinet to stand a minimum of 85 min from the initiation of CD gas generation with the assumption that the duration until peak concentration will be under 10 minutes.

o) Activate the system (scrubber) for removal of CD gas from the cabinet. Have the cabinet blower (if available) and CD recirculation blower energized during this period.

p) Allow sufficient time for the CD level within the cabinet to decrease to its STEL, the Short- Term Permissible Exposure Limit (0.3 ppm). This time depends upon the scrubbing system, but will generally require at least 30 min.

Method 2 – Fixed concentration of CD

a) If the cabinet is equipped with an external duct, fully close the exhaust decontamination damper, while leaving balancing, backdraft, EVAV, or other dampers in their original position. This duct and the exhaust decontamination damper must be of a "gas tight" design. Sealing may also be accomplished at the terminal end of the duct. If the exhaust duct is more than 10 ft (3 m) long, additional CD-generating chemical may be needed to compensate for the increased volume. If in the unlikely event the cabinet exhausts into a recirculating building exhaust system or does not have a fully functioning gas-tight decontamination damper, disconnect the cabinet from the building system and form a gas tight seal (plastic film and tape may be used).

b) If the cabinet exhaust air is discharged into the room, tape a plastic cover over and completely seal the exhaust HEPA filter or port.

c) Place the chlorine dioxide generator within the BSC, or attach the external chlorine dioxide gas (CD) generator delivery system to the BSC. For an external generator, the inlet and outlet tubes/hoses to the BSC, may be connected to or beneath the workspace. For all B-type cabinets and for A-type cabinets with an inoperable internal blower, a means of recirculation to ensure adequate distribution of CD and relative humidity within the BSC, including above the exhaust filter, will be provided. (The recirculation loop may include the CD generator within the loop.) The inlet tube will preferably be connected into or beneath the workspace and the return tube will preferably be connected to a location above the exhaust HEPA filter.

d) Provide a means, either within or external to the BSC, by which the air within the BSC may be humidified and the relative humidity (RH) monitored and maintained within a range of 60 - 85% RH throughout the decontamination process. A hot plate, beaker of water, and temperature and humidity indicators on the cabinet work tray may be used. If using a hot plate within the cabinet, do not connect its electrical cords to the internal cabinet electric supply, as these devices do not generally provide adequate current.

e) Either provide a means, within or external to the BSC, by which the CD gas within the cabinet may be subsequently removed. Such a system might involve either the use of activated carbon granules or pellets or a chemical scrubbing system, through which the air within the cabinet can be circulated.

f) Provide a means to monitor the concentration of CD gas during the decontamination. Gas sampling is to be extracted from within the BSC at a distance of at least 1 ft from the CD gas inlet.

g) Close the opening to the work area with heavy gauge plastic film and tape. Seal all possible leak areas, such as the exit of electrical cords, around inlet and outlet hoses for the CD gas and/or its recirculation, around the window, and at the junction of the plastic film and cabinet.
h) Determine the temperature and humidity inside the cabinet.
i) The temperature should be 60°F (15°C) or higher, and the humidity should be 60 – 75%RH. Use the hot plate with beaker of water or other means of humidity generation until the desired humidity level is attained. The cabinet blower and/or recirculation blower shall be operating during the entire humidification process.
j) Prior to the generation of CD gas, access to the area or room around the cabinet should be restricted in accordance with applicable federal and state regulation and prudent safety practice. It is recommended that a regulated area of radius of 20 ft be established about the cabinet to be decontaminated with CD, to be so indicated with signs and labels marking the area and access restricted to properly trained personnel. It is recommended that the room or area surrounding the cabinet be under negative relative pressure to prevent gas drifting in the event of leakage.
k) Begin generation and injection of CD gas into cabinet. Monitoring the CD concentration within the cabinet, cease generation when the concentration has at least achieved the targeted CD concentration (3.0 or 5.0 mg/L.).
l) The cabinet blower (if available) and CD recirculation blower (if present) shall be operating during the entire CD gas generation period. Following the completion of CD gas generation, the cabinet blower and/or CD recirculation blower should be energized for at least 1 min during every 15 min of contact time.
m) Continuously monitor the CD gas concentration during decontamination. Whenever the CD concentration decreases below the targeted concentration level, (3.0 or 5.0 mg/L) generate and inject more CD gas until the CD concentration has at least attained the targeted concentration level.
n) Continue the decontamination for a duration of 60 min for a targeted concentration of 3.0 mg/L or 45 min for a targeted concentration of 5.0 mg/L, measured from the time that the targeted concentration was first achieved.
o) Activate the system (scrubber) for removal of CD gas from the cabinet. Have the cabinet blower (if available) and CD recirculation blower energized during this period.
p) Allow sufficient time for the CD level within the cabinet to decrease to its STEL, the Short-Term Permissible Exposure Limit (0.3 ppm). This time depends upon the scrubbing system, but will generally require at least 30 min.

VIII.A.1.b-2. Decontamination Procedures – Rooms

Provide a description of decontamination procedures for Biosafety cabinets and rooms.

Title: Area or Building Decontamination Procedure	
Document Type: KEYSTONE Departmental Procedure	**Document Number:** OP-013
Issue Number: 1	**Page:** 1 of 12

1. PURPOSE

1.1. To describe the requirements for decontaminating an area or building at a customer facility by Keystone Certification (Keystone). This procedure is intended to help provide consistency and ensure the effectiveness of each area or building decontamination.

2. SCOPE

2.1. This procedure applies to all area or building decontaminations performed by KEYSTONE.

3. REFERENCE DOCUMENTS

3.1. N/A

4. DEFINITIONS

4.1. N/A

5. RESPONSIBILITIES

5.1. All KEYSTONE staff may use as a guide the requirements defined in this document when performing area or building decontaminations.

6. **PROCEDURE**

6.1. The KEYSTONE Project Manager for the decontamination project speaks with the potential customer and reviews and helps determine the customer requirements.

6.2. When an agreement is made to progress with the area or building decontamination project, the following steps occur prior to the decontamination:

6.2.1. The KEYSTONE Project Manager utilizes the Attachment 1 worksheet to assess the details of the project.

6.2.2. KEYSTONE determines the number and type of CD Generators, fans, and humidity generators required and procures the necessary supplies such as 2% chlorine and CD Cartridges.

6.2.3. At the time of gathering and shipping materials, it should be verified that the expiration date on the cartridges and 2% chlorine gas will not exceed the date upon which the decontamination will take place. Cartridges or gas tanks that have expired or will expire before the decontamination date must NEVER be shipped on-site for use. All biological indicators being shipped to a job site must also never exceed the expiration date.

6.2.4. KEYSTONE arranges to ship or deliver the necessary items to the job site.

6.3. During the preparation phase of the area or building decontamination project, the following steps occur prior to the decontamination:

6.3.1. KEYSTONE transports all needed equipment and supplies, per the Decontamination Supply Checklist (Attachment III) to the site.

6.3.2. KEYSTONE locates all needed equipment and supplies to the decontamination area and sets up the generators and decontamination monitoring system and safety monitoring system.

6.3.3. KEYSTONE ensures or performs any removal of equipment, material, etc. as applicable.

6.3.4. KEYSTONE ensures or performs any sealing of potential leaks and penetrations as applicable.

6.3.4.1. KEYSTONE examines the floor, walls, and ceiling for penetrations. Items such as light fixtures, pipes, sinks, smoke detectors, sprinkler heads, windows, are closely examined. If an item requires sealing, caulk, duct tape, painters tape, 24" plastic tape, or 4 to 8 mil plastic sheets will be used.

6.3.5. KEYSTONE or local facilities personnel examines the HVAC system to evaluate what to shut down, what dampers or valves exist, what dampers or valves should be closed, what supplies and returns need to be sealed, etc.

6.3.6. KEYSTONE ensures or places BI's or other indicators in the appropriate places if required.

6.3.7. KEYSTONE ensures or places gas sample tubing, gas feed tubing, circulation fans, humidity generators, Rh probes, etc. in the appropriate places.

6.3.8. KEYSTONE connects the gas sample tubing, gas feed tubing to the gas generation and monitoring equipment.

6.3.9. KEYSTONE turns on the humidifiers and monitors the humidity levels with hand held RH sensors. A humidity level over 60% is the goal with a target level between 65 to 75%.

6.3.10. Once the humidification level is held for a minimum of 30 minutes, the humidifiers are removed from the area.

6.3.11. KEYSTONE ensures or performs any sealing of doors.

6.3.12. KEYSTONE ensures signage is placed as per attachment II to alert people of the safety issues.

6.4. During the decontamination phase of the area or building decontamination project, the following steps occur:

6.4.1. KEYSTONE verifies that the area is empty of people to the best of its ability.

6.4.2. KEYSTONE develops and starts the decontamination process by opening the valves on the gas cylinders.

6.4.3. KEYSTONE monitors the neighboring areas and floors for any leakage.

6.4.3.1. If levels above 0.1 ppm are detected, the source of the leakage is investigated and corrected if possible.

6.4.3.2. If sealing to prevent the leakage is impractical, a determination is made based on the level and whether people are in the area as to continue or abort

the process. If people are in the area, they will either be evacuated or the process aborted.

6.4.4. KEYSTONE monitors the process through to its completion with people on site until safe levels are reached.

6.4.5. KEYSTONE utilizes the KEYSTONE EMS module to measure the CD concentration through the sample tubing which draws samples from locations in the decontamination area. These samples are documented on attachment IV. Once the concentration reaches approximately 1 mg/liter, the gas generation process is halted. If required. It can be re-initiated to ensure concentrations are held throughout the 2 hour exposure period. If concentration is not reached then the efficacious exposure level will be achieved which is a minimum of 720 ppm-hrs.

6.4.6. KEYSTONE or local facilities personnel initiates aeration by activating the HVAC system once the decontamination process is satisfactorily completed for the appropriate exposure levels.

6.5. Following the decontamination phase of the area or building decontamination project, the following steps occur:

6.5.1. KEYSTONE verifies that the CD levels are low enough to enter the area that was decontaminated.

6.5.2. KEYSTONE wears appropriate gowning before re-entering the decontaminated facility.

6.5.3. KEYSTONE ensures that BI's or other indicators are removed from the appropriate places.

6.5.4. KEYSTONE disconnects the gas sample tubing, gas feed tubing, etc. from the gas generation equipment.

6.5.5. KEYSTONE removes the gas generation equipment.

6.5.6. KEYSTONE ensures the removal of the gas sample tubing, gas feed tubing, circulation fans, humidity generators, Rh probes, etc. from the area.

6.5.7. KEYSTONE ensures removal of any sealing materials.

6.5.8. KEYSTONE ensures removal of any signage.

7. ATTACHMENTS AND FORMS

7.1. ATTACHMENT I - CHLORINE DIOXIDE SPACE DECONTAMINATION SETUP SHEET

7.2. ATTACHMENT II - CHLORINE DIOXIDE Warning Signage

7.3. ATTACHMENT III – Decontamination Supply Checklist

7.4. ATTACHMENT IV - Gas Sampling Log Form

VIII.A.1.b-2. ATTACHMENT I – Chlorine Dioxide Space Decontamination Setup Sheet

To follow is a list of issues to be addressed to set up a chlorine dioxide room or building decontamination.

Initial Support Documents

1) Documentation required prior to initial set-up:
   a) Room or decontamination space drawings or floor plans with equipment shown.
   b) Room sizes L x W x H (*Used to calculate the required consumables).*
   c) Room names and/or numbers to be involved.
   d) Building floor plans of all levels including roof
   e) Immediate site location building map
   f) Electrical drawings
   g) HVAC drawings. If ductwork involved, need as-built blueprints. Need sizes and scale on a print
   h) In-house applicable SOP's

Space or Room Set-up and Sealing Issues to be Considered

2) How hard does it look to seal the space with plastic, tape or other?
   a) Room to room air transfers or transitions
   b) Lights.
   c) Ceiling tiles.
   d) Access panels
   e) Sprinkler heads
   f) Light switches
   g) Electrical outlets
   h) Conduit penetrations
3) What is the scope of the decontamination? Does the Decontamination cover the interior only or also the perimeter? Shall the following be sealed or left open?
   a) Doors
   b) Pass-throughs
   c) Room to room air transfers or transitions
   d) Windows
   e) Office A/C units
   f) Access panels
   g) Floor waste doors
   h) Floor drain / pipe penetrations
   i) Others
4) Which decontamination perimeter door or pass thru shall be used as a penetration to measure and inject CD?
5) For the rooms to be decontaminated, do the walls run from the floor to the ceiling/deck?
6) Are there false ceilings or spaces above that may not be adequately decontaminated due to type of ceiling (may be a drop ceiling or other)?

7) Is there evidence of condensation on any outside walls or windows? Are any of the exterior walls colds?
8) Are there outside windows that need to be blocked to reduce the amount of daylight entering the area?

HVAC Issues

9) Supply, recirculation, or exhaust fans names and/or numbers to be involved.
10) Are the supply and exhaust air handler for the space on its own system or are they dedicated to the decontamination area?
11) Is there recirculation and what % of recirculation is it, or is it 100% in/out of room air?
12) Where are the shutdown locations of the supply and exhaust air handlers?
13) Is there a way to start the exhaust from the outside of the building?
14) Does the supply and exhaust have gas tight dampers?
15) What is the maximum temperature and humidity control capabilities of the present air handling systems? Can the space be brought up to ~65-70% RH prior to the decontamination?
16) How many rooms require additional recirculation of air?
17) Do the supply and exhaust ductwork need to be decontaminated?
18) Is it necessary to decontaminate the supply ductwork if there is no recirculation of room air?
19) If the ductwork is **NOT** to be decontaminated, where shall the space be sealed?
    a) At supply, return and/or exhaust registers or HEPA's within the space?
    b) At supply, return and/or exhaust registers or HEPA's outside the space?
    c) At the supply, return and/or exhaust dampers?
    d) At the supply, return and/or exhaust fans or air handlers?
20) If the ductwork **IS** to be decontaminated, where shall the space and HVAC be sealed?
21) If the ductwork is to be decontaminated, are the air handlers fixed-speed or can the system be run at lower speeds?
22) If the ductwork is to be decontaminated, are the supply, recirculation HVAC or exhaust fans located outside?

Site Utility Issues

23) Are all electrical outlets or receptacles labeled and are there enough to cover the decontamination?
24) Where is the outlet electrical panel or breaker box? Is it located within the decontamination area?
25) Are there any utilities such as natural gas, other flammable gas or oxygen? They need to be turned off since the exhaust is shutdown, flammable gasses can build up and cause possible hazard.
26) Are there smoke detectors in the space or ductwork? If they are turned off, will a fire watch be required during the process?
27) Are the entrance doors interlocked?

28) How many floor, sink, trough, sump pump area, drain pipes to sump pump or other drains in the decontamination area? Can they or must they be decontaminated? Who will take care of decontaminating and what method of decontamination shall be performed? (*We typically use CD Tab)*

29) All traps shall be full or system shall be in a closed mode (fill or cap):

Internal Decontamination Space Equipment or Items Issues

30) Are there any porous materials within the space such as wood, cardboard, ceiling tiles, dehumidifiers, traps, or anything that can harbor spores, viable or specific contamination?

    All other materials which may harbor spores should be removed by the time of decontamination.

31) What is the overall appearance of the space? Do the floors, counters, cabinets or devices need to be cleaned prior to decontamination?

    (Dirt, rubbish or other materials will inhibit chlorine dioxide penetration as well as react with CD, prior to the decontamination all debris to be removed this includes ductwork associated areas (returns). Must determine who will do this.).

32) Are all items within rooms to be decontaminated? Must all these items pass the BI test? Should some items be sealed from the decontamination process?

    (These items that are to remain are to be stacked or piled in ways that the chlorine dioxide gas will easily penetrate all surfaces. The floor area where these items are stacked may not see the proper concentration of chlorine dioxide and must be addressed by removal or elevation of the stacks off the floor. Determine if counters, benches, etc. need to be elevated. If so, they all shall be elevated with non-porous, non-organic materials.)

33) Are there chemicals, samples, cultures or viable stock in area that would conflict with performing the decontamination?

    If the chemicals, samples, cultures or viable stock are to remain, they must be stored in gas tight containers. ClorDiSys cannot insure the safety of the chemicals, samples, cultures or viable stock. Any loss is not ClorDiSys's responsibility.

34) Is the **equipment** in the rooms to be decontaminated or sealed off?

    Various issues on equipment may need to be addressed as to ensure the equipment receives full RH and chemical contact. (I.e. water in incubators, BSC venting, electronic devices). Must determine if another style decontamination may be more appropriate.

    a) Casework, cabinets - *all drawers and doors must be opened.*

    b) BSC's - *turn on the units and leave running during entire decontamination process unless they are exhausted units.*

    c) Refrigerators - *Must be at ambient temperature at start of decontaminated, need 1 day prior. Open door fully.*

    d) Freezers - *Must be at ambient temperature at start of decontamination, need 1-2 days prior. Open door fully.*

    e) Washers - *Open doors fully.*

    f) Others (warmer, water baths, shakers, tanks, CIP's, computers) - *To be determined.*

g) Elevators - *Need air circulation, so RH & CD will contact this area.*

35) Are there walk-in cold or warm rooms included in the decontamination space? They would need to be shutdown prior to the decontamination to be brought to the ambient temperature.

CD Issues

36) Need to determine the quantity of CD generators for the decontamination.

37) Need to determine the quantity of CD monitoring points for the decontamination.

38) The concentration will need to be determined in mg/l.

39) The CD gas contact time will need to be determined for the level of kill required.

40) Determine how many exhausting points there are for the CD gas.

41) Is chlorine dioxide scrubbing required?

Decontamination Time Sequence

42) Establish time sequence of the entire decontamination procedure if requested.

These times may change due to setup problems, humidity problems, or others. Once the chlorine dioxide generation is initiated the remaining times will be more firmly established.

a) Set-up initiation date and time.

Time for a crew to do the actual sealing, a trial run to see if a predetermined moisture level can be maintained.

b) Verify set-up and possibly perform trial run; date and time. _____

c) Possibly perform trial run; date and time. _____

d) Start date and time of the humidification process. _____

e) End time of the humidification process. _____

f) Start time of the chlorine dioxide generation. _____

g) End time of the chlorine dioxide generation. _____

h) Contact time of the chlorine dioxide _____to _____

i) Start time of the scrubbing (if required). _____

j) End time of the scrubbing (if required). _____

k) Start time of the ventilation. _____

l) End time of the ventilation. _____

m) Reentry time of the decontamination space _____

Safety Issues

43) Who are the emergency contacts and how can they be reached?

44) There should be no personnel animals, plants, others within the area or building at the time of decontamination.

Scheduling conflicts need to be resolved.

a) Security notified.

b) Maintenance notified.

c) Fire personnel notified.

d) Cleaning personnel notified.

e) All others associated with the area.

45) What would be the best time to perform the decontamination? Is it to be performed during the week, weekend, day, or night?

46) Where shall all signage and caution tape be posted inside and outside the building?

a) Interior Locations

b) Exterior Locations

47) What are the acceptable limits of chlorine dioxide outside the building or space during aeration or in the event of leakage, and how shall others be notified?

Value up to .3 ppm (STEL) is the limit immediately adjacent to the decontamination space prior to taking action to abort.

NOTE: CD can be smelled at or below 0.1 ppm.

48) In the event of gross leakage, determine a contingency plan?

49) How close are adjacent areas or building intake vents, what direction is the wind predominantly blowing?

50) When the decontamination is in progress and after it is completed, it must be monitored for chlorine dioxide. Where shall the gas monitoring locations be?

51) At the completion of the decontamination process, must the equipment utilized be quarantined within the decontamination area pending the results of the BI's (biological indicators)?

52) Determine where the sealing materials, tubing, etc. are to be disposed of on the customer's site.

Permit, Training, Access, SOP Issues

53) Are there any special work or safety permits that need to be filled out?

54) Is there site or particular area safety training required prior to entering the area or site?

55) Are there any SOP's that need to be reviewed?

56) What are the gowning procedures (CGMP or PPE) to enter the decontaminated area?

57) Are there any permits required to access the roof, mezzanine, penthouse, or confined areas?

58) Are there issues concerning site access for off hours or weekend hours.

Acceptance / Validation Issues

59) What type of biological indicator (BI's) should be used, *Bacillus atrophaeus or stearothermophilus*?

60) What are the acceptance criteria of the BI's to verify an acceptable decontamination, *3 or 6 log reduction*?

61) Who shall determine BI locations and how many BI's per room or space? HVAC and/or equipment? Equipment locations
    a) Casework, cabinets
    b) BSC's
    c) Refrigerators
    d) Freezers
    e) Washer
    f) Others
    g) Scales
62) Who will incubate, enumerate and record the log reduction of the BI's.
63) At the completion of the decontamination an additional 5-7 days will be required for the BI results.
64) In the event of failure or unacceptable results, can the failed areas be re-decontaminated?
65) Whom shall we communicate on this project?

VIII.A.1.b-2. ATTACHMENT II – Chlorine Dioxide Warning Signage

KEEP OUT

CHLORINE DIOXIDE

IN USE

HAZARDOUS OXIDIZING GAS
AUTHORIZED PERSONNEL ONLY

IN CASE OF EMERGENCY
CALL KEYSTONE AT _____-____-_____

DATE: START _____ END _____

TIME: START _____

VIII.A.1.b-2. ATTACHMENT III – Decontamination Supply Checklist

Yes/No	Equipment	Yes/No	Equipment
	Steam generators		Clean supplies for better tape seal
	Vinegar		Paper towels
	Little Rh /temp monitors		Alcohol
	Fans		Windex
	Sample tubing 1/4		Goo-Gone
	Gas injection tubing 3/8" or ¼"		Foggers
	Electrical extension cords		CD Tab
	Tubing cutter, razor knife,		Trash Bags
	Duct tape		Door stops
	2 ft wide tape		
	Plastic sheeting		CD Check Strips
	Plumbers Putty/Play-Dough		Permanent marker for BI's
	3 Outlet Plugs		BI's
	Cartridges		Flashlight, head lamp
	Generators		
	Regulators		Bladders for pipe plug
	PVDF Tube TEE for Regulator		Pipe plug plate / pipes / pump
	Regulator wrenches		
	Teflon washers		Automated valve damper
	Chlorine Gas cylinders		Switchbox
	Nitrogen gas cylinder		Flexible duct
	CGA 330/660 –nitrogen adapter		Ceiling plate and jack holder
	Spare tubing fittings		
	Under door plates		Run record sheets for CD readings
			Warning Signs
	Regen Blower		Low Level CD Sensor
	Hoses, 1-1/4"		Power Strip
	"Food" Blowers – Blue or Green		Hand truck
	Blower Infeed Hoses		Safety Mask
	Blower exhaust plastic roll		PAPR
			Warning Tape
	Scrubbers		Epoxy
	- Blower for scrubbers		Caulk
	-Check valves for scrubbers		Caulking Gun
	-Hoses for scrubbers		Spray Foam
	-Extension cord for scrubbers		
			Spare Regulator
	EMS		Spare Photometer
	-RH probe for connection to EMS		Spare Pump
	-Valve manifold		Spare Flowmeter
	-Power cord for EMS		Spare Needle Valve

VIII.A.1.b-2. ATTACHMENT IV – Gas Sampling Log Form

Gas Sampling Log Form

Place: _____ **Date:** _____

Time:	Sample Point 1	Sample Point 2	Sample Point 3	Sample Point 4	Sample Point 5	Sample Point 6	Sample Point 7	Sample Point 8	Sample Point 9	Sample Point 10

VIII.A.1.c. Trainings Offered

Provide a list of trainings offered and an outline or a full copy of training on "Biosafety Cabinet Use and Operation".

Training Options

Keystone Certification offers several training options which are designed to meet client needs. Keystone Certifiers often provide training in proper biosafety cabinet operation and use to lab personnel present at the time of certification at no additional cost to our clients. We are pleased to provide this service as Keystone's Certifiers are uniquely qualified and motivated to identify and rectify if possible, conditions that put personnel and processes at risk. It is our desire to be a part of a solutions-oriented team.

Keystone can design a training program to meet client's specific needs, or can offer more general training in the following areas:

Introduction to Biological Safety Cabinets
Biosafety Cabinet Purpose
How Biosafety Cabinets are classified
Choosing the correct type of Biosafety Cabinet for your laboratory
Best Practices
Common mistakes

Proper Biosafety Cabinet Use and Operation
Choosing the right Biosafety Cabinet for your work
Preparing your Biosafety Cabinet for use
Preparing the work zone
Proper Aseptic Technique
What to do after work is completed
Maintenance and Certification

Introduction to Chemical Fume Hoods
Chemical Fume Hood vs. Biosafety Cabinet
Purpose
Safety
ASHRAE 110
Maintenance and Certification

Proper Biosafety Cabinet Use and Operation Syllabus

1. Choosing the correct Biosafety Cabinet for your work
    a. Biosafety Cabinet Purpose

   b. How Biosafety Cabinets are Classified
      i. Class I
      ii. Class II
      iii. Class III
2. Preparing your Biosafety Cabinet for Use
   a. Develop SOP for practices and uses for BSC
      i. Users must receive training on risks associated with product or agents used in the BSC
      ii. Proper PPE
   b. Operate Blower 5-15 minutes prior to work
      i. Disinfect work surfaces and equipment
      ii. U.V. Lamps
   c. Prepare for work by making list
      i. Gather equipment and supplies
      ii. Plan work
      iii. Minimize movement in and out of BSC
3. Preparing the Work Zone
   a. Gather equipment and supplies
      i. Disinfect
      ii. Place in BSC toward rear of work surface
      iii. Wait at least 1 minute before working
4. Proper Aseptic Technique
   a. Proper PPE
   b. Disinfection frequency
   c. Potential for cross contamination
   d. Movement discipline
   e. Distraction
   f. Fatigue
5. After Work is done
   a. Disinfect work surfaces
   b. BSC is not for storage
   c. Use of UV technology
6. Maintenance and Certification
   a. NSF
   b. What is certification
      i. Tests
   c. Decontamination
      i. When is it needed
      ii. Risk assessment
      iii. How is it conducted
7. Summary Statement
8. Q&A

VIII.A.1.d. Bloodborne Pathogens Exposure Control Plan

Provide a copy of the blood borne pathogens exposure control plan.

When performing certification services:

1. All certifiers receive in-house training on sharps prevention and blood borne pathogen exposure control.
2. Wear appropriate PPE at all times when in contact with a biosafety cabinet device.
3. PPE shall include latex/nitrile gloves and clothing to cover the body and skin.
4. Keep face out of the cabinet interior.
5. Perform a visual inspection of all cabinet interior surfaces prior to cleaning –remove all sharps. Wipe interiors of cabinet surfaces slowly, using a 4 layer disposable rag soaked in disinfectant solution.

If you are stuck by a needle or other sharp or get blood in your eyes, nose, mouth, or on broken skin:

1. Immediately flood the exposed area with water and clean any wound with soap and water or a skin disinfectant if available.
2. Report this immediately to your employer.
3. Seek immediate medical attention.

VIII.A.1.e. Hazard Communication Program

Provide a copy of the Hazard Communication Program.

In Compliance with OSHA Standard 1910.1200, Keystone's hazard communication program is designed to ensure that:

- Keystone field personnel and certifiers are trained on hazardous chemicals and conditions in their work areas and on a variety of topics including training on:
    a. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by Keystone during decontamination, using continuous monitoring devices, observing visual appearances or odors of hazardous chemicals when being released, etc.);
    b. The measures employees can take to protect themselves from these hazards, including specific procedures Keystone has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and;
    c. The details of the hazard communication program used by Keystone, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.
- Keystone certifiers receive a medical evaluation for approval to wear a respirator and are fit tested for a P100 or better respirator; they are instructed on how to use, don and doff their pertinent PPE.
- Keystone certifiers understand unique health hazards pertinent to each specific job discussed prior to the initiation of a job, by the job supervisor.

VIII.A.1.f. Other Onsite Safety Plans

Provide copies of other appropriate on-site safety plans.

COVID-19 Policy for all Keystone Personnel at Client Locations

In consideration of the evolving COVID-19 situation, Keystone is refining its approach to managing critical protocols due to the COVID-19 risks in the workplace.

We recognize that critical services such as the certification of biosafety equipment must continue. If an in-person meeting or onsite service is critical (e.g. a certifier needs to come onsite to certify or fix a piece of equipment or provide a service that can be done only in person), then the certifier must obtain prior approval from the designated point of contact prior to arriving onsite.

Most buildings are screening all vendors prior to entry. All Keystone service personnel will submit to screening and only enter designated entrances of all buildings.

Keystone personnel will conduct the following assessment and will not arrive onsite if the answer to any of the following questions is "yes":

- Are you experiencing cold or flu-like symptoms, including fever, coughing, difficulty breathing, sore throat, body aches, chills, or extreme loss of sense of smell or taste?
- Have you been in contact with anyone diagnosed with COVID-19 or suspected of having COVID-19 within the past two weeks?
- Have you recently traveled (and stopped) in any area where an elevated outbreak of COVID-19 has been reported?

In Addition:

All Keystone personnel will be provided a face/procedure mask every day they come to work. The mask must be worn at all times while at work/in the building.

All Keystone personnel will avoid direct, face-to-face contact with clients and maintain a 6-foot distance from others when possible. Keystone personnel will adhere to any safety protocols in place at client locations.

Any change in health or suspected illness will be reported to supervisor at the onset of symptoms.

VIII.A.1.g. Personal Protective Equipment (PPE)

Provide a list of Personal Protective Equipment used for each procedure.

Standard Certifiers Uniform

- Long Sleeve Shirts
- Long Pants
- Leather Shoes
- Hard Toed Shoes/Eye Protection (determined by facility)

Additional Field Certification PPE

- Latex or Nitrile Gauntlet Gloves
- Half-Face N95 Respirator (optional)

Standard Cabinet Entry PPE

- Half-Face or Full-Face respirator with P100 cartridge (supervisor determines specific PPE prior to job)
- Tyvek, or similar, full-body suit
- Double Latex or Nitrile Gauntlet Gloves – inner glove taped to suit

Decontamination PPE

- Full-Face PAPR Respirator with P100 and Organic Vapor cartridge
- Tyvek, or similar, full-body suit
- Double Latex or Nitrile Gauntlet Gloves – inner glove taped to suit
- In some cases, additional isolation barriers are installed around the decontamination area for procedures when existing engineering controls appear insufficient to protect workers or the environment.

VIII.A.1.h. Equipment Used

Provide a list of equipment used.

List of Equipment Used

- ATI Model TDA-2G Photometer
- ATI Model 4B-Lite Aerosol Generator
- Air Compressor (various models)
- TSI Velocicalc plus 9565-P Thermal Anemometer (various configurations)
- Alnor Flow Hood
- Chemical smoke with aspirator bulb
- HHPC-6 particle counter
- Foxboro Miran 103 Vapor Analyzer
- Shortridge Flowmeter ADM-860C
- TEC Services Photometer PH-5, PH-4
- Various other sensors and tools for service and adjustments

VIII.A.1.i. Waste Disposal Methods

Provide a description of waste disposal methods.

Description of Waste Disposal Methods

Waste Disposal Methods vary; below is a list of methods employed by Keystone personnel.

- Non-biohazard waste will be carried off-site by Keystone and disposed of.
- Disposal of biohazard waste materials will be the responsibility of Virginia Tech, unless otherwise directed.
- Biohazards that have been decontaminated will be removed by Keystone.

VIII.A.1.j. SDS Documentation

Provide SDSs for all chemicals used in procedures.

SDS Documents for the following items are attached at the end of this RFP document (in the Attachments section).

1. Air Trace SmokeFluid
2. Ammonium Bicarbonate
3. Ammonium Carbonate
4. ATI PAO-4
5. CHEM-CD Part A
6. CHEM-CD Part B
7. CHEM-CD Part N (Neutralize)
8. Draeger Tubes
9. Instant Ice Pack
10. Isopropyl Alcohol 70%
11. mPerial
12. Paraformaldehyde
13. Petroleum Jelly
14. Silicone Elastomer
15. Smoke Pen and Refill
16. Sulfur Hexafluoride
17. Super Fluid
18. Windex Ammonia-D
19. Windex with Vinegar

VIII.A.1.k. Sample Test Report

Provide a sample test report.

Sample test report is attached at the end of this RFP document (in the Attachments section).

VIII.A.1.l. Database Software

Provide a description of the database software used to maintain records.

Keystone Certification uses Cert-Pro Hoods database software to maintain records of all certification and service work for our Clients. This powerful database tools allows field personnel to generate and complete reports onsite, as well as update administrative files, which ensures quick job/service documentation turnaround for our Clients.

Some benefits of our software include:

- Complete historical tracking for every hood certified or repaired.
- Maintains each client's equipment list, including its location and next certification due date.
- Automatic generation of all certification reports.
- NSF49 compliant certification of Biological Safety Cabinets (BSC).
- Fed Std 209E and ISO14644 Unidirectional Hood Certifications, automatically.
- Generation of hood repair reports to allow simple tracking of the repair history of every hood repair ever performed for each client.
- HEPA filter repair history with patch records and automatic calculation of patch percentages for all Unidirectional hoods and Biological Safety Cabinet (BSC) HEPA filter certification tests.
- Automated collection of test data including air velocities and airborne particle counts.
- Full calculation of all test requirements per NSF49, ISO14644, Fed Std 209E and OSHA. This includes air velocity statistics on fume hoods, Unidirectional hood and BSC's. Calculation of airborne particle count statistics for Biological Safety Cabinets and Unidirectional hoods.
- Certifies Chemical Fume Hoods, Unidirectional Flow Hoods, all types of Biological Safety Cabinets (BSC type A/A2/B1/B2) and specialized exhaust systems such as Ventilated Balance Safety Enclosures, Powder Weigh Hoods and canopy exhaust systems.
- Integrates the ***Cert-Pro BSC Test Spec*** software into this system. This allows simple retrieval of Biological Safety Cabinet (BSC) test specifications for most BSC cabinets.

VIII.A.1.m. Estimated Emergency Response Times

Provide an estimate of the response times to campus and off-site facilities as listed in Attachment E, Off Site Facilities, in case of an emergency.

Estimated Emergency Response Times: Blacksburg and other Off-site facilities

Estimated response times to arrive onsite from time of approval.

- **Virginia Tech, Blacksburg Campus:** 12-36 hours
- **Roanoke:** 12-36 hours
- **Marion DuPont Equine Medical Center:** 12-36 hours
- **Virginia Seafood:** 12-24 hours
- **Tidewater:** 12-24 hours
- **Hampton Roads:** 12-24 hours
- **Eastern Shore:** 12-24 hours

VIII.A.1.n. Electronic Reporting

Describe your firm's ability to provide all certification, decontamination, and repair reports electronically.

We make use of the Microsoft Office suite of tools for appointments and email communication. Emails are typically responded to within 3 hours. We aim to confirm all appointments with campus clients at least one week in advance of onsite arrival and will continue to let EHS know via email when we are scheduling appointments.

All Keystone reports are electronically generated using our certification software, Adobe, Word and Excel programs. Reports are generated and emailed to clients within 5 days of completion of scheduled work. Electronic file names are saved with the following format: "BSC EHS #115952062607 VT-Animal Resources and Care Division 072920.pdf". We also maintain our secure online database, which is currently being upgraded, and on which all reports will be available by end of year 2020.

VIII.A.1.o. Online Report Access

Describe your firm's ability to provide all certification, decontamination, and repair reports electronically.

At Keystone we also offer the added benefit of Online Access to certification and service reports for our clients. Our online document retrieval system allows Clients to access and print or save their documents 24/7/365 using their logon information – available when you need the information.

All field reports should be online accessible within 5 business days of the field service. Training for the online database can be provided at no cost to Virginia Tech and will be conducted via an internet "webinar" if requested.

We are upgrading this service and anticipate its availability by end of year 2020.

VIII.A.1.p. Service Deficiency Rectification Plan

Describe the firm's plan for rectifying any deficiencies in service to campus clients or EHS.

Historically speaking, deficiencies in our services to our clients is very rare. We pride ourselves on customer service and understand that our success as a company largely relies on our good name and reputation. Having said that, we understand occasionally mistakes or miscommunications can happen. It is our desire to remedy these situations as quickly as possible in a well-reasoned manner that is satisfactory to both our clients and our company policies.

In the event that a deficiency in services is self-reported by employees, contact will be made with the client or EHS (as necessary) and the employee will be counseled and retrained as appropriate.

If a deficiency in service is reported by a client or EHS, we ask that this is done in writing via email to the following:

- Russell Pittman, *Certification Manager*
- Stacey Pittman, *Administrative Assistant*
- Clesson "Skeet" Becker, *General Manager*

If the matter is urgent please contact our Certification Manager, Russell Pittman, directly at , or toll free at 866-477-2498.

Keystone will work to address concerns with EHS directly or specific clients as needed.

