



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration  
NOAA Marine and Aviation Operations  
Marine Operations Center  
439 W. York Street  
Norfolk, VA 23510-1114

October 7, 2016

MEMORANDUM FOR: Commander William Mowitt, NOAA  
Commanding Officer, NOAA Ship *Pisces*

FROM: Captain Scott M. Sirois, NOAA  
Commanding Officer, NOAA Marine Operations Center-Atlantic

S. M. Sirois

SUBJECT: Project Instruction for PC-16-09  
Fall Ecosystem Monitoring

Attached is the final Project Instruction for PC-16-09, Fall Ecosystem Monitoring, which is scheduled aboard NOAA Ship *Pisces* during the period of October 18 - November 8, 2016. Of the 22 DAS scheduled for this project, 22 days are funded by a Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to [OpsMgr.MOA@noaa.gov](mailto:OpsMgr.MOA@noaa.gov) at Marine Operations Center-Atlantic.





**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**  
Northeast Fisheries Science Center  
166 Water Street  
Woods Hole, MA 02543-1026

## Final Project Instructions

**Date Submitted:** October 6, 2016

**Platform:** NOAA Ship *Pisces*

**Project Number:** PC 16-09

**Project Title:** Fall Ecosystem Monitoring Survey

**Project Dates:** 18 October – 8 November 2016

Approved by: J. A. Hare (602) Date: 10/6/16  
Jonathan A. Hare Ph.D.  
Acting Science and Research Director  
Northeast Fisheries Science Center

Approved by: Captain Scott Sirois, NOAA  
Commanding Officer  
Marine Operations Center – Atlantic Date: 10/18/16

## I. Overview

### A. Brief Summary and Project Period

The principal objective of the survey is to assess the hydrographic, planktonic and pelagic components of the Northeast U.S. Continental Shelf Ecosystem. Specifically we will quantify the spatial distribution of the following parameters: water currents, water properties, phytoplankton, microzooplankton, mesozooplankton, sea turtles and marine mammals. We will use traditional and novel techniques and instruments. A broad array of measurements of the pelagic ecosystem will be made during the 18 October – 8 November 2016.

### B. Days at Sea (DAS)

Of the \_22\_DAS scheduled for this project, \_22\_DAS are funded by a Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo.

### C. Operating Area

The continental shelf from north of Cape Hatteras, NC, including Georges Bank and the Gulf of Maine, to the Nova Scotia Shelf (including stations in Canada's Exclusive Economic Zone). Stations will be occupied in waters with depths ranging between 15 and 500 meters.

### D. Summary of Objectives

Operational objectives are to: (1) collect underway data using TSG and SCS; 2) complete CTD and bongo operations at stations throughout area, (2) collect biological data with bongo plankton nets, (3) collect marine mammal and seabird observations, and (4) collect online data and imagery of phytoplankton and ciliates using Imaging FlowCytobot units.

The Ecosystem Monitoring surveys contribute to stock assessments, protected species assessments, ecosystem assessments, and climate assessments. As such, the surveys are multi-objective. Ichthyoplankton and hydrographic data are collected for stock assessments. A range of ecosystem observations are made, from nutrients and ocean acidification to marine mammals, and a number of the measurements are used in NEFSC ecosystem assessment products. The ocean acidification and hydrographic measurements are incorporated into the region's climate assessments.

This survey is multidisciplinary and as such will integrate all these operations. The

cruise plan will evolve with input from scientists as well as the officers and crew of *Pisces*. A post-cruise meeting will focus on lessons learned and improvements to make for subsequent surveys of this type.

#### E. Participating Institutions

NMFS-Northeast Fisheries Science Center  
 Woods Hole Oceanographic Institute  
 University of Maine  
 Canadian Wildlife Service  
 Stony Brook University

#### F. Personnel/Science Party

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Prezioso, Jerome	Chief Scientist, Leg 1	10/18/2016	10/28/2016	M	NMFS	US
Holzwarth- Davis, Tamara	Lead CTD Specialist, Legs 1,2	10/18/2016	11/08/2016	F	NMFS	US
Bowman, Marlena	Controlled Technology Coordinator, Leg 1	10/18/2016	10/28/2016	M	NMFS	10/28/2016US10/28/2016
Taylor, Christopher	Fishery Biologist, Leg 2	10/28/2016	11/08/2016	M	Integrated Statistics	US
Conlon, LeAnn	Student Volunteer, Leg 2	10/28/2016	11/08/2016	F	University of ME	US
Melrose, Christopher	Chief Scientist, Leg 2	10/28/2016	05/19/2015	M	NMFS	11/08/2016US11/08/2016

Henderson, Meghan	Student Volunteer, Leg 2	10/28/2016	11/08/2016	F	Stony Brook University	US
To Be Determined	Seabird Observer, Leg 2	10/28/2016	11/08/2016	?	Canadian Wildlife Service	Canada
Nathan Keith	Vessel Coordinator	10/18/2016	10/28/2016	M	NMFS	06/05/2016US06/05/2016
Carter, Lauren	Fishery Biologist Leg 1	10/18/2016	10/28/2016	F	NMFS	US
Michael Jech	Fishery Biologist Leg 1	10/17/2016	10/18/2016	M	NMFS	US
Joseph Godlewski	Electronics Engineer Leg 1	10/17/2016	10/18/2016	M	NMFS	06/05/2016US06/05/2016
Jennifer Johnson	Fishery Biologist Leg 1	10/17/2016	10/18/2016	F	Integrated Statistics	US

**Tamara Holzwarth-Davis will be the foreign national sponsor.**

## G. Administrative

### 1. Points of Contact:

Chief Scientist – Jerome Prezioso NOAA Fisheries 28 Tarzwell Drive  
Narragansett, RI 02882, [jerry.prezioso@noaa.gov](mailto:jerry.prezioso@noaa.gov) 401 742-0228  
Project Operations Leads-Tamara Holzwarth-Davis-NOAA Fisheries 166  
Water Street, Woods Hole, MA 02543 Christopher Taylor – NOAA  
Fisheries 28 Tarzwell Drive, Narragansett, RI 02882  
[chris.1.taylor@noaa.gov](mailto:chris.1.taylor@noaa.gov), 401-782-3200, Christopher Melrose  
Ops Officer- LTJG Nathaniel Gilman, [ops.pisces@noaa.gov](mailto:ops.pisces@noaa.gov)  
Agent- Nathan Keith, Vessel Coordinator

**Email Contact:** The following should be included as recipients of the daily e-mail message:

<a href="mailto:Wendy.Gabriel@noaa.gov">Wendy.Gabriel@noaa.gov</a>	{FEMAD Chief}
<a href="mailto:Thomas.Noji@noaa.gov">Thomas.Noji@noaa.gov</a>	{EPD Chief}
<a href="mailto:Bill.Karp@noaa.gov">Bill.Karp@noaa.gov</a>	{Science and Research Director}

<a href="mailto:Susan.Gardner@noaa.gov">Susan.Gardner@noaa.gov</a>	{Acting Deputy Science and Research Director}
<a href="mailto:Nathan.Keith@noaa.gov">Nathan.Keith@noaa.gov</a>	{NEFSC Vessel Coordinator}
<a href="mailto:Jon.Hare@noaa.gov">Jon.Hare@noaa.gov</a>	{Oceanography Branch Chief}
<a href="mailto:Tamara.Holzwarth-Davis@noaa.gov">Tamara.Holzwarth-Davis@noaa.gov</a>	{Oceanography Branch}
<a href="mailto:CO.Pisces@noaa.gov">CO.Pisces@noaa.gov</a>	{Commanding Officer – <i>Pisces</i> }
<a href="mailto:Michael.S.Abbott@noaa.gov">Michael.S.Abbott@noaa.gov</a>	{NEFSC Port Captain}
<a href="mailto:ops.Pisces@noaa.gov">ops.Pisces@noaa.gov</a>	{Operations Officer – <i>Pisces</i> }

2. Diplomatic Clearances

This project involves Marine Scientific Research in waters under the jurisdiction of Canada. Diplomatic clearance has been requested.