RFP Section VIII.A.2. Qualifications and experiences of Offeror in providing the services

VIII.A.2.a. Qualifications and Experience of Individuals

Provide a description of the qualifications and experience of the individuals that will participate in fulfilling the obligations of this RFP. Include resumes, and/or supporting information such as curriculum vitae.

Please see the following individual resumes and CVs for personnel who may participate in fulfillment of this contract.

Russell S. Pittman
Controlled Environment Consultant
Certification Manager
Accredited Certifier
CETA NBT RCCP SCP

Current 2020

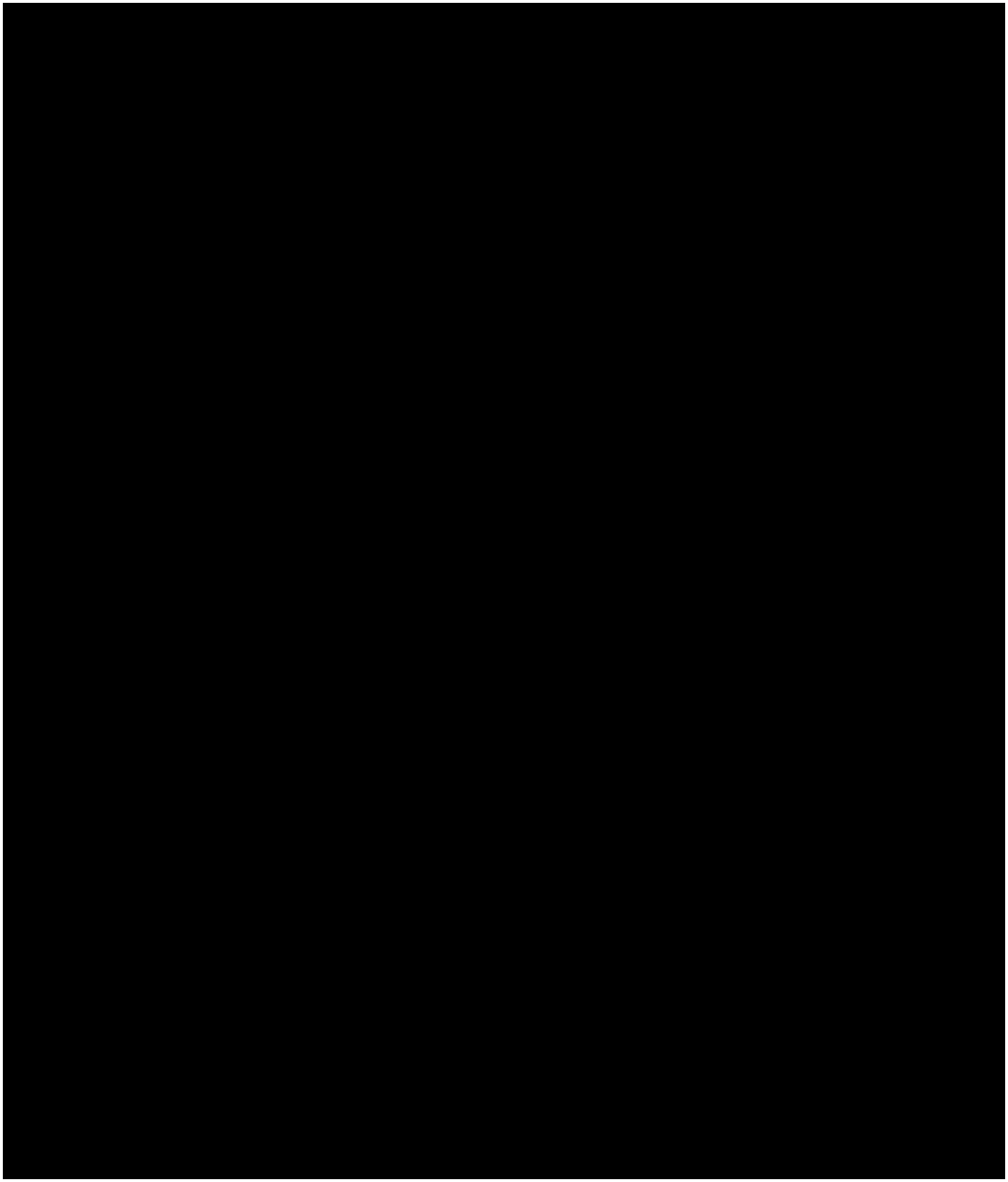
Personal Information

Name: Russell S. Pittman
[redacted]
Citizenship: United States

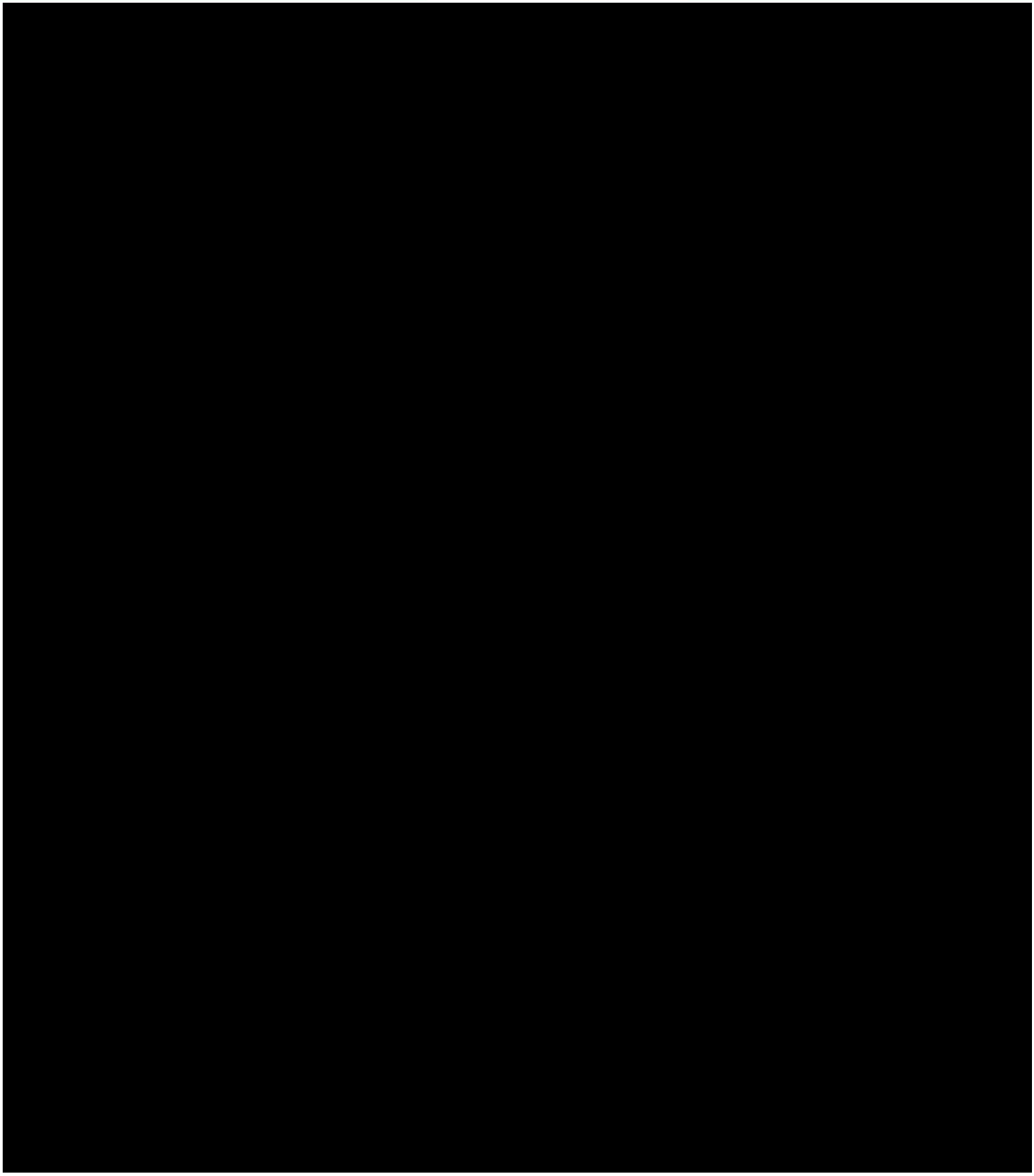
[redacted]
Fax: (757) 962-5634
[redacted]

Professional Services

[redacted]



PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634



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Curriculum Vitae
Eric C. McKee
Principal Keystone Certification

Personal Information

Name: Eric Clayton McKee
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Citizenship: United States
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Fax: (757) 962-5634
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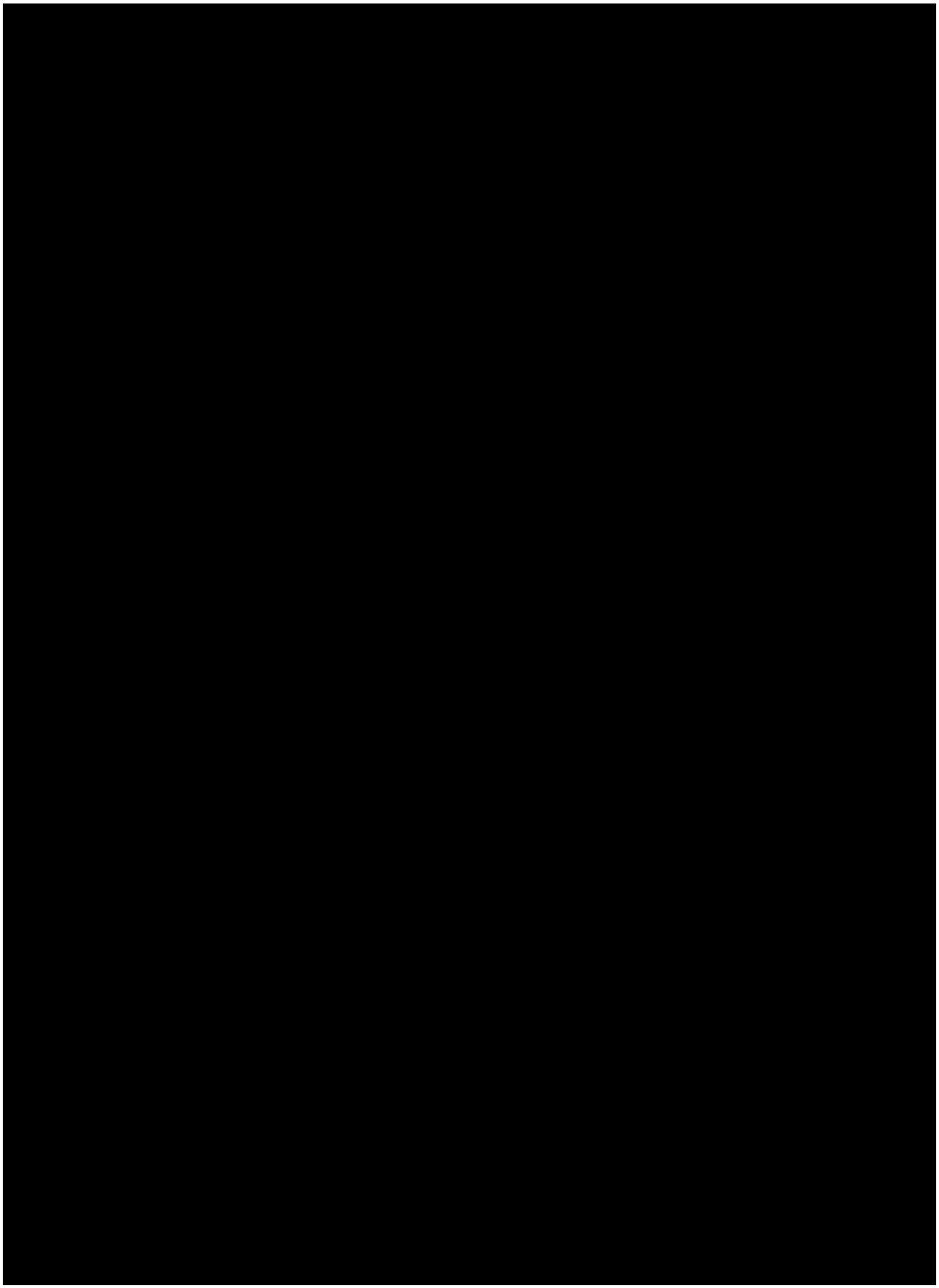
(757) 333-3363 (757) 333-4988 (Fax) 757-962-5634

the McKEE GROUP



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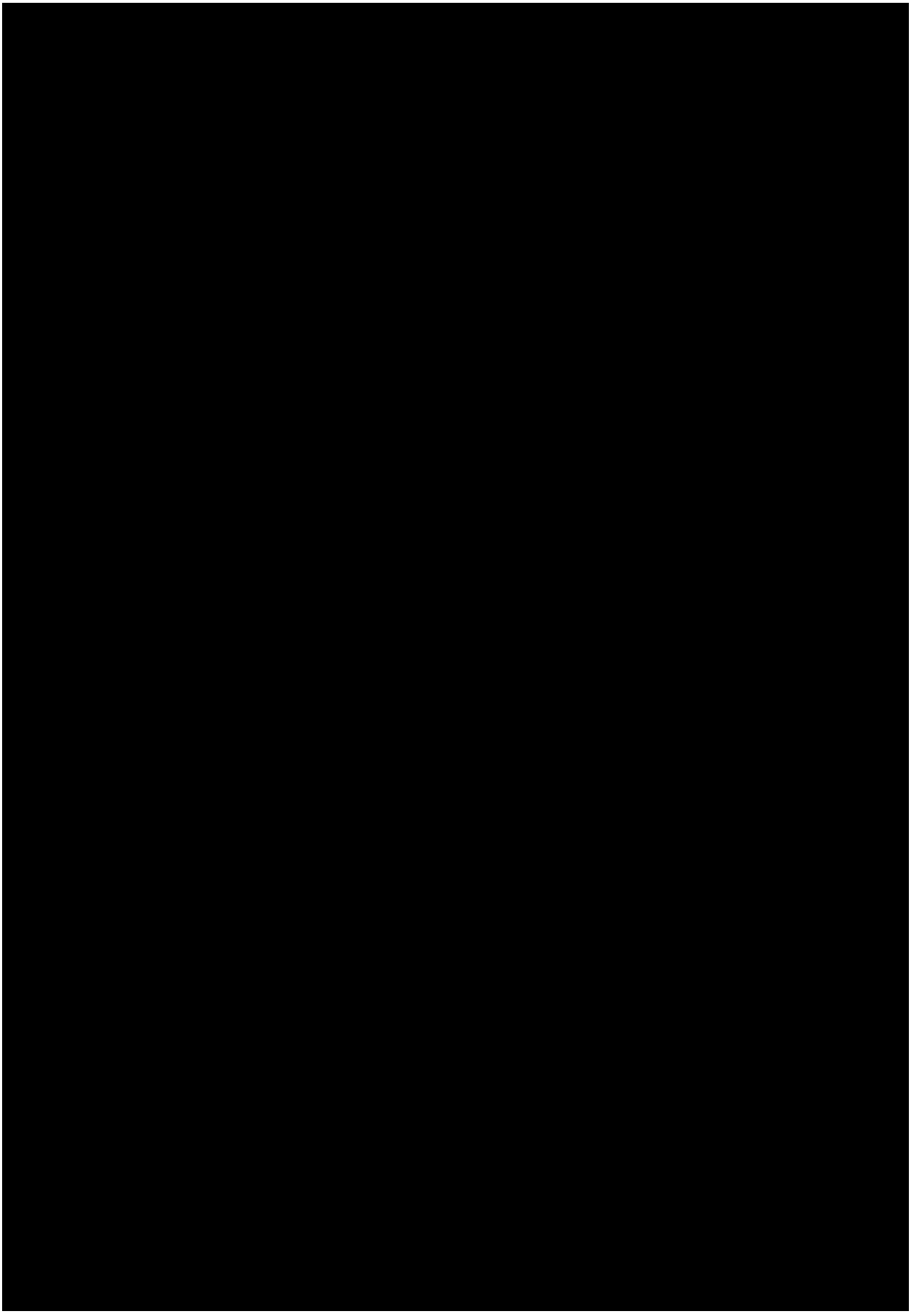

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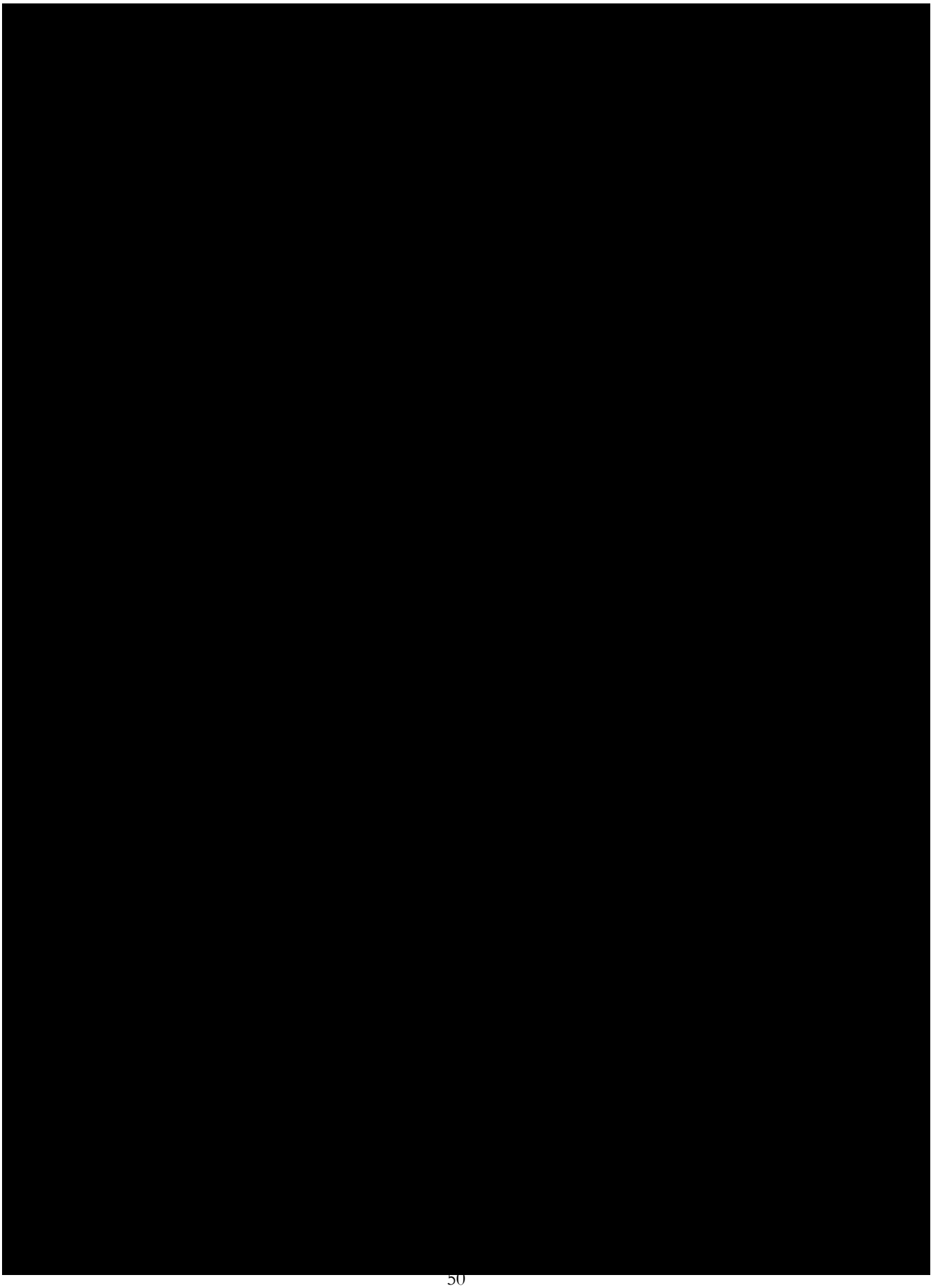
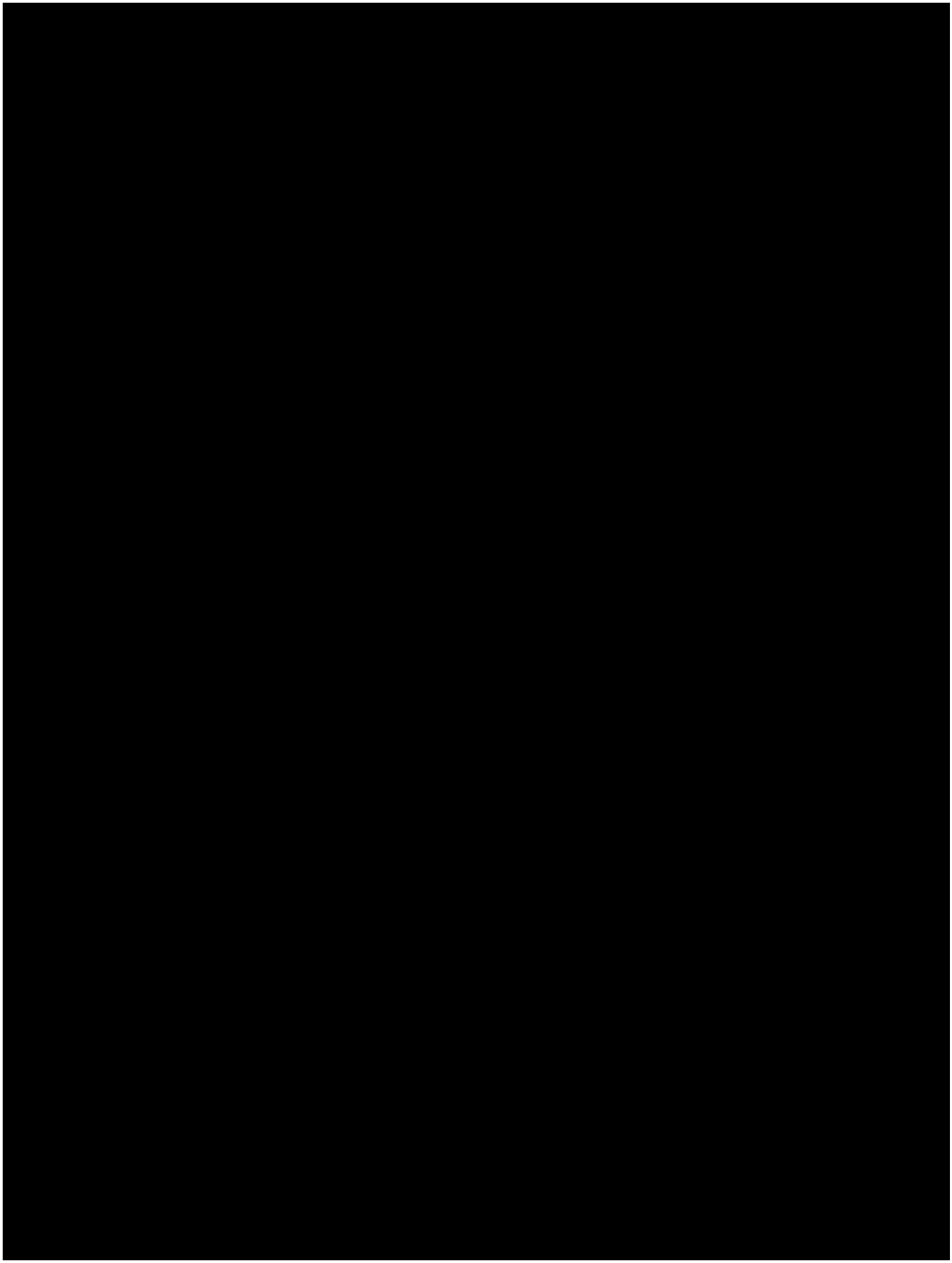


PO Box 61775, Virginia Beach, Virginia 23466
(757) 333-3363 (757) 333-4988 (Fax) 757-962-5634



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PO Box 61775, Virginia Beach, Virginia 23466
(757) 333-3363 (757) 333-4988 (Fax) 757-962-5634

Danny E. Testa, Jr.

NSF Accredited Class II Biosafety Cabinet Field Certifier
Service Manager
Project Supervisor

Current 2020

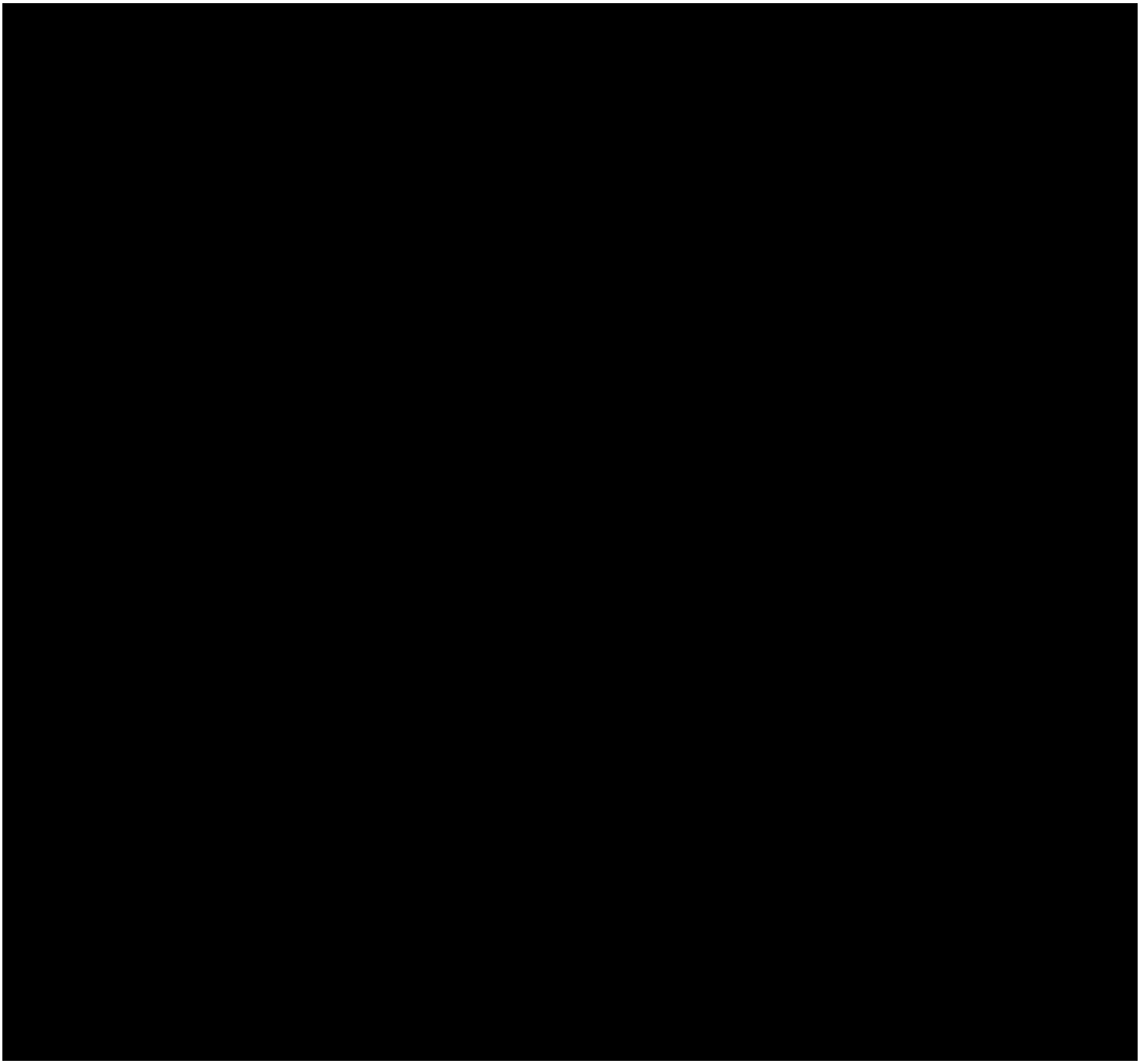
Personal Information

Name: Danny E. Testa, Jr.
[redacted]
Citizenship: United States

[redacted]
Fax: (757) 962-5634
[redacted]

[redacted]

PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634



PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634

Ty W. Turner

Safety Coordinator / ASHRAE 110 Specialist
HAZWOPER, Safety Consultant, HEPA Filtered Air Specialist
Certifier

Current 2020

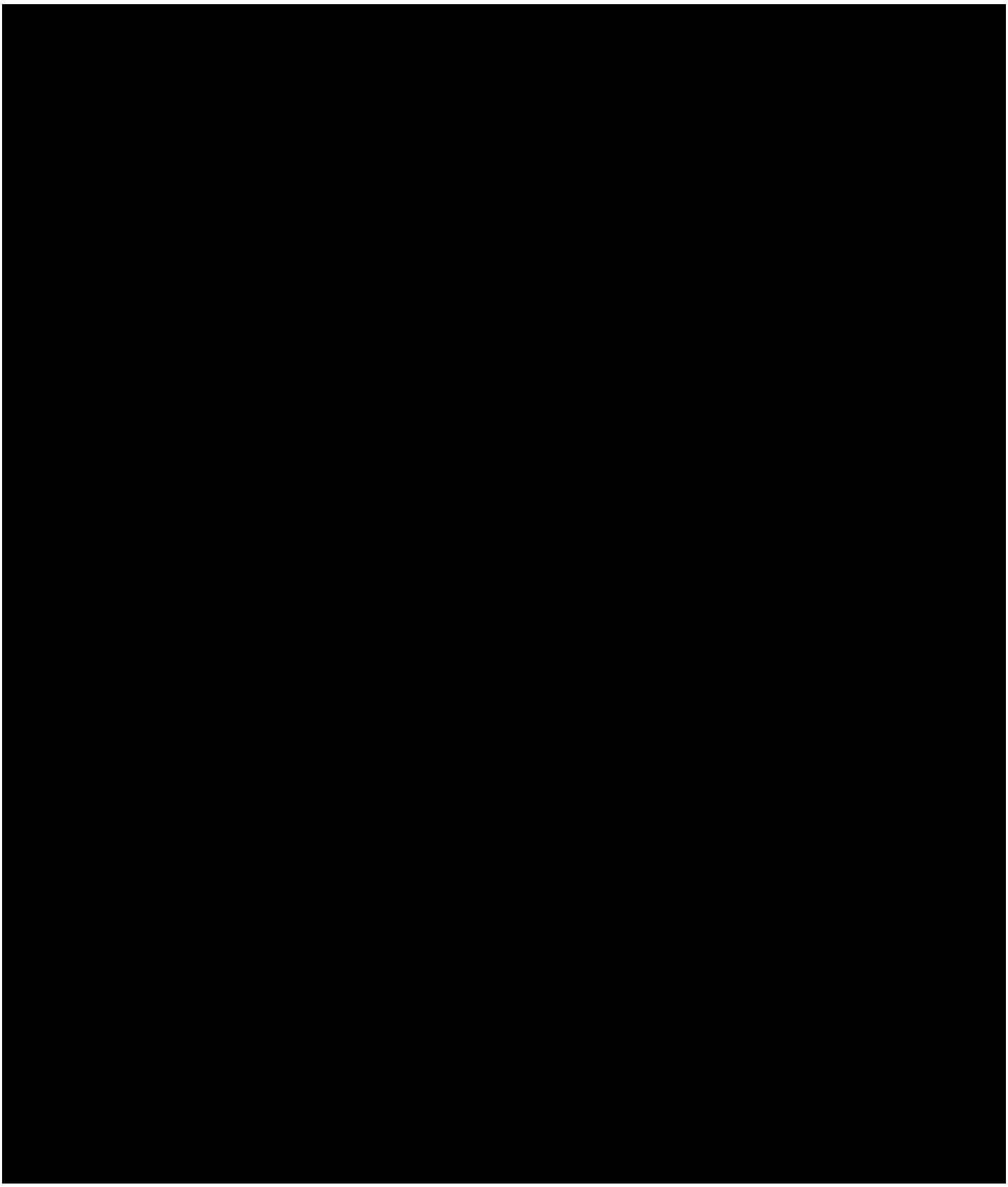
Personal Information

Name: Ty W. Turner
[redacted]
Citizenship: United States

[redacted]
Fax: (757) 962-5634
[redacted]

[redacted]

PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634



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fax 757.962.5634

PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634

Jordan M. Anderson

Controlled Environment Professional
Project Developer
Certifier

Current 2020

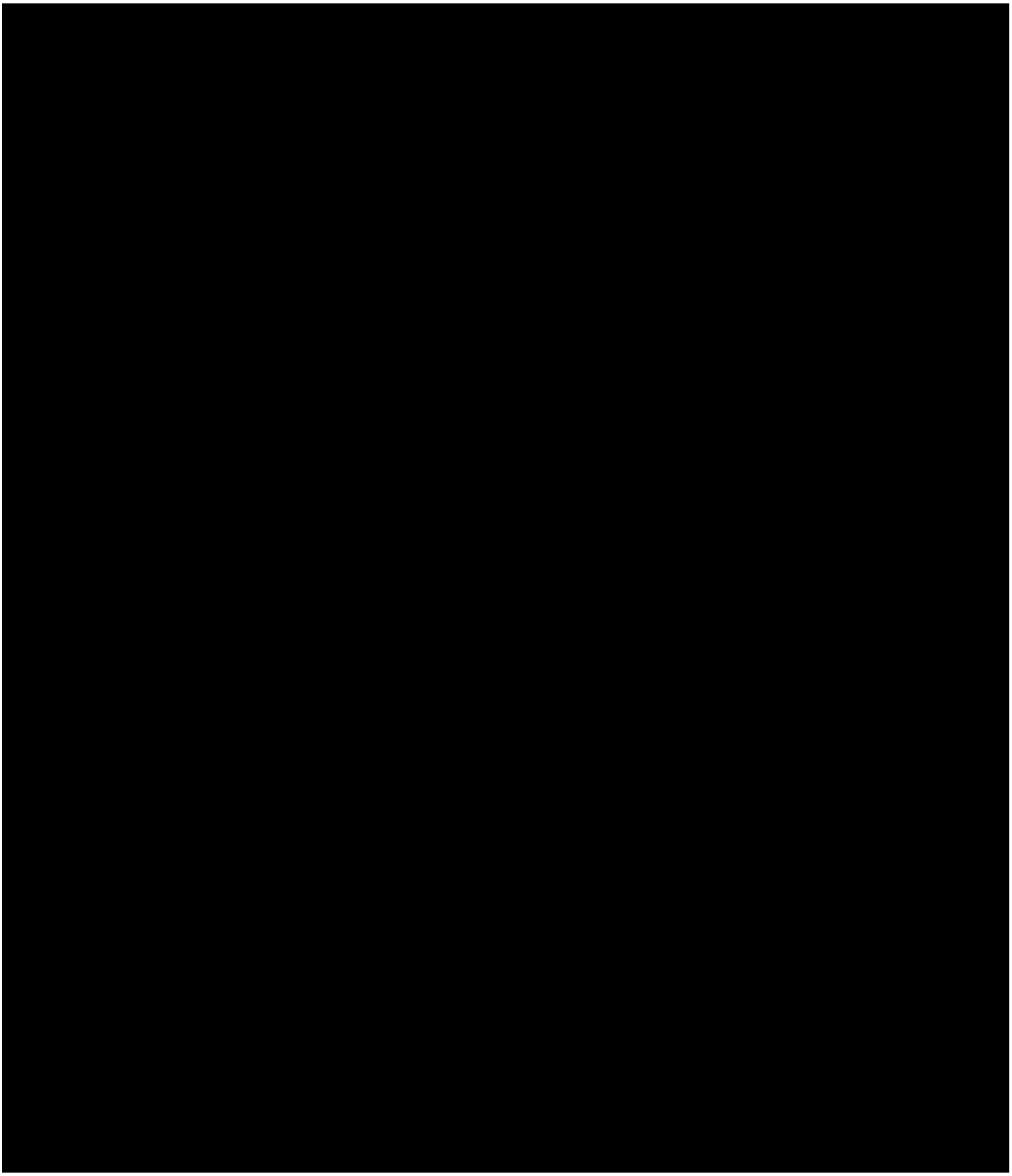
Personal Information

Name: Jordan M. Anderson
[redacted]
Citizenship: United States

[redacted]
Fax: (757) 962-5634
[redacted]

[redacted]

PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634



PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634

Ronald Trower, RBT
Vice President and Managing Partner

Chief Biosafety Consultant to Keystone Certification

PO BOX 61775, Virginia Beach, VA 23466
phone 757.333.3363
toll free 866.477.2498
fax 757.962.5634

VIII.A.2.b. Experience of the firm

Describe the qualifications and experience of the firm in providing the services described herein.

Keystone Certification has been providing professional certification services in laboratory environments since 2003. Today we are one of the largest and most reliable certification companies in the Mid-Atlantic Region. The Keystone Team has over 30 years of experience in the certification and testing industry and maintains a fully staffed administrative office and by EOY 2020 an updated online database always available to our clients. Our lead certifiers are NSF Accredited Class II Biosafety Cabinet Field Certifiers and we are constantly growing and expanding our capabilities; we have worked with major manufacturers in product development. Keystone has worked with the FDA, CDC, NIH, DOD, Navy, Army, Air force, many hospital health systems such as: Carilion, Sentara, and Riverside and major universities such as: Virginia Tech, UVA, Old Dominion, VCU, University of Richmond, EVMS, Hampton University, Norfolk State, NOVA, College of William and Mary, Tidewater Community College, Christopher Newport University, Lord Fairfax Community College, and Radford University.

Keystone Certification has a wide range of professional experience and qualifications that can support our clients' needs and often offer in house solutions even with the most complex issues. Keystone's Team of professionals and consultants hold the following accreditation and memberships:

- NSF Accredited Class II Biosafety Cabinet Field Certifier
- IAFCA Accredited Biosafety Cabinet Certifier
- American Council for Accredited Certification – Board Accredited Certified Indoor Environmental Consultant (CIEC)
- American Council for Accredited Certification – Board Accredited Certified Mold Remediator (CMR)
- American Council for Accredited Certification – Accredited Certified Indoor Environmentalist (CIE)
- Microbiologist – American Society of Clinical Pathologists (M(ASCP))
- Specialist in Public Health and Clinical Microbiology – American Society for Microbiology (SM(ASM))
- Certified Biosafety Professional – American Biological Safety Association
- American Board of Industrial Hygiene, Certified Industrial Hygienist (CIH)
- Board of Certified Safety Professionals, Certified Safety Professional (CSP)
- Controlled Environment Testing Association- CNBT RCCP Sterile Compounding Facilities
- Controlled Environment Testing Association- CNBT Fume Hood ASHRAE 110 Testing

VIII.A.2.c. References

Provide three (3) recent references, for whom you have provided the types of services described herein. Include the date(s) the services were furnished, the client name, address and the name and phone number of the individual Virginia Tech has your permission to contact.

[redacted]

[redacted]

[redacted]

b. [redacted]

[redacted]

[redacted]

RFP Section VIII.A.3. Price

Complete the attached Schedule of Prices, see Attachment F, associated with providing the services described herein. Virginia Tech will reimburse the vendor for any parts at vendor cost. Documentation is required.

Attachment F
Schedule of Prices

Provide the amount that the owner will be billed for each of the services listed below. Pricing must include travel and labor costs. Virginia Tech will reimburse the vendor for any parts at vendor cost. Documentation is required.

Equipment Certification	Price for routine task Blacksburg	Price for emergency response Blacksburg	Price for routine task ARECS	Price for emergency response ARECS	Price for routine task Leesburg	Price for emergency response Leesburg	Price for routine task Roanoke	Price for emergency response Roanoke
Nuaire Model 425-600, Class II-A2 Biosafety Cabinet	$120	$180	$120	$180	$120	$180	$120	$180
Nuaire Model 430-400, Class II-B2 Biosafety Cabinet	$120	$180	$120	$180	$120	$180	$120	$180
Nuaire Model 201630-20 Laminar Flow hood	$90	$135	$90	$135	$90	$135	$90	$135
Esco Model AHS6AZ Laminar Flow hood	$90	$135	$90	$135	$90	$135	$90	$135
Allentown Model 3490000 Animal Transfer Station	$110	$165	$110	$165	$110	$165	$110	$165
Ace Model 3820007 Animal Transfer Station	$110	$165	$110	$165	$110	$165	$110	$165
Thoren animal rack blower/filters: dual (supply and exhaust) HEPA filters ---Price to certify both units/HEPA filters on one animal rack	$90	$135	$90	$135	$90	$135	$90	$135

*(AREC) Agricultural Research and Extension Center

Equipment Certification	**Price for Routine task Blacksburg**	**Price for Emergency Response Blacksburg**	**Price for Routine Task ARECS**	**Price for Emergency Response ARECS**	**Price for Routine Task Leesburg**	**Price for Emergency Response Leesburg**	**Price for Routine Task Roanoke**	**Price for Emergency Response Roanoke**
A - Roof top HEPA filtered BSL-3 room exhaust (Bag in/bag out), Filtration group model BB1020G202F26HIJ10VX, flow of 4000 cubic feet per minute (cfm). It uses an array of two 24 inches by 24 inches by 12 inches 99.97 % HEPA filters and two 24 inches by 24 inches by 2 inches 30% pre-filters. **Pre-filters provided by owner** ---Price to include removal and installation of new HEPA filters and certification	$355 for certification/ labor $650 for decon, certification/ labor	$532.50 for certification/ labor $975 for decon, certification/ labor	$355 for certification/ labor $650 for decon, certification/ labor	$532.50 for certification/ labor $975 for decon, certification/ labor	$355 for certification/ labor $650 for decon, certification/ labor	$532.50 for certification/ labor $975 for decon, certification/ labor	$355 for certification/ labor $650 for decon, certification/ labor	$532.50 for certification/ labor $975 for decon, certification/ labor
B - ABSL-3 room exhaust HEPA filter. Each filter bank is in its own locked mechanical closet. Each filter bank uses one 24 inches by 24 inches by 12 inches 99.97 % HEPA filter and one 24 inches by 24 inches by 2 inch 30% pre-filter. The air exhausts through the filter banks and is blown out on top of the roof through exhaust stacks.	$255 for certification	$382.50 for certification	$255 for certification	$382.50 for certification	$255 for certification	$382.50 for certification	$255 for certification	$382.50 for certification
Differential for multiple units serviced in one trip								
1 additional unit	$5 off add'l unit	$5 off add'l unit	$5 off add'l unit	$5 off add'l unit	$5 off add'l unit	$5 off add'l unit	$5 off add'l unit	$5 off add'l unit
5 additional units	$10 off add'l units	$10 off add'l units	$10 off add'l units	$10 off add'l units	$10 off add'l units	$10 off add'l units	$10 off add'l units	$10 off add'l units
15 additional units	$25 of add'l units	$25 of add'l units	$25 of add'l units	$25 of add'l units	$25 of add'l units	$25 of add'l units	$25 of add'l units	$25 of add'l units

Decontamination of equipment	**Specify type: Formaldehyde (F), VHP (V), ClO2 (C)**	**Price for routine task Blacksburg**	**Price for emergency response Blacksburg**	**Price for routine task ARECS**	**Price for emergency response ARECS**	**Price for routine task Leesburg**	**Price for emergency response Leesburg**	**Price for routine task Roanoke**	**Price for emergency response Roanoke**
Nuaire Model 425-600, Class II-A2 Biosafety Cabinet	C	$550	$825	$550	$825	$550	$825	$550	$825
Allentown Model 3490000 Animal Transfer Station	C	$550	$825	$550	$825	$550	$825	$550	$825
A - Roof top HEPA filtered BSL-3 room exhaust as described above	C	$550	$825	$550	$825	$550	$825	$550	$825
B - ABSL-3 room exhaust HEPA filter as described above	C	$550	$825	$550	$825	$550	$825	$550	$825
Differential for multiple units serviced in one trip									
1 additional unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit	$25 off add'l unit
5 additional units	$50 off add'l units	$50 off add'l units	$50 off add'l units	$50 off add'l units	$50 off add'l units	$50 off add'l units	$50 off add'l units	$50 off add'l units	$50 off add'l units
15 additional units	$100 off add'l units	$100 off add'l units	$100 off add'l units	$100 off add'l units	$100 off add'l units	$100 off add'l units	$100 off add'l units	$100 off add'l units	$100 off add'l units

Decontamination of Rooms	**Specify type: formaldehyde (F), VHP (V), ClO2 (C)**	**Price for routine task Blacksburg**	**Price for emergency response Blacksburg**	**Price for routine task ARECS**	**Price for emergency response ARECS**	**Price for routine task Leesburg**	**Price for emergency response Leesburg**	**Price for routine task Roanoke**	**Price for emergency response Roanoke**
12'X 15 'X 10' (2400 cu.ft.) room	C	$9,800	30% added to routine fee	$9,150/*$9,800* circled area/ *other locations*	30% added to routine fee	$9,800	30% added to routine fee	$9,800	30% added to routine fee
Suite of three rooms. Each room 12' X 20' X 10'	C	$9,800	30% added to routine fee	$9,150/*$9,800* circled area/ *other locations*	30% added to routine fee	$9,800	30% added to routine fee	$9,800	30% added to routine fee
Same suite of three rooms (above) if they are Biosafety Level -3	C	$9,800	30% added to routine fee	$9,150/*$9,800* circled area/ *other locations*	30% added to routine fee	$9,800	30% added to routine fee	$9,800	30% added to routine fee
One very large room: 30' X 70' X 25' (52,000 cu. ft.)	C	$23,700	30% added to routine fee	$21,700/*$23,700* circled area/ *other locations*	30% added to routine fee	$23,700	30% added to routine fee	$23,700	30% added to routine fee
Animal facility: multiple rooms and hallways. (216,000 cu. ft.)	C	$66,450	30% added to routine fee	$62,250/*$66,450* circled area/ *other locations*	30% added to routine fee	$66,450	30% added to routine fee	$66,450	30% added to routine fee
Differential for multiple units services in one trip									
1 additional unit	TBD at time of request.								
5 additional units	TBD at time of request.								
15 additional units	TBD at time of request.								

Labor cost/hour	**Price for routine task**	**Price for emergency response**
Equipment repair and maintenance	$75/manhr	$112.50/manhr
Telephone consultation: cost/1/2 hour	$55/half-hr	$82.50/half-hr
Email consultation: cost/1/2 hour	$55/half-hr	$82.50/half-hr
Educational seminar/training – 2 hour seminar on biosafety cabinet use and operation. Specify cost/location		N/A
Blacksburg	$770	N/A
ARECS	$220 Circled area $550 other areas	N/A
Leesburg	$550	N/A
Roanoke	$770	N/A

RFP Section VIII.A.4. Quality of services offered and suitability for the intended purpose

Describe services offered addressing reliability, responsiveness, competence, courtesy, communication, credibility, security and understanding of customer's needs. Include any example of improved service design and delivery that achieved higher levels of service quality and delivery. Define quality customer service offered addressing efficient, timely and friendly services, building strong relationships with customers, handling complaints quickly, and responding to customer issues timely.

Keystone Certification is pleased to offer its continued professional certification services to Virginia Tech. Keystone places ethics and reliability at the front of all of our professional services. We are a family owned business and our name is very important to us and we place a high importance of providing solutions for our client base. Keystone has a fully staffed office that is responsible for correspondence with our clients and maintaining our secure online database, on which all reports are available.

We keep track of due dates for our clients, and we are proactive in our scheduling. We set aside time every month to cover any of Virginia Tech's needs, should they arise. Keystone has a reputation for making time for our clients. If there is a need, Keystone will provide a solution!

Certification appointments are conducted at the convenience of laboratory personnel and reports will be available within 5 days of appointment on our secured online database. All certifications are conducted or supervised by an NSF Accredited Class II Biosafety Cabinet Field Certifier.

Our lead certifiers are responsible not only for certification project management, but also communicating with and understanding the needs of lab users. If there are special needs or concerns onsite, our certifiers will take care of those items onsite if at all possible or begin a plan of action that will lead to a solution. When lab personnel are present, our certifiers will provide onsite training in regard to biosafety cabinet use and maintenance. Keystone certifiers will also work with equipment manufacturers on our client's behalf to resolve warranty and technical issues.

Keystone works hard to satisfy all of our clients' needs in a friendly, responsible way, however if there is ever an issue with expectations that were not met, our Certification/Client Services Manager will communicate directly with client and courteously resolve the issue. We will make sure that we communicate clearly until our client is satisfied with the results. We are a results-oriented firm.

Keystone has developed a large footprint in the Roanoke/Blacksburg area servicing the Carilion Health system. This relationship and presence in the western part of Virginia means we are more able to quickly take care of Virginia Tech's needs. We are in the Roanoke area monthly and will reliably schedule Virginia Tech's certification and service needs on that basis as needed.

RFP Section VIII.A.5. Quality of Business Practices

Describe your firm's ability to provide modern-day industry standard business practices. Include your firm's ability of timeliness of communications to emails, ability to send e-reports, consistent submission of pre and post work reports, and ability to provide a searchable database for VT equipment certifications.

Keystone has a fully staffed office that is responsible for correspondence with our clients. We meticulously keep track of due dates for our clients, and we are proactive in our scheduling. We make use of the Microsoft Office suite of tools for appointments and email communication. Emails are typically responded to within 3 hours. We aim to confirm all appointments with campus clients at least one week in advance of onsite arrival and will continue to let EHS know via email when we are scheduling appointments.

Our reports are electronically generated using our certification software, Adobe, Word, and Excel programs. Reports are generated and emailed to clients within 5 days of completion of scheduled work. Electronic file names are saved with the following format: "BSC EHS #115952062607 VT-Animal Resources and Care Division 072920.pdf". We also maintain our secure online database, which is currently being upgraded, and on which all reports will be available by end of year 2020.

We set aside time every month to cover any of Virginia Tech's certification or service needs and schedule all appointments prior to arriving onsite. Occasionally we are asked to add services while onsite and if requested we will adhere to clients requests as we are able. Keystone will send a summary to EHS via email by the last Thursday of every month of all services provided for VT clients during that calendar month.

RFP Section VIII.A.6. Participation of SWAM Business

If your business cannot be classified as SWaM, describe your plan for utilizing SWaM subcontractors if awarded a contract. Describe your ability to provide reporting on SWaM subcontracting spend when requested. If your firm or any business that you plan to subcontract with can be classified as SWaM, but has not been certified by the Virginia Department of Small Business and Supplier Diversity (SBSD), it is expected that the certification process will be initiated no later than the time of the award. If your firm is currently certified, you agree to maintain your certification for the life of the contract. For assistance with SWaM certification, visit the SBSD website at http://www.sbsd.virginia.gov/.

IAM Enterprising Corp., dba KEYSTONE CERTIFICATION, is a SWAM certified Small- / Micro-Business in Virginia, SWAM Certification Number [redacted].

RFP Section VIII.A.7 General Information Form and Addenda

The return of the General Information Form and addenda, if any, signed and filled out as required.

RFP 0061452
GENERAL INFORMATION FORM

QUESTIONS: All inquiries for information regarding this solicitation should be directed to: Levi Henry, Phone: (540) 231-7852 e-mail: lhenry29@vt.edu

DUE DATE: Proposals will be received until 10/15/2020 at 3:00 PM. Failure to submit proposals to the correct location by the designated date and hour will result in disqualification.

PROPOSAL SUBMISSION:
Bids or Proposals may NOT be hand deliver to the Procurement Office.

Due to the COVID-19 Emergency Declaration, Virginia Tech will be accepting electronic submission of proposals. All submissions should be submitted to procurement@vt.edu with the RFP number, due date, and time in the subject line of the email.

Virginia Tech will not confirm receipt of proposals. It is the responsibility of the proposers to make sure their proposal is delivered on time. Delivery Confirmation functionality is recommended from the proposer's email system.

Attachments must not exceed 25MB to avoid delivery issues thru email servers.

TYPE OF BUSINESS: (Please check all applicable classifications). If your classification is certified by the Virginia Department of Small Business and Supplier Diversity (SBSD), provide your certification number: [redacted]. For assistance with SWaM certification, visit the SBSD website at http://sbsd.virginia.gov/ .

____ **Large**

_X_ **Small business** – An independently owned and operated business which, together with affiliates, has 250 or fewer employees or average annual gross receipts of $10 million or less averaged over the previous three years. Commonwealth of Virginia Department of Small Business and Supplier Diversity (SBSD) certified women-owned and minority-owned business shall also be considered small business when they have received SBSD small business certification.

____ **Women-owned business** – A business concern that is at least 51% owned by one or more women who are U. S. citizens or legal resident aliens, or in the case of a corporation, partnership, or limited liability company or other entity, at least 51% of the equity ownership interest is owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with the United States immigration law, and both the management and daily business operations are controlled by one or more women who are U. S. citizens or legal resident aliens.

____ **Minority-owned business** – A business concern that is at least 51% owned by one or more minority individuals (see Section 2.2-1401, Code of Virginia) or in the case of a corporation, partnership, or limited liability company or other entity, at least 51% of the equity ownership interest in the corporation, partnership, or limited liability company or other entity is owned by one or more minority individuals and both the management and daily business operations are controlled by one or more minority individuals.

COMPANY INFORMATION/SIGNATURE: In compliance with this Request For Proposal and to all the conditions imposed therein and hereby incorporated by reference, the undersigned offers and agrees to furnish the goods or services in accordance with the attached signed proposal and as mutually agreed upon by subsequent negotiation.

<table>
<tr><td colspan="2">FULL LEGAL NAME (PRINT)
(Company name as it appears with your Federal Taxpayer Number)

IAM Enterprising Corp.</td><td colspan="2">FEDERAL TAXPAYER NUMBER (ID#)

[redacted]</td></tr>
<tr><td colspan="2">BUSINESS NAME/DBA NAME/TA NAME
(If different than the Full Legal Name)

Keystone Certification</td><td colspan="2">BILLING NAME
(Company name as it appears on your invoice)

Keystone Certification</td></tr>
<tr><td colspan="2">PURCHASE ORDER ADDRESS

P.O. Box 16461, Chesapeake, VA 23328-6461</td><td colspan="2">PAYMENT ADDRESS

P.O. Box 16461, Chesapeake, VA 23328-6461</td></tr>
<tr><td colspan="3">CONTACT NAME/TITLE (PRINT)

Wendy McKee / President</td><td>E-MAIL ADDRESS

Info@KeystoneCT.com</td></tr>
<tr><td>TELEPHONE NUMBER

757-333-4988</td><td>TOLL FREE TELEPHONE NUMBER

866-477-2498</td><td>FAX NUMBER TO RECEIVE E-PROCUREMENT ORDERS
757-962-5634</td><td></td></tr>
</table>

I acknowledge that I have received the following addendums posted for this solicitation.

1 _____ 2 _____ 3 _____ 4 _____ 5_____ 6_____ (Please check all that apply)

Is any member of the firm an employee of the Commonwealth of Virginia who has a personal interest in this contract pursuant to the Code of Virginia, 2.2 – 3102 - 3112

YES_____ NO_X_____

SIGNATURE _____ Date: _9/28/2020_____

03/17/2020

RFP ATTACHMENTS

Applicable attachments and additional information.

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1. VIII.A.1.k. Example Certification Test Report
2. VII.A.1.j. SDS Documentation
3. Additional Material: Keystone Certification Certificate of Insurance
4. Additional Material: McKee Environmental, Inc. Services Brochure

Certification Report Biological Safety Cabinet

SAMPLE

Equipment No : 15259
Equipment ID :
Manufacturer : Thermo Scientific Forma
Model Number : 1286
Serial Number: 15259
Tested By: Russell Pittman

Work Order No: 5698
Report No: 21943
Bldg Location:
Room Location: Lab
Test Date: 6/21/2016

HEPA Filter Leak Test:

A HEPA filter leak test was performed to ensure filter integrity. The entire filter face and seals were scanned using an aerosol photometer and an aerosol challenge. The filter is scanned at a rate of not more than 10 lineal feet per minute. The HEPA filter leak test results are reported below.

Supply Filter Penetration	0.0000%	Allowable Limits	0.0100%	PASS
Exhaust Filter Penetration	0.0000%	Allowable Limits	0.0100%	PASS
Upstream Concentration	10.3 ug/l Supply	10.3 ug/l Exhaust		

Downflow Air Velocity Profile:

The supply HEPA filter velocity is measured using a thermal anemometer. The air velocity is measured on a grid and distance, as specified by the manufacturer. The manufacturer of this cabinet specifies the average downflow HEPA filter air velocity must be within the requirements specified in the acceptance criteria listed below. The air velocity test results are reported below.

Average Velocity	77 fpm	Allowable Limits	71 To 81 fpm	PASS
Velocity Variation:	3 %	Allowable Limits	25% or 16 fpm	PASS
Motor Speed Control Setting:	%	(No Adjustment)	_	
Min/Max Readings	75/77 fpm			

Faceshield Inflow Test:

In order to ensure operator safety, airflow at the work area opening must flow into the cabinet in a uniform manner, at a velocity range specified by the manufacturer. The air velocity acceptance criteria and the test results are reported below.

Inflow Air Velocity	110 fpm	Allowable Limits	105 To 115 fpm	PASS

Downflow Smoke Test:

Small volume smoke was passed from one end of the cabinet to the other, along the centerline of the work surface, at a height of 4 in (10 cm) above the top of the access opening.

Smoke Pattern Downflow Test	PASS	View Screen Retention Test	PASS
Work Opening Edge Retention Test	PASS	Sash/Window Seal Test	PASS
Inflow Monitor Test	N/A	Sash Position Alarm Test	N/A

Airborne Particle Count Test:

Airborne particle count measurements were made within the cabinet work area to verify the cleanliness of the cabinet. The location of each sampling point was equally spaced across the work surface at 5 inches above the work surface. The results of the particle count test and acceptance criteria is listed below:

0.50um High Average	0	Allowable Limits	≤ 100	PASS
0.50um Overall Average	0	Allowable Limits	≤ 100	PASS
0.50um 95% UCL	0	Allowable Limits	≤ 100	PASS

Particle Counts Listed are reported as Particles Per Cubic Foot

Overall Test Results

All test procedures and results are based on the following test standard(s) : NSF49 and Mfg Specs.
The final result of this test is PASS. The next certification for this equipment is due December 2016.

Biosafety Cabinet was tested under dynamic operating conditions. We hereby certify that the test results contained within this report were true and accurate at the time of the tests.

Keystone Certification
PO Box 16461, Chesapeake, VA 23328

Certification Report Biological Safety Cabinet

SAMPLE

Equipment No : 15259
Equipment ID :
Manufacturer : Thermo Scientific Forma
Model Number : 1286
Serial Number: 15259
Tested By: Russell Pittman

Work Order No: 5698
Report No: 21943
Bldg Location:
Room Location: Lab
Test Date: 6/21/2012

Uniform Downflow Air Velocity Test

Downflow Dimensions (W x H) : 67 x 21 (9.77 sq. ft.)

Samples Req'd: 33 (3 Rows Of 11)

	1	2	3	4	5	6	7	8	9	10	11	12
1	75	75	75	75	75	75	77	77	77	77	77	
2	77	77	77	77	77	77	77	77	77	77	77	
3	77	77	77	77	77	77	77	77	77	77	77	
4												

Average Velocity	77 fpm	Allowable Limits 71 To 81 fpm	PASS
Velocity Variation:	3 %	Allowable Limits 25% or 16 fpm	PASS
Motor Speed Control Setting:	%	(No Adjustment)	
Min/Max Readings	75/77 fpm		

Inflow Velocity Test

Faceshield Inflow Dim (WxH) 72.69 X 10.00 5.05

Readings below are inflow exhaust, with Downflow Blower On

1	2	3	4	5
555	555	555	555	555

Inflow Air Velocity	110 fpm	Allowable Limits 105 To 115 fpm	PASS

HEPA Filter Leak Test

Supply Filter Penetration	0.0000%	Allowable Limits 0.0100%	PASS
Exhaust Filter Penetration	0.0000%	Allowable Limits 0.0100%	PASS
Upstream Concentration	10.3 ug/l Supply	10.3 ug/l Exhaust	

Smoke Test

Smoke Pattern Downflow Test	PASS	View Screen Retention Test	PASS
Work Opening Edge Retention Test	PASS	Sash/Window Seal Test	PASS
Inflow Monitor Test	N/A	Sash Position Alarm Test	N/A

Airborne Particle Count Test

	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0									
2												
3												
Avg	0	0	0									

0.50um High Average	0	Allowable Limits	≤ 100	PASS
0.50um Overall Average	0	Allowable Limits	≤ 100	PASS
0.50um 95% UCL	0	Allowable Limits	≤ 100	PASS

Particle Counts Listed are reported as Particles Per Cubic Foot

Overall Test Results

All test procedures and results are based on the following test standard(s) : NSF49 and Mfg Specs.
The final result of this test is PASS. The next certification for this equipment is due December 2016.

Keystone Certification
PO Box 16461, Chesapeake, VA 23328

Appendix D2 Air Trace Smoke Fluid

Appendix D2 - Health and Safety Data

Smoke Simulant Fluid - Air Trace Smoke Fluid

1. Identification of the substance/mixture and of the company/undertaking

Product identifier	
Trade Name:	Air Trace Smoke Fluid
Article Number:	Not Available
Application of substance / preparation:	Airflow tracing
Details of supplier of safety data sheet:	
	Concept Engineering Ltd, 7 Woodlands Business Park, Maidenhead, Berkshire, SL6 3UA, UK
Tel:	01628 825 555
Email:	info@conceptsmoke.com

2. Hazards Identification

Not a hazardous substance according to Regulation (EC) no 127212008
This substance is not classified as dangerous according to Directive 67/548/EEC Not generally regarded as hazardous in normal conditions of handling and use.
This product does not need to be labelled in accordance with EC directives or respective national laws

3. Composition/information on ingredients

CAS	Description	%
57-55-6	USP propane giycol-1,2-diol	≤50.0%
56-81-5	USP glycerol	<10.0%
7732-18-5	Water, distilled, conductivity or of similar purity	≥40.0%

4. First aid measures

- **After Inhalation**: Supply fresh air; consult doctor in case of complaints* (Refer to section 8 – In concentrations associated with visualisation for durations <10min, no respiratory / eye protection required).
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly. If skin irritation continues, consult a doctor.
- **After eye contact**: Rinse opened eyed for several minutes under running water
- **After swallowing**: If symptoms persist consult doctor

5. Firefighting measures

- **Suitable extinguishing agents**: Use firefighting measures that suit the environment.
- **Special hazards arising from the substance or mixture**: No further relevant information available.
- **Protective equipment**: Mouth respiratory protective device.

6. Accidental release measures

- **Personal precautions protective equipment & emergency procedures**: Mount respiratory protective device.
- **Environmental precautions:** Dilute with plenty of water. Do not allow to enter sewers/surface or ground water
- **Methods and material for containment and cleaning up**: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

7. Handling and storage

Handling:

- **Precautions for safe handling**: keep receptacles tightly sealed.
- **Information about protection against explosions and fires:** Keep Ignition sources away – Do not smoke

Storage:

- **Requirements to be met by storerooms and receptacles**: Store in a cool location.
- **Information about storage in one common storage facility**:
  Store away from foodstuffs
  Store away from flammable substances
- **Further Information about storage conditions**: Keep receptacle tightly sealed

8. Exposure controls/personal protection

Exposure Limits: CAS 57-55-6/56-81-5	10 mg.m³ 8h TWA Type: OES
Monitoring Method:	As mist
Protective Measures Respiratory protection	Unlikely to be required in normal use - see below
Hand:	Gloves
Eye:	Goggles
Skin:	Overall and boots
Hygiene Measures:	Always wash thoroughly after handling chemical

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non toxic. Independent health and safety reports (available on request) indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time.

In the concentrations typically required for Air Trace applications, no respiratory protection would be required, although we do recommend in general terms that those suffering from asthma or with a severe respiratory condition should not be subjected to artifical smoke / fog from any device.

9. Physical and chemical properties

• General Information	
• Appearance:	
Form:	Liquid
Color:	Transparent
Odour:	Odourless
Odour threshold:	Not available
• pH-value:	Not available
• Change In condition	
Melting point/Melting range:	Not available
Freezing point:	Not available
Boiling point/Boiling range:	Not available
• Flash point:	Not available
• Flammability {solid gaseous):	Not available
• Auto-Ignition temperature:	Not available
• Decomposition temperature:	Not available
• Explosion limits:	
Lower:	Not available
Upper:	Not available
• Vapour pressure:	Not available
• Density:	Not available
Relative density	Not available
Vapour density	Not available
Evaporation rate	Not available
• Solubility In / miscibility with water	Not available
• Partition coefficient (n-octanol/water)	Not available
• Viscosy	
Dynamic:	Not available
Kinematic:	Not available

10. Stability and reactivity

- **Reactivity**: No decomposition if used according to specification.
- **Chemical stability**: Stable under recommended storage conditions.
- **Possibility of hazardous reactions**: No dangerous reactions known.
- **Conditions to avoid**: No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11.Toxicological information

Acute toxicity:
LD/LC50 values that are relevant for classification:
57-55-6 USP propane glycol-1,2-dlol

Oral	LD50	20000 mg/kg (rat)
Dermal	LD50	20800 mg/kg (rabbit)

56-81-5 USP glycerol

Oral	LD50	4090 mg/kg (mouse) 12600 mglkg (rat)
Dermal	LD50	>10000 mg/kg (rabbit)

Primary Irritant effect:

- On the skin: Irritating effect possible
- One the eye: Irritating effect possible
- Sensitization: Sensitization possible through skin contact
- Additional toxicological information:

The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specification, the product does not have any harmful effects according to our experience and the information provided to us.

Carcinogenic categories

- IARC (International Agency for Research on Cancer)
  None of the ingredients is listed

- NTP (National Toxicology Program) None of the ingredients is listed

12. Ecological information

Toxicity

- Aquatic toxicity: No further relevant Information available
- Persistence and degradability: No further relevant information available
- Bio-accumulative potential: No further relevant information available
- Mobility In soil: No further relevant information available

- General notes:Water hazard class 1 (self-assessment): slightly hazardous for water
  Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

13. Disposal considerations

Waste treatment methods

- Recommendation: Smaller quantities can be disposed of with household waste.
  Uncleaned packages:
- Recommendation: Disposal must be made according to official regulations.
- Recommend cleansing agent: Water, if necessary with cleansing agents.

14. Transportation information

Non hazardous for shipping / transportation

- UN-Number
- DOT,IMDG, IATA Not applicable
- UN proper shipping name
- DOT,IMDG,IATA Not applicable
- Transport hazard class(es)
- DOT, IMDG,IATA
- Class Not applicable
- Packing Group
- DOT,IMDG,IATA Not applicable
- Environmental hazards:
- Marine pollutant: No
- Special precautions for user Not applicable
- EMS Number: Not applicable Trade name: Concept Air Trace (fog machine for flow visualisation)

- Transport In bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable

15. Regulatory Information

Supply label details:	CPL
Label name:	Air Trace Smoke Fluid
Symbol:	No risk or safety phrases stiupulated
Risk phrases:	No risk or safety phrases stiupulated
Safety phrases:	No risk or safety phrases stiupulated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

16. Other Information

Further details may be available upon request from Concept Engineering Ltd

Legal Disclaimer The above information is based on the present state of our knowledge of the product at the time of publication. It is given in good faith, no warranty is implied with respect to this information

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 *Reviewed on 10/02/2017*

1 Identification

· **Product identifier**

· **Trade name: Ammonium Bicarbonate, Reagent Grade**

· **Article number:** A4333
· **CAS Number:**
1066-33-7
· **EC number:**
213-911-5

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Aqua Solutions, Inc.
6913 Highway 225
DEER PARK, TX 77536
USA
800-256-2586

· **Information department:**
Technical Coordinator
Sherman Nelson sherman@aquasolutions.org
· **Emergency telephone number:**
Chemtrec: 800-424-9300
Canutec: 613-996-6666

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS06 Skull and crossbones

Acute Tox. 3 H301 Toxic if swallowed.

· **Label elements**
· **GHS label elements** The substance is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS06

· **Signal word** Danger
· **Hazard statements**
Toxic if swallowed.
· **Precautionary statements**
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
Specific treatment (see on this label).
Rinse mouth.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

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Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

Trade name: Ammonium Bicarbonate, Reagent Grade

(Contd. of page 1)

· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 2
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 2
Fire = 1
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
1066-33-7 Ammonium Bicarbonate
· **Identification number(s)**
· **EC number:** 213-911-5

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Do not induce vomiting; immediately call for medical help.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** No special measures required.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

Trade name: Ammonium Bicarbonate, Reagent Grade

(Contd. of page 2)

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Not required.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**
· **PAC-1:** 4.7 mg/m3
· **PAC-2:** 52 mg/m3
· **PAC-3:** 310 mg/m3

7 Handling and storage

· **Handling:**
· **Precautions for safe handling** Thorough dedusting.
· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Keep receptacle tightly sealed.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
· **Breathing equipment:** Not required.
· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

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Safety Data Sheet
acc. to OSHA HCS

Trade name: Ammonium Bicarbonate, Reagent Grade

(Contd. of page 3)

· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:** Not required.
· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Color:	White
· **Odor:**	Ammonia-like
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto igniting:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	0.96 g/cm³ (8.011 lbs/gal)
· **Bulk density at 20 °C (68 °F):**	600 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water at 20 °C (68 °F):	176 g/l
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Other information**	No further relevant information available.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Ammonium Bicarbonate, Reagent Grade

(Contd. of page 4)

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
Oral	LD50	100 mg/kg (ATE)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**

· **Carcinogenic categories**
· **IARC (International Agency for Research on Cancer)** Substance is not listed.
· **NTP (National Toxicology Program)** Substance is not listed.
· **OSHA-Ca (Occupational Safety & Health Administration)** Substance is not listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

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Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

Trade name: Ammonium Bicarbonate, Reagent Grade

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· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, ADN, IMDG, IATA**	Not regulated
· **UN proper shipping name**	
· **DOT, ADN, IMDG, IATA**	Not regulated
· **Transport hazard class(es)**	
· **DOT, ADN, IMDG, IATA**	
· **Class**	Not regulated
· **Packing group**	
· **DOT, IMDG, IATA**	Not regulated
· **Environmental hazards:**	
· **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Hazardous substance:**	5000 lbs, 2270 kg
· **UN "Model Regulation":**	Not regulated

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**
· **Section 355 (extremely hazardous substances):** Substance is not listed.
· **Section 313 (Specific toxic chemical listings):** Substance is not listed.
· **TSCA (Toxic Substances Control Act):** Substance is listed.
· **Proposition 65**
· **Chemicals known to cause cancer:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
· **Chemicals known to cause developmental toxicity:** Substance is not listed.

· **Carcinogenic categories**
· **EPA (Environmental Protection Agency)** Substance is not listed.
· **TLV (Threshold Limit Value established by ACGIH)** Substance is not listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
· **GHS label elements** The substance is classified and labeled according to the Globally Harmonized System (GHS).

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Safety Data Sheet
acc. to OSHA HCS

Trade name: Ammonium Bicarbonate, Reagent Grade

(Contd. of page 6)

· **Hazard pictograms**

GHS06

· **Signal word** Danger
· **Hazard statements**
Toxic if swallowed.
· **Precautionary statements**
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
Specific treatment (see on this label).
Rinse mouth.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** Environment protection department.
· **Contact:**
· **Date of preparation / last revision**
10-02-2017: review SDS for accuracy. STN
Creation date for SDS 02-27-2014. STN
10/02/2017 / -
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Tox. 3: Acute toxicity – Category 3

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

1 Identification

· **Product identifier**

· **Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump**

· **Article number:** A4426
· **CAS Number:**
506-87-6
· **EC number:**
208-058-0

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Aqua Solutions, Inc.
6913 Highway 225
DEER PARK, TX 77536
USA
800-256-2586

· **Information department:**
Technical Coordinator
Sherman Nelson sherman@aquasolutions.org
· **Emergency telephone number:**
Chemtrec: 800-424-9300
Canutec: 613-996-6666

2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified according to the Globally Harmonized System (GHS).

· **Label elements**
· **GHS label elements** Not Applicable
· **Hazard pictograms** Not Applicable
· **Signal word** Not Applicable
· **Hazard statements** Not Applicable
· **Precautionary statements**
Wear protective gloves / eye protection / face protection.
Collect spillage.
Store in accordance with local/regional/national/international regulations.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 2
Fire = 1
Reactivity = 1

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump

(Contd. of page 1)

· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
506-87-6 Ammonium Carbonate (~ 30% Ammonia), Lumps
· **Identification number(s)**
· **EC number:** 208-058-0

4 First-aid measures

· **Description of first aid measures**
· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** Generally the product does not irritate the skin.
· **After eye contact:** Rinse opened eye for several minutes under running water.
· **After swallowing:** If symptoms persist consult doctor.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Not required.
· **Environmental precautions:** No special measures required.
· **Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**
· **PAC-1:** 0.31 mg/m3
· **PAC-2:** 3.5 mg/m3
· **PAC-3:** 21 mg/m3

7 Handling and storage

· **Handling:**
· **Precautions for safe handling** No special measures required.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump

(Contd. of page 2)

· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
· **Breathing equipment:** Not required.
· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:** Not required.
· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid
Color:	Colorless
· **Odor:**	Strong ammonia odor
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump

(Contd. of page 3)

· **Change in condition**	
Melting point/Melting range:	58 °C (136 °F)
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Auto igniting:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density:**	Not determined.
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Not determined.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump

(Contd. of page 4)

· **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

· **Carcinogenic categories**
· **IARC (International Agency for Research on Cancer)** Substance is not listed.
· **NTP (National Toxicology Program)** Substance is not listed.
· **OSHA-Ca (Occupational Safety & Health Administration)** Substance is not listed.