3. Licenses and Permits

This project will be conducted under the direction of the Science and Research Director of the Northeast Fisheries Science Center as well as NEFSC active Letter of Authorization for marine mammals and Incidental Take Statement for endangered and threatened species.

## II. Operations

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary:

18 October: Depart Newport Naval Station, RI to commence calibration of the EK60 acoustic system in Narragansett Bay, shortly after the *Pisces* leaves the dock. Once calibrations are completed the calibration team will return to the dock via a small boat, and the vessel will depart the Bay to head south and commence sampling operations.

28 October: The *Pisces* will return to Newport Naval Station in Rhode Island after completing cruise operations for the southern portion of the Survey. Personnel from Leg 1 will disembark. Personnel for Leg 2 will board vessel.

29 October: Depart Newport Naval Station, RI to commence sampling operations in the Gulf of Maine and Georges Bank portions of the Survey.

8 November: Dock at Coast Guard Station Boston, MA after completing sampling operations on Georges Bank and in the Gulf of Maine.

B. Staging and Destaging:

16-17 October: Begin cruise staging at Newport Naval Station, RI. Load and set up scientific equipment and complete CTD, SCS and ImagingFlowCytoBot installations.

8 November: Dock at Coast Guard Station Pier, Boston, MA. Disembark scientific personnel, and off-load scientific equipment and supplies.

C. Operations to be conducted:

The survey consists of 155 random-stratified and fixed Oceanography stations in the Middle Atlantic Bight, Southern New England, Georges Bank and the Gulf of Maine (Table 1, Figure 1.) These stations are randomly distributed at varying distances, and as such there is no fixed expectation of number to be covered each day. Rather, the progress of the survey will depend on transit time, sea state, and water depth of the stations, with deeper stations requiring more time to complete operations. Some stations will also have more complex operations scheduled, such as a water cast and a bongo tow, which will increase the amount of time spent on-station.

Several of the ship's systems will be running and continuously logging: TSG, and EK-60 data from the entire track-line. Personnel from Woods Hole Oceanographic Institution will be using water from the scientific seawater flow-through system to capture images of phytoplankton with an Imaging FlowCytobot Unit on a dedicated computer. Marine mammal and seabird observers will be stationed on the bridge or flying bridge making continual observations during daylight hours.

Oceanographic station locations and a cruise track will be provided to the vessel prior to sailing to allow the navigation officer ample time to load this information into the navigation systems. The Commanding Officer and Chief Scientist will jointly modify the track during the cruise as weather conditions and time constraints vary to best achieve the cruise objectives. **Highest reasonable cruising speeds should be employed to improve the potential to complete the cruise missions. Transiting between stations located 15 or more nautical miles apart at speeds of 12 knots or greater when possible can greatly improve the coverage of the survey area within the 22 allotted days for this cruise.**

Oceanography Stations: A Seabird CTD profiler attached to a bongo net will be deployed at approximately 125 stations. In addition, a Seabird CTD 19+ profiler will be deployed alone to collected data at deep stations (>200 m) and to collect water for salinity and chlorophyll calibrations, nutrient, DIC and total alkalinity analysis. A Seabird 911+ CTD will be deployed on a rosette frame with a carousel water sampling system (SBE32) and 11 10-liter Niskin bottles at a subset of fixed stations. This package will collect profiles of water temperature, salinity, chlorophyll-a and oxygen levels. Water samples collected by the Niskin sampling bottles at multiple depths along the upcast will be processed ashore for nutrients and carbonate chemistry.

A Seabird 911+ CTD will be deployed on a rosette frame with a carousel water sampling system (SBE32) and 11 10-liter Niskin bottles at all fixed stations. The package will be deployed on vertical casts, collecting profiles of water temperature, salinity, chlorophyll-a and oxygen levels. Water samples are collected by the Niskin sampling bottles at multiple depths along the upcast to be processed ashore for nutrients, carbonate chemistry and dissolved inorganic carbon (DIC) analysis. (Figure 3).

The deployments of the Seabird 19+ and 911+ CTD units will use the two oceanographic winches and the CTD computer located in the dry lab.

Acoustic Survey Operations: EK-60 operations will be conducted continuously throughout the cruise track at the highest safe transit speed possible, and during scientific gear deployments.

Scientific Computer System (SCS): *Pisces* ' SCS system is a PC-based server, which continuously collects and distributes scientific data from various navigational, oceanographic, meteorological, and sampling sensors throughout the cruise. Date and time for data collections from computers, instrumentation, and logsheets recording will be synchronized using the vessel's GPS master clock and Dimension IV software. The NEFSC and *Pisces* ' ET are responsible for ensuring data collection and logging.

### 1. Continuous Underway Sampling:

#### 1.1. SCS

1.1.1. Navigational, meteorological, and environmental data will be archived throughout the cruise using *Pisces* ' Scientific Computer System (SCS).

#### **1.1.2. Ship Requirements**

1.1.2.1. SCS system should be running for duration of cruise

#### 1.2. Flow-through system

1.2.1. TSG - salinity, temperature, density

1.2.2. pCO<sub>2</sub> system surface water and atmospheric CO<sub>2</sub> (science will bring IFCB to plumb into scientific seawater system).

1.2.3. Discrete samples – drawn from flow-through by scientists

1.2.3.1. DIC – dissolved inorganic carbon

1.2.3.2. salt – for salinity calibrations

#### **1.2.4. Ship Requirements**

1.2.4.1. Flowthrough system cleaned prior to cruise (freshwater flush)

1.2.4.2. Flowthrough system running during cruise and logging data.

1.2.4.3. Ability to draw small amount of water from system for Imaging FlowCytoBot unit.

1.2.4.4. Seawater will be needed for sample preservation in the hood located in the wet lab.

### 1.3. Fisheries acoustics

#### 1.3.1. EK-60

#### **1.3.2. Ship Requirements**

1.3.2.1. Acoustics running during cruise at all frequencies and logging data

NOTE: Extraneous echo sounders should be turned off to eliminate or at least minimize acoustic interference with the EK60.

### 1.6 Surface observations

1.6.1 Marine mammal and seabird observations will be made from the bridge or flying bridge by an observer during daylight hours.

#### **1.6.2 Ship Requirements**

1.6.2.1 110 VAC available either on the flying bridge or bridge for the observer's laptop.

1.7 Water Bottle Cast – deployed at subset of stations surface to 500 m or 5 m from bottom

1.7.2 SBE19 – Temperature, conductivity, depth

1.7.3 Water bottles – tripped manually with a messenger for salinity calibrations.

#### **1.7.4 Ship Requirements**

1.7.4.1 None

Data: At the end of the cruise the ship will provide the chief scientist with three copies of the data from the EK60 transducer and the SCS system. The chief scientist will provide a 1 terabyte drive for this. A copy of the SCS data should also be FTP'd to DMS personnel in Woods Hole.

### D. Dive Plan

Dives are not planned for this project.

### E. Applicable Restrictions

Conditions which would preclude normal operations may include the following:

Adverse weather – Marginal conditions such as high seas and winds that make deploying gear over the side hazardous to personnel, and secondarily to the equipment, warrant having operations suspended until the command deems conditions safe again. One way to mitigate such interruptions would involve coordination between the chief scientist and the command to adjust the cruise track to avoid the worst weather and continue operations in a more sheltered area where they can be conducted safely.

Equipment failures - if scientific, may involve the adjustment of sampling strategies to permit survey operations to continue with functional equipment. Vessel equipment failures will be worked out on an ad hoc basis between the scientists and command to permit survey operations to continue with the understanding that the safety of the vessel is always the top priority.