12 Ecological information

· **Toxicity**

· **Aquatic toxicity:**	
EC50	34.7 mg/kg (Human)

· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:** Not known to be hazardous to water.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:** Smaller quantities can be disposed of with household waste.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, ADN, IMDG, IATA**	Not regulated
· **UN proper shipping name**	
· **DOT, ADN, IATA**	Not regulated
· **IMDG**	Not Regulated
· **Transport hazard class(es)**	
· **DOT, ADN, IMDG, IATA**	
· **Class**	Not regulated
· **Packing group**	
· **DOT, IMDG, IATA**	Not regulated
· **Environmental hazards:**	
· **Marine pollutant:**	No

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/02/2017 Reviewed on 10/02/2017

Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump

(Contd. of page 5)

· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Remarks:**	Not regulated
· **IMDG**	
· **Remarks:**	Not regulated
· **IATA**	
· **Remarks:**	Not regulated
· **UN "Model Regulation":**	Not regulated

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**
· **Section 355 (extremely hazardous substances):** Substance is not listed.
· **Section 313 (Specific toxic chemical listings):** Substance is not listed.
· **TSCA (Toxic Substances Control Act):** Substance is listed.
· **Proposition 65**
· **Chemicals known to cause cancer:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
· **Chemicals known to cause developmental toxicity:** Substance is not listed.

· **Carcinogenic categories**
· **EPA (Environmental Protection Agency)** Substance is not listed.
· **TLV (Threshold Limit Value established by ACGIH)** Substance is not listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
· **GHS label elements** Not Applicable
· **Hazard pictograms** Not Applicable
· **Signal word** Not Applicable
· **Hazard statements** Not Applicable
· **Precautionary statements**
Wear protective gloves / eye protection / face protection.
Collect spillage.
Store in accordance with local/regional/national/international regulations.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** Environment protection department.
· **Contact:**
· **Date of preparation / last revision**
Creation date for SDS 06/11/2014 LS

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Ammonium Carbonate (~30% Ammonia) Reagent ACS Lump

(Contd. of page 6)

10-02-2017: review SDS for accuracy. STN
10/02/2017 / -

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit

PAO
SAFETY DATA SHEET

To access this Safety Data Sheet (SDS) and Supplemental Safety information online in English, go to https://ati.zendesk.com/, select PAO SDS English, 73-00825-001

Para acceder a esta ficha de datos de seguridad (FDS) y a información de seguridad adicional en Español por Internet, diríjase a https://ati.zendesk.com/ y seleccione PAO FDS Español, 73-00825-003

Pour accéder à cette fiche de données de sécurité (FDS) et aux informations complémentaires sur la sécurité en ligne en Français, accédez à https://ati.zendesk.com/, sélectionnez PAO FDS Français, 73-00825-004

Per accedere a questa Scheda di dati di sicurezza (SDS) e ai documenti complementari online sulla sicurezza, in Italiano, visita https://ati.zendesk.com/, e seleziona PAO SDS Italiano, 73-00825-005

Revision History

Part Number	Revision	Date	Owner	Description of Change
73-00825-001	A	July 17, 2020	A. Wert	Added Supplemental Document

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 – United Kingdom (UK)

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/ MIXTURE AND OF THE COMPANY/ UNDERTAKING

Product Name: ATI PAO-4

Preparation Date: August 20, 2015
Revision Date: July 17, 2020

Recommended Use: Particle filter testing

Supplier: Air Techniques International UK
4 Campus Five
Letchworth Business Park
Letchworth Garden City, Hertfordshire SG6 2JF
United Kingdom

Telephone: +44 (0) 1462 676446

Emergency Telephone Number: CARECHEM24: +44 1235 239 670

2. HAZARD IDENTIFICATION

GHS Classification: Aspiration Hazard: Category 1. H304 – May be fatal if swallowed and enters airways.

GHS Labeling:

Symbol:

Signal Word: Danger

Precautionary Statements:

P101: If medical advice is needed, have product container or label at hand.
P102: Keep out of reach of children
P103: Read label before use.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER OR doctor/physician
P331: Do NOT induce vomiting
P405: Store locked up
P501: Dispose of contents and container in accordance with local regulations

Other Hazards Not Classified: No significant hazards

US OSHA/HCS Status: Hazardous under OSHA Hazard Communication Standard Revised in 2012

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Identifiers	Concentration, Wt. %
Dec-1-ene, trimers hydrogenated	CAS#: 157707-86-3 EC: 500-393-3	100%

4. FIRST AID

Inhalation: If inhaled, move to fresh air. If victim has stopped breathing give artificial respiration, preferably, mouth to mouth. Contact a physician immediately.

Eyes: Flush with large amounts of cold water for at least 15 minutes. Do not let victim rub eyes. If irritation develops, contact a physician immediately.

Ingestion: Do not induce vomiting. If victim is conscious and able to swallow, promptly have victim drink water to dilute. Do not give sodium bicarbonate, fruit juices or vinegar. Never give anything by mouth if victim is unconscious or having convulsions. Contact a physician immediately.

Skin: Wash affected area with soap and water. Remove contaminated clothing. Launder contaminated clothing before re-use.

Most important symptoms and hazardous effects: Local necrosis as evidenced by delayed onset of pain and tissue damage a few hours after exposure.

Indication of immediate medical attention and special treatment needed: If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Carbon dioxide, Dry chemical, Foam, Water spray

Specific hazards: Smoke, fumes and incomplete combustion products.

Specific protective equipment and precautions for fire fighters: Use water spray, dry chemical, foam or carbon dioxide. Water may be ineffective but should be used to keep fire exposed containers cool. If a spill or a leak has not ignited, use water spray to disperse the vapors. Water spray may be used to flush spills away from fire.

Perform only those firefighting procedures for which you have been trained. Firefighters should wear self-contained breathing apparatus in the positive pressure mode with a full-face piece where there is a possibility of exposure to smoke, fumes or hazardous decomposition products.

Flammability Properties:
Flash point: 222^{o}C (Closed Cup)
Auto-Ignition Temperature: 324 to 362^{o}C

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
Use personal protective equipment. Ensure adequate ventilation.

Environmental Precautions: Do not allow spilled material to enter sewers or streams. If spills are likely to enter any drain, waterway or groundwater, contact the appropriate governmental agency.

Methods and materials for containment: Add dry material to absorb (if large spill, dike to contain). Using recommended protective equipment, pick up bulk of spill and containerize for recovery or disposal. Flush area with water to remove residues.

7. HANDLING AND STORAGE

Precautions for safe handling: Read label for instructions in use of product. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Conditions for safe storage: Store in closed containers in a cool, dry well-ventilated area. Maintain closure of bungs. Store at temperatures between 5°C and 50°C. Do not reuse container. Avoid container damage while storing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters: No exposure limit value known.

Appropriate engineering controls: Proper protection and controls is dependent upon the potential exposure conditions. No special requirements are needed under ordinary conditions where adequate ventilation is available.

Individual protective measures:

Respiratory protection: Needed when airborne contaminant concentrations are at a level which cannot protect worker health. Then an approved respirator must be used. Selection of the respirator is dependent upon regulatory conditions. For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode.

Eye protection: No eye protection is needed under conditions of normal use. If there is a possibility that the product can be splashed into the eyes, then safety glasses with side shields or chemical goggles are required. Contact lenses should also not be worn if the product could be splashed into the eyes.

Hand protection: No gloves are required for single, short duration exposures. For prolonged or repeated exposures, wear rubber gloves.

Body protection: If product use involves single, short duration exposures, then no additional protective wear for covering the skin is required. For prolonged or repeated exposures to the skin, wear impervious, protective clothing including rubber safety shoes to avoid skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless liquid
Odor: Not available
Odor Threshold: Not available
pH: Not applicable
Melting point/freezing point: < -68°C (Pour Point)
Initial boiling point and boiling range: 336 to 529°C
Flash Point (Method): 222°C (Closed Cup)
Evaporation Rate: Not available

Flammability (Solid, Gas): Not applicable
Upper/lower flammability or explosive limits: Not available
Vapor pressure: Not available
Vapor density: Not available
Relative density: 0.8 @ 15.5°C
Partition coefficient n-octanol/water: >10
Autoignition Temperature: 324 to 362°C
Decomposition Temperature: Not available
Viscosity: 17.4 cSt at 40°C
Water Solubility: Insoluble

10. STABILITY AND REACTIVITY

Chemical stability: Stable at normal conditions
Possibility of hazardous reactions: Not expected and hazardous polymerization will not occur
Conditions to avoid: Excessive Heat. High energy sources of ignition.
Incompatible Materials: Strong acids, bases and oxidizing agents.
Hazardous decomposition products: Carbon dioxide and carbon monoxide

11. TOXICOLOGICAL INFORMATION

Oral Toxicity (Rats): LD 50 Oral > 2000 mg/kg
Inhalation Toxicity: Not available
Skin Irritation: Not available
Dermal Toxicity: Not available
Eye Irritation: Not available

Aspiration Toxicity: May be fatal if swallowed and enters airways. Substances known to cause human aspiration toxicity hazards or to be regarded as if they cause human aspiration toxicity hazard.

Skin Sensitization: Not available

Chronic Exposure Target Organ Effects: Not available

Carcinogenicity: This product present at a level of 0.1% or higher is not considered to be carcinogenic under ACGIH, IARC or EC.

12. ECOLOGICAL INFORMATION

Aquatic/terrestrial ecological toxicity:

Toxicity to daphnia: EL50 > 1000 mg/l WAF (similar material) (48 hours)

Toxicity to fish: LL 50 > 1000 mg/l (similar material) (96 hours)

Toxicity to micro-organism: NOEC 2 mg/l (similar material) (28 days)

Toxicity to aquatic plants: NEOLR 1000 mg/l WAF (similar material) (72 hours)

Toxicity to daphnia: NOELR: 125 mg/l WAF (similar material) (21 days)

Mobility: Not available

Persistence and degradability: Not available

13. DISPOSAL CONSIDERATIONS

Disposal methods: Product can be disposed of by burning in an enclosed, controlled burner for fuel value or disposal by supervised incineration. Such burning may be limited by the controlling authority. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at any licensed waste disposal site.

Precaution for disposal: All recovered material should be packaged, labeled, transported and disposed or reclaimed in conformance with Good Engineering Practices. Comply with all applicable governmental regulations. Avoid land filling of liquids. Reclaim where possible.

14. TRANSPORT INFORMATION

Not classified as hazardous for transport (ADR, AND, IMDG, IATA)

15. REGULATORY INFORMATION

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV (List of substances subject to authorization): None of the components are listed.

Substances of very high concern: None of the components are listed.

Annex XVII (Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles): Not applicable

European Inventory: Internationally listed or exempted under CAS# 68037-01-4. Listed in the EU under CAS # 157707-86-3.

16. OTHER INFORMATION

References and Sources: Information contained in this safety data sheet is based on Air Techniques International's owned data and public sources deemed valid or acceptable. The absence of data elements required by ANSI or 2001/58/EC indicates that no data meeting these requirements is available.

Disclaimer: *This document has been prepared in good faith and from information provided to us by our suppliers and other sources considered to be reliable. No warranty, express or implied is given. The buyer is responsible to evaluate all available information when using this product for any particular use. The buyer is also responsible for complying with all regulations when using this product.*

EU SDS Supplemental Document
Use of PAO-4 when Testing Filters

The purpose of this supplemental document is to assist Air Techniques International's customers with safely using ATI-PAO-4 for filtration testing which is a specialized application for the only component present in ATI PAO-4, polyalphaolefin (PAO).

Introduction

ATI-PAO-4 is a polymer that is a liquid that is widely used by the lubricant industry.

This safety data sheet (SDS) is in compliance with the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals. Due to PAO-4's viscosity, the ATI PAO-4 SDS lists the product as an Aspiration Hazard – Category 1. The reason for this classification is that PAO-4 is present at a concentration greater than 10% of the Air Techniques International product and exhibits a kinematic viscosity less than 20.5 cSt (centistokes) at 40° C.

For this reason, the following health hazard pictogram must be shown on the SDS:

However, ***PAO is not an aspiration hazard when aerosolized during in filter testing.*** PAO is widely considered to be a safe material by the lubricant industry. There have been no safety issues including no issues related to aspiration reported by lubricant manufacturers and end users in the nearly 50 years PAO has been used.

Risk to Operator during Filtration Testing

Exposure risk when pouring oil into generator
During filtration testing, the only time that there is worker exposure to liquid ATI-PAO-4 is during the addition to the aerosol generator used in filtration testing. The safety precautions listed in the ATI-PAO-4 SDS Section 8 *Exposure Controls/Personal Protection* must be followed during this phase of the testing to minimize worker exposure.

Exposure risk when oil is aerosolized during filtration testing
ATI PAO-4 is aerosolized during filter testing which means that this product is diluted with air. The result is the formation of a polydisperse sub-micron PAO aerosol. The exposure for an end user, after dilution by the system air flow upstream of the filter is typically between 10 milligrams/cubic meter and 20 milligrams/cubic meter of ATI PAO-4.

A certifier downstream of the filter under test will be exposed to a level of ATI PAO-4 that is typically at maximum, less than 0.1% of the upstream aerosol concentration. This means that the maximum likely exposure downstream is 0.001 milligram/cubic meter of ATI PAO-4.

The average permissible exposure limits over an 8-hour period for mineral oil which is a hydrocarbon that has a similar composition to ATI PAO-4 is 5 milligrams/cubic meter which is 5,000 times higher than the typical exposure found in filtration testing.

Based on these values, a protective mask or other form of personal protective equipment will not be necessary when using PAO-4 in an aerosolized form during filter testing provided the levels remain below 5 milligrams/cubic meter. If the user will be working with ATI PAO-4 for an extended period of time, then please follow guidelines for "Personal Protection" in Section 8 of the SDS.

As an aerosol, ATI PAO-4 is present at a concentration that is significantly below the 10% concentration specified by GHS. The PAO aerosol is not in the liquid form so the viscosity requirement is not relevant. ***For these two reasons, the pictogram for ATI PAO-4 in the European SDS is not applicable to the use of ATI PAO-4 in filter testing.***

This analysis is relevant for filter testing users working with the two most common aerosol generators manufactured by Air Techniques International. These units are the Model ATI 5B/5C/5D thermal generators.

If the permissible exposure limit for mineral oil is updated in the future, these guidelines will change accordingly. Air Techniques International pledges to ensure that the safety of its customers is paramount.

Risk to Individuals in Heating ATI PAO-4 in Aerosol Generator

Proper use of the Model ATI 5B/5C/5D generators prevents the user from coming in contact with heated PAO. In its normal application, an adaptor and hose will be attached to the generator's nozzle, enabling the aerosol produced to be injected directly into an HVAC duct.

Without the adapter and hose, ATI PAO-4 is heated in a sealed chamber in the aerosol generator and expelled under pressure through a nozzle. As the ATI PAO-4 leaves the nozzle, 7.6 centimeters away from the generator, the very center of the aerosol plume is 105° C, and rapidly cools to ambient temperature.

Safety Data Sheet CHEM-CD Part A

ClorDiSys Solutions, Inc. **Safety Data Sheet**

Revision Date: 01/02/2019 **Date Printed:** 01/02/2019 **Date Reviewed:** 01/02/2019

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name: **Chlorine Dioxide Release Material**

Chemical Name: Chemical Mixture

Product Use and Restrictions on Use: Various Applications

Supplier: ClorDiSys Solutions, Inc.
PO Box 549
Lebanon, NJ 08833

For Chemical Emergency Call PERS (24 Hours/Day, 7 Days/Week):
1-800-633-8253 (Domestic/Canada)
1-801-629-0667 (International)

2. Hazards Identification

EMERGENCY OVERVIEW: This product is a white, flaked, oxidizing solid. This product may have a slight chlorine odor.

Color: White
Form: Flakes / Powder
Odor: Odorless to slight chlorine odor

MAJOR HEALTH HAZARDS: CORROSIVE. FATAL IF INHALED. TOXIC IF SWALLOWED. CAUSES SKIN IRRITATION. CAUSES SERIOUS EYE DAMAGE. INGESTION MAY CAUSE DAMAGE TO: BLOOD SYSTEM AND KIDNEY SYSTEM. INHALATION MAY CAUSE DAMAGE TO THE RESPIRATORY SYSTEM. MAY CAUSES DAMAGE TO THE CLOOD AND KIDNEYS THROUGH PROLONGED OR REPEATED EXPOSURES.
Physical Hazards: STRONG OXIDIZER. Contact with other materials may cause fire or explosion.
Aquatic Toxicity: HARMFUL TO AQUATIC LIFE.
Precautionary Statements: Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep/store away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles, acids, chlorine or organic materials. Ear protective gloves, protective clothing, eye and face protection. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe dust. Avoid release to the environment.
Additional Hazards: This material is corrosive and an oxidizer. This material's pH and oxidative action contribute to its health and physical hazards.

GHS Classification:

GHS: Contact Hazard- Skin	Category 2 - Causes skin irritation
GHS: Contact Hazard- Eye	Category 1 - Causes serious eye damage
GHS: Acute Toxicity- Inhalation	Category 2 – Fatal if inhaled
GHS Acute Toxicity- Oral	Category 3 – toxic if Swallowed
GHS Target Organ Toxicity (Single Exposure)	Category 2 – May Cause Damage to Respiratory System, Blood, Kidneys
GHS Target organ Toxicity (Repeated Exposure)	Category 2 – May Cause Damage to Blood and/or Kidneys
GHS: Carcinogenicity	Not classified as a carcinogen per GHS criteria. This product is not classified as a carcinogen by NTP, IARC, or OSHA
GHS: Hazardous to Aquatic Environment- Acute Hazard	Category 3- Harmful to Aquatic Life

Unknown Acute Toxicity: Not applicable. This product was tested as a whole. This information only pertains to untested mixtures. 100% of this product consists of ingredient(s) of known acute toxicity.
GHS Symbol: Oxidizer, Skull and Crossbones, Corrosion, Health Hazard.
GHS Signal Word: DANGER

GHS Hazard Statements:
GHS Physical hazard Statement(s)
May intensify fire; oxidizer
GHS- Health Hazard Statement(s)
Fatal if Inhaled
Toxic if Swallowed
Causes Serious Eye Damage
Causes Skin Irritation
May Cause Damage to Organs (Respiratory, Kidney and Blood Systems)
May Cause Damage to Renal System (Kidneys) and Blood System Through Prolonged or Repeated Exposure
GHS- Precautionary Statement(s)
Do not breathe Dust, Fume, Gas, Mist, Vapors, or Spray
In Case of Inadequate Ventilation, Wear Respiratory Protection
Wear Protective Gloves, Protective Clothing, Eye and Face Protection
Wash Thoroughly After Handling
Use Only Outdoors or in a Well-Ventilated Area
Do Not Eat, Drink or Smoke When Using This Product
Keep Away From Heat
Keep/Store Away From Clothing and Other Combustible Materials
Take any Precaution to Avoid Mixing with Combustibles
GHS- Precautionary Statement(s)
IF INHALED: Remove person to fresh air and keep comfortable for breathing
Specific treatment is urgent (see Section 4 of SDS or First Aid information on this label)
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing
IF SWALLOWED: Immediately call POISON CENTER or doctor/physician. Rinse mouth.
Specific Treatment (see Section 4 of the safety data sheet and/or the First Aid information on the product label)
IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
IN CASE OF FIRE: Use agent suitable for surrounding fire to extinguish

GHS Precautionary Statement(s)- Storage
Store locked up
Store in well-ventilated place. Keep container tightly closed

GHS- Precautionary Statement(s)- Disposal
Dispose of contents and container in accordance with applicable loval, regional, national and/or international regulations.

Hazards Not Otherwise Classified (HNOC)
None Identified

See Section 11: Toxicological Information

NFPA Classification:		**HMIS Classification:**	
Health:	**1**	**Health:**	**1**
Flammability:	**1**	**Flammability:**	**0**
Instability:	**1**	**Reactivity:**	**0**
Special Hazards:	**OX**	**Personal Protection:**	**E**

3. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	CAS #	EINECS#	Weight in Product %	Notes
Sodium Chlorite	7758-19-2	231-836-6	74-88%	None
Sodium Chloride	7647-14-5	231-598-3	2-24%	None
Sodium Sulfate	7757-82-6	231-820-9	0-4.5%	None
Sodium Chlorate	7775-09-9	231-887-4	0-6%	None
Sodium Hydroxide	1310-73-2	215-185-5	0-4.5%	None
Sodium Carbonate	497-19-8	207-838-8	0-3%	None
Water	7732-18-5	231-791-2	1.6-8%	None

Other Information: NOTE: The percentage by weight values reported for this product represent approximate formulation values.

4. FIRST AID MEASURES

Inhalation: If airborne dusts of this product are inhaled, remove victim to fresh air. If inhalation occurs and adverse effects result, remove to contaminated area. Evaluate ABC's (is Airways constricted, is Breathing occurring, is blood Circulating) and treat symptomatically. GET MEDICAL ATTENTION IMMEDIATELY.
Specific Treatment: There is no specific antidote. Treat symptomatically. Pulse oximetry may not be reliable, see notes to physician.

Ingestion: If this product is swallowed, DO NOT INDUCE VOMITING. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. Never give anything by mouth to an unconscious or convulsive person. GET MEDICAL ATTENTION IMMEDIATELY. CALL PHYSICIAN OR CALIFORNIA POISON CONTROL CENTER (1-800-764-7661; 1-800-876-4766) FOR MOST CURRENT INFORMATION.

Skin Contact: **Brush off excess chemical.** Begin decontamination with copious amounts of running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. GET MEDICAL ATTENTION IMMEDIATELY. Thoroughly clean and dry contaminated clothing before reuse. Discard leather goods.

Eye Contact: If the product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have the contaminated individual "roll" eyes. The recommended minimum flushing time is 15 minutes. Exposure to eyes may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn. Significant and prolonged contact may cause damage to the internal contents of the eye.

Most Important Symptoms/Effects (Acute and Delayed)

Acute Symptoms/Effects: Listed Below

Inhalation (Breathing): Respiratory System Effects: Exposure to airborne material may cause irritation, redness of upper and lower airways, coughing, laryngeal spasm and edema, shortness of breath, bronchio-constriction, and possible pulmonary edema. Severe and permanent scarring may occur. The pulmonary edema may develop several hours after acute exposure.

Skin: Skin irritation. Skin exposure may cause irritation, redness, itching swelling, burning sensation.

Eye: Serious eye damage. Exposure to eyes may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn. Significant and prolonged contact may cause damage to the internal contents of the eye.

Ingestion (Swallowing): Ingesting this material may cause irritation, nausea, and vomiting. Oxidation may cause significant metabolic issues such as methemogobinemia, hemolysis, and intravascular coagulation and renal failure.

Delayed Symptoms/Effects:

Repeated and prolonged skin contact may cause dermatitis.

Interaction with Other Chemicals Which Enhance Toxicity: Mixing with ammonia, acids, detergents, or organic matter will release chlorinated compounds, which are irritating to eyes, lungs, and mucus membranes. Chlorine dioxide vapors are emitted when this product contacts acids, chlorine or bleach.

Medical Conditions Aggravated by Exposure: May aggravate preexisting conditions such as: Eye disorders that decrease tear production or have reduced integrity. Skin disorders that compromise the integrity of the skin. Respiratory

conditions including asthma and other breathing disorders. Ingestion may induce G6PD deficiency, hemolysis and renal failure. G6PD deficiency, hemoglobinopathies, renal compromise, and conditions causing hypoxia may be aggravated by ingestion of this material.

Protection to First-Aiders: Protect yourself by avoiding contact with this material. Avoid contact with skin and eyes. Do not ingest. Do not breathe dust. Use personal protective equipment. Refer to Section 8 for specific personal protective equipment recommendations. At minimum, treating personnel should utilize PPE sufficient for prevention of blood borne pathogen transmission.

Notes to Physicians: Chlorine dioxide vapors are emitted when this product contacts acids or chlorine. If these vapors are inhaled, monitor patient closely for delayed development of pulmonary edema which may occur up to 48-72 hours post inhalation. Following ingestion, neutralization and use of activated charcoal is not indicated. Probable mucosal damage may contraindicate the use of gastric lavage. Treat as a corrosive due to the pH of this material. This is also a strong oxidizer which will react with tissue in the presence of water. For prolonged exposures and significant exposures, considered delayed injury to exposed tissues. There is no specific antidote. Treatment is supportive care. Follow normal parameters for airway, breathing and circulation. Ingestion of even small amounts of solution should be closely monitored for methemoglobinemia, hemolysis, and glutathione depletion, followed by renal failure. This chemical acts similarly to its related compound chlorate, and produces a drug induced G6PD deficiency. Methylene blue has not been reported as effective. Consult the PubMed Case Report PMID 22996135 for the case description and treatment utilized.

5. FIRE FIGHTING MEASURES

Flash Point, C: Not Applicable
Auto-ignition Temperature, C: Not Applicable
Lower explosive Limit, %: Not Applicable
Upper Explosive Limit, %: Not Applicable
Extinguishing Media: Select fire extinguishing media appropriate for the surrounding area.

Water Spray: YES (for cooling) Carbon Dioxide: YES
Foam: YES Dry Chemical: YES
Halon: YES Other: Any "ABC" Class.

Fire Fighting Procedures: Prevent the spread of any released product to combustible objects. Structural firefighters must wear Positive-Pressure Self-Contained Breathing Apparatus and fully protective equipment. Chemical resistant clothing may be necessary. Move containers from fire area if it can be done without risk to personnel. Cool fire-exposed containers with water to prevent rupture. Flood with a fine water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. Rinse contaminated equipment thoroughly before returning such equipment to service.

Unusual Fire and Explosion Hazards: This product is irritating and presents a moderate inhalation and contact hazard to firefighters. When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (e.g., sodium oxides, hydrogen chloride). This product may become unstable at elevated temperatures. This product is an oxidizer; it can act to initiate and sustain the combustion of flammable materials.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Isolate hazard area and deny entry. Keep unnecessary and unprotected personnel from entering the area. Avoid contact with the skin and eyes. Do not breathe dust, fume gas, mist, vapors or spray. Do not ingest. Wear appropriate personal protective equipment recommended in Section 8.

Methods and Materials for Containment and Cleaning Up: DO NOT use floor sweeping compounds to clean up spills. Dampen and scoop spilled material into clean, dedicated equipment. Do not dry sweep. Every attempt should be made to avoid mixing with other chemicals or debris when cleaning up. Keep collected material damp and put into drums. Dispose of in accordance with al applicable regulations.

Environmental Precautions: This material is harmful to aquatic life. Keep out of water supplies and sewers. Should not be released into the environment. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

Precautions for Safe Handling: Do not taste or swallow. Do not get in eyes, on skin, or on clothing. Avoid breathing vapors or dust when opening container. Avoid creation of dust or fumes. Wear personal protective equipment as described in Section 8. Wash thoroughly after handling. Use clean, dry utensils. Do not add the product to any dispensing device containing residuals of other products. Contamination may start a chemical reaction with generation of heat, liberation of hazardous gasses (chlorine dioxide- a poisonous, explosive gas), and possible fire and explosion. Do not contaminate with acids, reducing agents, combustible materials, oxidizing materials, hypochlorite, organic solvents and compounds, garbage, dirt, organic matter, household products, chemicals, soap products, paint products, vinegar, beverages, oils, pine oil, dirty rags, sulfur-containing rubber, or any other foreign matter, Do not drop, roll or skid drums.

Storage and Handling Practices: All employees who handle this material should be trained to handle it safely. Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of fire-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Floors should be sealed to prevent absorption of this material. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Have appropriate extinguishing equipment in the storage area (e.g., sprinkler system, portable fire extinguishers). Refer to NFPA 43A, *Liquid, Solid Oxidizers,* for additional information on storage. Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers that held this product.

Protective Practices During Maintenance of Contaminated Equipment: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely if necessary. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures and appropriate Canadian standards.

Incompatibilities/Materials to Avoid: Acids, reducing agents, combustible materials, oxidizing agents, hypochlorite, organic solvents and compounds, garbage, dirt, organic materials, household products, chemicals, soap products, vinegar, beverages, oils, pine oil, dirty rags, sulfur-containing rubber, or any other foreign matter.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Regulatory Exposure Limit(s): None. This product does not contain any components that have regulatory occupational exposure limits (OEL's) established.

OEL: Occupational Exposure Limit; OSHA: United States Occupational Safety and Health Administration
PEL: Permissible Exposure Limit; TWA: Time Weighted Average; STEL: Short Term Exposure Limit

Non-Regulatory Exposure Limit(s): Listed below for the product components that have advisory (non-regulatory) occupational exposure limits (OEL's) established.

-The Non-Regulatory United States Occupational Safety and Health Administration (OSHA) limits, if shown are Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

-The American conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called the Threshold Limit Values (TLV's) for hundreds of chemicals, physical agents, and biological exposure indices.

OXY REL 8hr TWA	1mg/m^3 recommended Time Weighted Average- 8 hour (internal Occupational Exposure Limit). This value is based on potential systematic effects from inhalation of sodium chlorite dust

Engineering Controls: Use only in well-ventilated areas. Provide local exhaust ventilation where dust or mist may ne generated. Ensure compliance with applicable exposure limits.

Personal Protective Equipment:

Eye Protection: Safety glasses as authorized in 29 CFR 1910.133, applicable U.S. State regulations, or the appropriate standards of Canada and its Provinces or EC Member States (per European Standard EN 166).

Hand Protection: None required when handling chemical in a sealed container. When direct contact with Chlorine Dioxide is possible, use butyl rubber, natural rubber, neoprene, and nitrile rubber gloves for routine use (do not use polyvinyl gloves). Gloves should be changed frequently during use of product. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS.

Body Protection: None required when handling chemical in a sealed container. When direct contact with Chlorine Dioxide is possible, use body protection appropriate for task (e.g., gown or apron).

Respiratory Protection: None normally required for routine use. If respiratory protection is needed, such as during use of this product with other materials, or during emergency response to uncontrolled releases, use only protection authorized in 29 CFR 1910.134, applicable U.S. State regulations, Canadian CSA Standard Z94.4-93, or EC Member States (per European Standard EN 149). Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998)..

Ventilation: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients), if applicable. If existing ventilation is not adequate, product should be used with a local exhaust hood, or in ductless fume hood/portable ventilation system. All ventilation systems should pull air at or below the open container in order to pull dusts away from the person using the product. Ensure eyewash/safety shower stations are available near areas where this product is used.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Solid.
Color:	White, flaky.
Odor:	Slight chlorine.
Odor Threshold:	Not established.
Molecular Weight:	90.45
Molecular Formula	**$NaClO_2$**
Boiling Point:	Not established.
Melting /Freezing Point:	180-200°C (356-392°F)
Vapor Pressure, mm Hg @ 20°C:	Not established.
Relative Vapor Density (air = 1):	Not established.
Evaporation Rate (n-BuAc = 1):	Similar to water.
Specific Gravity (water = 1):	Not established.
Solubility in Water @ 25°C:	39%.
pH (25% Solution):	> 12
Viscosity:	Not applicable.
Flash Point:	Not applicable.

Coefficient of Oil/Water Distribution (Partition Coefficient): Not established.

How to Detect this Substance (warning properties): The odor and appearance may be a distinguishing characteristic for this product if spilled.

10. STABILITY AND REACTIVITY

Reactivity:	Not reactive under normal temperatures and pressures.
Stability Data:	Stable at normal temperatures and pressures.
Possibility of Hazardous Reactions:	Avoid heat, flames, sparks and other sources of ignition. Avoid contamination with foreign materials. Avoid exposure to sunlight or ultraviolet light.
Incompatibility (Materials to Avoid):	Strong reducers, finely powdered metals, phosphorus, sulfur, zinc, ammonia, organic materials, combustible materials, acids, reducing agents, oxidizing materials, household products, chemicals, soap products, paint products, vinegar, beverages, oils, pine oil, dirty rags, sulfur-containing rubber, or any other foreign matter.
Hazardous Decomposition Products:	Products of thermal decomposition include sodium oxides and hydrogen chloride. Chlorine dioxide is formed on contact with acids.
Polymerization:	Will not occur.
Conditions/Hazards to Avoid:	Avoid exposure to or contact with extreme temperatures, incompatible chemicals. Avoid mechanical shock or impact, if contaminated.

11. TOXOLOGICAL INFORMATION

Toxicity Data: The specific toxicology data available for the Sodium Chlorite component of this product are as follows. Data for other components are not given on this SDS.

SODIUM CHLORITE:

Mutation in Microorganisms (*Salmonella typhimurium*) = 300 μg/plate

DNA Inhibition (oral, rat) = 84 mg/kg/12 weeks/continuous

Sperm Morphology (oral, rat) = 660 mg/kg/66 days/continuous

Micronucleus Test (intraperitoneal, mouse) = 15 mg/kg

Cytogenetic Analysis (fibroblast, hamster) = 20 mg/L

TDLo (oral, rat) = 365 mg/kg/1 year/continuous; Blood: pigmented or nucleated red blood cells, changes in other cell count (unspecified); Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (oral, rat) = 182 g/kg/26 weeks/intermittent; Liver function tests impaired; Changes in serum composition (e.g. TP, bilirubin, cholesterol), Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

SODIUM CHLORITE (continued):

TDLo (oral, rat) = 800 mg/kg/female 8–15 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TDLo (oral, rat) = 16 g/kg/female 8–15 days after conception; Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

TDLo (oral, rat) = 660 mg/kg/male 66 days pre-mating; Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count)

TDLo (oral, rat) = 1130 mg/kg/male 8 weeks pre-mating/female 2 weeks pre-mating: 3 weeks post-birth; Reproductive: Effects on Newborn: biochemical and metabolic

TDLo (intraperitoneal, rat) = 160 mg/kg/female 8–15 days after conception; Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

SODIUM CHLORITE (continued):

TDLo (intraperitoneal, rat) = 80 mg/kg/female 8–15 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TDLo (oral, mouse) = 29,750 mg/kg/85 weeks/continuous; Tumorigenic: Carcinogenic by RTECS criteria; Liver: tumors

TDLo (oral, mouse) = 22 g/kg/female 1–21 days after conception/lactating female 28 days post-birth; Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain)

LD_{50} (oral, rat) = 165 mg/kg; jaundice, other or unclassified; Kidney, Ureter, Bladder: interstitial nephritis; Biochemical: Metabolism (Intermediary): other

LC_{50} (inhalation, rat) = 230 mg/m^3/4 hours

LD_{50} (oral, mouse) = 350 mg/kg

LD_{50} (oral, guinea pig) = 300 mg/kg

Suspected Cancer Agent: The components of this product are not found on the following lists: U.S. FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

Irritancy of Product: This product may be mildly to moderately irritating to contaminated tissue, especially after prolonged or repeated exposure.

Sensitization of the Product: This product is not known to be a skin or respiratory sensitizer.

Reproductive Toxicity Information: Listed below is information concerning the effects of this product and its components on animal and human reproductive systems.

Mutagenicity: This product is not reported to produce mutagenic effects in humans. Animal mutation data are available for the Sodium Chlorite component of this product; these data were obtained during clinical studies on specific human animal tissues exposed to high doses of these compounds.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.

Teratogenicity: This product is not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of the Sodium Chlorite component of this product provided teratogenic data.

Reproductive Toxicity: This product is not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of the Sodium Chlorite component of this product provided reproductive toxicity data. *A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.*

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no ACGIH Biological Exposure Indices (BEIs) determined for the components of this product.

Potential Health Effects:

Inhalation (Breathing): Respiratory System Effects: Exposure to airborne material may cause irritation, redness of upper and lower airways, coughing, laryngeal spasm and edema, shortness of breath, bronchio-constriction, and possible pulmonary edema. Severe and permanent scarring may occur. The pulmonary edema may develop several hours after acute exposure.

Skin: Skin irritation. Skin exposure may cause irritation, redness, itching swelling, burning sensation.

Eye: Serious eye damage. Exposure to eyes may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn. Significant and prolonged contact may cause damage to the internal contents of the eye.

Ingestion (Swallowing): Ingesting this material may cause irritation, nausea, and vomiting. Oxidation may cause significant metabolic issues such as methemogobinemia, hemolysis, and intravascular coagulation and renal failure.

Signs and Symptoms of Exposure: Depending on the degree and duration of exposure, possible signs and symptoms from contact of this material with the skin and eyes, breathing this material and swallowing this material may include:

Inhalation (Breathing): Respiratory System Effects: Exposure to airborne material may cause irritation, redness of upper and lower airways, coughing, laryngeal spasm and edema, shortness of breath, bronchio-constriction, and possible pulmonary edema. Severe and permanent scarring may occur. The pulmonary edema may develop several hours after acute exposure.

Skin: Skin irritation. Skin exposure may cause irritation, redness, itching swelling, burning sensation.

Eye: Serious eye damage. Exposure to eyes may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn. Significant and prolonged contact may cause damage to the internal contents of the eye.

Ingestion (Swallowing): Ingesting this material may cause irritation, nausea, and vomiting. Oxidation may cause significant metabolic issues such as methemogobinemia, hemolysis, and intravascular coagulation and renal failure.

Chronic Toxicity: Sodium chlorite has produced hymolytic anemia in several animal species at concentrations of 100 mg/L or higher. In a subchronic study using rats, hematological alterations included decreased erthrocyte counts, hemoglobin levels, and hemacrit. Methemoglobin levels decreased in females, but increased in males. There is no evidence of kidney effects in humans; however, in animal studies with sodium chlorite, there is limited evidence of kidney effects.

Interaction with Other Chemicals Which Enhance Toxicity: Mixing with ammonia, acids, detergents, or organic matter will release chlorinated compounds, which are irritating to eyes, lungs, and mucus membranes. Chlorine dioxide vapors are emitted when this product contacts acids, chlorine, or bleach.

GHS Health Hazards: Listed Below

GHS: Acute Toxicity- Oral:	Category 3- Toxic if Swallowed
GHS: Acute Toxicity- Inhalation:	Category 2- Fatal if Inhaled
GHS: Contact Hazard- Skin:	Category 2- Causes Skin Irritation
GHS: Contact Hazard- Eye:	Category 1- Causes Serious Eye Damage
GHS: Carcinogenicity:	Not classified as a carcinogen per GHS, NTP, IARC, or OSHA criteria
Specific Target Organ Toxicity (Single Exposure):	Category 2- Respiratory System, Blood, Kidneys
Specific Target Organ Toxicity (Repeated/Prolonged Exposure):	Category 2- Blood, Kidneys
Mutagenic Data:	Not classified as a mutagen per GHS criteria. Sodium Chlorite has tested positive in some studies. The significance of these test results for human health is unclear because the oxidizing effects of the chlorite or salting effects of sodium may significantly affect the ability of the tests to accurately detect mutagens.
Reproductive Toxicity:	Not classified as a reproductive toxin per GHS criteria. There is limited evidence of male reproductive effects in animal studies.
Developmental Toxicity:	Not classified as a developmental or reproductive toxin per GHS criteria. Observations in animal studies include decreased serum levels of thyroid hormones in offspring.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

Environmental Stability: The components of this product will slowly decompose into sodium chloride.

Effect of Material on Plants or Animals: This product may be harmful to plant and animal-life (especially if large quantities are released).

Biodegration: Chlorite ions are reduced by some bacteria under aerobic conditions

Bioconcentration: This material will not bioaccumulate

Effect of Chemical on Aquatic Life: This product may be harmful to aquatic plant and animal life.

Aquatic Toxicity

LC50 Rainbow Trout = 290 mg/L as 80 $NaClO_2$ (96 hour)

LC50 Bluegill = 265-310 mg/L as 80% $NaClO_2$ (96 hour)

LC50 Sheepshead minnow = 62-90 ppm (96 hour)

Invertebrate Toxicity

LC50 Daphnia Magna = 0.29 mg/L as 80% $NaClO_2$ (48 hour)

Other Toxicity

LC50 Mallard Duck = 0.49-1.00 g/kg as 80% $NaClO_2$ (gavage)

LC50 Bob White Quail = 0.66 g/kg as 80% $NaClO_2$ (gavage)

Sodium Chlorite in the diet of birds was not acutely toxic. Eight day dietary LC50's in the Mallard Duck and Bob White Quail were > 10,000 ppm

German Environmental Listings:

Aquatic Hazard Class (WGK): None of the components of this product have specific WGK classifications assigned. As such, the classification for this product, per the VwVS regulations is WGK 3.

Chemical	Rating
Sodium Chlorite	2

13. DISPOSAL CONSIDERATIONS

Waste from Material: Dispose in accordance with all applicable regulations. Do not put this product, spilled product, or fully/partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction and fire. Keep out of water supplies and sewers. May be subject to disposal regulations.

Container Management: Do not reuse or refill this container. Offer for recycling iff available. Offer for reconditioning if appropriate. Triple rinse the container promptly after emptying. Triple rinse as follows: empty remaining contents into application equipment or mix tank. Fill the container ¼ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Container rinsate must be disposed of in compliance with applicable regulations. Refer to the label for further details.

U.S. EPA WASTE NUMBER: D001 (Characteristic/Ignitability), applicable to wastes consisting only of this product

14. TRANSPORT INFORMATION

Land Transport

U.S. DOT 49 CFR 172.101:

Proper Shipping Name:	Sodium Chlorite
Hazard Class Number and Description:	5.1 (Oxidizer)
UN Identification Number:	UN 1496
Packing Group:	PG II
DOT Label(s) Required:	5.1 Oxidizer

Canadian Transportation of Dangerous Goods:

This material is considered as dangerous goods. Use the above information for the preparation of Canadian Shipments. Additional Canadian information provided below.

UN Identification Number:	UN 1496
Proper Shipping Name:	Sodium Chlorite
Hazard Class Number and Description:	5.1 (Oxidizer)
Packing Group:	PG II
Label(s) Required:	5.1 Oxidizer

International Air Transport Association (IATA):

THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS UNDER IATA RULES. This material is considered as dangerous goods by the International Air Transport Association.

Proper Shipping Name:	Sodium Chlorite
Hazard Class Number and Description:	5.1 (Oxidizer)
UN Identification Number:	1496
Packing Group:	PG II
Hazard Label (S) Required:	OXIDIZER
ERG Code:	5L

The following Packaging Information is applicable to this product:

PROPER SHIPPING NAME	PASSENGER AND CARGO AIRCRAFT				CARGO AIRCRAFT ONLY	
Sodium Chlorite	Limited Quantity					
	Packing Instruction	Max. Qty per Pkg	Packing Instruction	Max. Qty per Pkg	Packing Instruction	Max. Qty per Pkg
	Y544	2.5 kg	588	5 kg	562	25 kg

International Maritime Organization (IMO):

This material is considered as dangerous goods by the International Maritime Organization.

Proper Shipping Name: Sodium Chlorite
Hazard Class Number and Description: 5.1 (Oxidizer)
UN Identification Number: 1496
Packing Group: PG II
Labels(S) Required: OXIDIZER
Marine Pollutant: This product is not designated by the IMO to be a Marine Pollutant.

European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR):

This material is considered by the United Nations Economic Commission for Europe to be dangerous goods.

Substance Identification No.: 1496
Name of Substance: Sodium Chlorite
Hazard Identification No. (Description): 50
Label: 5.1 (OXIDIZER)
Class and Item Number: 5.1 14° (b)

15. REGULATORY INFORMATION

U.S. REGULATIONS:

OSHA Regulatory Status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

CERCLA Sections 102a/103 Hazardous Substances (40 CFR 302.4): If a release is reportable under CERCLA section103, notify the state emergency response commission and local emergency planning committee. In addition, notify the national Response Center at (800) 424-8802 or (202) 426-2675.

SARA EHS Chemical (40 CFR355.30): Not regulated.

EPCRA Sections 311/312 Hazard Categories (40 CFR 370.10): Acute health hazard, chronic health hazard, fire hazard.

EPCRA Section 313 (40 CFR 372.65): Not regulated.

OSHA Processes Safety (PSM) (29 CFR 1910.119): Not regulated.

FIFRA Regulations: Registered pesticide under 40 CFR 152.10, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), EPA Reg. No. 5382-42 (Technical Sodium Chlorite)

FIFRA Labeling Requirements: This chemical is a pesticide product registered by the United States Environmental Protection Agency (EPA) and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace of non-pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

-FIFRA Signal Word- DANGER
-Corrosive
-Causes irreversible eye damage and skin burns
-May be fatal if swallowed
-Irritating to nose and throat
-This product is toxic to fish and aquatic organisms
-Danger: Strong oxidizing agent
-Mix only into water
-Contamination may start a chemical reaction with generation of heat, liberation of hazardous gasses (chlorine dioxide- a poisonous, explosive gas), and a possible fire and explosion
-Do not contaminate with moisture, garbage, dirt, organic matter, household products, chemicals, soap products, paint products, solvents, acids, vinegar, beverages, oils, pine oil, dirty rags, or any other foreign matter
-Do not use moist or damp utensils.

National Inventory Status

US Inventory Status: Toxic Substance Control Act (TSCA): All components are listed or exempt.

TSCA 12(b): This product is not subject to export notification.

Canadian Chemical Inventory: All components of this product are listed on either the DSL or the NDSL.

State Regulations

California Proposition 65: This product and its ingredients are not listed, but it may contain impurities/trace elements known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act. For additional information, contact OxyChem Technical Services at 1 (800) 733-1165.

Component	California Proposition 65 Cancer Warning	California Proposition 65 CRT List- Male reproductive toxin	California Proposition 65 CRT List- Female reproductive toxin	Massachusetts Right to Know Hazardous Substance List	New Jersey Right to Know Hazardous Substance List	New Jersey Special Health Hazards Substance List
Sodium Chlorite 7758-19-2	Not Listed	Not Listed	Not Listed	Listed	1689	Corrosive; Reactive- Second Degree

Component	New Jersey- Environmental Hazardous Substance List	Pennsylvania Right to Know Substance List	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Environmental Hazard List	Rhode Island Right to Know Hazardous Substance List
Sodium Chlorite 7758-19-2	Not Listed	Listed	Not Listed	Not Listed	Not Listed

CANADIAN REGULATIONS:

This Product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

WHMIS Classifications of Substances

C- Oxidizing Materials

D1A- Poisonous and infections Material; materials causing immediate and serious toxic effects- Very toxi material

D1B- Poisonous and infections Material; materials causing immediate and serious toxic effects- Toxic material

D2B- Poisonous and infections Material; materials causing other toxic effects- Toxic material

E- Corrosive Material

PCP Registration: This product is registered as a pesticide in Canada under PCP Reg No. 25361

EUROPEAN COMMUNITY INFORMATION:

EC LABELING AND CLASSIFICATION: This product meets the definition of Oxidizing [O] and Toxic [T] as defined by the European Community Council Directive 67/548/EEC.

EC CLASSIFICATION: Oxidizing; Toxic [O; T]

EC RISK PHRASES: Contact with combustible material may cause fire. Toxic by inhalation, in contact with skin, and if swallowed. Irritating to eyes, respiratory system, and skin. [R: (2)–8–23/24/25–36/37/38]

EC SAFETY PHRASES: Keep out of reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.*) Keep away from combustible material. In case of contact with eyes, rinse immediately with water and seek medical advice. Take off immediately all contaminated clothing. Wear suitable protective clothing, gloves, and eye/face protection. If swallowed, seek medical advice immediately and show this container or label. [S: (2)–17–26–27–36/37/39–46]

EUROPEAN COMMUNITY ANNEX II HAZARD SYMBOL:

EUROPEAN COMMUNITY INFORMATION FOR CONSTITUENTS: The following information is available for components of this product.

Sodium Chlorite:
EC EINECS/ELINCS NUMBER: 231-836-6.
EC CLASSIFICATION: Oxidizing; Toxic [O; T]
EC RISK PHRASES: Contact with combustible material may cause fire. Toxic by inhalation, in contact with skin, and if swallowed. Irritating to eyes, respiratory system, and skin. [R: 8–23/24/25–36/37/38]
EC SAFETY PHRASES: Keep out of reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.*) Keep away from combustible material. In case of contact with eyes, rinse immediately with water and seek medical advice. Take off immediately all contaminated clothing. Wear suitable protective clothing, gloves, and eye/face protection. [S: (2)–17–26–27–36/37/39]

16. OTHER INFORMATION

Revision Number: 1/19
Section(s) Revised Emergency Contact information
Prepared By: ClorDiSys Solutions, Inc.

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. ClorDiSys Solutions, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, ClorDiSys Solutions, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

Safety Data Sheet CHEM-CD Part B

ClorDiSys Solutions, Inc. **Safety Data Sheet**

Revision Date: 01/02/2019 **Date Printed:** 01/02/2019 **Date Reviewed:** 01/02/2019

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name: Chlorine Dioxide Release Material
Chemical Name: Chemical Mixture
Product Use: Various Applications.
Supplier: ClorDiSys Solutions, Inc
PO Box 549
Lebanon, NJ 08833

For Chemical Emergency Call PERS (24 Hours/Day, 7 Days/Week):
1-800-633-8253 (Domestic/Canada)
1-801-629-0667 (International)

2. HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS): Combustible Dust

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS Label Elements, Including Precautionary Statements

Pictogram	None
Signal Word	Warning
Hazard Statement(s)	May form combustible dust concentrations in air
Precautionary Statement(s)	None

Hazards Not Otherwise Classified (HNOC) or Not Covered by GHS: Combustible Dust

NFPA Classification:		**HMIS Classification:**	
Health:	**0**	**Health:**	**0**
Flammability:	**0**	**Flammability:**	**0**
Instability:	**0**	**Reactivity:**	**0**
Special Hazards:	No OSHA Hazards		

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Synonyms:	Vitamin C Sodium Salt
	L(+) – Ascorbic Acid Sodium Salt
Formula:	$C_6H_7NaO_6$
Molecular Weight:	198.11 g/mol
CAS-No.	134-03-2
EC-No	205-126-1

Ingredient	CAS #	EINECS#	Weight in Product %	Notes
(+)-Sodium L-ascorbate	134-03-2	205-126-1	97-100%	None
Proprietary Ingredient 1			<1%	None
Proprietary Ingredient 2			<1%	None
Proprietary Ingredient 3			<1%	None
Proprietary Ingredient 4			<1%	None

Other Information: The percentage by weight values reported for this product represent approximate formulation values

4. FIRST AID MEASURES

Inhalation: Move person to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

Ingestion: Never give anything by mouth to an unconscious person. Rinse mouth with water.
Skin Contact: Wash with soap and water. Get medical attention if irritation persists.
Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Most important symptoms and effects, both acute and delayed: The most important known symptoms and effects are described in Section 11
Indication of any immediate medical attention and special treatment needed: No data available

5. FIRE FIGHTING MEASURES

Flash Point, C: Not Applicable
Autoignition Temperature, C: Not Applicable
Lower explosive Limit, %: Not Applicable
Upper Explosive Limit, %: Not Applicable
Extinguishing Media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Fire Fighting Procedures: **S**elf-contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures:
Avoid dust formation. Avoid breathing vapors, mist or gas.
For personal protection see Section 8.
Environmental precautions: Do not let product enter drains.
Methods for cleaning up: Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling: Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed.
Conditions for safe storage, including any incompatibilities: Keep container tightly closed in a dry and well-ventilated place. Light sensitive.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Control Parameters: Contains no substances with occupational exposure limit values.
Exposure Controls:
Appropriate Engineering Controls: General industrial hygiene practice.
Personal Protective Equipment:
Eye/Face Protection: Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN166 (EU).
Skin Protection: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full Contact:	Material:	Nitrile Rubber
	Minimum Layer Thickness:	0.11 mm
	Break Through Time:	480 min
	Material Tested:	Dermatril ® (KCL 740 Aldrich Z677272)
Splash Contact:	Material:	Nitrile Rubber
	Minimum Layer Thickness:	0.11 mm
	Break Through Time:	480 min
	Material Tested:	Dermatril ® (KCL 740 Aldrich Z677272)

Data Source: KCL GmbH, D-36124 Eichenzell; phone: +49 (0)6659 87300; email: sales@kcl.de,; test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN374, contact the supplier of the CE approved cloves. This recommendation is adcisory only and must be evaluated by our customers. It should not be construed as offering an approval for any specific scenario.
Body Protection: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory Protection: Respiratory protection is not required. Wear protection from nuisance levels of dusts are desired, use type N95 (US) or P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of Environmental Exposure: Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Solid (solid crystalline powder).
Color:	No Data Available
Odor:	Odorless
Boiling Point, C:	No Data Available
Melting point:	220 °C (428 °F)
Solubility (in water)	No Data Available
pH:	No Data Available
Flash point:	No Data Available
Evaporation Rate:	No Data Available
Ignition temperature:	No Data Available
Flammability:	May form combustible dust concentrations in air
Vapor Pressure:	No Data Available
Vapor Density:	No Data Available
Relative Density:	No Data Available
Partition coefficient: n-octanol/water	No Data Available
Decomposition : Temperature:	No Data Available
Viscosity:	No Data Available
Explosive properties:	No Data Available
Oxidizing properties:	No Data Available
Lower explosion limit:	No Data Available
Upper explosion limit:	No Data Available

10. STABILITY AND REACTIVITY

Reactivity:	No data available
Stability Data:	Stable under recommended storage conditions.
Conditions/Hazards to Avoid:	Exposure to light.
Incompatibility (Materials to Avoid):	Strong oxidizing agents, Strong bases.
Hazardous Reactions:	Upon exposure to water vapor, chlorine dioxide gas is released.
Hazardous Decomposition Products:	**Hazardous decomposition products formed under fire conditions.** Carbon oxides, Sodium/sodium oxides.

11. TOXOLOGICAL INFORMATION

Acute toxicity:	no data available
Irritation and corrosion:	no data available
Sensitization:	no data available
Chronic exposure:	no data available
Signs and Symptoms of Exposure:	To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Carcinogenicity:

IARC:	No component of this product presents at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC
ACGIH:	No component of this product presents at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by ACGIH
NTP:	No component of this product presents at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by NTP.
OSHA:	No component of this product presents at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by OSHA

Potential Health Effects

Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.

Skin: May be harmful if absorbed through skin. May cause skin irritation.
Eyes: May cause eye irritation.
Ingestion: May be harmful if swallowed.

12. ECOLOGICAL INFORMATION

Toxicity	No data available.
Persistence and Degradability:	No data available.
Bioaccumulative Potential:	No data available.
Mobility in Soil:	No data available.
Results of PBT and vPvB Assessment	No data available.
Other Adverse Effects	No data available.

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Federal, state and local disposal laws and regulations will determine the proper waste disposal/recycling/reclamation procedure. All waste materials should be reviewed to determine the applicable hazards (testing may be necessary).

14. TRANSPORT INFORMATION

US Department of Transportation (US-DOT): Not dangerous goods
International Maritime Organization (IMO): Not dangerous goods
International Air Transport Association (IATA): Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards: No OSHA Hazards
TSCA Status: On TSCA Inventory
DSL Status: All components of this product are on the Canadian DSL list.
SARA 302 Components: SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components: SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
SARA 311/312 Hazards: No SARA Hazards.
Massachusetts Right To Know Components: No Components Listed.
Pennsylvania Right To Know Components: Sodium ascorbate, CAS-No.134-03-2.
New Jersey Right To Know Components: Sodium ascorbate CAS-No.134-03-2.
California Prop. 65 Components: This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Revision Number: 1/19
Section(s) Revised Emergency Contact Number
Prepared By: ClorDiSys Solutions, Inc

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. ClorDiSys Solutions, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, ClorDiSys Solutions, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

HMIS Rating

Health hazard:	0
Chronic health hazard:	0
Flammability:	0
Physical hazard:	0

NFPA Rating

Health hazard:	0
Fire hazard:	0
Reactivity hazard:	0

Safety Data Sheet CHEM-CD Part N

ClorDiSys Solutions, Inc **Material Safety Data Sheet**

Revision Date: 01/02/2019 **Date Printed:** 01/02/2019 **Date Reviewed:** 01/02/2019

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name: **Sodium Sulfite**

Chemical Name: Chemical Mixture

Product Use And Restrictions On Use: Paper manufacture, food additive, water treatment, waste treatment, other industrial processes.

Supplier: ClorDiSys Solutions, Inc
PO Box 549
Lebanon, NJ 08833

For Chemical Emergency Call PERS (24 Hours/Day, 7 Days/Week):
1-800-633-8253 (Domestic/Canada)
1-801-629-0667 (International)

2. HAZARDS IDENTIFICATION

GHS Classification Not Classified as Hazardous
Label Elements None Required

NFPA Classification:		**HMIS Classification:**	
Health:	**1**	**Health:**	**1**
Flammability:	**0**	**Flammability:**	**0**
Instability:	**0**	**Reactivity:**	**0**
		Personal Protection:	**E**

Special Hazards: No OSHA Hazards

3. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	CAS #	EINECS#	Weight in Product %	Notes
Sodium Sulfite	7757-83-7	231-821-4	97 %	None
Sodium Sulfate	7757-82-6		< 3%	None

Other Information: **Toxicological Data on Ingredients:** Sodium sulfite: ORAL (LD50): Acute: 820 mg/kg [Mouse.]. 3650 mg/kg [Rat].

Trace impurities and additional material names not listed above may appear in Section 15 of this SDS. These materials may be listed for local "Right-to-Know" compliance and for other reasons. The exact concentrations are trade secret.

4. FIRST AID MEASURES

Inhalation: Move person to fresh air. Aid in breathing, if necessary. Get immediate medical attention if signs of suffocation, irritation or other symptoms develop.

Ingestion: If conscious, immediately rinse mouth with water and give 1 glass of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get immediate medical attention.

Skin Contact: Flush skin with plenty of soap and water. Remove contaminated clothing and shoes and launder before reuse. Get medical attention if irritation persists.

Eye Contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Check for and remove any contact lenses within 5 minutes if you can do so easily, and continue rinsing. Get medical attention if irritation persists.

Most Important Symptoms/Effects Acute and Delayed: May irritate the skin May cause irritation to the eyes. Harmful if swallowed or ingaled. May cause severe and possibly fatal allergic reactions if inhaled or swallowed by some asthmatics and over 'sulfite-sensitive' individuals. Reacts with acids to form toxic and irritating sulfur dioxide gas.

Indication of Immediate Medical Attention and Special Treatment, If Needed: Treat symptomatically. Note potential for anaphylactic shock with allergic individuals.

5. FIRE FIGHTING MEASURES

Suitable (and Unsuitable) Extinguishing Media:

Material is not flammable. Use extinguishing media appropriate for material in surrounding fire.

Specific Hazards Arising From the Chemical:

Releases tocxic and irritating sulfur dioxide at fire temperatures.

Special Protective Equipment and Precautions for Fire-Fighting:

Wear special NIOSH-approved self-contained breathing apparatus. Use water spray to keep conditions cool and to knock down vapors or gasses.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures:

Provide ventilation to clear sulfur dioxide fumes which may be generated by contact with water. Wear appropriate personal protective equipment.

Environmental precautions:

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

Methods and Materials for Containment and Cleaning Up:

Promptly sweep up material with minimum dustiong and shovel into an empty container with a cover. Rinse spill area with plenty of water.

7. HANDLING AND STORAGE

Precautions for Safe Handling:

(see section 8 for recommended personal protective equipment). Avoid contact with skin, etes and clothing. Do not breathe dust. Do not eat or drink in the work area. Use normal personal hygiene and housekeeping. Keep away from acid and oxidizing agents.

Conditions for Safe Storage, Including any Incompatablities:

Store in a cool, dry, well-ventilated place away from acids and oxidizing

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Guidelines:

Ingredient Name	ACGIG TLV	OSHA PEL	Other Limit
Sodium Sulfite	None	None	None
Soduim Sulfate	None	None	None

Other Exposure Limits for Potential Decomposition Products:

Sulfur Dioxide: OSHA TWA = 5 ppm
ACGIH STEL = 0.25

Appropriate Engineering Controls:

Local exhaust if dusty conditions exist or if there is a release of sulfur dioxide gas. Do not use in unventilated spaces, e.g. holds of fishing boats, walk-in coolers or confined spaces.

Personal protective equipment

Respiratory Protection: Where required use a NIOSH-approved respirator for dust, mist and/or sulfur dioxide gas, as conditions indicate. Some exposures may require a NIOSH-approved self-contained breathing

apparatus or supplied-air respirator. Equipment selection depends on containment type and concentration. Select in accordance with 29 CFR 1910.134 and good industrial hygiene practice

Skin Protection: For handling dry material, wear rubber gloves and full work clothing, including long sleeved shirt and trousers. When handling solutions and there is prolonged or repeated contact, wear impervious gloves, clothing and boots.

Eye protection: Wear chemical safety glasses

Additional Recommendations: Eyewash and safety shower are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Solid (solid crystals or powder).
Color:	White to pale yellow.
Odor:	Odorless.
Odor Threshold:	Not determined.
Molecular Weight:	126.04
Chemical Formula:	**Na_2SO_3**
Relative Density (H_2o = 0)	2.63
Solubility in Water (weight %):	**17% at 10°C; 28% at 33.3°C**
Boiling Point, C:	Not applicable.
Melting/Freezing point:	Decomposition temperature: >900°C.
pH:	5% solution- 9.8.
Vapor Pressure:	Not Applicable.
Vapor Density(air = 1.0):	Not Applcable.
Evaporation Rate:	Not Applicable.
% Volatiles:	Not Applicable.
Partition Coefficient:	Not Applicable.
Viscosity:	Not Applicable.
Flash Point:	Not Flammable.
Flash Point Method:	Not Applicable.
Autoignition Temperature:	Not Applicable.
Upper Flame Limit:	Not Applicable.
Lower Flame Limit:	Not Applicable.
Decomposition Temperature:	Not Determined.
Flammability (solid, gas):	Not Flammable.
OSHA Flammability Class:	Not Applicable.

10. STABILITY AND REACTIVITY

Reactivity:	Not normally reactive.
Chemical Stability:	Normally stable.
Possibility of Hazardous Reactions:	Reacts with acids to form toxic and irritating sulfur dioxide gas.
Incompatibility (Materials to Avoid):	Reactive with oxidizing agents, combustible materials, organic materials, acids.
Conditions of Instability:	Avoid elevated temperatures. Temperatures above 900°C cause the rapid evolution of toxic and corrosive sulfur dioxide gas and hazardous residue.
Hazardous Decomposition Products:	Sulphur Dioxide and Sodium Sulfide Residue. Sodium Sulfide is flammable, a dangerous fire risk, a strong irritant to skin and tissue, and is incompatible with acids.

11. TOXOLOGICAL INFORMATION

Potential Health Hazards

Acute Effects of Exposure:

Skin: Repeated or prolonged contact with dust may cause irritation. Contact with solutions will cause skin irritation.

Eyes: Dust or mist may irritate the eyes. Solutions will irritate or burn.

Inhalation: Inhalation of dust or mist can irritate the respiratory tract. May cause severe or deadly allergic reactions in some asthmatic and sulfite sensitive individuals. Possible signs and symptoms of allergic reactions include bronchoconstriction, sweating, flushing, hives, rapid heart rate,

decreased blood pressure, and anaphylaxis. Contact with acids releases sulfur dioxide gas which may be harmful or deadly if inhaled.

Ingestion: May irritate the gastrointestinal tract. May cause severe or deadly allergic reactions in some asthmatics and sulfite sensitive individuals. Large doses may cause violent colic and diarrhea, circulatory disturbances, central nervous system depression, and even death.

Chronic Effects: None known.

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

Ingredient Name	NTP Status	IARC Status	OSHA List
No ingredients listed in this section.	-----	------	------

Numerical Measures of Toxicity:

Immediate (Acute) Effects:

Sodium Sulfite- LD_{50} (oral, rat) = 2610-6400 mg/k; LC_{50} (inhalation, rat) > 5.5 mg/L/4 hr.; LC_{50} (inhalation, rat) >22 mg/L./1 hr.

Sodium Sulfate- LD_{50} (oral, rat) > 10,000 mg/kg

Delayed (Subchronic and Chronic) Effects:

Sodium sulfite has been demonstrated to be mutagenic in microbial systems; however, it is not mutagenic in studies involving insects and is not considered to present a mutagenic threat to multi-cell organisms.

Other Data:

None

12. ECOLOGICAL INFORMATION

Ecotoxicity:

The following ecotoxicity data is available for Sodium Sulfite:

Daphnia magna LC_{50} 48 hr	440 mg/L
Western Mosquitofish LC_{50} 96 hr	460 mg/L
Biological Oxygen Demand (BOD)	0.12 lb/lb, instantaneous

The following ecotoxicity data is available for Sodium Sulfate:

Daphnia magna LC_{50} 48 hr	2,564 mg/L
Western Mosquitofish LC_{50} 96 hr	3,710 mg/L

Persistence and Degradability:

No data available.

Bioaccumulative Potential:

No data available.

Mobility in Soil:

No data available.

Other Adverse Effects:

No data available.

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded?	No
If yes, the RCRA ID Number is:	N/A
Other Disposal Considerations:	Dispose of in accordance with applicable Federal, State and Local regulations.

The information offered in Section 13 is for the product as shipped. Use and/or alterations to the product such as mixing it with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US Department of Transportation (US-DOT): Not regulated.
US-DOT ID Number: Not applicable.
Proper Shipping Name: Not applicable.

For additional information on shipping regulations affecting this material, contact the info number found in Section 1.

15. REGULATORY INFORMATION

Toxic Substances Control Act (TSCA)
TSCA Inventory Status: **All components are listed on TSCA Inventory of Chemical Substances**
Other TSCA Issues: **None.**

SARA Title III/CERCLA
"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities"

Ingredient Name	SARA/CLERCLA RQ (lb)	SARA EHS TPQ (lb)
No ingredients listed in this section.	-----	-----

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee. Many states have more stringent regulations. Report all spills in accordance with local, state and federal regulations.

SECTION 311 HAZARD CLASS: Not hazardous.
SARA 303 TOXIC CHEMICALS: Not available

State Right-To-Know Not available.
California Proposition 65: This product does not contain any ingredients known to the State of California to cause cancer and/or reproductive harm
Additional Regulatory Information: None
WHMIS Classification (Canada): D2B
Foreign Chemical Control Inventory Status: Listed on Canadian DS:, Australian AICS, Philippines PICCS, Chinese IECSC, Japanese MITI, Korean KECL, and EU EINECS.

16. OTHER INFORMATION

Revision Number: 1/19
Section(s) Revised Emergency Contact Number
Prepared By: ClorDiSys Solutions, Inc

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. ClorDiSys Solutions, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, ClorDiSys Solutions, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

Product Safety Information Sheet

Document:	9030167	Date of revision:	21.07.2020
Version:	07/2020	Supersedes:	Version 04.09.2019
Format:	Dräger-Tubes™ (which are classified as dangerous goods, PG III)_various_PSIS_st_167e_04.09.2019.doc	Status:	released

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Trade name: **Dräger-Tubes™ (which are classified as dangerous goods, PG III)**
Part nos. : various

1.2 Use of the substance/preparation:

Detection of gases, measuring of gas concentrations.

1.3 Company/undertaking name:

Dräger Safety AG & Co. KGaA
Revalstr. 1
D-23560 Lübeck
Telephone number +49 451/882-0
Fax number +49 451/882-2080
Contact for information: Dräger Environmental Management
Telephone number +49 451/882-6979
Fax number +49 451/882-76979

1.4 Emergency telephone: **+49 451/882-2395**

1.5 Relevant products:

Part-No.	Trade Name	Part-No.	Trade Name
64 00 901	1000 DT Alco-Check 0.5 Bulk	CH 19 701	Carbon Monoxide 8/a
64 00 441	1000 DT Alco-Check 0.8 Bulk	81 01 791	Carbon Tetrachloride 0,2/b
64 00 701	Alco-Check 0,8	67 28 861	Chloroform 2/a
64 00 681	Alco-Check 0.4	81 03 671	Cyclohexane 40/a
64 00 721	Alco-Check 0.5 20 Test/ Display	81 03 541	Ethyl Formate 20/a
64 00 731	Alco-Check 0.5 Single Pack	64 00 501	Gasoline Detektor
64 00 700	Alco-Check 0.8 Single Pack	81 03 681	Hexane 10/a
CH 00 199	Alcotest Box of 10 English	81 03 571	Hydrocarbons 0.1 %/c
CH 00 201	Alcotest Box of 10 French	81 03 581	Hydrocarbons 2/a
CH 00 222	Alcotest Pack of 10	67 28 161	Methyl Acrylate 5/a
CH 00 225	Alcotest, Box of 3	64 00 491	Motor Fuels Detector
CH 00 237	Alcotest-Tubes (10 Pieces)	67 28 371	Oil 10/a-P
81 03 691	Benzene 0,25/a	67 33 031	Oil Mist 1/a
81 01 841	Benzene 0,5/c	81 03 111	Oil PN
81 03 641	Benzene 1/a	67 28 081	Oxygen 5 %/B
81 01 741	Benzene 15/a	81 03 261	Oxygen 5 %/C
81 01 231	Benzene 2/a	81 03 511	PID-Pre-filter Tube Benzene
67 28 071	Benzene 5/b	CH 28 401	Polytest
67 28 351	Carbon Disulphide 5/a	CH 00 270	Respiratory CO-Test Unit
CH 29 901	Carbon Monoxide 0.3 %/b	67 33 141	Styrene 10/b
CH 20 601	Carbon Monoxide 10/b	81 03 501	Tetra 0,1/a
67 33 051	Carbon Monoxide 2/a	67 33 161	Xylene 10/a
67 28 511	Carbon Monoxide 5/a-P		
CH 25 601	Carbon Monoxide 5/c		

2. Hazards identification

2.0 Generell information:
Dräger-Tubes™ are articles which are not subject to labelling. The requirements of EC regulations 1907/2006 (Reach) and 1272/2008 (GHS/CLP) do not apply to such products. Hence, the information in this Product Safety Information Sheet is purely voluntary!

2.1 Classification: n.a.
"Nature of hazard": n.a.
"H302", "H312", "H332"
"H314"
"H318"

2.**2 Particular hazards for man and environment:**
These products are non-flammable, granulate filled glass tubes. Improper handling, leaks, and/or damage to the tubes may release strong caustic/corrosive and/or irritant/harmful granulate material in solid form.
The chemicals and preparations in the detector tubes may cause different irritation, injury or corrosive damage to the skin, eyes, gastrointestinal tract and may cause corrosive damage to the respiratory tract. If the glass tubes are broken, the sharp edges may cause cuts or scratches.

3. Composition/Information on ingredients

3.1 Chemical characterisation (constituent):
not applicable

3.2 Chemical characterisation (preparation):
Dräger-Tubes™ are glass tubes usually containing small amount of inert carrier materials which have been impregnated with different chemicals. In the following table such chemicals are listed; for detailed information about the ingredients in the different tubes please see the Dräger-Tubes™/CMS Handbook.

EINECS / ELINCS-No.	CAS-No.	Designation acc. to the EC Regulation	Content*	Unit	GHS-Pictogram	H-Phrases
n/a	n/a	Chromium(VI) salts	<1	w/w per cent	GHS06, GHS09	H301, H312, H315, H317, H318, H330, H335, H400, H410
202-088-8	91-66-7	N,N-Diethylaniline	0-0.2	w/w per cent	GHS06, GHS09	H301, H311, H330, H331, H373, H411
n/a	n/a	Formaldehyde	0-0.5	w/w per cent	GHS07	H302, H315, H317, H319, H332, H335,
n/a	n/a	Hydrochloric acid	< 9	w/w per cent	GHS05	H314, H335
206-114-9	78036-57-8	Hydrazine-Hydrate	0-1	w/w per cent	GHS06, GHS09	H301, H311, H314, H317, H330, H331, H400, H410
234-740-2	12029-98-0	Iodinepentoxide	0-0,5	w/w per cent	GHS07	H315, H319
n/a	n/a	Palladium compounds	0-0,5	w/w per cent	GHS05	H314
202-429-0	95-53-4	o-Tolidine	0-0,0005	w/w per cent	GHS06, GHS09	H302, H411
n/a	n/a	Selenium salts	<1	w/w per cent	GHS06, GHS09	H330, H331, H373, H400, H410
n/a	n/a	Sulphuric acid	< 9	w/w per cent	GHS05	H314, H290
n/a	n/a	Fuming sulphuric acid	< 9	w/w per cent	GHS05	H314, H290
n/a	n/a	Titanium salts	0-5	w/w per cent	GHS05	H314
---	100-10-7	4-Dimethylaminobenzaldehyd	0-2	%	./.	---

* based on the gross weight of the Draeger Tube™. -

The information contained in this Product Information Sheet is applicable to the hazardous contents of the Draeger Tubes™.

3.3 Other information:
Dräger-Tubes™ are closed glass tubes which are filled with several preparation layers. The preparation layers are usually fixed by holding and separative elements within the glass tube. Partially the Dräger-Tubes™ contain filled glass ampullas also with reactive liquids.
Substancial ingredients in preparations used for the Dräger-Tubes™:
- inorganic acid,
- inorganic salts, and
- organic chemicals/indicators in small quantities and in concentrations below the limit for marking-requiring in acc. to the German GefStoffV.

Substantial ingredients of the ampullas used in the Dräger-Tubes™:
- inorganic acids,
- organic solvents.