### **Protected Resources:**

North Atlantic right whale protection: The vessel is requested to adhere to right whale protection regulations. Information on Seasonal Management Area (SMA) and Dynamic Management Area (DMA) regulations and information for protecting right whales from collisions with vessels are provided through the NOAA Protected Resources website (<http://www.nmfs.noaa.gov/pr/shipstrike/>), Right Whale Sighting Advisory System (SAS) website (<http://www.nefsc.noaa.gov/psb/surveys/>), the U.S. Coast Guard's "Notices To Mariners" and NOAA weather radio. Mariners are urged to use caution and proceed at safe speeds in areas where right whales occur. U.S. Law (50 CFR 224.105) prohibits operating vessels 65 feet (19.8 meters) or greater in excess of 10 knots in Seasonal Management Areas (SMAs) along the U.S. east coast. Mariners are also requested to route around voluntary speed restriction zones, Dynamic Management Areas (DMAs) or transit through them at 10 knots or less. Approaching within 500 yards of right whales is prohibited, unless the Chief Scientist is in possession of an ESA/MMPA permit allowing such approaches.

Whale sightings: Sightings of right whales, or dead or entangled whales of any species, are extremely valuable and reports are urgently requested. Please report all right whale sightings north of the Virginia-North Carolina border to 866-755-6622; right whale sightings south of that border should be reported to 877-WHALE HELP. Right whale sightings in any location may be reported to the U.S. Coast Guard via VHF channel 16. Protocols for reporting sightings are described in the Guide to Reporting Whale Sightings placard. The placard is available online ([http://www.nefsc.noaa.gov/psb/surveys/documents/20120919\\_Report\\_a\\_Right\\_Whale.pdf](http://www.nefsc.noaa.gov/psb/surveys/documents/20120919_Report_a_Right_Whale.pdf)) and laminated copies will be provided by the Protected Species Branch upon request. It is requested that this placard be kept on the bridge for quick reference and to facilitate rapid reporting (via satellite phone if necessary). Opportunistic sightings of other marine mammal species that are live and well may be reported using the Platforms of Opportunity (POP) forms and protocols. To information regarding the WhaleALERT

application <http://stellwagen.noaa.gov/protect/whalealert.html>. For information on reporting a dead whale  
[http://www.nefsc.noaa.gov/psb/surveys/documents/20120919\\_Report\\_a\\_Dead\\_Whale.pdf](http://www.nefsc.noaa.gov/psb/surveys/documents/20120919_Report_a_Dead_Whale.pdf)

### **Mitigation for Protected Resources:**

#### **Plankton Nets, Small-mesh Towed Nets, Oceanographic Sampling Devices, Video Cameras, and Remotely Operated Vessel (ROV) Deployments**

The NEFSC deploys a wide variety of gear to sample the marine environment during many of their research cruises, such as plankton nets, oceanographic sampling devices, video cameras, and ROVs. These types of gear are not considered to pose any risk to protected species because of their small size, slow deployment speeds, and/or structural details of the gear and are therefore not subject to specific mitigation measures. However, the officer on watch and crew monitor for any unusual circumstances that may arise at a sampling site and use their professional judgment and discretion to avoid any potential risks to protected species during deployment of all research equipment.

**“Take” of Protected Resources:** Under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) it is unlawful to take a protected species. The MMPA defines take as “harass, hunt, capture, kill, or collect, or attempt to harass, hunt, capture, or collect”. The ESA defines take as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.” An incidental take is one that is incidental to, but not the purpose of, otherwise lawful activities.

**In the event of an incidental take of a marine mammal or federally listed threatened or endangered species during the cruise, the chief scientist will take the following actions:**

**Marine turtle, Sturgeon and Atlantic salmon bycatch:** Please refer to the Permits & Incidental Take Manual for handling and sampling procedures. Information should be collected on the Sturgeon & Salmon and Turtle Data Collection Sheets and required information should be submitted within 24 hours of the take to [Incidental.Take@noaa.gov](mailto:Incidental.Take@noaa.gov), [Elizabeth.Josephson@noaa.gov](mailto:Elizabeth.Josephson@noaa.gov), [Nathan.Keith@noaa.gov](mailto:Nathan.Keith@noaa.gov), [Sarah.Pike@noaa.gov](mailto:Sarah.Pike@noaa.gov) for PSIT entry. **Dead turtles, sturgeon, and Atlantic salmon shall, if feasible, be frozen and returned to the Woods Hole Laboratory.**

**Marine mammal bycatch:** Please refer to the Permits & Incidental Take Manual for handling and sampling procedures. Information should be collected on the Marine Mammal Incidental Take & Data Collection Sheet. **Animals determined to be dead, shall if feasible be frozen and return to the Woods Hole laboratory.** Required PSIT information should be submitted within 24 hours of the take to [Incidental.Take@noaa.gov](mailto:Incidental.Take@noaa.gov), [Elizabeth.Josephson@noaa.gov](mailto:Elizabeth.Josephson@noaa.gov), [Nathan.Keith@noaa.gov](mailto:Nathan.Keith@noaa.gov), [Sarah.Pike@noaa.gov](mailto:Sarah.Pike@noaa.gov).

Migratory bird salvage: Please refer to the Federal Fish and Wildlife “Special Purpose – Salvage” Permit located in the Permits & Incidental Take Manual for the salvage of dead migratory birds (except species listed as threatened or endangered under the Endangered Species Act; see 50 CFR 17.11).

Stellwagen Bank National Marine Sanctuary:

Please see the permit and requirements located in the Permits and Incidental Take Manual.

### **III. Equipment**

#### **A. Equipment and Capabilities provided by the ship (itemized)**

##### **Ship Requirements for Acoustics**

Simrad EK60 Scientific Sounder: The Simrad EK60 Scientific Sounder will be the primary sampling gear used during fisheries acoustic surveys for providing species-specific abundance estimates. The EK60 operates four transducers mounted on the retractable keel (18, 38, 120, and 200 kHz split-beam transducers). EK60 data are logged to the EK60 data server, which is on the ship’s and scientific networks. RS232 connections are used for navigational (Differential GPS) input.

Acoustics are running during cruise at all frequencies and logging data.

Scientific Computer System (SCS): *Pisces*’ SCS system is a PC-based server, which continuously collects and distributes scientific data from various navigational, oceanographic, meteorological, and sampling sensors throughout the cruise.

##### **Ship Requirements for Side Sampling Station and Oceanographic Operations**

SBE911 connected to conducting cable on forward winch.

Slip rings are to be checked prior to cruise and redone if necessary.

New terminations will be done prior to the start of this cruise for both oceanographic winches.

SBE19 connected to conducting cable on aft winch for bongo deployments.

Disposal of waste water cannot happen before, during, or right after CTD rosette operations.

Smoking is not allowed on Oceanography deck due to nutrient and carbonate chemistry sampling.

NEMA Data String to Computer Lab.

Ultra-cold (-80°C) freezer (tested prior to embarkation) for storage of samples.

### **Ship Requirements for Continuous Underway Sampling**

SCS - Navigational, meteorological, and environmental data will be archived throughout the cruise using *Pisces*' Scientific Computer System (SCS). SCS system should be running for duration of cruise.

Flow-through system - TSG - salinity, temperature, density.

Fluorometer – chlorophyll-a concentration.

Imaging FlowCytobot – small amount of seawater drawn from the system to obtain phytoplankton images.

PCO2 system – operational during the entire cruise period

Discrete samples – drawn from flow-through by scientists.

DIC – dissolved inorganic carbon.

salt – for salinity calibrations.

Flowthrough system cleaned prior to cruise (freshwater flush).

Flowthrough system running during cruise and logging data.

Ability to draw water samples from system and to plumb in Imaging FlowCytobot instrument from WHOI.

## **B. Equipment and Capabilities provided by the scientists (itemized)**

### CTD Rosette Operations :

A CTD Rosette will be deployed at subset of stations surface to **500 m max depth** or 5 m from bottom; at approximately 20-50 locations during the course of the cruise.

SBE911 – salinity, temperature, density.

Fluorometer – chlorophyll a concentration.

PAR – for light measurement.

Water bottles – tripped automatically from computer in CTD Lab.

Salt - for salinity calibrations.  
Nutrients – N, P, Si, others.  
Ocean Carbon – DIC, Total alkalinity.  
Chlorophyll-a – measured directly.

**Oceanography Stations:**

CTD SBE19/Bongo – deployed at most stations surface to **200 m max depth** or 5 m from bottom.

CTD 911+ – Temperature, conductivity, depth deployed with rosette having 10 ten-liter bottles, and radiometer.

61 cm, 333 micron mesh– zooplankton and ichthyoplankton.

20 cm, 165 micron mesh – microzooplankton and zooplankton (20 stations).

45 kg depressor weight for bongo net deployments.

**Continuous Underway Sampling:**

Imaging FlowCytoBot: An Imaging Flow Cytobot unit will be plumbed into the scientific flow-through system and used throughout the cruise. The unit will require a very small amount of seawater from the flow-through system and 110 VAC (Figure 4). This unit will be brought to the ship as early as possible during staging to ensure optimal installation and functionality.

**IV. Hazardous Materials**

**A. Policy and Compliance**

The Chief Scientist is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents

- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

## B. Inventory

Common Name of Material	Qty	Notes	Trained Individual	Spill control
Acetone (90%)	2 x 500 ml.	Alkalinity, Located in chem lab.	Jerome Prezioso, Chris Taylor	E
Formaldehyde solution (37%)	2 x 20 liters	Alkalinity, Stored in ship chem. locker. 10 liters will be in dispensing carboy in Preservation Alcove hood.	Jerome Prezioso	F
Ethanol (95%)	4 x 20 liters	Alkalinity, Stored in ship chem. locker.	Jerome Prezioso	E
Mercuric Chloride	1 x 50 ml.	Located in ship chem. locker.	Chris Taylor, Jerry Prezioso	M

C. Chemical safety and spill response procedures (see appendices)

**Mercuric Chloride**

- Use aspirator in mercury spill cleanup kit to pick up as much mercuric chloride solution as possible and place into mercury waste bottle.
- Mix water, CINNASORB Mercury Absorbent Base and Activator as per directions in mercury spill kit to form a paste which is placed on contaminated area, and scraped up with wooden spatulas to be placed into mercury waste jar. Allow paste to dry before sealing jar with cap.
- Wipe down contaminated area with warm soapy water on sponge from mercury spill kit.

CINNASORB Elemental Mercury Absorbent Base

CINNASORB elemental Mercury Absorbent Activator

Mercury aspirator, spatulas, sponge, gloves, mercury waste bottle and jar

**Formalin/Formaldehyde/Ethanol**

- Ventilate area of leak or spill. Remove all sources of ignition.
- Wear appropriate personal protective equipment.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
- Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container.
- Do not use combustible materials, such as saw dust.

Neutralizer and Absorbent Materials

Spill-X-FP, Formaldehyde Eater and Spilfyter (Trade Marks) will be brought in sufficient quantities – (two 5-gallon buckets and several 2 lb. containers) to neutralize 40 liters of 37% Formaldehyde solution.

Absorbent ground clay containment material will be brought along to absorb spilled chemicals – (three 14 lb. containers).

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

**V. Additional Projects**

- A. Supplementary (“Piggyback”) Projects  
No Supplementary Projects are planned.
  
- B. NOAA Fleet Ancillary Projects  
No NOAA Fleet Ancillary Projects are planned.

## **VI. Disposition of Data and Reports**

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA’s Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

- A. Data Classifications: *Under Development*
  - a. OMAO Data
  - b. Program Data
  
- B. Responsibilities: *Under Development*

## **VII. Meetings, Vessel Familiarization, and Project Evaluations**

- A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship’s crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship’s Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.
  
- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project’s start and is normally presented by the ship’s Operations Officer.

- C. Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hours before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.
- D. Project Evaluation Report  
Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at <http://www.omao.noaa.gov/fleeteval.html> and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships', specific concerns and praises are followed up on while not divulging the identity of the evaluator.

## **VIII. Miscellaneous**

### A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be

reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website

<http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted after March 1, 2014 must be accompanied by [NOAA Form \(NF\) 57-10-02](#) - Tuberculosis Screening Document in compliance with [OMAO Policy 1008](#) (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance ([http://ocio.os.doc.gov/ITPolicyandPrograms/IT\\_Privacy/PROD01\\_008240](http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240)).

The only secure email process approved by NOAA is [Accellion Secure File Transfer](#) which requires the sender to setup an account. [Accellion's Web Users Guide](#) is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to [acellionAlerts@doc.gov](mailto:acellionAlerts@doc.gov) requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact information:  
Regional Director of Health Services

Marine Operations Center – Atlantic  
439 W. York Street  
Norfolk, VA 23510  
Telephone 757-441-6320  
Fax 757-441-3760  
Email [MOA.Health.Services@noaa.gov](mailto:MOA.Health.Services@noaa.gov)

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Operations Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

#### C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

#### D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Commanding Officer at least 30 days in advance.

#### E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy 1.1* (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

- (1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.

- (2) Installation of the latest critical operating system security patches.
- (3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

#### F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (<http://deemedexports.noaa.gov>). National Marine Fisheries Service personnel will use the Foreign National Registration System (FNRS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated Line Office Deemed Export point of contact to assist with the process.

Foreign National access must be sought not only for access to the ship involved in the project but also for any Federal Facility access (NOAA Marine Operations Centers, NOAA port offices, USCG Bases) that foreign nationals might have to traverse to gain access to and from the ship. The following are basic requirements.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the email generated by the Servicing Security Office granting approval for the foreign national guest's visit. (For NMFS-sponsored guests, this email will be transmitted by FNRS.) This email will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.
4. Export Control - Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FNRS or Servicing Security Office email granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

Responsibilities of the Foreign National Sponsor:

1. Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen and a NOAA or DOC employee. According to DOC/OSY, this requirement cannot be altered.
3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National