Dräger-Tubes™ contain no ozone-depleting chemicals and no volatile organic chemicals (except special ampoules). During the manufacturing process for the Dräger-Tubes™ (except special calibration procedures) no ozone-depleting chemicals (group I-IV of the Montreal Protocol) were used.

4. First-aid measures

4.1 After inhalation:
If dusts of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.

4.2 After contact with skin:
Wash with plenty of water. Tube contents can be neutralized with lime and water, or rinsed with plenty of water, then treated with polyethylene glycol 400. If irritation persists, get medical advice. Discard any shoes or clothing items that cannot be decontaminated.

4.3 After contact with the eyes:
Immediately flush eyes with plenty of water (for at least 15 minutes), while holding eyelids open. Seek medical advice at once. Danger of corneal clouding.

4.4 After ingestion:
If the material is swallowed, get immediate medical attention or advice. Do not induce vomiting (Danger of perforation!).

4.5 Information for the doctor:
After ingestion there is a danger of the oesophagus and the stomach becoming perforated.

5. Fire-fighting measures

5.1 Suitable extinguishing media:
Dry chemical, carbon dioxide. Adapt extinguishing media to the environment. Materials in the glass tubes are non-flammable. Avoid direct contact of this product with water since this may cause an exothermic reaction.

5.2 Extinguishing media which must not be used for safety reasons:
not checked

5.3 Special exposure hazards arising from substances or preparation itself, combustion products, resulting gases:
Non-Flammable. Thermal decomposition of the tube contents may produce weak amount of harmful, irritant or toxic gases (sulphur oxides, carbon monoxide, etc.). When using water as an extinguishing media, take care of the resulting slight acidic fire-fighting water.
Contents of the tubes are corrosive to the eyes, skin, gastrointestinal tract and may cause irritation to the respiratory tract. Improper handling, leaks, and/or damage to the tube may release caustic granulate material in solid form. From the contents of the tubes small quantities of corrosive or toxic gases could be released by thermal decomposition or burning.

5.4 Special protective equipment for fire-fighters:
Recommendation: Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

6. Accidental release measures

6.1 Personal precautions:
Do not inhale released vapour, fumes, or dusts from the spilled material. Do not allow spilled materials to contact eyes or skin, use protective gloves (e.g. PE/PP, Latex, rubber) resistant against acidic materials and safety goggles. Isolate area. Keep unnecessary personnel away. Use dust mask with P2/FFP2 filters.

6.2 Environmental precautions:
Block any potential routes to water systems. Do not discharge into the sewer system. Do not allow to enter drains/surface water/groundwater.

6.3 Methods for cleaning up:
Sweep up dry while avoiding formation of dusts. Do not pick up glass with bare hands. Dilute tube contents with water and baking soda. Shovel material into appropriate container for disposal. Thoroughly wash the area with water after a spill or leak clean-up. Sweep up or scrape broken tubes into container for disposal.

6.4 Additional information:
Follow all Local, State, Federal and Provincial regulations for disposal.

7. Handling and storage

7.1 Handling:

Precautions for safety handling:	Observe the Instructions for Use.
Information for protection against fire and explosion:	These products are non-flammable.

7.2 Storage:

Requirements for storage and containers:	Keep containers tightly closed and dry. Do not store at temperatures exceeding 77°F (25°C). Handling according to the Instructions for Use. Store the product in the original packaging. The expiry date on the packaging must be considered.
Information on storage together with other materials:	Observe VCI-concept for storing chemicals.
Further information on storage conditions:	Contents are corrosive. Avoid contact with water. Open tubes should be stored in the container in a well ventilated area until they are disposed of.
Storage class:	LGK 8 (recommendation) (VCI-Concept)

7.3 Certain application:
n/a

8. Exposure controls/Personal protection

8.1 Components with exposure limit values:
Some, in relation to the chemicals in the tubes (see Section 2). But with normal handling of the Dräger-Tubes™ there should be no exposure to contents. However, if exposure does occur, follow the national exposure limits for the relevant chemicals. For detailed information about the ingredients in the different tubes, please see the Dräger-Tubes™ -/CMS Handbook.

EC, Land	CAS-No.	Description of material	Type	Content	Unit
D	7664-93-9	Sulphuric acid	MAK	0,1 E**	mg/m³
UK	7664-93-9	Sulphuric acid	TLV	[1]	mg/m³
EU	7664-93-9	Sulphuric acid	TLV	0,05	mg/m³
D	n/a	Chromium(VI) compounds	TRK	./.	./.
D/EU/UK	1333-82-0	Chromium trioxide	EU	Carc. Cat 1 / S	./.
D/EU/UK	7778-50-9	Potassium dichromate	EU	Carc. Cat 1 / Muta. Cat. 2 / S	
		E = inhalable fraction	MAK = German TLV		

		Carc. Cat 1 = Carcinogen to human body			
		Carc. Cat 2 = Carcinogen to human body is possible.			
		Muta. Cat 2 = Reproductive toxic to human body is possible.			
		S = Hazard of sensitization			

8.2 Exposure controls:

8.2.1 Occupational exposure controls:
General protection and hygiene measures:
With normal handling of the Dräger-Tubes™ there should be no exposure to contents. However, if exposure does occur, follow the exposure limits.
Use good industrial hygiene practice.

Personal protection:

8.2.1.1 Respiratory protection:
Not necessary when handled according to the Instructions for use.

8.2.1.2 Hand protection:
With normal handling of the Dräger-Tubes™ there should be no exposure to contents. In case of accidents use suitable protective gloves made from PE/ PP, Latex, butyl or nitrile rubber. Please observe the glove manufacturers instructions on permeability and rupture times as well as the specific workplace conditions.

8.2.1.3 Eye protection:
Not necessary when handled according to the Instructions for use.
Recommendation: Wear safety glasses with side shields.

8.2.1.4 Skin protection:
Prophylactic skin protection is recommended. Wash thoroughly after handling. Skin care.

8.2.2 Additional information on plant design:
Handling according to the Instructions for Use.

9. Physical and chemical properties

9.1 General information:

Form:	Glass tubes containing colourless and/or coloured solids.
Colour:	various
Odour:	slightly pungent/odourless

9.2 Important information about the protection of health, safety and the environment:

		Method (67/548/EEC):
Solubility:		n/a
pH-value:		n/a (acidic reaction)
Boiling point:		n/a
Melting point:		n/a
Flame point:		n/a
Inflameability:		n/a
Explosion limits:		
	lower:	n/a
	upper:	n/a
Ignition temperature:		n/a
Vapour pressure:		n/a
Mass density:		n/a
Further information:		n/a

9.3 Other information
n/a

10. Stability and reactivity

General information:
Stable under normal conditions and appropriate commerce.

10.1 Conditions to avoid:
Do not mix other substances with contents of tubes. Avoid contact with water. Stable under normal conditions. Hazardous polymerisation will not occur. Do not store above 25°C (77°F).

10.2 Materials to avoid:
Tubes contents react with bases. Possibility of an exothermic reaction.

10.3 Hazardous decomposition products:
Decomposition of the granulate in the tubes may produce toxic substances (e.g. sulphur oxides).

Possibility of a dangerous exothermic reaction:	Avoid contact with bases/water, tube contents may react with bases and water in an exothermic reaction.
Dangerous products of decomposition at contact with water:	Acids and solutions of (heavy) metal salts

10.4 Further information:
n/a

11. Toxicological information

11.1 Toxicity tests:
Classification-relevant LD/LC_{50}-values: No toxicity data are available for the contents of the tubes (carrier materials impregnated with different chemicals!).

11.1.1 Specific symptoms in animal studies: No data are available.

11.1.2 Irritant/corrosive effects: Irritant and corrosive effects of the contents of the tubes cannot be excluded.

11.1.3 Sensitization: Sensitisation effects of the contents of the tubes cannot be excluded.

11.1.4 Subacute and chronical toxicity:
Experiments: No data are available.
Species: No data are available.

11.1.5 Carcinogenic, mutagenic and reproductive toxic effects:
No data are available. See Section 11.3

11.1.6 Further information:
For detailed information about the ingredients in the different tubes and their hazards, please see the Dräger-Tubes™-/CMS Handbook and section 2.

11.2 Effects on human body/Experiments made in practice:

after inhalation:
Inhalation of dusts from the tube contents would cause irritation or injury to the respiratory system.
after ingestion:
Product contents would be harmful or fatal if swallowed. This product produces corrosive damage to the gastrointestinal tract if swallowed.
after eye contact:
Eye contact with contents of the tubes causes corrosive damage with irritation, and possible eye injury.
after skin contact:
Skin contact with the contents of the tubes may cause corrosive damage with irritation.

11.3 Additional toxicological information:
The toxicity of the impregnated carrier material contained in the tubes has not been tested in detail. With respect to the chemicals used for the impregnation these material should be handled in the same way as the pure chemicals. They may cause sensitisation, irritation or injury to the skin, eyes and mucous membrane. Carcinogenic, mutagenic and reproductive toxic effects can not be excluded, because some of the impregnation chemicals in pure form are classified accordingly.

Further information:
If the glass tube is broken, the sharp edges may cause cuts or scratches.

12. Ecological information

12.1 Ecotoxicity:
No ecotoxicity data are available for the preparations/components in the Dräger-Tubes™.

12.2 Mobility:
No data are available

12.3 Persistence and degradability:

Biological decompositionability:	No data are available
Behaviour in purification plants:	No data are available

12.4 Bioaccumulative potential:
No data are available

12.5 Other adverse effects:
No data are available

12.6 Additional information:
Dräger-Tubes™ themselves and also the chemical preparations/components in the tubes shouldn´t be released into water because the chemicals on the carrier material could be dissolved and then contaminate the water. Normally water extracts from the impregnated carrier materials have a low pH-value and contain small amounts of the chemicals used for impregnation. So, it would be expected to produce ecotoxicity upon exposure to aquatic organisms and aquatic systems. Dräger-Tubes™ themselves and the chemical preparations/components in the tubes are not expected to accumulate in the food chain.

13. Disposal considerations

13.1 Product (recommendations):
If discarded, wastes may be classified as corrosive waste or reactive waste. Do not allow this material to drain into sewers/water supplies. Waste must be handled in accordance with all federal, state, provincial, and local regulations. Dräger-Tubes™ must be disposed in accordance with local waste disposal regulations. If discarded, wastes may be classified as hazardous waste.

European waste code:	17 02 04*
Waste designation:	Glass, plastic and wood containing or contaminated with dangerous substances.
Obligation to prove correct disposal:	yes

13.2 Not cleaned packaging material (recommendations):
The disposal of plastic containers and cardboard packages is possible by waste code 15 01 02, and fibre board boxes by waste code 15 01 01.

14. Transport information

14.1 Road transport ADR/RID and GGVSE (cross-border/domestic):

UN-No.:	3260	Class:	8	Packing group:	III
Name:	Corrosive solid, acidic, inorganic, n.o.s. (Sulphuric acid, mixt.)			Classification code:	C2
Remarks:	Dräger-Tubes™ could be shipped in "Excepted Quantities" according to Code E1				

14.2 Marine transport IMDG-Code/GGVSee:

UN-No.	3260	Correct technical name:		Corrosive solid, acidic, inorganic, n.o.s. (Sulphuric acid, mixt.)	
Class:	8	Sub risk:	./.	Packing group:	III
EmS-No.:	F-A, S-B			MFAG:	./.
Marine pollutant:	./.				
Remarks:	Dräger-Tubes™ could be shipped in "Excepted Quantities" according to Code E1				

14.3 Air transport ICAO-TI und IATA-DGR:

UN-No.	3260	Proper shipping Name:	Corrosive solid, acidic, inorganic, n.o.s. (Sulphuric acid, mixt.)		
Class	8	Sub risk:	./.	PG:	III
Remarks:	Dräger-Tubes™ could be shipped in "Excepted Quantities" according to Code E1.				

14.4 Transport/further information:

May be sent by post.

15. Regulatory information

15.1 Labelling according to EC Regulations:

Hazardous symbols and indicators of danger for dangerous substances and preparations: No labelling necessary.
Hazardous components to be indicated on label: contains: n/a

H-Phrases:
n/a
P-Phrases (recommendation):

P102	Keep out of reach of children.
P302+P352	IF ON SKIN: Wash with plenty of water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.

15.2 National regulations:

Additional classification acc. to GefStoffV Annex II No. (only if differing from EC classification): n/a
Restrictions of occupation: n/a
Statutory order on hazardous incidents: n/a
Water pollution class: 2 (self-classification)
Information according 1999/13/EC about limitation of emissions of volatile organic compounds (VOC-guideline):
Further regulations, restrictions, and prohibition regulation:
(such as principles of industrial medicine and health and safety regulations)
Instruction Sheet BG-Chemie (Chemical Professional Association):
Other state regulations may apply. Check individual state requirements.

16. Other information

Use of the substance / preparation:
See section 1.2; additional information in the Instructions for Use.

Relevant H-Phrases:

H290	May be corrosive to metals
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H331	Toxic if inhaled.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Comments:
n. a.; n/a; ./. : not applicable

MAC:	Maximum allowable concentration
COD:	Chemical oxygen demand
BOD:	Biochemical oxygen demand
EWL:	European waste list
EU	European Union
VOC:	Volatile organic compounds
VCI:	Verband der Chemischen Industrie e.V. (Association of the German chemical industry)
WGK:	German water hazard class

Further information:
The above information represents our current state of experience and describes the product only with respect to safety requirements. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. It is the responsibility of the customer to test whether the product is suitable for the purpose intended by the customer.
Any questions of warranty and liability for this product are subject to our General Terms and Conditions unless legislation imperatively provides otherwise.

Product information sheet issued by: Global EHS Management
Contact: Dr. Michaela Schatz, michaela.schatz@draeger.com

Changes to preceding version: changes in section 1.3 and 13.

dynarex Corporation

TILLOTSON™ HEALTHCARE CORPORATION
"Your First Choice For Gloves"

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Reviewed on 4/5/16

Safety Data Sheet

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Instant Cold Packs
Product Use:	An economical, one time use disposable product that promotes faster healing for the treatment of bruises, cuts, lacerations, sprains, minor burns, sinus & tension headaches, insect bites and toothaches.
Product Codes:	4511-4512-4515
Responsible Party:	Dynarex Corporation 10 Glenshaw Street Orangeburg, NY 10962
Emergency or Information Phone No.:	(888)-DYNAREX or 845-365-8200 (Mon – Fri). At other times, contact the local Poison Control Center.

EMERGENCY OVERVIEW

Emergency Telephone Numbers:
Local Emergency Center

Health Hazards: Dry chemical of cold pack is an eye and skin irritant. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Physical Hazards: Dry chemical is an oxidizer. Oxidizers can support combustion. Contact may increase flammability of other materials. Avoid contact with clothing and other combustible material.

- Physical Form: Solid/Liquid
- Appearance: White solid in water bag
- Odor: None

National Fire Protection Association (U.S.A.)

Telephone: (845) 365-8200 * **Website:** www.dynarex.com
Toll Free: (888) DYNAREX * **Website:** www.thcnet.com
Fax: (845) 365-8201

SECTION 2. HAZARDS IDENTIFICATION

OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	:	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
GHS label elements		
Hazard pictograms	:	
Signal word	:	Warning
Hazard statements	:	Causes serious eye irritation.
Precautionary statements		
Prevention	:	Wear eye or face protection. Wash hands thoroughly after handling.
Response	:	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
Storage	:	Not applicable.
Disposal	:	Not applicable.
Hazards not otherwise classified	:	None known.

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

List 1, The composition of the product.

Chemical Name	Percent (by weight)	CAS No.	EC#	MITI No.
Calcium Ammonium Nitrate (with crystal water)	≤40%	15245-12-2	Unlisted	-
Water	≧50%	7732-18-5	Unlisted	-

Note: Calcium Ammonium Nitrate (with crystal water) is a compound and its ingredients are listed in List 2.

List 2, TheIngredients of Calcium Ammonium Nitrate

Chemical Name	CAS No	Percent	Hazardous
Calcium Nitrate With Crystal Water	10124-37-5(Anyhdrous)	81%	No
Ammonium Nitrate With Crystal Water	13477-34-4(Tetrahydrate)	7%	No
Crystal water		12%	No

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SECTION 4. FIRST AID MEASURES

Inhalation: Remove to fresh air. Get medical attention if ill effects occur.
Ingestion: If swallowed, do not induce vomiting, give several glasses of water or milk to drink. If large amounts were swallowed or symptoms occur, get medical advice. Never give anything by mouth to an unconscious person

Skin Contact : Wash the affected area with soap and water
Eye Contact: Immediately flush eyes with plenty of water for at least 15minutes, lifting uper and lower eyelids occasionally. Get medical attention if irritation persists.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.

If substance is not directly involved in the fire, use the best means available to extinguish the fire.

If substance is involved in the fire, use plenty of water. Do not use chemical extinguishers or foams or attempt to smother the fire with steam or sand.

Open doors and windows of the store to give maximum ventilation. Do not allow molten substance to run into drains. Prevent contamination of the substance by oils or other combustible materials. If water containing fertilizer enters any drains or watercourse, inform the local authorities immediately.

In the event of a fire, wear full protective clothing and approved self-contained breathing apparatus, if fumes are being entered.

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SECTION 6. ACCIDENTAL RELEASE MEASURES

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.

Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

SECTION 7. HANDLING AND STORAGE

General Information: This product should be stored, handled and used in accordance with good industrial hygiene practices and in conformity with any legal regulation. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Storage: Store in a closed container. Store in a cool, dry, and well-ventilated area and keep away from incompatible substances, food, drink and dust/impurities. Inspect regularly for deficiencies such as damage or storage area should be equipped with the corresponding species and quantity of fire equipment and leakage emergency equipment. Store protected from moisture.

Handling: Ensure good local exhaust ventilation. Handle and open container with care. Keep container closed and away from incompatible substances, food, drink and dust/impurities. Protect from humidity and water. Minimize dust generation and accumulation. Avoid dust contact with eyes. Avoid breathing dust and fume. Avoid ingestion. Remove contaminated clothing and wash before reuse. Empty containers retain product residue. The work area should be equipped with the corresponding species and quantity of fire equipment and leakage emergency equipment.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limit: No exposure limits is listed for this product.

Monitoring Methods: No information found.

Engineering Controls: Use adequate ventilation to keep airborne concentrations low. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment:

- Eyes: Dust service goggles should be worn to prevent mechanical injury or other irritation to eyes due to airborne particles which may result from handling product.
- Skin and Clothing: Wear appropriate protective clothing, and gloves to prevent skin contact.
- Respirators: An appropriate respirator or mask should be used whenever workplace conditions warrant a respirator's use. A full face positive pressure supplied-air respirator of a self contained breathing apparatus should be used when large spilled or fire.
- Other Protection: To maintain good health habits. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: White granules

Odor: Odorless.

Molecular Formula: $5Ca(NO_3)_2.NH_4NO_3.10H2O$

Molecular Weight: 1080.71

Water Solubility: Soluble in water.

Bulk Density: Normal between 1000-1200kg/m3.

PH : 5.0(1%aqueous solution)

%Volatiles by volume/ 21℃(70F): No information found.

Boiling Point: No information found.

Melting Point: 100-104℃

Decomposition Temperature: No information found.

Flash Point (closed cup): No information found.

Explosion Limit: No information found.

Vapor Density (Air=1): No information found.

Vapor Pressure: (mm Hg) No information found.

Usage: Physical hot and cold therapy.

SECTION 10. STABILITY AND REACTIVITY

Stability: Stable under ordinary conditions of use and storage.

Reactivity: No information found..

Conditions to Avoid: Incompatible materials, dust generation.

Incompatibilities with Other Materials: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Hazardous Polymerization: No.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological Information:

Oral rat LD50:>2000mg/kg.

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SECTION 12. ECOLOGICAL INFORMATION

Environmental date: No information found.
Environemental Toxicity: No information found.
Ecological Degradation: Not available.
Biology D egradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

SECTION 13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Dispose of container and unused contents in accordance with state and local requirements.

SECTION 14. TRANSPORT INFORMATION

Not regulated as a hazardous material for transportation. (TDG; IMDG CODE; IATA DGR)
UN Number: N/A
UN Proper Shipping Name: N/A
UN Classification: N/A
Packing Group: N/A
Packaging Sign: N/A
Transport Fashion: N/A

SECTION 15. REGULATORY INFORMATION

Regulatory Information: Reference to the local, national, US, EU, CA, Japan and international regulations.

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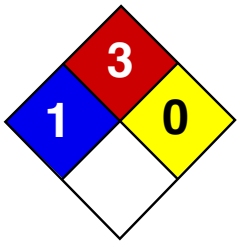
Fax: (845) 365-8201

SECTION 16. OTHER INFORMATION

Disclaimer:
This Safety Data Sheet, which takes into consideration the requirements of Directive 76/768/EC and subsequent amendments and Directive 1999/45/EC plus subsequent amendments, has been prepared in accordance with Directive (EC) 1907/2006. It is believed to be correct and corresponds to the latest scientific/technical knowledge but all data, instructions, recommendations and/or suggestions are made without guarantee. No warranty, expressed or implied, is made and Dynarex Corp. assumes no legal responsibility or liability resulting from its use.



Isopropyl Alcohol, 70%
Safety Data Sheet

Section 1: Chemical Product and Company Identification

Product Name: Isopropyl Alcohol, 70%

Catalog Codes: 201

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Isopropyl alcohol; Water

CI#: Not available.

Synonym: 2-Propanol, 70%; Isoprpanol, 70%; Isopropyl Rubbing Alcohol

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Breen Laboratories
841 Sandhill Avenue
Carson, CA 90746
Ph: 310-366-7121
Fx: 310-366-7123

E-mail: Breenlabs@gmail.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Isopropyl alcohol	67-63-0	70
Water	7732-18-5	30

Toxicological Data on Ingredients: Isopropyl alcohol: ORAL (LD50): Acute: 5045 mg/kg [Rat]. 3600 mg/kg [Mouse]. 6410 mg/kg [Rabbit]. DERMAL (LD50): Acute: 12800 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (sensitizer, permeator). Non-corrosive for skin. Non-corrosive to the eyes. Non-corrosive for lungs.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [Isopropyl alcohol]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol]. The substance may be toxic to kidneys, liver, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: The lowest known value is 399°C (750.2°F) (Isopropyl alcohol).

Flash Points: CLOSED CUP: 18.3°C (64.9°F) - 24 deg. C (75 deg. F)

Flammable Limits: The greatest known range is LOWER: 2% UPPER: 12.7% (Isopropyl alcohol)

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Flammable in presence of oxidizing materials. Non-flammable in presence of shocks

Explosion Hazards in Presence of Various Substances:
Slightly explosive in presence of open flames and sparks, of heat. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME. Hydrogen peroxide sharply reduces the autoignition temperature of Isopropyl alcohol. After a delay, Isopropyl alcohol ignites on contact with dioxgenyl tetrafluorborate, chromium trioxide, and potassium tert-butoxide. When heated to decomposition it emits acrid smoke and fumes. (Isopropyl alcohol)

Special Remarks on Explosion Hazards:
Secondary alcohols are readily autooxidized in contact with oxygen or air, forming ketones and hydrogen peroxide. It can become potentially explosive. It reacts with oxygen to form dangerously unstable peroxides which can concentrate and explode during distillation or evaporation. The presence of 2-butanone increases the reaction rate for peroxide formation. Explosive in the form of vapor when exposed to heat or flame. May form explosive mixtures with air. Isopropyl alcohol +

phosgene forms isopropyl chloroformate and hydrogen chloride. In the presence of iron salts, thermal decompositon can occur, whicn in some cases can become explosive. A homogeneous mixture of concentrated peroxides + isopropyl alcohol are capable of detonation by shock or heat. Barium perchlorate + isopropyl alcohol gives the highly explosive alkyl perchlorates. It forms explosive mixtures with trinitormethane and hydrogen peroxide. It produces a violent explosive reaction when heated with aluminum isopropoxide + crotonaldehyde. Mixtures of isopropyl alcohol + nitroform are explosive. (Isopropyl alcohol)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Isopropyl alcohol TWA: 983 STEL: 1230 (mg/m3) [Australia] TWA: 200 STEL: 400 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 980 STEL: 1225 (mg/m3) from NIOSH TWA: 400 STEL: 500 (ppm) from NIOSH TWA: 400 STEL: 500 (ppm) [United Kingdom (UK)] TWA: 999 STEL: 1259 (mg/m3) [United Kingdom (UK)] TWA: 400 STEL: 500 (ppm) from OSHA (PEL) [United States] TWA: 980 STEL: 1225 (mg/m3) from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Alcohol like.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 82.5°C (180.5°F) (Isopropyl alcohol). Weighted average: 87.75°C (189.9°F)

Melting Point: May start to solidify at -88.5°C (-127.3°F) based on data for: Isopropyl alcohol.

Critical Temperature: The lowest known value is 235°C (455°F) (Isopropyl alcohol).

Specific Gravity: Weighted average: 0.84 (Water = 1)

Vapor Pressure: The highest known value is 4.4 kPa (@ 20°C) (Isopropyl alcohol). Weighted average: 3.77 kPa (@ 20°C)

Vapor Density: The highest known value is 2.07 (Air = 1) (Isopropyl alcohol). Weighted average: 1.63 (Air = 1)

Volatility: Not available.

Odor Threshold: The highest known value is 22 ppm (Isopropyl alcohol)

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility: Easily soluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, flame, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts violently with hydrogen + palladium combination, nitroform, oleum, COCl2, aluminum triisopropoxide, oxidants Incompatible with acetaldehyde, chlorine, ethylene oxide, isocyanates, acids, alkaline earth, alkali metals, caustics, amines, crotonaldehyde, phosgene, ammonia. Isopropyl alcohol reacts with metallic aluminum at high temperatures. Isopropyl alcohol attacks some plastics, rubber, and coatings. Vigorous reaction with sodium dichromate + sulfuric acid. (Isopropyl alcohol)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation.

Toxicity to Animals:
Acute oral toxicity (LD50): 5143 mg/kg (Mouse) (Calculated value for the mixture). Acute dermal toxicity (LD50): 18286 mg/kg (Rabbit) (Calculated value for the mixture).

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [Isopropyl alcohol]. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol]. Contains material which may cause damage to the following organs: kidneys, liver, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (sensitizer, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive/teratogenic effects (fertility, fetoxicity, developmental abnormalities(developmental toxin)) based on animal studies. Detected in maternal milk in human. (Isopropyl alcohol)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause mild skin irritation, and sensitization. Eyes: Can cause eye irritation. Inhalation: Breathing in small amounts of this material during normal handling is not likely to cause harmful effects. However, breathing large amounts may be harmful and may affect the respiratory system and mucous membranes (irritation), behavior and brain (Central nervous system depression - headache, dizziness, drowsiness, stupor, incoordination, unconciousness, coma and possible death), peripheral nerve and senstation, blood, urinary system, and liver. Ingestion: Swallowing small amouts during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. Swallowing large amounts may cause gastrointestinal tract irritation with nausea, vomiting and diarrhea, abdominal pain. It also may affect the urinary system, cardiovascular system, sense

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Isopropanol, solution (Isopropyl alcohol) UNNA: 1219 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Isopropyl alcohol Illinois toxic substances disclosure to employee act: Isopropyl alcohol Rhode Island RTK hazardous substances: Isopropyl alcohol Pennsylvania RTK: Isopropyl alcohol Florida: Isopropyl alcohol Minnesota: Isopropyl alcohol Massachusetts RTK: Isopropyl alcohol New Jersey: Isopropyl alcohol New Jersey spill list: Isopropyl alcohol TSCA 8(b) inventory: Isopropyl alcohol; Water TSCA 4(a) final testing order: Isopropyl alcohol TSCA 8(a) IUR: Isopropyl alcohol TSCA 8(d) H and S data reporting: Isopropyl alcohol: Effective date: 12/15/86 Sunset Date: 12/15/96 TSCA 12(b) one time export: Isopropyl alcohol SARA 313 toxic chemical notification and release reporting: Isopropyl alcohol 70%

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R36- Irritating to eyes. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious). Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 8/11/2011

Last Updated: 6/15/2015

SDS

Safety Data Sheet

SECTION 1: PRODUCT IDENTIFICATION

Product Name	mPERIAL
Product Code #	mPACTmPER
CAS #	N/A
Manufacturer	mPact Environmental
Synonym	None
Chemical Name	mPerial
Chemical Formula	N/A
Trade Secret	Yes

Address	PO Box 277 Fountain Inn, SC 29644
Phone	Local: (864)862-5553
Emergency Contact	CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300 International CHEMTREC, call: 1-800-255-3924 NRC 1-800-424-8802 National Response Center (Coast Guard) Military 1-703-697-0218 Incidents involving explosives & ammunition D.O.D. 1-800-851-8061 Incidents of dangerous goods other than above
Recommended Use	N/A
Restrictions on Use	N/A

SECTION 2: HAZARD(S) IDENTIFICATION

Classifications:	Eye Damage: Category 2B Aquatic Hazard – Acute: Category 3
Pictograms:	N/A
Signal Word:	Warning
Hazard Statements:	**H320**: Causes eye irritation. **H402:** Harmful to aquatic life.
Precautionary Statements:	**PREVENTION:** P264: Wash hands thoroughly after handling. P305+P351+P338: **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. P337+P313: If eye irritation persists: Get medical advice/attention. P273: Avoid release to the environment. **DISPOSAL:**

P501: Dispose of contents/container to Section 13.

Percent of the mixture consisting of ingredient(s) of unknown toxicity: Not known

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Designation	% of Comp.	CAS No.
None	None	None

SECTION 4: FIRST AID MEASURES

Eyes: Flush eyes with water for at least 15 minutes. If irritation persists, seek medical attention.

Skin: Immediately remove contaminated clothing and shoes. Wash off immediately with plenty of water for at least 15 minutes. Call a physician immediately.

Inhalation: Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration using a pocket mask type resuscitator. Call a physician immediately.

Ingestion: May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting, and diarrhea. If swallowed, do not induce vomiting and seek medical attention.

SECTION 5: FIRE FIGHTING MEASURES

Fire Hazard: No

Flash Point F(C): N/A

Flammable Limits: The greatest known range is LOWER: N/A UPPER: N/A

Extinguishing Media: Water Mist Foam Dry Powder CO2

Special protective Equipment and firefighting procedures: Use self-contained breathing apparatus (SCBA). Personal protection clothing should be worn by fire fighters involved in chemical fires.

Unusual Fire & Explosion: None noted.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid any uncontrolled release of material.

Spills / Leaks: Land Release:
This material may cause ground water contamination. Contain as much material as possible. Begin a containerization process as soon as practical. Rinse spill area with water after cleanup is complete and containerize all rinse water.
Air Release:
Vapors may be suppressed by the use of a water fog. Contain all run-off water for proper disposal.
Water Release:
This material is soluble/dispersible in water. Stop source of spill if safe to do so. Divert all flow and contain. Remove and containerize or neutralize in place, then remove for proper disposal.

SECTION 7: HANDLING & STORAGE

Handling: Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and prompt removal of material from eyes skin and clothing.

Storage: Store in a sealed container in a cool, dry environment.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

OSHA Permissible Exposure Limits (PELs) :	Not established
Threshold Limit Values (TLVs):	Not established

Engineering Controls:
Normal ventilation has been found to be generally adequate.
The end user must determine if the process or methods involved with the use of this material requires any additional or special ventilation.

Personal Protective Equipment:

Face:	N/A
Eyes:	Safety Glasses
Skin:	Gloves
Respiratory:	N/A
Pictograms:	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear liquid	**Upper Flammability/Explosive Limit:**	N/A
Odor:	Mild	**Lower Flammability/Explosive Limit:**	N/A
Odor Threshold:	N/A	**Vapor Pressure:**	N/A
pH:	10 - 12	**Vapor Density:**	N/A
Melting Point F(C):	N/A	**Vapor Temperature:**	N/A
Freezing Point F(C):	N/A	**Relative Density/Specific Gravity:**	1.0035
Boiling Point F(C):	N/A	**Solubility:**	Water Soluble
Boiling Range:	N/A	**Partition Coefficient:**	N/A
Flash Point F(C):	N/A	**Auto-ignition temperature:**	N/A
Flash Point Method used:	ASTM D93	**Decomposition temperature:**	N/A
Evaporation Rate:	N/A	**Viscosity:**	N/A
Flammability:	Undetermined	**VOC Content:**	N/A
		VOC Less Water & Exempts:	N/A

SECTION 10: STABILITY AND REACTIVITY

Chemical Reactivity:	N/A
Chemical Stability:	Stable under normal ambient temperature and conditions.
Conditions to Avoid:	N/A
Materials to Avoid:	Strong oxidizers and anionic material
Hazardous Decomposition:	Oxides of carbon and nitrogen

SECTION 11: TOXICOLOGICAL INFORMATION

Inhalation

Description of effects from short- and long-term exposure:
Adverse effects are not expected when this product is used in open areas. In the event a person had an existing sensitivity to products such as this, avoid using the product in enclosed areas where vapors may gather. If breathing becomes difficult or painful consult a doctor.

Description of symptoms:
Prolonged or excessive inhalation may cause respiratory tract irritation.

Measure of toxicity:
Not known

Ingestion

Description of effects from short- and long-term exposure:
Immediately consult a physician or poison control center. Follow the instructions given to you by the physician or poison control center.
Description of symptoms:
May cause nausea and vomiting.
Measure of toxicity:
Not known

Eyes

Description of effects from short- and long-term exposure:
If irritation should develop, flush eyes with water. If irritation persists, consult a doctor.
Description of symptoms:
Contact may cause eye irritation.
Measure of toxicity:
Not known

Skin

Description of effects from short- and long-term exposure:
This material should not cause irritation. In people with an existing sensitivity to such products, a reddening of the skin may occur. If irritation persists, consult a doctor.
Description of symptoms:
Not expected to present a hazard in normal industrial use.
Measure of toxicity:
Not known

Carcinogens listing:

NTP: No
IARC: No
OSHA: No
GHS: No

Chronic Toxicity: No

SECTION 12: ECOLOGICAL INFORMATION

Aquatic Toxicity: This product contains pesticides that are toxic to aquatic life. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless with accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit. Do not discharge effluent to sewer systems without notifying the local sewage treatment plant authority.

Inactivation of solutions containing this product may be accomplished by the addition of anionic surfactant in a quantity equivalent the percent active ingredients.

Biodegradability: Readily biodegradable

Bioaccumulation: Unlikely

SECTION 13: DISPOSAL CONSIDERATION

Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations. Regulations may vary by location.

SECTION 14 : TRANSPORT INFORMATION

Not regulated in transportation by DOT/IMO/IATA. Not classified as dangerous in the meaning of transport regulation.

Pictograms:

SECTION 15: REGULATORY INFORMATION

OSHA Regulated Hazard:	No
DOT Regulated:	No
E C Classification:	Non-applicable
TSCA Status:	In compliance with TSCA inventory requirements for commercial purposes
SARA 312 Regulated Chemical(s):	No
SARA 313 Regulated Chemical(s):	No
EPA Registration Number:	Non-applicable
California Prop. 65:	None known
PA Right to know Chemical(s):	None known
NJ Right to know Chemical(s):	None known
Additional State Regulations:	None known
Canada:	Non-applicable

SECTION 16: OTHER INFORMATION

NFPA

HMIS

mPERIAL	
HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	B

The above Information is based on the present state of our knowledge of the product at the time of publication. No warranty is implied with respect to the quality or the specification of the product and the user must satisfy himself that the product is entirely suitable for his purposes.

DISCLAIMER This SDS is intended to provide a brief summary of our knowledge and guidance regarding the use of this material. The information contained here has been compiled from sources considered by Other to be dependable and is accurate to the best of the company's knowledge. The information is offered in good faith. Each user of this material needs to evaluate the conditions of use and design the appropriate protective mechanisms to prevent employee exposures, property damage, or release to the environment. Other assumes no responsibility for injury to the recipient or third persons, or for any damage to any property resulting from misuse of the product.