**VIII. Appendices (all that apply)**

1. Figures, maps, tables, images, etc.

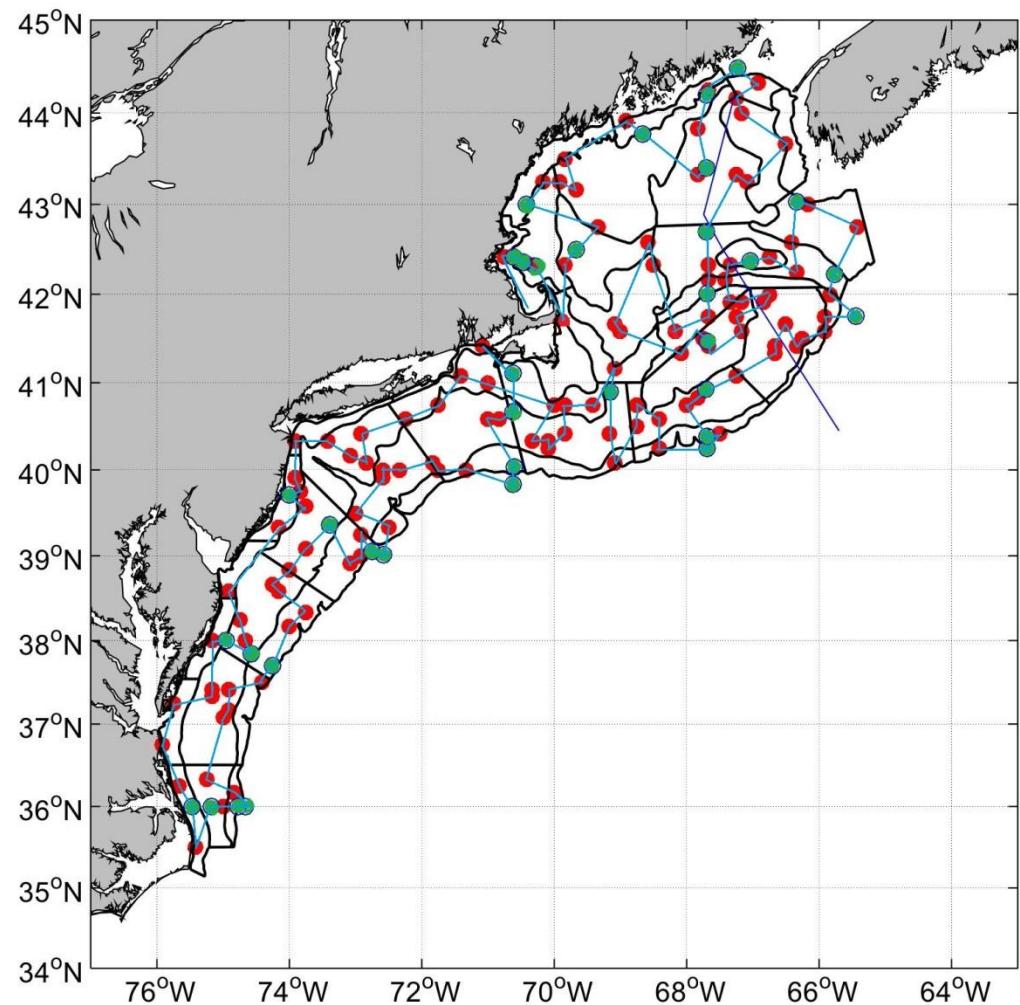


Figure 1. Station locations and proposed cruise track for PC 16-09 Ecosystem Monitoring Survey

18 October – 8 November 2016. Red circles are stratified-random stations, green circles are fixed stations.

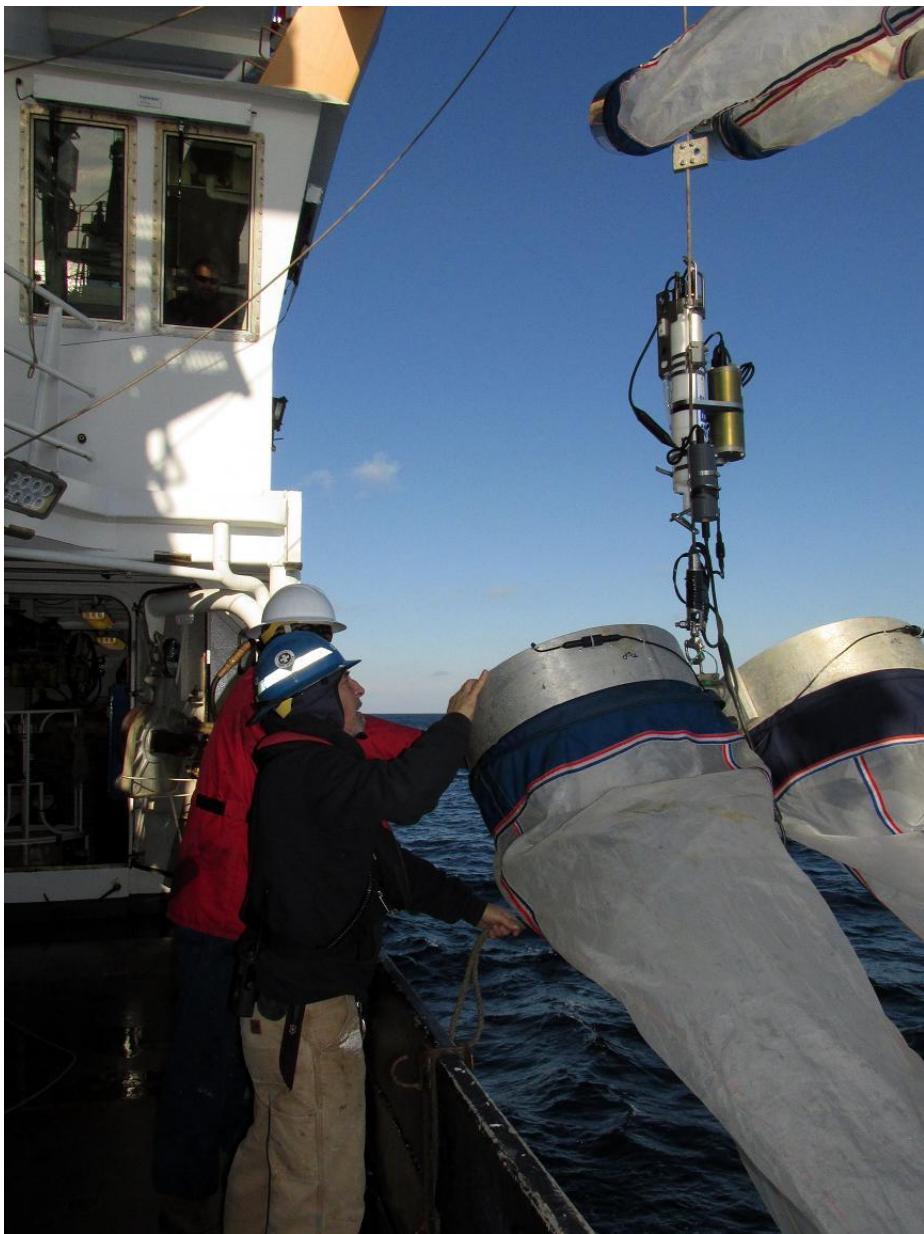


Figure 2. Plankton net sampling array, showing 61 and 20 cm bongo frames, and CTD unit.



Figure 3. A Niskin bottle rosette sampler equipped with 10 liter Niskin bottles.



Figure 4. The cylindrical Imaging FlowCytobot unit.

Table 1. Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

Name	Region	Strata	Deployment	Latitude		Longitude		
				Degrees	Minutes	Degrees	Minutes	
1-MAB-1	MAB	1	Bongo Oblique	STD	36	0.17	74	0.8
2-MAB-1	MAB	2	Bongo Oblique	STD	35	1.00	75	0.4
2-MAB-2	MAB	2	Bongo Oblique	STD	36	0.33	75	0.2
3-MAB-1	MAB	3	Bongo Oblique	STD	36	0.25	75	0.4
3-MAB-2	MAB	3	Bongo Oblique	STD	35	0.50	75	0.2
4-MAB-1	MAB	4	Bongo Oblique	STD	37	0.50	75	0.3
5-MAB-1	MAB	5	Bongo Oblique	STD	37	0.42	75	0.8
5-MAB-2	MAB	5	Bongo Oblique	STD	37	0.08	74	0.6
5-MAB-3	MAB	5	Bongo Oblique	STD	37	0.17	75	0.5
5-MAB-4	MAB	5	Bongo Oblique	STD	37	0.33	74	0.7
5-MAB-5	MAB	5	Bongo Oblique	STD	37	0.42	74	0.9
6-MAB-1	MAB	6	Bongo Oblique	STD	36	0.75	74	0.5
6-MAB-2	MAB	6	Bongo Oblique	STD	37	0.25	75	0.0
7-MAB-1	MAB	7	Bongo Oblique	STD	38	0.33	75	0.0
7-MAB-2	MAB	7	Bongo Oblique	STD	38	0.17	74	0.5
8-MAB-1	MAB	8	Bongo Oblique	STD	37	1.00	74	0.0
8-MAB-2	MAB	8	Bongo Oblique	STD	38	0.25	75	0.0
8-MAB-3	MAB	8	Bongo Oblique	STD	38	0.67	74	0.4
8-MAB-4	MAB	8	Bongo Oblique	STD	38	0.58	74	0.3
9-MAB-1	MAB	9	Bongo Oblique	STD	37	1.00	73	0.0
10-MAB-1	MAB	10	Bongo Oblique	STD	38	0.92	74	0.3
10-MAB-2	MAB	10	Bongo Oblique	STD	38	1.00	74	0.4
10-MAB-3	MAB	10	Bongo Oblique	STD	39	0.25	73	0.1
11-MAB-1	MAB	11	Bongo Oblique	STD	39	0.08	73	0.1
11-MAB-2	MAB	11	Bongo Oblique	STD	39	0.75	73	0.6
11-MAB-3	MAB	11	Bongo Oblique	STD	38	0.83	73	0.6
11-MAB-4	MAB	11	Bongo Oblique	STD	39	0.58	73	0.3
12-MAB-1	MAB	12	Bongo Oblique	STD	38	0.58	74	0.1
13-MAB-1	MAB	13	Bongo Oblique	STD	39	0.91	72	0.9
13-MAB-2	MAB	13	Bongo Oblique	STD	39	0.33	72	0.5
14-SNE-1	SNE	14	Bongo Oblique	STD	39	0.33	73	0.5
15-SNE-1	SNE	15	Bongo Oblique	STD	39	1.00	73	0.1

15-SNE-2	SNE	15	Bongo Oblique	STD	39	0.50	72	0.2
15-SNE-3	SNE	15	Bongo Oblique	STD	39	0.91	74	0.0
15-SNE-4	SNE	15	Bongo Oblique	STD	39	1.00	72	0.0
16-SNE-1	SNE	16	Bongo Oblique	STD	40	0.33	72	0.9
16-SNE-2	SNE	16	Bongo Oblique	STD	40	0.16	71	0.5
16-SNE-3	SNE	16	Bongo Oblique	STD	40	0.08	70	0.5
16-SNE-4	SNE	16	Bongo Oblique	STD	40	0.41	69	0.0
17-SNE-1	SNE	17	Bongo Oblique	STD	40	0.33	69	0.5
18-SNE-1	SNE	18	Bongo Oblique	STD	39	1.00	69	0.3
19-SNE-1	SNE	19	Bongo Oblique	STD	40	0.58	68	0.4
19-SNE-2	SNE	19	Bongo Oblique	STD	39	1.00	72	0.2
19-SNE-3	SNE	19	Bongo Oblique	STD	40	0.58	71	0.8
19-SNE-4	SNE	19	Bongo Oblique	STD	40	0.08	71	0.0
19-SNE-5	SNE	19	Bongo Oblique	STD	40	0.75	69	0.4
20-SNE-1	SNE	20	Bongo Oblique	STD	40	0.58	68	0.3
20-SNE-2	SNE	20	Bongo Oblique	STD	40	1.00	70	0.5
20-SNE-3	SNE	20	Bongo Oblique	STD	41	0.08	68	0.7
21-SNE-1	SNE	21	Bongo Oblique	STD	41	0.41	67	0.5
22-SNE-1	SNE	22	Bongo Oblique	STD	40	0.08	73	0.2
23-SNE-1	SNE	23	Bongo Oblique	STD	40	0.41	72	0.7
23-SNE-2	SNE	23	Bongo Oblique	STD	40	0.25	72	0.7
23-SNE-3	SNE	23	Bongo Oblique	STD	40	0.41	70	0.9
23-SNE-4	SNE	23	Bongo Oblique	STD	40	0.33	72	0.3
23-SNE-5	SNE	23	Bongo Oblique	STD	40	0.33	71	0.0
24-SNE-1	SNE	24	Bongo Oblique	STD	40	0.75	69	0.5
24-SNE-2	SNE	24	Bongo Oblique	STD	40	0.75	69	0.3
24-SNE-3	SNE	24	Bongo Oblique	STD	40	0.75	69	0.0
25-SNE-1	SNE	25	Bongo Oblique	STD	41	0.66	68	0.2
26-GB-1	GB	26	Bongo Oblique	STD	40	0.25	67	0.1
26-GB-2	GB	26	Bongo Oblique	STD	40	0.41	72	0.1
27-GB-1	GB	27	Bongo Oblique	STD	40	0.75	71	0.7
27-GB-2	GB	27	Bongo Oblique	STD	40	0.58	67	0.1
27-GB-3	GB	27	Bongo Oblique	STD	41	0.08	66	0.8
27-GB-4	GB	27	Bongo Oblique	STD	40	0.50	71	0.2
27-GB-5	GB	27	Bongo Oblique	STD	40	0.75	68	0.0
27-GB-6	GB	27	Bongo Oblique	STD	40	0.83	67	0.5
28-GB-1	GB	28	Bongo Oblique	STD	41	0.58	67	0.4
28-GB-2	GB	28	Bongo Oblique	STD	41	1.00	68	0.9
29-GB-1	GB	29	Bongo Oblique	STD	41	0.91	67	0.9
29-GB-2	GB	29	Bongo Oblique	STD	41	0.50	70	0.3
29-GB-3	GB	29	Bongo Oblique	STD	41	0.41	67	0.9
29-GB-4	GB	29	Bongo Oblique	STD	41	1.00	66	0.5
29-GB-5	GB	29	Bongo Oblique	STD	41	0.33	68	0.3

29-GB-6	GB	29	Bongo Oblique	STD	41	0.41	66	0.3
29-GB-7	GB	29	Bongo Oblique	STD	41	0.75	69	0.0
29-GB-8	GB	29	Bongo Oblique	STD	41	0.66	67	0.7
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30-GB-4	GB	30	Bongo Oblique	STD	41	0.58	69	0.8
30-GB-5	GB	30	Bongo Oblique	STD	41	0.91	68	0.2
30-GB-6	GB	30	Bongo Oblique	STD	41	0.50	66	0.7
30-GB-7	GB	30	Bongo Oblique	STD	41	0.75	66	0.5
31-GB-1	GB	31	Bongo Oblique	STD	41	0.75	66	0.0
31-GB-2	GB	31	Bongo Oblique	STD	41	0.58	69	0.5
31-GB-3	GB	31	Bongo Oblique	STD	41	0.91	68	0.3
32-GB-1	GB	32	Bongo Oblique	STD	42	0.16	67	0.0
32-GB-2	GB	32	Bongo Oblique	STD	42	0.16	65	0.8
33-GOM-1	GOM	33	Bongo Oblique	STD	41	0.16	69	0.0
34-GOM-1	GOM	34	Bongo Oblique	STD	42	0.33	67	0.4
34-GOM-2	GOM	34	Bongo Oblique	STD	41	0.58	66	0.5
34-GOM-3	GOM	34	Bongo Oblique	STD	41	0.66	66	0.9
35-GOM-1	GOM	35	Bongo Oblique	STD	42	0.41	65	0.9
36-GOM-1	GOM	36	Bongo Oblique	STD	42	0.33	69	0.5
36-GOM-2	GOM	36	Bongo Oblique	STD	43	0.25	70	0.5
37-GOM-1	GOM	37	Bongo Oblique	STD	42	0.58	70	0.7
37-GOM-2	GOM	37	Bongo Oblique	STD	42	0.33	69	0.9
38-GOM-1	GOM	38	Bongo Oblique	STD	42	0.33	67	0.0
38-GOM-2	GOM	38	Bongo Oblique	STD	42	0.25	67	0.2
38-GOM-3	GOM	38	Bongo Oblique	STD	42	0.33	65	0.4
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41-GOM-2	GOM	41	Bongo Oblique	STD	43	0.25	68	0.9
41-GOM-3	GOM	41	Bongo Oblique	STD	42	0.75	69	0.9
41-GOM-4	GOM	41	Bongo Oblique	STD	43	0.16	68	0.3
42-GOM-1	GOM	42	Bongo Oblique	STD	43	0.33	66	0.7
42-GOM-2	GOM	42	Bongo Oblique	STD	43	0.25	68	0.2
42-GOM-3	GOM	42	Bongo Oblique	STD	43	0.83	68	0.5
42-GOM-4	GOM	42	Bongo Oblique	STD	43	0.33	67	0.8
43-GOM-1	GOM	43	Bongo Oblique	STD	44	0.16	70	0.0
43-GOM-2	GOM	43	Bongo Oblique	STD	43	1.00	66	0.8
44-GOM-3	GOM	44	Bongo Oblique	STD	43	0.66	69	0.1
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46-GOM-1	GOM	46	Bongo Oblique	STD	44	0.33	67	0.9
47-GOM-1	GOM	47	Bongo Oblique	STD	42	0.75	66	0.5