Revision Date: 01/11/2016

SAFETY DATA SHEET

Version 6.2
Revision Date 01/15/2020
Print Date 08/29/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Paraformaldehyde

Product Number : P6148
Brand : Sigma-Aldrich
CAS-No. : 30525-89-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Skin sensitisation (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H302 + H332	Harmful if swallowed or if inhaled.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H402	Harmful to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Polyoxymethylene

Formula : HO(CH2O)nH
Molecular weight : 30.03 g/mol

CAS-No. : 30525-89-4

Component	Classification	Concentration
Paraformaldehyde		
	Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Skin Sens. 1; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 3; H302, H332, H315, H318, H317, H341, H350, H335, H402	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline
b)	Odour	No data available
c)	Odour Threshold	No data available

d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 120 - 170 °C (248 - 338 °F) - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air.
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 73 %(V) Lower explosion limit: 7 %(V)
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.88 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 800 mg/kg
Remarks: (RTECS)
LC50 Inhalation - Rat - 4 h - 1.07 mg/l
Remarks: (RTECS)
Inhalation: Irritating to respiratory system.
LC50 Inhalation - Rat - 4 h - 1.07 mg/l
Remarks: (RTECS)
Inhalation: Irritating to respiratory system.
LDLo Dermal - Rabbit - 10,000 mg/kg
Remarks: (RTECS)
LDLo Dermal - Rabbit - 10,000 mg/kg
Remarks: (RTECS)
No data available

Skin corrosion/irritation
Dermatitis
Dermatitis

Serious eye damage/eye irritation
No data available
No data available

Respiratory or skin sensitisation
Human experience
Result: positive
Remarks: (External MSDS)
Human experience
Result: positive
Remarks: (External MSDS)

Germ cell mutagenicity
Suspected of causing genetic defects.
Suspected of causing genetic defects.
Mutagenicity (mammal cell test):
Result: positive
(Lit.)
Mutagenicity (mammal cell test):
Result: positive
(Lit.)

Carcinogenicity
Presumed to have carcinogenic potential for humans
Presumed to have carcinogenic potential for humans

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is

on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation. - Respiratory system
May cause respiratory irritation. - Respiratory system
Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Lung oedema
Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Lung oedema

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: RV0540000

May cause permanent eye injury.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:
Systemic effects:
drop in blood pressure
Other dangerous properties can not be excluded.
This substance should be handled with particular care.
After absorption:
Systemic effects:
drop in blood pressure
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 46 - 78 mg/l - 96 h Remarks: (ECOTOX Database)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 42 mg/l - 24 h Remarks: (External MSDS)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.
Reacts with water to form toxic decomposition products.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 2213 Class: 4.1 Packing group: III
Proper shipping name: Paraformaldehyde
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 2213 Class: 4.1 Packing group: III EMS-No: F-A, S-G
Proper shipping name: PARAFORMALDEHYDE

IATA
UN number: 2213 Class: 4.1 Packing group: III
Proper shipping name: Paraformaldehyde

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Paraformaldehyde	30525-89-4	1993-02-16

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.2 Revision Date: 01/15/2020 Print Date: 08/29/2020

SAFETY DATA SHEET

Vaseline Petroleum Jelly – All Variants

Section 1. Identification

Product names	:	Vaseline Petroleum Jelly – All Variants Pure, Baby, Cocoa
Product type	:	Skin Protectant
UPC Code	:	305212335002, 305212326000, 305210069275
Internal product code	:	11001016, 11002034, 83142385

Relevant identified uses of the substance or mixture and uses advised against

Identified uses
Industrial uses: Uses of substances as such or in preparations at industrial sites Consumer uses: Private households (= general public = consumers) Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Supplier's details	:	UNILEVER 700 Sylvan Avenue Englewood Cliffs NJ 07632 USA
Emergency telephone number (with hours of operation)	:	Phone #: 800-761-3683 Monday thru Friday (8:30 AM – 5:00 PM EST) Emergency #: 800-745-9269 (24 hours) Poison Control #: 800-949-7866 (24 hours) CHEMTREC #: 800-424-9300 (24 hours, Transportation Emergencies)

Consumer Information:
For information regarding the use of this product by a consumer, please refer directly to the product label. This industrial MSDS is provided for workplace employees, per US OSHA regulations. It contains recommendations for handling of this product in an occupational, or workplace, setting.

Any first aid or warnings that are applicable to consumer use are stated directly on the product label, in accordance with all applicable government regulations.

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.
Hazard statements : No known significant effects or critical hazards.

Precautionary statements

General : Keep out of reach of children.
Prevention : Not applicable.
Response : Not applicable.

Storage : Not applicable.
Disposal : Not applicable.
Supplemental label elements : None known.
Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

CAS number/other identifiers

Ingredient name	%	CAS number
Petrolatum	75 - 100	8009-03-8

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-aid measures

Description of necessary first aid measures

Eye contact	:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Inhalation	:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact	:	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion	:	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	:	No known significant effects or critical hazards.
Inhalation	:	No known significant effects or critical hazards.
Skin contact	:	No known significant effects or critical hazards.
Ingestion	:	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	:	No specific data.
Inhalation	:	No specific data.
Skin contact	:	No specific data.
Ingestion	:	No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	:	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	:	No specific treatment.
Protection of first-aiders	:	No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
NFPA 30B Classification	:	Not available.
Specific hazards arising from the chemical	:	No specific fire or explosion hazard.

Hazardous thermal decomposition products	:	No specific data.
Special protective actions for fire-fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Put on appropriate personal protective equipment.
For emergency responders	:	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	:	Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill	:	Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.
Large spill	:	Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	:	Put on appropriate personal protective equipment (see Section 8).
Advice on general occupational hygiene	:	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Petrolatum	None

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks

		involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	:	Semi-solid
Colour	:	Light yellow
Odour	:	Not available.
Odour threshold	:	Not available.
pH	:	Not available
Melting point	:	Not applicable
Boiling point	:	Not available.
Flash point	:	>200°F/93.3°C
Evaporation rate	:	Not available.
Flammability (solid, gas)	:	Not available.
Lower and upper explosive (flammable) limits	:	**Lower:** Not available. **Upper:** Not available.
Vapour pressure	:	Not applicable.
Vapour density	:	Not available.
Relative density	:	0.8475
Solubility	:	Not available.
Solubility in water	:	Not available.
Partition coefficient: n-octanol/water	:	Not available.
Auto-ignition temperature	:	Not available.
Decomposition temperature	:	Not available.
Viscosity	:	**Dynamic:** Not available. **Kinematic:** Not available.

Section 10. Stability and reactivity

Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	No specific data.
Incompatible materials	:	No specific data.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal

conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Conclusion/Summary : Very low toxicity to humans or animals.

Irritation/Corrosion

Conclusion/Summary
Skin : The mixture is not an irritant for the skin.
Eyes : The mixture is not an irritant for eyes.
Respiratory : No inhalation irritancy studies have been performed on the mixture. Based on the composition as indicated in section 3, it is not likely that this mixture will cause irritation of the respiratory tract.

Sensitisation

Conclusion/Summary
Skin : No sensitization studies have been performed on the mixture. Based on the composition as indicated in section 3, it's not likely that the mixture will cause sensitisation by skin contact

Respiratory : No inhalation irritancy studies have been performed on the mixture. Based on the composition as indicated in section 3, it is not likely that this mixture will cause irritation of the respiratory tract.

Mutagenicity

Conclusion/Summary : Not applicable.

Carcinogenicity

Conclusion/Summary : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Reproductive toxicity

Conclusion/Summary : Not applicable.

Teratogenicity

Conclusion/Summary : Not applicable.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Conclusion/Summary : Very low toxicity to humans or animals.

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Conclusion/Summary : No known significant effects or critical hazards.

Persistence and degradability

Conclusion/Summary : No known significant effects or critical hazards.

Mobility in soil

Soil/water partition coefficient (KOC) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

RCRA classification : No known significant effects or critical hazards.

United States - RCRA Acute hazardous waste "P" List: Not listed

United States - RCRA Toxic hazardous waste "U" List: Not listed

Section 14. Transport information

FOR SHIPMENT IN CONSUMER PACKAGING	Ground	Water	Air
UN number	N/A	N/A	N/A

UN proper shipping name	Not regulated.	Not regulated.	Not regulated.
Transport hazard class(es)	Not regulated.	Not regulated.	Not regulated.
Packing group	N/A	N/A	N/A
Environmental hazards	None	None	None
Additional information	Not regulated.	Not regulated. **Marine pollutant:** No.	Not regulated.

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product have been trained in the event of an accident or spillage.'

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not available.

Section 15. Regulatory information

U.S. Federal regulations :

United States - TSCA 12(b) - Chemical export notification: None of the components are listed.
United States - TSCA 4(a) - Final Test Rules: Not listed
United States - TSCA 4(a) - ITC Priority list: Not listed
United States - TSCA 4(a) - Proposed test rules: Not listed
United States - TSCA 4(f) - Priority risk review: Not listed
United States - TSCA 5(a)2 - Final significant new use rules: Not listed
United States - TSCA 5(a)2 - Proposed significant new use rules: Not listed
United States - TSCA 5(e) - Substances consent order: Not listed
United States - TSCA 6 - Final risk management: Not listed
United States - TSCA 6 - Proposed risk management: Not listed
United States - TSCA 8(a) - Chemical risk rules: Not listed
United States - TSCA 8(a) - Dioxin/Furan precursor: Not listed
United States - TSCA 8(a) - Chemical Data Reporting (CDR): Not determined
United States - TSCA 8(a) - Preliminary assessment report (PAIR): Not listed
United States - TSCA 8(c) - Significant adverse reaction (SAR): Not listed
United States - TSCA 8(d) - Health and safety studies: Not listed
United States - EPA Clean water act (CWA) section 307 - Priority pollutants: Not listed
United States - EPA Clean water act (CWA) section 311 - Hazardous substances: Not listed
United States - EPA Clean air act (CAA) section 112 - Accidental release prevention - Flammable substances: Not

listed
United States - EPA Clean air act (CAA) section 112 - Accidental release prevention - Toxic substances: Not listed
United States - Department of commerce - Precursor chemical: Not listed

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	:	Not listed
Clean Air Act Section 602 Class I Substances	:	Not listed
Clean Air Act Section 602 Class II Substances	:	Not listed
DEA List I Chemicals (Precursor Chemicals)	:	Not listed
DEA List II Chemicals (Essential Chemicals)	:	Not listed

SARA 302/304

: Not applicable.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

Not available

SARA 313
None of the components are listed.

State regulations

Massachusetts	:	None of the components are listed.
New York	:	None of the components are listed.
New Jersey	:	None of the components are listed.
Pennsylvania	:	None of the components are listed.

US California 22CCR Appendix X Substances

Not listed

California Prop. 65 : Not applicable

United States inventory (TSCA 8b)	:	Exempted
Canada inventory	:	Not determined.

International regulations

International lists : **Australia inventory (AICS):** Not determined.
Taiwan inventory (CSNN): Not determined.
Malaysia Inventory (EHS Register): Not determined.
Japan inventory: Not determined.
China inventory (IECSC): Not determined.
Korea inventory: Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Section 16. Other information

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

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Key to abbreviations : ATE = Acute Toxicity Estimate
ACGIH = American Conference of Governmental & Industrial Hygienists
AH = Acute Hazard
BCF = Bioconcentration Factor
CAA = Clean Air Act
CARB = California Air Resources Board
CCR = California Code of Regulations
CERCLA = Comprehensive Environmental Response, Compensation & Liability Act
CFR = Code of Federal Regulations
CH = Chronic Hazard

CWA = Clean Water Act
DEA = Drug Enforcement Administration
DOT = Department of Transportation
EC = European Commission
EPCRA = Emergency Planning and Community Right‑To‑Know Act
EST = Eastern Standard Time
F = Fire
HAPS = Hazardous Air Pollutants
HCS = Hazard Communication Standard
HMIS = Hazardous Materials Information System
HVOC = High Volatile Organic Compound
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IARC = International Agency for the Research of Cancer
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
ICAO = International Civil Aviation Organization
IMDG = International Maritime Dangerous Goods
IMO = International Maritime Organization
ITC = Interagency Testing Committee (TSCA)
KOC = Organic Carbon/Water Partition Constant
LogPow = logarithm of the octanol/water partition coefficient
LVOC = Low Volatile Organic Compound
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
MPPCF = Million Particles Per Cubic Foot
N/A = Not Applicable
NFPA = National Fire Protection Association
NOEC = No Observable Effect Concentration
NTP = National Toxicology Program
OSHA = Occupation Safety & Health Administration
PEL = Permissible Exposure Limit
RCRA = Resource Conservation & Recovery Act
RQ = Reportable Quantity
RTK = Right-To-Know
SARA = Superfund Amendments & Reauthorization Act
STEL = Short-Term Exposure Limit
TBD = To Be Determined
TCC = Tagliabue Closed Cup
TCLP = Toxicity Characteristic Leaching Procedure
TDG = Transport of Dangerous Goods
TLV = Threshold Limit Value
TSCA = Toxic Substances Control Act
TWA = Time Weighted Average
UN = United Nations

References **:** Evaluation method used for mixture classification: Calculation method.
Hazard Communication Standard 29 CFR 1910.1200 and Appendices

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the

sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Safety Data Sheet

24 Hour Emergency Phone Numbers
Medical/Poison Control:
In U.S.: Call 1-800-222-1222

Outside U.S.: Call your local poison control center

Transportation/National Response Center:

1-800-535-5053
1-352-323-3500

NOTE: The National ResponseCenter emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

IMPORTANT: Provide this information to employees, customers, and users of this product. Read this SDS before handling or disposing of this product. This product is covered by the OSHA Hazard Communication Standard and this document has been prepared in accordance with requirements of this standard. All abbreviated terms used in this MSDS are further described in Section 16.

1. Identification

This Safety Data Sheet is available in American Spanish upon request.
Los Datos de Serguridad pueden obtenerse en Espanol si lo riquiere.

Product Name:	DAP 100% Silicone Rubber Sealant Clear	**Revision Date:**	6/30/2015
Product UPC Number:	070798006843	**Supercedes Date:**	New SDS
Product Use/Class:	Caulking Compound	**SDS No:**	00000684004
Manufacturer:	DAP Products Inc. 2400 Boston Street Suite 200 Baltimore, MD 21224-4723 888-327-8477 (non - emergency matters)		
Preparer:	Regulatory Department		

2. Hazards Identification

EMERGENCY OVERVIEW: Under normal use conditions, this product is not expected to cause adverse health effects. High concentration of vapors may cause irritation to eyes and respiratory system.

GHS Classification
Not a hazardous substance or mixture.

Symbol(s) of Product

None

Signal Word
Not a hazardous substance or mixture.

3. Composition/Information on Ingredients

Chemical Name	CAS-No.	Wt. %	GHS Symbols	GHS Statements
Silica, amorphous	7631-86-9	2.5-10	GHS03-GHS07	H270-332
Hydrotreated middle distillate	64742-46-7	2.5-10	GHS03-GHS06	H270-331

Silanetriol, methyl-, triaceta	4253-34-3	2.5-10	GHS03-GHS07	H270-302-312-315-319-332

The text for GHS Hazard Statements shown above (if any) is given in the "Other information" Section.

4. First-aid Measures

FIRST AID - INHALATION: Material is not likely to present an inhalation hazard at ambient conditions. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical attention immediately.

FIRST AID - SKIN CONTACT: Wash skin with soap and water for 15 minutes. Get medical aid if symptoms persist.

FIRST AID - EYE CONTACT: In case of contact, immediately flush eyes with large quantities of water for at least 15 minutes until irritation subsides. Get medical attention immediately.

FIRST AID - INGESTION: If swallowed, DO NOT INDUCE VOMITING. Get medical attention immediately.

5. Fire-fighting Measures

UNUSUAL FIRE AND EXPLOSION HAZARDS: 465 <undefined>

SPECIAL FIREFIGHTING PROCEDURES: Wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear. Use water spray to cool exposed surfaces.

EXTINGUISHING MEDIA: Carbon Dioxide, Dry Chemical, Foam, Water Fog

6. Accidental Release Measures

ENVIRONMENTAL MEASURES: No Information

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations. Scrape up dried material and place into containers. Use personal protective equipment as necessary. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.

7. Handling and Storage

HANDLING: KEEP OUT OF REACH OF CHILDREN!DO NOT TAKE INTERNALLY. Avoid breathing vapor and contact with eyes, skin and clothing. Use only with adequate ventilation. Ensure fresh air entry during application and drying. Wash thoroughly after handling. Remove contact lenses before using. Do not handle contact lenses until all sealant has been cleaned from fingertips, nails and cuticles. Residual sealant may transfer to contact lenses and cause severe eye irritation.

STORAGE: Avoid excessive heat and freezing. Do not store at temperatures above 120 degrees F. Store away from caustics and oxidizers.

8. Exposure Controls/Personal Protection

Ingredients with Occupational Exposure Limits

Chemical Name	ACGIH TLV-TWA	ACGIH-TLV STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Silica, amorphous	N.E.	N.E.	N.E.	N.E.
Hydrotreated middle distillate	N.E.	N.E.	N.E.	N.E.
Silanetriol, methyl-, triaceta	N.E.	N.E.	N.E.	N.E.

Further Advice: MEL = Maximum Exposure Limit OES = Occupational Exposure Standard SUP = Supplier's Recommendation Sk = Skin Sensitizer N.E. = Not Established

Personal Protection

RESPIRATORY PROTECTION: No personal respiratory protective equipment normally required.

SKIN PROTECTION: Wear nitrile or neoprene gloves.

EYE PROTECTION: Goggles or safety glasses with side shields.

OTHER PROTECTIVE EQUIPMENT: Not required under normal use.

HYGIENIC PRACTICES: Wash hands before breaks and at the end of workday. Remove and wash contaminated clothing before re-use.

9. Physical and Chemical Properties

Appearance:	Clear	**Physical State:**	Paste
Odor:	Acetic Acid	**Odor Threshold:**	Not Established
Density, g/cm3:	1.01 - 1.01	**pH:**	Not Established
Freeze Point, °C:	Not Established	**Viscosity (mPa.s):**	Not Established
Solubility in Water:	Not Established	**Partition Coeff., n-octanol/water:**	Not Established
Decomposition Temperature, °C:	Not Established	**Explosive Limits, %:**	N.I. - N.I.
Boiling Range, °C:	N.I. - N.I.	**Auto-Ignition Temperature, °C**	Not Established
Minimum Flash Point, °C:	100	**Vapor Pressure, mmHg:**	No Information
Evaporation Rate:	Slower Than n-Butyl Acetate	**Flash Method:**	Seta Closed Cup
Vapor Density:	Heavier Than Air	**Flammability:**	No Information
Combustibility:	Does not support combustion		

(See "Other information" Section for abbreviation legend)
(If product is an aerosol, the flash point stated above is that of the propellant.)

10. Stability and Reactivity

STABILITY: Stable under recommended storage conditions.

CONDITIONS TO AVOID: Oxidizing agents. Excessive heat and freezing.

INCOMPATIBILITY: Incompatible with strong bases and oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Normal decomposition products, i.e., COx, NOx.

11. Toxicological Information

EFFECT OF OVEREXPOSURE - INHALATION: Under normal use conditions, this product is not expected to cause adverse health effects. During application and cure, this product releases methanol. During application and cure, this product releases acetic acid. Inhalation of vapors in high concentration may cause mild irritation of respiratory system (nose, mouth, mucous membranes).

EFFECT OF OVEREXPOSURE - SKIN CONTACT: Under normal use conditions, this product is not expected to cause adverse health effects. Prolonged or repeated contact with skin may cause mild irritation.

EFFECT OF OVEREXPOSURE - EYE CONTACT: Under normal use conditions, this product is not expected to cause adverse health effects. Direct eye contact may cause irritation.

EFFECT OF OVEREXPOSURE - INGESTION: Under normal use conditions, this product is not expected to cause adverse health effects. Single dose oral toxicity is very low. Amounts ingested incidental to industrial handling are not likely to cause injury; however, ingestion of large amounts may cause injury. Ingestion may result in obstruction when material hardens.

CARCINOGENICITY: No Information

EFFECT OF OVEREXPOSURE - CHRONIC HAZARDS: Repeated or prolonged exposure may cause irritation of eyes and skin.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Inhalation, Skin Contact

Acute Toxicity Values
The acute effects of this product have not been tested. Data on individual components are tabulated below

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
7631-86-9	Silica, amorphous	>3300 mg/kg Rat	>5000 mg/kg Rabbit	>20 mg/L
64742-46-7	Hydrotreated middle distillate	7400 mg/kg Rat	>2000 mg/kg Rabbit	>5 mg/L
4253-34-3	Silanetriol, methyl-, triaceta	1602 mg/kg Rat	1060 mg/kg Rabbit	11.6 mg/L

N.I. = No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Ecological injuries are not known or expected under normal use.

13. Disposal Information

DISPOSAL INFORMATION: This product does not meet the definition of a hazardous waste according to U.S. EPA Hazardous Waste Management Regulation, 40 CFR Section 261. Dispose as hazardous waste according to all local, state, federal and provincial regulations. State and Local regulations/restrictions are complex and may differ from Federal regulations. Responsibility for proper waste disposal is with the owner of the waste.

14. Transport Information

SPECIAL TRANSPORT PRECAUTIONS: No Information

DOT UN/NA Number: N.A.
DOT Proper Shipping Name: Not Regulated
DOT Technical Name: N.A.
DOT Hazard Class: N.A.
Hazard SubClass: N.A.
Packing Group: N.A.

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

None Known

SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Sara 313 components exist in this product.

TOXIC SUBSTANCES CONTROL ACT:

All ingredients in this product are either on TSCA inventory list, or otherwise exempt.
This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

CALIFORNIA PROPOSITION 65 CARCINOGENS AND REPORODUCTIVE TOXINS

CALIFORNIA PROPOSITION 65: No Information

International Regulations: As follows -

CANADIAN WHMIS:

This SDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

WHMIS Class Consumer Commodity

16. Other Information

Revision Date: 6/30/2015 **Supersedes Date:** New MSDS

Reason for revision: HazCom2012/GHS Conversion

Datasheet produced by: Regulatory Department

HMIS Ratings:

Health:	1	**Flammability:**	0	**Reactivity:**	0	**Personal Protection:**	X

VOC Less Water Less Exempt Solvent, g/L 30.0

VOC Material, g/L: 30

VOC as Defined by California Consumer Product Regulation, Wt/Wt%: 3.0

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H270	May cause or intensify fire; oxidiser.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H332	Harmful if inhaled.

Icons for GHS Pictograms shown in Section 3 describing each ingredient:

GHS03

GHS06

GHS07

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

DAP believes the data and statements contained herein are accurate as of the date hereof. They are offered in good faith as typical values and not as a product specification. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE WITH REGARD TO THE INFORMATION HEREIN PROVIDED OR THE PRODUCT TO WHICH THE INFORMATION REFERS. Since thisdocument is intended only as a guide to the appropriate use and precautionary handling of the referenced product by a properly trained person, it is therefore the responsibility of the user to (i) review the recommendations with due consideration for the specific context of the intended use and (ii) determine if they are appropriate.

SAFETY DATA SHEET

In accordance with 453/2010 and 1272/2008

(All references to EU regulations and directives are abbreviated into only the numeric term)

Issued 2015-08-26

Replaces issued SDS 2013-10-07

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Trade name **SMOKE PEN, REFILL**

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Smoke for leakage tests and air flow studies

1.3. Details of the supplier of the safety data sheet

Company BJÖRNAX AB
Ringshyttan
Gruvstugan 729
SE-71393 Nora
Sweden

Telephone +46 581 43150

E-mail info@bjornax.se

1.4. Emergency telephone number

In case of emergency contact toxicological information, emergency tel 112.

For non-emergency poison information, see http://www.who.int/gho/phe/chemical_safety/poisons_centres/en/

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification in accordance with 1272/2008

Upon assessment, this mixture is not classified as hazardous according to 1272/2008.

2.2. Label elements

Label information in accordance with 1272/2008

Hazard pictograms	Not applicable
Signal words	Not applicable
Hazard statements	Not applicable

2.3. Other hazards

The product produces smoke which can cause irritation upon contact with the eyes or inhalation under conditions of long periods of exposure or incorrect use. In case of uncertainty about how the product should be used, please contact the manufacturer or the company from which the product was originally purchased.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

This product is composed of a mixture of several solid substances.

3.2. Mixtures

Note that the table shows known hazards of the ingredients in a pure form. These hazards are reduced or eliminated when mixed or diluted, see Section 16d.

Constituent	Classification	Concentration
CELLULOSE		
CAS No 9004-34-6 EC No 232-674-9	-	80 - 100%

STEARIC ACID			
CAS No EC No	57-11-4 200-313-4	-	6 - 10%

Explanations to the classification and labelling of the ingredients are given in Section 16e. Official abbreviations are printed in normal font. Text in italics are specifications and/or complement used in the calculation of the hazards of this mixture, see Section 16b.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Generally

No special measures are considered to be necessary. If symptoms do occur however, call a doctor/physician.

Upon breathing in

Inhalation of chemicals from the product in normal use is not appropriate. For generated smoke: In the case of overexposure to generated smoke, move the affected person to fresh air. If symptoms persist, consult a doctor.

Upon contact with the eyes

Eye contact with chemicals from the product in normal use is not appropriate. For generated smoke: If symptoms occur, Flush with lukewarm water with the eye or eyes wide open. If symptoms persist, consult a doctor. In the case of a broken or tampered product, the procedure for the constituent chemicals is as follows: Flush immediately with lukewarm water for 15 - 20 min with the eye or eyes wide open. If symptoms persist, consult a doctor.

Upon skin contact

Normal washing of the skin is considered sufficient; If nevertheless symptoms do occur, contact a physician.
Remove contaminated clothes.

Upon ingestion

No specific action is considered to be needed; As a precaution, induce vomiting and call a doctor/physician.

4.2. Most important symptoms and effects, both acute and delayed

Information on symptoms are ambiguous or missing for this product.

4.3. Indication of any immediate medical attention and special treatment needed

Symptomatic treatment.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Extinguish with water.

5.2. Special hazards arising from the substance or mixture

Produces fumes containing harmful gases (carbon monoxide and carbon dioxide) when burning, and, in case of incomplete combustion, aldehydes and other toxic, harmful, irritant or environmentally harmful substances.
Combustible solid.

5.3. Advice for fire-fighters

In case of fire use a respirator mask.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Not applicable

6.2. Environmental precautions

Not applicable

6.3. Methods and material for containment and cleaning up

Contaminated products should be treated as chemical waste and declared as non-hazardous goods.

6.4. Reference to other sections

See section 8 and 13 for personal protection equipment and disposal considerations.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Not applicable

7.2. Conditions for safe storage, including any incompatibilities

Store in a dry place not above normal room temperature.

Store only in the original package.

7.3. Specific end uses

Not relevant.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. National limit values, United Kingdom

All ingredients (cf. Section 3) lack occupational exposure limit values.

8.2. Exposure controls

In terms of minimizing risks, no special attention is needed for this product besides the general obligations that follow EU directive 89/391 and national occupational legislation.

Protective gloves are normally not needed due to the properties of this product, but may be necessary for other reasons, e.g. mechanical risks, temperature conditions or microbiological risks. Very sensitive persons can use gloves labelled "Low Chemical resistant" or "Waterproof" or with the pictogram indicated here.

Protective breathing equipment should only be required in extreme work-situations. Consult the manufacturer if this is the case. Dust filter IIb (P2) may be required.

For limitation of environmental exposure, see Section 12.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

a)	Appearance	State of aggregation: Solid substance or solid mixture Colour: beige
b)	Odour	Odourless or almost odourless
c)	Odour threshold	Not applicable
d)	pH	Not applicable
e)	Melting point/freezing point	Not applicable
f)	Initial boiling point and boiling range	Not applicable
g)	Flash point	> 165°C
h)	Evaporation rate	Not applicable
i)	Flammability (solid, gas)	Not applicable
j)	Upper/lower flammability or explosive limits	Not applicable
k)	Vapour pressure	Not applicable
l)	Vapour density	Not applicable
m)	Relative density	Not applicable
n)	Solubility	Solubility in water: Insoluble(<0.001%)
o)	Partition coefficient: n-octanol/water	Not applicable
p)	Auto-ignition temperature	Not applicable
q)	Decomposition temperature	Not applicable
r)	Viscosity	Not applicable
s)	Explosive properties	Not applicable
t)	Oxidising properties	Not applicable

9.2. Other information

No data available

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

The product contains no substances which can lead to hazardous reactions at normal use.

10.2. Chemical stability

The product is stable at normal storage and handling conditions.

10.3. Possibility of hazardous reactions

No hazardous reactions known.

10.4. Conditions to avoid

Not indicated

10.5. Incompatible materials

Not indicated

10.6. Hazardous decomposition products

None under normal conditions.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

General or unspecific toxicity

The product is not classified as toxic.

Acute effects

Not classified as an acutely toxic substance.

Harmfulness

The product is not classified as harmful to health.

Repeated dose toxicity

To the best of our knowledge, no chronic effects have been reported for this product.

Carcinogenicity

To the best of our knowledge, no carcinogenic effects have been reported for this product.

CMR effects

To the best of our knowledge, no mutagenic or otherwise genetic or reproductive toxic effects have been reported for this product.

Sensibilisation

Hypersensitive reactions cannot be ruled out for persons who are overtly sensitive.

Corrosive and irritating effects

The product is not corrosive. Minor irritation cannot be ruled out for persons who are prone/susceptible.

Synergism and antagonism

To the best of our knowledge, no synergistic effects have been reported for this product or any of its ingredients.

Effect on judgement and other psychological effects

To the best of our knowledge this product does not affect discernment if used in the manner intended.

Effect on human microflora

Effects on human micro flora have not been proven, or are negligible.

Relevant toxicological properties

STEARIC ACID

LD50 rat (Orally) 24h > 5000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Not applicable

12.2. Persistence and degradability

The product degrades in the natural environment.

12.3. Bioaccumulative potential

Neither this product, nor its contents, accumulates in nature.

12.4. Mobility in soil

No information about mobility in the nature exists but there is no reason to suppose the product to be ecologically harmful because of this.

12.5. Results of PBT and vPvB assessment

No chemical safety report has been executed.

12.6. Other adverse effects

Not indicated

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste handling for the product

The product is not classified as hazardous waste.

Also take local regulations for dealing with waste into account.

Recycling of the product

This product is not usually recycled.

Transportation of waste

Waste class J(0) - Does not have adverse effects on health or the environment.

SECTION 14: TRANSPORT INFORMATION

Where not otherwise stated the information applies to all of the UN Model Regulations, i.e. ADR (road), RID (railway), ADN (inland waterways), IMDG (sea), and ICAO (IATA) (air).

14.1. UN number

Not classified as dangerous goods

14.2. UN proper shipping name

Not applicable

14.3. Transport hazard class(es)

Not applicable

14.4. Packing group

Not applicable

14.5. Environmental hazards

Not applicable

14.6. Special precautions for user

Not applicable

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable

14.8 Other transport information

Stowage category not indicated.

Emergency Schedule (EmS) for FIRE (IMDG) Not indicated.

Emergency Schedule (EmS) for SPILLAGE (IMDG) Not indicated.

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Not applicable.

15.2. Chemical safety assessment

Assessment and chemical safety report in accordance with 1907/2006 Annex I has not yet been performed.

SECTION 16: OTHER INFORMATION

16a. Indication of where changes have been made to the previous version of the safety data sheet

Revisions of this document

Earlier versions

2013-10-07 Revisions of this document has, where not otherwise stated, been caused by changes in the regulations

16b. Legend to abbreviations and acronyms used in the safety data sheet

Full texts for Hazard Class and Category Code mentioned in section 3

No phys haz	Non-assigned physical hazard
No tox haz	Not classified as toxic
No environmental hazard	Not classified as being environmentally hazardous

Explanations of the abbreviations in Section 14

ADR	European Agreement concerning the International Transport of Dangerous Goods by Road
RID	Regulations concerning the International Transport of Dangerous Goods by Rail
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
IMDG	International Maritime Dangerous Goods Code
ICAO	International Civil Aviation Organization (ICAO, 999 University Street, Montreal, Quebec H3C 5H7, Canada)

IATA The International Air Transport Association

16c. Key literature references and sources for data

Sources for data

Primary data for the calculation of the hazards has preferentially been taken from the official European classification list, 1272/2008 Annex I , as updated to 2015-08-26.

Where such data was lacking, on the second hand the documentation on which this official classification is based was used, e.g. IUCLID (International Uniform Chemical Information Database). On the third hand, information was used from reputable international chemical suppliers, and on the fourth hand from other available information, e.g. safety data sheets from other suppliers or information from non-profit associations, whereby the reliability of the source was judged by an expert. If, in spite of this, reliable information was not found, the hazards were judged by expert opinions based on the known properties of similar substances, and according to the principles in 1907/2006 and 1272/2008.

Full texts for Regulations mentioned in this Safety Data Sheet

453/2010 COMMISSION REGULATION (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

1272/2008 REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

89/391 COUNCIL DIRECTIVE (89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work

1907/2006 REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC Annex I

16d. Methods of evaluating information referred to in 1272/2008 Article 9 which was used for the purpose of classification

The calculation of the hazards of this mixture has been performed as an evaluation by applying a weight of evidence determination using expert judgement in accordance with 1272/2008 Annex I, weighing all available information having a bearing on the determination of the hazards of the mixture, and in accordance with 1907/2006 Annex XI.

16e. List of relevant hazard statements and/or precautionary statements

16f. Advice on any training appropriate for workers to ensure protection of human health and the environment

Warning for misuse

This product is not expected to cause severe harm to humans or the environment. However the manufacturer, the distributor or the supplier cannot be responsible for unusual or criminal use of the product.

Other relevant information

Editorial information

This safety data sheet has been generated by the program KemRisk®, KemRisk Sweden AB, Teknikringen 10, SE-583 30 Linköping, Sweden.

Sulfur Hexafluoride Safety Data Sheet

according to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1996 Revision date: 08/08/2016 Supersedes: 08/20/2016

Form 2-103/16

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Sulfur hexafluoride
CAS No	:	2551-62-4
Formula	:	SF6

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Concorde Specialty Gases, Inc.
36 Eaton Rd.
Eatontown, NJ 07712 USA
T (732) 5449899- F (732) 5449894
www.concordegas.com

1.4. Emergency telephone number

Emergency number : CHEMTREC, 24hr/day 7days/week — Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Liquefied gas H280

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS04

Signal word (GHS-US) : WARNING

Hazard statements (GHS-US) : H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
CGA-HG01 - MAY CAUSE FROSTBITE.

Precautionary statements (GHS-US) : P202 - Do not handle until all safety precautions have been read and understood
P262 - Do not get in eyes, on skin, or on clothing.
P271+P403 - Use and store only outdoors or in a well-ventilated place.
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards

Other hazards not contributing to the classification : Asphyxiant in high concentrations.

Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS-US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%
Sulfur hexafluoride (Main constituent)	(CAS No) 2551-62-4	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First-aid measures after skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

Special protective equipment for fire fighters : Use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Stop flow of product if safe to do so.

Use water spray or fog to knock down fire fumes if possible.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Monitor concentration of released product. Try to stop release.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Sulfur hexafluoride (2551-62-4)		
ACGIH	ACGIH TLV-TWA (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m³)	6000 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm

8.2. Exposure controls

Appropriate engineering controls : Oxygen detectors should be used when asphyxiating gases may be released. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Ensure exposure is below occupational exposure limits (where available).

Hand protection	:	Wear working gloves when handling gas containers.
Eye protection	:	Wear safety glasses with side shields or goggles when transfilling or breaking transfer connections. Wear safety glasses with side shields.
Respiratory protection	:	Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
Thermal hazard protection	:	Wear cold insulating gloves when transfilling or breaking transfer connections. None necessary.
Environmental exposure controls	:	Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.
Other information	:	Wear safety shoes while handling containers. Wear leather safety gloves and safety shoes when handling cylinders.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Colorless gas.
Molecular mass	:	146 g/mol
Color	:	Colorless.
Odor	:	No data available
Odor threshold	:	Odor threshold is subjective and inadequate to warn for overexposure.
pH	:	Not applicable.
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable.
Melting point	:	-50.8 °C
Freezing point	:	No data available
Boiling point	:	-63.9 °C
Flash point	:	Not applicable.
Critical temperature	:	45.5 °C
Auto-ignition temperature	:	0 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapor pressure	:	2100 kPa
Critical pressure	:	3760 kPa
Relative vapor density at 20 °C	:	No data available
Relative density	:	1.4
Relative density of saturated gas/air mixture	:	5.04
Specific gravity / density	:	0.0061 g/cm³ (at 20 °C)
Relative gas density	:	5
Solubility	:	Water: 41 mg/l
Log Pow	:	1.68
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosive limits	:	Non flammable.

9.2 Other information

Sublimation point	:	-63.9 °C
Gas group	:	Liquefied gas
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

No known effects from this product.

Aspiration hazard : Not classified

Not applicable.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Sulfur hexafluoride (2551-62-4)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Sulfur hexafluoride (2551-62-4)	
Log Pow	1.68
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Sulfur hexafluoride (2551-62-4)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : None.

Global warming potential [CO2=1] : 22200

Effect on the global warming : Contains Fluorinated greenhouse gases covered by the Kyoto protocol.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Do not discharge into any place where its accumulation could be dangerous. Avoid discharge to atmosphere.