47-GOM-2	GOM	47	Bongo Oblique	STD	42	0.58	67	0.6
47-GOM-3	GOM	47	Bongo Oblique	STD	42	1.00	67	0.0
LNG (Acid 1)	GOM	36	CTD Profile911+, Bongo Oblique	FXD/STD	42	25.01	70	36.8
Wilkinson Basin (Acid 3)	GOM	37	CTD Profile911+, Bongo Oblique	FXD/STD	42	30.00	69	40.0
NE Ch (Acid 2)	GOM	38	CTD Profile911+, Bongo Oblique	FXD/STD	42	13.50	65	46.0
Georges Basin (Acid 4)	GOM	39	CTD Profile911+, Bongo Oblique	FXD/STD	42	22.42	67	2.6
Jordon Basin (Acid 5)	GOM	42	CTD Profile911+, Bongo Oblique	FXD/STD	43	24.00	67	42.0
Acid 8 MAB	MAB	1	CTD Profile 911+	FXD	36	0.02	74	46.6
Acid 7 MAB	MAB	2	CTD Profile 911+	FXD	36	0.02	75	10.3
Acid 6 MAB	MAB	3	CTD Profile 911+	FXD	36	0.02	75	28.3
Acid 12 MAB	MAB	7	CTD Profile 911+	FXD	37	42.07	74	15.3
Acid 10 MAB	MAB	8	CTD Profile 911+	FXD	37	59.97	74	57.4
Acid 11 MAB	MAB	8	CTD Profile 911+	FXD	37	50.60	74	34.7
Acid 14 MAB	MAB	11	CTD Profile 911+	FXD	39	21.68	73	23.5
Acid 13 MAB	MAB	13	CTD Profile 911+	FXD	39	42.49	74	0.2
Acid 19 SNE	SNE	18	CTD Profile 911+	FXD	40	2.23	70	36.0
Acid 18 SNE	SNE	23	CTD Profile 911+	FXD	40	40.20	70	37.3
Great South Ch (Acid 28)	GOM	23	CTD Profile 911+	FXD	40	54.00	69	9.4
Acid 17 SNE	SNE	24	CTD Profile 911+	FXD	41	6.31	70	37.3
Acid 24 GB	GB	26	CTD Profile 911+	FXD	40	22.97	67	41.4
Acid 23 GB	GB	27	CTD Profile 911+	FXD	40	55.72	67	42.5
Acid 22 GB	GB	30	CTD Profile 911+	FXD	41	28.20	67	41.4
Acid 21 GB	GB	32	CTD Profile 911+	FXD	42	0.40	67	41.4
Acid 32 GOM	GOM	36	CTD Profile 911+	FXD	42	18.94	70	16.7
Acid 33 GOM	GOM	36	CTD Profile 911+	FXD	42	21.40	70	27.9
Jordan Basin S (Acid 35)	GOM	38	CTD Profile 911+	FXD	42	42.06	67	42.0
PF01 (Acid 26)	GOM	40	CTD Profile 911+	FXD	42	59.92	70	25.3
Jordan Basin N (Acid 34)	GOM	41	CTD Profile 911+	FXD	44	12.00	67	42.0
JT04 (Acid 30)	GOM	41	CTD Profile 911+	FXD	43	46.30	68	40.2
Acid 27 GOM	GOM	47	CTD Profile 911+	FXD	43	1.65	66	20.4
BI01 (Acid 29)	GOM	48	CTD Profile 911+	FXD	44	29.13	67	13.6
Acid 9 MAB	MAB	50	CTD Profile 911+	FXD	36	0.02	74	40.1
Acid 15 MAB	MAB	56	CTD Profile 911+	FXD	39	3.23	72	44.6
Acid 16 MAB	MAB	56	CTD Profile 911+	FXD	39	0.76	72	34.9
Acid 20 SNE	SNE	60	CTD Profile 911+	FXD	39	49.95	70	37.3
Acid 25 GB	GB	62	CTD Profile 911+	FXD	40	14.74	67	41.4
Acid 26 GB	GB	68	CTD Profile 911+	FXD	41	45.14	65	26.5
<b>Buoy M Acid 36 GOM</b>	<b>GOM</b>	<b>42</b>	<b>CTD Profile 911+</b>	<b>FXD</b>	<b>43</b>	<b>29.44</b>	<b>67</b>	<b>52.76</b>
<b>Buoy N 0118 NE Chan</b>	<b>GOM</b>	<b>38</b>	<b>CTD Profile 911+</b>	<b>FXD</b>	<b>42</b>	<b>19.54</b>	<b>65</b>	<b>54.68</b>
<b>Buoy I 0130 east Maine shelf</b>	<b>GOM</b>		<b>CTD Profile 911+</b>	<b>FXD</b>	<b>44</b>	<b>6.37</b>	<b>68</b>	<b>6.57</b>
<b>Buoy E 0133 central Maine shelf</b>	<b>GOM</b>		<b>CTD Profile 911+</b>	<b>FXD</b>	<b>43</b>	<b>42.94</b>	<b>69</b>	<b>21.31</b>

## Appendix 2.

MSDS Forms for Chemicals being used during HB 16-02 Cruise.

### 1. Formaldehyde 37% Solution

**CAS#** 50-00-0

**Code** AC-4553

**Formula weight**

**Supersedes**

Not applicable.

### **FORMALDEHYDE**

Not applicable.

Methylene oxide, AC-4553, AC-4554, 41860, 41883

For laboratory use only.

Anachemia Canada.

255 Norman.

Lachine (Montreal), Que

H8R 1A3

### **Section II. Ingredients**

## Material Safety Data Sheet

**Synonyms**

**Chemical formula**

**Material uses**

**WHMIS Protective Clothing TDG Road/Rail**

### **Section I. Product Identification and Uses**

Not available.

**Supplier**

**CI#**

**Product name**

255 Norman.

Lachine (Montreal), Que

H8R 1A3

PIN: UN1198 PG: III

WHMIS CLASS: B-3 E D-1A D-2A TDG CLASS: 3 8

1) FORMALDEHYDE 50-00-0 30-40 Exposure limits: ACGIH Ceiling limit

0.3 ppm (0.37 mg/m<sup>3</sup>):

2) METHANOL 67-56-1 5-15 Exposure limits: ACGIH TWA 200

ppm (262 mg/m<sup>3</sup>) (skin); STEL 250

ppm (328 mg/m<sup>3</sup>) (skin)

3) WATER 7732-18-5 Balance Not established by ACGIH

**FORMALDEHYDE:**

ORAL (LD50): Acute: 100 mg/kg (Rat). 42 mg/kg (Mouse).

ORAL (LD<sub>Lo</sub>): Acute: 108 mg/kg (Woman).

DERMAL (LD50): Acute: 270 ul/kg (Rabbit).

VAPOR (LC50): Acute: 203 mg/m<sup>3</sup> (Rat). 454 mg/m<sup>3</sup> (Mouse) (4 hour(s)).

**METHANOL:**

ORAL (LD50): Acute: 7300 mg/kg (Mouse). 14200 mg/kg (Rabbit).

DERMAL (LD50): Acute: 15800 mg/kg (Rabbit).