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1080 Sulfur hexafluoride, 2.2

UN-No.(DOT) : UN1080

Proper Shipping Name (DOT) : Sulfur hexafluoride

Department of Transportation (DOT) Hazard Classes : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115

Hazard labels (DOT) : 2.2 - Non-flammable gas

Additional information

Emergency Response Guide (ERG) Number : 126

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1080

Proper Shipping Name (IMDG) : SULPHUR HEXAFLUORIDE

Class (IMDG) : 2 - Gases

MFAG-No : 126

Air transport

UN-No.(IATA) : 1080

Proper Shipping Name (IATA) : Sulphur hexafluoride

Class (IATA) : 2

Civil Aeronautics Law : Gases under pressure/Gases nonflammable nontoxic under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Sulfur hexafluoride (2551-62-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Sudden release of pressure hazard

15.2. International regulations

CANADA

Sulfur hexafluoride (2551-62-4)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Sulfur hexafluoride (2551-62-4)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Liquefied gas H280

Full text of H-phrases: see section 16

15.2.2. National regulations

Sulfur hexafluoride (2551-62-4)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

Sulfur hexafluoride(2551-62-4)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Revision date : 08/08/2016

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Concorde asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Concorde Specialty Gases, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Concorde Specialty Gases, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Concorde Specialty Gases, Inc. SDSs are furnished by Concorde or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Concorde sales representative, local distributor, or supplier, or download from www.concordegas.com. If you have questions regarding Concordes SDSs, would like the document number and date of the latest SDS, or would like the names of the Concordes suppliers in your area, phone or write Concorde Specialty Gases, Inc Phone: (732)5449899; Address: 36 Eaton Rd. Eatontown, NJ 07712 USA

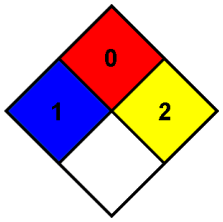
Full text of H-phrases:

Liquefied gas	Gases under pressure Liquefied gas
H280	CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.



HMIS III Rating

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Concorde Specialty Gases, Inc.

PRODUCT SPECIFICATIONS SHEET:

SF6, Sulfur Hexafluoride Gas

Sulfur Hexafluoride (SF_6) is an inorganic, colorless, odorless, and non-flammable gas. SF_6 primary use is in the electrical industry as a gaseous dielectric medium for high-voltage circuit breakers, switchgear, and other electrical equipment, often replacing oil filled circuit breakers (OCBs) that can contain harmful PCBs. SF_6 gas under pressure is used as an insulator in gas insulated switchgear (GIS) because it has a much higher dielectric strength than air or dry nitrogen. This property makes it possible to significantly reduce the size of electrical gear.

99.95% SF6 Grade:

SF6 99.95% Grade Maximum Impurities	
Sulfur Hexafluoride	99.95%
Oxygen (O_2)	<100 ppmv
Nitrogen (N_2)	<250 ppmv
Water (H_2O)	<5 ppmv
Hydrolyzable fluoride, expressed as HF	<0.3 ppmv
Carbon Tetrafluoride (CF_4)	<100 ppmv
Toxicity	None

99.999% SF6 Ultra High Purity Grade:

SF6 99.999% Ultra High Purity Grade Maximum Impurities	
Sulfur Hexafluoride	99.999%
Oxygen (O_2)	< 2 ppm
Water (H_2O)	< 2 ppm
Carbon Tetrafluoride (CF_4)	< 2 ppm

Appearance, Safety Requirements: Colorless gas, compressed under pressure. Non-flammable, non-explosive, has a moderate general toxic action in inhalation contact.

Physical Constants	
Chemical formula	SF_6
Molecular Weight	146.065
Specific volume @ +70°F (+21.1°C)	2.648 ft^3/lb., 0.165 m^3/kg
Critical pressure	545.34. psia, 37.59 bar
Critical temperature	113.97°F, 45.54°C
Specific gravity @ 70°F, 1 atm (Air=1)	5.043
Hazardous Class	2.2
Vapor Pressure	320 psig
Boiling Point	-82.7°F, -63.72°C

Concorde's Cylinder Identification

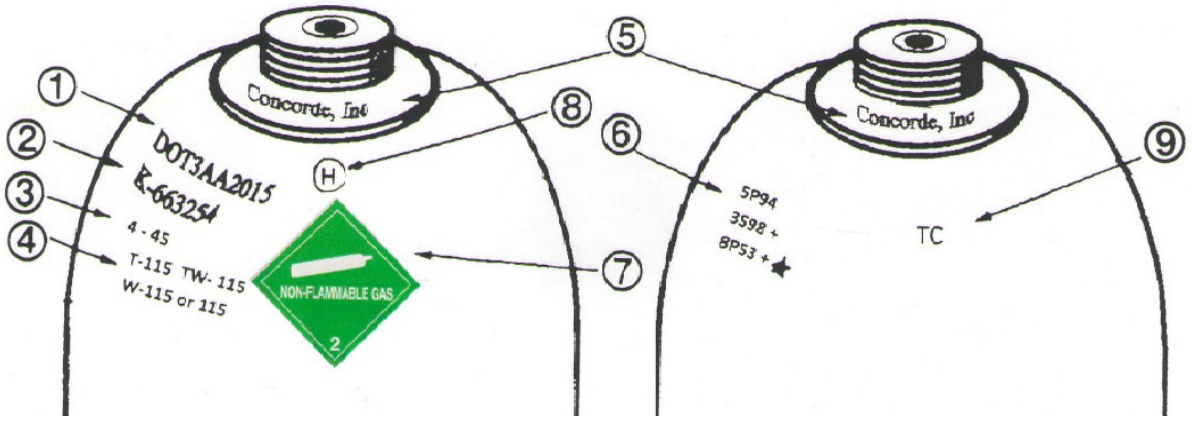
Concorde Specialty Gases uses a unique color blue paint to identify our cylinders among the specialty gas industry. We also stencil the gas name on the bottle, aligned to its serial number to facilitate identification of product for all our customers.

How can you tell you have a Concorde Cylinder?

- Our bottles are painted a dark blue and we stencil SF6 in yellow aligned to the cylinder's serial number.

- Cylinder neck ring is fixed below the valve. This neck ring has our company name and phone number.

Common Cylinder Markings



1. **Cylinder DOT Specification:** DOT indicates that the cylinder was made to U.S. Government Department of Transportation specifications.
2. **Cylinder Serial Number:** Even though some serial numbers may start with a letter, Concorde only tracks its cylinders by the numbers that come after any letter. We use our proprietary software CONCORDETRAK® which records every cylinder that leaves or returns from our facility.
3. **Manufacture Date:** Date (month-year) indicates the first hydrostatic test the cylinder went through. The most current date indicates the last time the cylinder was recertified.
4. **Cylinder Tare (empty):** The weight is most commonly preceded by TW, but is some cases you can also find only a T or W. This is the weight of the empty cylinder with the valve and no cap.
5. **Neck Ring Identification:** Located right below the cylinder valve and identifies the owner of the cylinder.
6. **Marks of Hydro Retest:** The star ★ symbol means the cylinder meets the requirements for another 10 years. No star ★ symbol means that the cylinder is good only for five (5) years from the latest test day stamped. The **+** sign indicates that the cylinder is qualified to a 10% overfill.
7. **DOT Class 2.2 Green Label:** This is a 4x4 inch label that must be placed on a SF6 service cylinder. It classifies that the gas in NON-FLAMMABLE.
8. **Manufacture's Symbol**
9. **TC – Transport Canada:** TC indicates that the cylinder was made to Canada Transport Regulations specifications.

QUIKPOINT™ Inc.
Toll Free: 800-368-2292 Phone: 978-371-3267
Fax: 978-371-2292
Web Site: www.quikpoint.com E-Mail: sales@quikp
23B Bradford St., Concord, Ma. 01742

SDS Safety Data Sheet

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: Quikpoint, Inc.
23 Bradford St. #2
Concord, MA. 01742
TEL: 978-371-3267
FAX: 978-371-2292
E-MAIL: sales@quikpoint.com

Product Name: Super Fluid

Product Use: Water-based fog fluid used in the following products:

a) SmokPoint
b) Dragon Puffer Air Flow Indicator
c) Wizard Stick
d) The Zero Blaster

Product Ingredients: Glycerin (Synonyms: 1,2,3-Propanetriol; Glycerol), and distilled water. CAS Registry Number: 56-81-5

2. HAZARDS/ TOXICOLOGICAL PROPERTIES

Finding: The primary ingredient (Glycerin/1,2.3-Propanetriol; Glycerol) in Super Fluid, in small amounts, possess minimal to no toxicity and are commonly used in foods, drugs and cosmetics.

Root of Entry: Ingestion, eyes, skin, inhalation.

HMIS: 0

Hazards Identification: Glycerin (Synonyms: 1,2,3-Propanetriol; Glycerol),

1.) Classification of the substance or mixture
- Not a hazardous substance or mixture

2.) GHS Label elements, including precautionary statements

- **Not a hazardous substance or mixture**

3.) Hazards not otherwise classified (HNOC) or not covered by GHS

- **none**

Effects of Overexposure

Ingestion:	**No evidence of adverse effect for low dose.**
Eyes:	**May cause slight transient eye irritation, seen as slight redness of the conjunctiva.**
Skin:	**Essentially non-irritating to the skin. May cause minimal irritation of areas exposed to liquid. Skin sensitization – none.**
Inhalation:	**A single prolonged (hours) exposure is not likely to cause adverse effects. Fog may cause asthmatic reactions in highly sensitive individuals.**
Carcinogenicity:	**None**
Teratogenicity: (Reproductive Effects)	**None**
Mutagenicity:	**None**

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Super Fluid is a mixture of food grade kosher USP ingredients, consisting of glycerin, propylene glycol and distilled water. According to OSHA (1910.1200) this product is non-hazardous.

4. EMERGENCY FIRST AID PROCEDURES

Eyes:	**Flush with water for several minutes, keeping eyelids open.**
Skin:	**Rinse with water.**
Ingestion:	**Drink plenty of water.**
Inhalation:	**Bring person to fresh air if discomfort arises.**

5. FIRE AND EXPLOSION HAZARD DATA

Flammability:	**Nonflammable**
Flash Point	**> 325.4° F. (162° C)**
Auto ignition Temp.	**Not detectable**
Flammable limits in air (% by volume)	**Not determined**
Extinguishing media:	**Water, foam, dry chemicals, carbon dioxide**
Unusual Fire and explosion hazards:	**None**
HMIS:	**0**

6. Accidental Release Measures

If the Super Fluid is spilled or leaking from the container, please apply a wet rag and soap to the area to soak up the solution and clean the area. The Super Fluid is non-toxic and water based. Product may stain a fabric surface.

7. Handling and Storage

The Super Fluid should be stored in a cool dry place in a plastic or glass container. Make sure container is placed on a stable surface to prevent accidental spilling or breaking of container.

8. Exposure Controls/Personal protection

According to OSHA (1910.1200) this product is non-hazardous. There are no exposure controls or personal protection guide lines specified or necessary for the Super Fluid.

9. PHYSICAL DATA / Chemical Properties

Boiling Point:	**212 - 480° F. (100-249° C)**
Melting Point:	**Not Applicable (N/A)**
Specific Gravity:	**(H_2O = 1) 1.075 @ 68° F. / 20° C**
Vapor Pressure:	**< .025 mm Hg**
Vapor Density:	**Air = 1 4.1**
Solubility in Water:	**Complete**
Specific Gravity:	**(H_2O = 1) 1.079 @ 68° F. / 20° C**
Evaporation Rate:	**No data**
Appearance and Odor:	**Clear. Unscented.**

10. STABILITY AND REACTIVITY HAZARD DATA

Chemical Stability:	**Stable, does not polymerize. Also, does not react violently with: air, water, heat.**
Incompatibility Materials:	**Strong oxidizing agents.**
Hazardous Decomposition Products:	**With strong oxidizing agent: acetic acid, aldehydes, ketones, carbon dioxide and / or carbon monoxide.**
HMIS:	**0**

11. TOXICOLOGICAL INFORMATION

Mutagenic Effects: No information available
Reproductive Effects: No information available.
Developmental Effects: No information available.
Teratogenicity: No information available.
STOT - single exposure: Central nervous system (CNS)
STOT - repeated exposure: None known
Aspiration hazard: No information available
Symptoms / effects, both acute and delayed: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
Endocrine Disruptor Information: No information available
Other Adverse Effects: No information available

The chemical substances in this product comply with all applicable rules or orders under TSCA. This product is not in violation of TSCA or any applicable rule or Order under TSCA.

12. ECOLOGICAL INFORMATION

-Toxicity·
· Ecotoxicity: Ecotoxicity in water (LC50): >5000 mg/l 24 hours [Goldfish]. >10000 mg/l 48 hours [guppy]. >10000 mg/l 48 hours [water flea].

· Persistence and biodegradability: The products of degradation are less toxic than product itself.
· Bioaccumulative potential: No further relevant information available.
· Mobility in soil: No further relevant information available.
· Additional ecological information: None

General notes:

Super Fluid is a mixture of food grade kosher USP ingredients, consisting of glycerin, propylene glycol and distilled water. According to OSHA (1910.1200) this product is non-hazardous. This product should not be ingested or pored into a body of water for disposal.

Results of PBT and vPvB assessment:

· PBT: Not applicable.
· VPVB: Not applicable.
· Other adverse effects No further relevant information available

13. DISPOSAL CONSIDERATIONS

The Super Fluid should not be ingested or pored into a body of water for disposal. This product is non-hazardous according to OSHA (1910.1200) and non-toxic. Disposal is to be performed in compliance with all Federal and State/Provincial and local regulations. Do not dispose of via sinks, drains or into the immediate environment.

14. TRANSPORTATION INFORMATION

-U.S. DOT Hazerd Classsification: Not regulated for transport
-UN number: Not applicable
-UN proper shipping name: Not applicable
-Transport hazard class(es): Not applicable
-Packing group number: Not Applicable
-Environmental Hazards: Not applicable
-Not classified in RID/ADR – IMDG – ICAO/IATA
-Special Provisions for Transport: Not applicable

15. ADDITIONAL REGULATORY INFORMATION

WGK water endangering class: 1, low hazard to water

EU Classification:
This product is not classified as dangerous according to Directive 67/548/EEC

Canada:

HAZARDOUS INGREDIENTS – WHIMIS
This product when tested as a whole is not a controlled substance within the meaning of the Hazardous Products Act.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

16. PREPARATION/ OTHER INFORMATION

Created: **May 15, 2003**

Last Updated: **January 7, 2019**

Revision Number:	**6**
Prepared by:	**Quikpoint, Inc.**
	Information compiled from: Dr. James R. Beall, Ph.D. in Toxicological Services. Independent Report # STR 6121.8623 and MSDS reports from chemical manufacturers of similar and/or same ingredients.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their unique purposes. In no event shall Quikpoint, Inc. be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Quikpoint, Inc. has been advised of the possibility

SC Johnson Professional® Windex® Glass Cleaner with Ammonia-D®

Version *1*.2 Print Date 03/24/2017

Revision Date 03/14/2016 SDS Number 350000014153

1. PRODUCT AND COMPANY IDENTIFICATION

Product information

Product name	:	**SC Johnson Professional® Windex® Glass Cleaner with Ammonia-D®**
Recommended use	:	Hard Surface Cleaner
Manufacturer, importer, supplier	:	S.C. Johnson & Son, Inc. 1525 Howe Street Racine WI 53403-2236
Telephone	:	+18005585252
Emergency telephone number	:	24 Hour Medical Emergency Phone: (866)231-5406 24 Hour International Emergency Phone: (703)527-3887 24 Hour Transport Emergency Phone: (800)424-9300

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Globally Harmonized System (GHS) Classification
This product does not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200.

Labelling

Precautionary statements
Other hazards : None identified

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product does not contain hazardous chemicals at or above a reportable level as defined by OSHA 29 CFR 1910.1200

For additional information on product ingredients, see www.whatsinsidescjohnson.com.

4. FIRST AID MEASURES

Eye contact	:	No special requirements
Skin contact	:	No special requirements
Inhalation	:	No special requirements.
Ingestion	:	No special requirements

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Specific hazards during firefighting	:	Container may melt and leak in heat of fire.
Further information	:	Fight fire with normal precautions from a reasonable distance. Standard procedure for chemical fires. Wear full protective clothing and positive pressure self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wash thoroughly after handling.
Environmental precautions	:	Outside of normal use, avoid release to the environment.
Methods and materials for containment and cleaning up	:	Dike large spills. Clean residue from spill site.

7. HANDLING AND STORAGE

Handling

Precautions for safe handling	:	Avoid contact with skin, eyes and clothing. For personal protection see section 8. KEEP OUT OF REACH OF CHILDREN AND PETS.

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.

Storage

Requirements for storage areas and containers	:	Keep container closed when not in use.
Other data	:	Stable under normal conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

ACGIH or OSHA exposure limits have not been established for this product or reportable ingredients unless noted in the table above.

Personal protective equipment

Respiratory protection	:	No special requirements.
Hand protection	:	No special requirements.
Eye protection	:	No special requirements.
Skin and body protection	:	No special requirements.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	liquid
Color	:	blue
Odor	:	floral
Odour Threshold	:	Test not applicable for this product type
pH	:	10.7

at (25 C)

Melting point/freezing point	:	0 C
Initial boiling point and boiling range	:	100 C
Flash point	:	does not flash
Evaporation rate	:	Test not applicable for this product type
Flammability (solid, gas)	:	Does not sustain combustion.
Upper/lower flammability or explosive limits	:	Test not applicable for this product type
Vapour pressure	:	Calculated31.7 hPa
Vapour density	:	Test not applicable for this product type
Relative density	:	1.00 g/cm3 at 25 C
Solubility(ies)	:	soluble
Partition coefficient: n-octanol/water	:	Test not applicable for this product type
Auto-ignition temperature	:	Test not applicable for this product type
Decomposition temperature	:	Heating can release hazardous gases.
Viscosity, dynamic	:	similar to water

Viscosity, kinematic	:	similar to water
Oxidizing properties	:	Test not applicable for this product type
Volatile Organic Compounds Total VOC (wt. %)*	:	0.2 % - additional exemptions may apply *as defined by US Federal and State Consumer Product Regulations
Other information	:	None identified :

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	If accidental mixing occurs and toxic gas is formed, exit area immediately. Do not return until well ventilated.
Conditions to avoid	:	Direct sources of heat.
Incompatible materials	:	Do not mix with bleach or any other household cleaners. Strong bases
Hazardous decomposition products	:	Thermal decomposition can lead to release of irritating gases and vapours.

11. TOXICOLOGICAL INFORMATION

Emergency Overview	:	This product does not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200.
Acute oral toxicity	:	LD50 > 5000 mg/kg
Acute inhalation toxicity	:	LC50 > 10 mg/L

Acute dermal toxicity : LD50 > 5000 mg/kg

GHS Properties	Classification	Routes of entry
Acute toxicity	No classification proposed	Oral
Acute toxicity	No classification proposed	Dermal
Acute toxicity	No classification proposed	Inhalation - Dust and Mist
Acute toxicity	No classification proposed	Inhalation - Vapour
Acute toxicity	No classification proposed	Inhalation - Gas
Skin corrosion/irritation	No classification proposed	-
Serious eye damage/eye irritation	No classification proposed	-
Skin sensitisation	No classification proposed	-
Respiratory sensitisation	No classification proposed	-
Germ cell mutagenicity	No classification proposed	-
Carcinogenicity	No classification proposed	-
Reproductive toxicity	No classification proposed	-
Specific target organ toxicity - single exposure	No classification proposed	-
Specific target organ toxicity - repeated exposure	No classification proposed	-
Aspiration hazard	No classification proposed	-

Aggravated Medical Condition : None known.

SC Johnson Professional® Windex® Glass Cleaner with Ammonia-D®

Version *1*.2 Print Date 03/24/2017

Revision Date 03/14/2016 SDS Number 350000014153

12. ECOLOGICAL INFORMATION

Product : The product itself has not been tested.

Toxicity
The ingredients in this formula have been reviewed and no adverse impact to the environment is expected when used according to label directions.

No environmental data required.

Other adverse effects : None known.

13. DISPOSAL CONSIDERATIONS

Consumer may discard empty container in trash, or recycle where facilities exist.

14. TRANSPORT INFORMATION

Please refer to the Bill of Lading/receiving documents for up-to-date shipping information.

Land transport
Not classified as dangerous in the meaning of transport regulations.

Sea transport
Not classified as dangerous in the meaning of transport regulations.

Air transport
Not classified as dangerous in the meaning of transport regulations.

15. REGULATORY INFORMATION

Notification status : All ingredients of this product are listed or are excluded from

listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

Notification status : All ingredients of this product comply with the New Substances Notification requirements under the Canadian Environmental Protection Act (CEPA).

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Ratings

Health	1
Flammability	0
Reactivity	0

NFPA Ratings

Health	1
Fire	0
Reactivity	0
Special	-

This information is being provided in accordance with the Occupational Safety and Health Administration (OSHA) regulation (29 CFR 1910.1200). The information supplied is designed for workplaces where product use and frequency of exposure exceeds that established for the labeled consumer use.

Further information

SC Johnson Professional® Windex® Glass Cleaner with Ammonia-D®

Version *1*.2 Print Date 03/24/2017

Revision Date 03/14/2016 SDS Number 350000014153

This document has been prepared using data from sources considered to be technically reliable. It does not constitute a warranty, expressed or implied, as to the accuracy of the information contained herein. Actual conditions of use are beyond the seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

Prepared by	SC Johnson Global Safety Assessment & Regulatory Affairs (GSARA)

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200

WINDEX® MULTISURFACE CLEANER VINEGAR

Version *1*.1 Print Date 07/15/2015

Revision Date 02/25/2015 SDS Number 350000017346

1. PRODUCT AND COMPANY IDENTIFICATION

Product information

Product name : **WINDEX® MULTISURFACE CLEANER VINEGAR**

Recommended use : Hard Surface Cleaner

Manufacturer, importer, supplier : S.C. Johnson & Son, Inc.
1525 Howe Street
Racine WI 53403-2236

Telephone : +18005585252

Emergency telephone number : 24 Hour Medical Emergency Phone: (866)231-5406
24 Hour International Emergency Phone: (703)527-3887
24 Hour Transport Emergency Phone: (800)424-9300

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Globally Harmonized System (GHS) Classification
This product does not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200.

Labelling

Precautionary statements

Other hazards : None identified

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Weight percent
Ethyleneglycol Monohexylether	112-25-4	1.00 - 5.00
Lactic Acid	79-33-4	0.0001 - 0.10

The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

For additional information on product ingredients, see www.whatsinsidescjohnson.com.

WINDEX® MULTISURFACE CLEANER VINEGAR

Version *1*.1 Print Date 07/15/2015

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4. FIRST AID MEASURES

Eye contact	:	No special requirements
Skin contact	:	No special requirements
Inhalation	:	No special requirements.
Ingestion	:	No special requirements

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Specific hazards during firefighting	:	Container may melt and leak in heat of fire.
Further information	:	Fight fire with normal precautions from a reasonable distance. Standard procedure for chemical fires. Wear full protective clothing and positive pressure self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wash thoroughly after handling.
Environmental precautions	:	Outside of normal use, avoid release to the environment.
Methods and materials for containment and cleaning up	:	Dike large spills. Clean residue from spill site.

7. HANDLING AND STORAGE

Handling

Precautions for safe	:	Avoid contact with skin, eyes and clothing.

WINDEX® MULTISURFACE CLEANER VINEGAR

handling		For personal protection see section 8. KEEP OUT OF REACH OF CHILDREN AND PETS.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.

Storage

Requirements for storage areas and containers	:	Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

ACGIH or OSHA exposure limits have not been established for this product or reportable ingredients unless noted in the table above.

Personal protective equipment

Respiratory protection	:	No special requirements.
Hand protection	:	No special requirements.
Eye protection	:	No special requirements.
Skin and body protection	:	No special requirements.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	liquid
Color	:	colourless transparent
Odor	:	pleasant
Odour Threshold	:	No data available

WINDEX® MULTISURFACE CLEANER VINEGAR

Version *1*.1 Print Date 07/15/2015

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pH	:	3.3
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	> 95 °C > 203 °F Method: Tag Closed Cup (TCC)
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper/lower flammability or explosive limits	:	No data available
Vapour pressure	:	No data available
Vapour density	:	No data available
Relative density	:	1.0 g/ml at 25 °C
Solubility(ies)	:	completely soluble
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available

WINDEX® MULTISURFACE CLEANER VINEGAR

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Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Oxidizing properties	:	No data available
Volatile Organic Compounds Total VOC (wt. %)*	:	0.5 % - additional exemptions may apply *as defined by US Federal and State Consumer Product Regulations
Other information	:	None identified :

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Stable under recommended storage conditions.
Conditions to avoid	:	Direct sources of heat.
Incompatible materials	:	None known.
Hazardous decomposition products	:	Thermal decomposition can lead to release of irritating gases and vapours.

11. TOXICOLOGICAL INFORMATION

Emergency Overview	:	This product does not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200.
Acute oral toxicity	:	LD50 estimated > 5,050 mg/kg

Acute inhalation toxicity : LC50
estimated
> 2.58 mg/l

Acute dermal toxicity : LD50
estimated
> 5,050 mg/kg

GHS Properties	Classification	Routes of entry
Acute toxicity	No classification proposed	-
Skin corrosion/irritation	No classification proposed	-
Serious eye damage/eye irritation	No classification proposed	-
Skin sensitisation	No classification proposed	-
Respiratory sensitisation	No classification proposed	-
Germ cell mutagenicity	No classification proposed	-
Carcinogenicity	No classification proposed	-
Reproductive toxicity	No classification proposed	-
Specific target organ toxicity - single exposure	No classification proposed	-
Specific target organ toxicity - repeated exposure	No classification proposed	-
Aspiration hazard	No classification proposed	-

Aggravated Medical Condition : None known.

12. ECOLOGICAL INFORMATION

Product : The product itself has not been tested.

Toxicity
The ingredients in this formula have been reviewed and no adverse impact to the environment is expected when used according to label directions.

Toxicity to fish

Components	End point	Species	Value	Exposure time
Ethyleneglycol Monohexylether	static test LC50	Pimephales promelas (fathead minnow)	140 mg/l	96 h
Lactic Acid	static test LC50	Oncorhynchus mykiss (rainbow trout)	100 - 180 mg/l	96 h

Toxicity to aquatic invertebrates

Components	End point	Species	Value	Exposure time
Ethyleneglycol Monohexylether	static test EC50	Daphnia magna (Water flea)	145 mg/l	48 h
Lactic Acid	static test EC50	Daphnia magna (Water flea)	130 mg/l	48 h

Toxicity to aquatic plants

Components	End point	Species	Value	Exposure time
Ethyleneglycol Monohexylether	static test EC50	Desmodesmus subspicatus (green algae)	147.128 mg/l	96 h
Lactic Acid	static test EC50	Pseudokirchneriella subcapitata (green algae)	> 2,800 mg/l	72 h

Persistence and degradability

Component	Biodegradation	Exposure time	Summary
Ethyleneglycol Monohexylether	96.8 %	20 d	Readily biodegradable
Lactic Acid	67 %	20 d	

Bioaccumulative potential

Component	Bioconcentration factor (BCF)	Partition Coefficient n-Octanol/water (log)
Ethyleneglycol Monohexylether	5.8 estimated	1.97
Lactic Acid	No data available	-0.62

Mobility

Component	End point	Value
Ethyleneglycol Monohexylether	Koc	10 estimated
Lactic Acid	log Koc	< 1.32

PBT and vPvB assessment

Component	Results
Ethyleneglycol Monohexylether	Not fulfilling PBT and vPvB criteria
Lactic Acid	Not fulfilling PBT and vPvB criteria

Other adverse effects : None known.

13. DISPOSAL CONSIDERATIONS

Consumer may discard empty container in trash, or recycle where facilities exist.

WINDEX® MULTISURFACE CLEANER VINEGAR

Version *1*.1 Print Date 07/15/2015

Revision Date 02/25/2015 SDS Number 350000017346

14. TRANSPORT INFORMATION

Please refer to the Bill of Lading/receiving documents for up-to-date shipping information.

Land transport
Not classified as dangerous in the meaning of transport regulations.

Sea transport
Not classified as dangerous in the meaning of transport regulations.

Air transport
Not classified as dangerous in the meaning of transport regulations.

15. REGULATORY INFORMATION

Notification status	:	All ingredients of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.
Notification status	:	All ingredients of this product comply with the New Substances Notification requirements under the Canadian Environmental Protection Act (CEPA).
California Prop. 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

WINDEX® MULTISURFACE CLEANER VINEGAR

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16. OTHER INFORMATION

HMIS Ratings

Health	0
Flammability	1
Reactivity	0

NFPA Ratings

Health	0
Fire	1
Reactivity	0
Special	-

This information is being provided in accordance with the Occupational Safety and Health Administration (OSHA) regulation (29 CFR 1910.1200). The information supplied is designed for workplaces where product use and frequency of exposure exceeds that established for the labeled consumer use.

Further information

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Prepared by	SC Johnson Global Safety Assessment & Regulatory Affairs (GSARA)

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- *Building-Related Illness and Sick Building Syndrome Investigations*
- *Post Remediation Verification Assessments*
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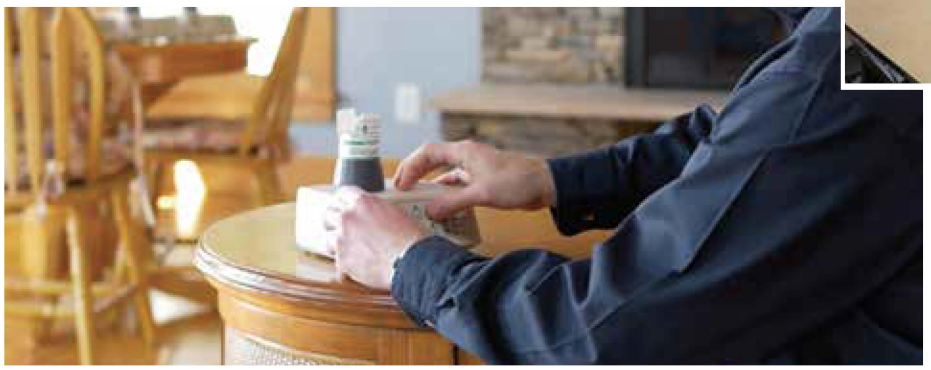
- *Moisture Mapping*



Institute of Inspection Cleaning and Restoration

American Council for Accredited Certification — ERIC C. MCKEE — CIEC — Board Certified #0612019 Exp. 12/31/2016 — Council-certified Indoor Environmental Consultant

American Council for Accredited Certification — CIE — Council-certified Indoor Environmentalist

American Council for Accredited Certification — CMR — Council-certified Microbial Remediator

American Council for Accredited Certification — ACAC — McKee Environmental, Inc. — Employer of Council-certified Personnel

We would love to hear from you! *toll free* 1-866-477-2498

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Indoor Environmental Quality

- *Proactive, Baseline Investigations*
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Industrial Hygiene Audits

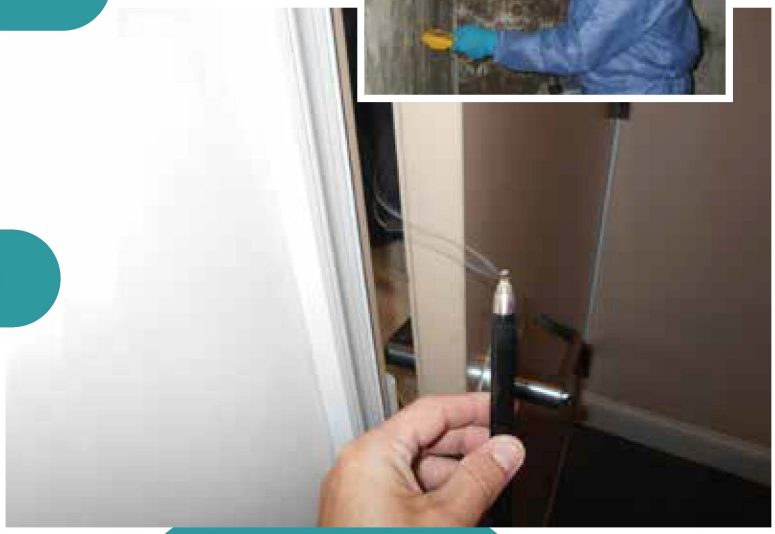
- *Personal exposure monitoring – physical & chemical agents*
- *Asbestos & Lead Inspections*
- *Industrial safety audits*

Mold Remediation Planning

- *Cause and Origin Studies*
- *Protocol Development to EPA, ACGIH and IICRC Guidelines*
- *Baseline Environmental Testing*
- *Post Remediation Varification Assessments*

Forensic Studies & Expert Witness

- *Expert Witness Services*
- *Forensic-Based Building Inspections*
- *Clear; Concise and Court Defensible Reporting*



Building Science Investigation

- *Moisture Intrusion Studies*
- *Building Envelope Evaluation*
- *Pollution Pathway Studies*

We would love to hear from you! *toll free* 1-866-477-2498

Attachment 1

Summary of Negotiations

1. **Virginia Tech question:** Regarding pages 39 – 40 of your proposal, at what time will Virginia Tech gain access to this database?

   Keystone Response: *Our upgrade is completed, access will be available no later than December 31, 2020*

2. **Virginia Tech question:** How do you dispose of contaminated HEPA filters?

   Keystone Response: *Contaminated HEPA filters should be decontaminated via an NSF approved methodology, such as chlorine dioxide gas, paraformaldehyde, etc. After HEPA filters are decontaminated, they are no longer considered to be contaminated with biological hazards and can be contained in 6mil poly and left onsite for client disposal, or if directed by EHS, can be taken to a designated receptacle. Please note, HEPA filters cannot be transported in Keystone vehicles, and if to be taken to a designated receptacle we request that client inform us of this requirement ahead of time*

3. **Virginia Tech question:** How quickly can you provide a report for certification/decontamination/repair if EHS cannot find the VT copy?

   Keystone Response: Typically, requests for copies of reports can be responded to within a few minutes; or within one business day.

4. **Virginia Tech question:** How do you verify that an area has been cleared and is secure before a room or larger area decontamination begins?

   Keystone Response: Decontamination is scheduled with client, and client is informed that nobody can be in the room during decontamination process. The room in which the decontamination is taking place is visually inspected for personnel, and signage prohibiting entry and describing risks is placed at every potential access point, and doors are secured.

5. **Virginia Tech question:** How do you verify decontamination for units (BSCs, etc.) and for rooms? What criteria do you apply for using BIs; is this customer-driven or do you guarantee full decontamination by employing a verification method as part of your process?

   Keystone Response: CD test strips, which indicate appropriate level of exposure to chlorine dioxide is met, are placed at appropriate locations to verify that gaseous decontamination has been completed as intended. This is an approved methodology by NSF standard 49, decontamination for biological organisms. If EHS or end user request use of Biological Indicators, Keystone must be notified ahead of time, and the cost will be added to our estimate.

6. **Virginia Tech question:** Please provide copies of your Exposure Control plan and Haz Comm plan.

   Keystone Response: Attached

7. **Virginia Tech question:** Are there any additional forms or documents that you will require to be incorporated into the contract documents? If so, please submit.

   Keystone Response: None

8. **Virginia Tech question:** Does Keystone Certification agree to provide monthly invoices with payment due thirty (30) days after receipt of invoice or goods/services, whichever is later?

   Keystone Response: Yes

9. **Virginia Tech question:** Do you agree that you will be performing services as an Independent Contractor, Company, Corporation or other business entity and are not an employee of Virginia Tech or any other Commonwealth Entity?

   Keystone Response: Yes

10. **Virginia Tech question:** If awarded a contract, do you agree to limit price increases to no more than the increase in the Consumer Price Index, CPI-W, All Items category for the latest twelve (12) months for which statistics are available at the time of renewal or 3 percent, whichever is less?

    Keystone Response: Yes

11. **Virginia Tech question:** If awarded a contract, will you be able to handle increased volumes of business and/or provide service to additional departments during the course of the contract?

    Keystone Response: Yes

12. **Virginia Tech question:** If awarded a contract, will you agree to work with each user department before you begin to provide service so that issues such as inspection times and days and service requirements may be addressed?

    Keystone Response: Yes

13. **Virginia Tech question:** Do you acknowledge, agree and understand that Virginia Tech cannot guarantee a minimum amount of business if a contract is awarded to your company?

    Keystone Response: Yes

14. **Virginia Tech question:** Does the vendor acknowledge, agree, and understand that the terms and conditions of the RFP # 0061452 shall govern the contract if a contract is awarded to your company?

    Keystone Response: Yes

15. **Virginia Tech question:** For purposes of interacting with HokieMart, please identify the person (name, phone number, email address, etc.) in your company that will serve as liaison for a) e-commerce, b) accounts receivable, c) emergency orders.

Keystone Response:

E-commerce and emergency orders:

Stacey Pittman 757-333-4988

stacey@keystonect.com

Accounts receivable:

Jordan Anderson 757-333-4988

andersonj@keystonect.com