VAPOR (LC50): Acute: 64000 ppm (Rat) (4 hour(s)).

**Toxicity values of the**

**hazardous ingredients**

**Name CAS # %**

**EMERGENCY NUMBERS:**

(USA) CHEMTRAC : 1(800) 424-9300 (24hrs)

(CAN) CANUTEC : 1(613) 996-6666 (24hrs)

(USA) Anachemia : 1(518) 297-4444

(CAN) Anachemia : 1(514) 489-5711

**TLV**

## **Section V. Toxicological Properties**

May be fatal by ingestion, inhalation, or by skin absorption. Corrosive. Severe lachrymator. Target organs: central nervous system, liver, kidneys, spleen, eyes, skin, gastrointestinal system, respiratory system, lungs, reproductive system, peripheral nervous system, pancreas. 20 ppm (FORMALDEHYDE) is immediately dangerous to life or health.

## **Section III. Physical Data**

**Physical state and appearance / Odor**

**Percent volatile**

**pH (1% soln/water)**

**Freezing point**

**Boiling point**

**Vapor pressure**

**Odor threshold**

**Specific gravity**

**Vapor density**

**Water/oil dist. coeff.**

**Evaporation rate**

**Solubility**

100% (V/V)

2.8-4.0 (25°C) (37% Solution)

Insoluble polymer gradually forms.

90 to 100°C

1.08 to 1.0975 (Water = 1)

0.62 to 1.04 (Air = 1)

~40 mm of Hg (@ 39°C)

Not available.

2.1(n-Butyl acetate = 1) (Methanol).

Miscible in water.

0.8-1 ppm

Clear, colorless liquid with strong formaldehyde odor.

**FORMALDEHYDE** page 2/4

**Auto-ignition temperature**

**Fire degradation**

**products**

**Flash point**

**Fire extinguishing**

**procedures**

**Flammable limits**

**Fire and Explosion**

**Hazards**

299°C (For formaldehyde gas.)

CLOSED CUP: 50 to 78°C

LOWER: 7% (For formaldehyde gas.) UPPER: 73% (For formaldehyde gas.)

Use DRY chemical, carbon dioxide, alcohol-resistant foam or water spray. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode. Cool containing vessels with flooding quantities of water until well after fire is out.

Combustible liquid. Vapor may travel considerable distance to source of ignition and flash back, eliminate all sources of ignition. Vapor forms explosive mixture with air. Container explosion may occur under fire conditions or when heated. Contact with oxidizers may cause fire and/or explosion. Sensitive to static discharge. The sensitivity to impact is not available. Emits toxic fumes under fire conditions.

## **Section IV. Fire and Explosion Data**

**Effects of Acute**

**Exposure**

**Routes of entry** Inhalation and ingestion. Eye contact. Skin contact. Skin absorption.

**Ingestion**

**Inhalation**

**Skin**

**Eye** Vapors causes tearing and severe irritation. Liquid causes severe burns. Eye contact can result in corneal damage or blindness. IRRITATION: EYE-RABBIT 750 ug/24H SEVERE.

Causes severe burns. Prolonged and repeated contact causes hardening or tanning effect. May cause allergic dermatitis.

Liquid can be absorbed in toxic amounts through intact skin (massive skin contact can cause visual impairment and death). IRRITATION: SKIN-RABBIT 2 mg/24H SEVERE.

Highly toxic and corrosive. Vapors are extremely irritating to the nose, throat, lungs and mucous membranes. Bronchitis, bronchopneumonia, pulmonary edema and chemical pneumonitis may occur. Prolonged exposure may result in more severe irritation and tissue damage. Methanol can cause central nervous system depression (signs and symptoms may include headache, dizziness, nausea, vomiting, drowsiness and incoordination), coughing, chest pain and dyspnea. Can affect the optic nerve resulting in blindness. Can cause liver, kidney, and lung damage. See ingestion and chronic effects. Highly toxic. Vapors, mists, and liquid is corrosive to the mouth and throat and stomach. Swallowing the liquid inflames the tissues, causes severe abdominal pain, nausea, vomiting, hematuria, proteinuria, anuria, acidosis, and possible loss of consciousness. Methanol can affect the optic nerve resulting in blindness. See inhalation and chronic effects.

Oxides of carbon (CO, CO<sub>2</sub>).

## **Section VI. First Aid Measures**

### **Section V. Toxicological Properties**

Reaction with hydrochloric acid may form bis-chloromethyl ether which is a confirmed human carcinogen according to ACGIH and carcinogenic to humans according to IARC. Hazardous polymerization will not occur.

If conscious, wash out mouth with water. DO NOT induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious or convulsing person. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus.

**Hazardous decomp.**

**products**

**Stability**

**Incompatibility**

Stable. Conditions to avoid: heat, sparks and flame, temperatures below 20°C.

Not available.

May react violently with: acids, alkalis, anhydrides, isocyanates, urea, phenol, oxidizing agents, oxides, organic oxides, reducing agents, ammonia, aniline, magnesium carbonate, performic acid, alkali metals, amines, hydrogen peroxide, nitromethane, nitrogen dioxide, perchloric acid, perchloric acid-aniline mixtures, bases, monomers, water reactive materials, magnesium carbonate hydroxide.

## **Section VII. Reactivity Data**

**Reaction Products**

**FORMALDEHYDE** page 3/4

Immediate first aid is needed to prevent eye damage. IMMEDIATELY flush eyes with copious quantities of water for at least 20 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention. DO NOT use an eye ointment.

Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek immediate medical attention.

**Eye contact**

**Skin contact**

**Inhalation**

**Ingestion**

Immediate first aid is needed to prevent skin damage. Immediately flush skin with plenty of water for at least 20 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash contaminated clothing before reusing.

**Effects of Chronic**

**Overexposure**

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs. Rats chronically exposed to 14 ppm formaldehyde contracted nasal cancers. Based on animal data and limited epidemiological evidence, NTP, IARC and OSHA have listed formaldehyde as a probable human carcinogen. Possible reproductive disorders from prolonged exposure (embryotoxic). Mutagen. Passes through the placental barrier in animal. May cause sensitization by inhalation (asthma) and skin contact (dermatitis). Can cause central nervous system depression. May cause damage to the central nervous system, respiratory system, lungs, eyes, skin, gastrointestinal tract, liver, spleen, and kidneys. Repeated or prolonged exposure to the substance can produce target organs damage.

*While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto*

*and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.*

## **Section X. Other Information**

**Waste disposal**

**Storage and Handling**

**Spill and leak**

**Protective Clothing in**

#### **case of spill and leak**

According to all applicable regulations. Harmful to aquatic life at low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Evacuate and ventilate the area. Stay upwind: Keep out of low areas. Eliminate all sources of ignition. Dyke the area with sand or a natural barrier. Absorb on sand or vermiculite and place in a closed container for disposal. Use non-sparking tools. Transport outdoors. Wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material. Runoff to sewer may create fire or explosion hazard.

Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Full suit.

Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep container tightly closed. Manipulate under an adequate fume hood. Take precautionary measures against electrostatic discharges. Ground the container while dispensing. Ground all equipment containing material. Use explosion proof equipment. Use non-sparking tools. Watch for accumulation in low confined areas. Do not use pressure to dispense. Storage temperature depends on methanol content and should be controlled to avoid precipitation or vaporization. Low temperature storage results in formation of paraformaldehyde, while high temperature storage produces formic acid. Keep away from direct sunlight or strong incandescent light. Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling.

### **Section VIII. Preventive Measures FORMALDEHYDE page 4/4**

Splash goggles. Impervious gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Have available and use as appropriate: face shields, rubber suits, aprons, and boots. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

### **Section IX. Protective Measures**

**Engineering controls** Use in a chemical fume hood to keep airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Do not use in unventilated spaces.

#### **Protective clothing**

Prepared by MSDS Department/Département de F.S.. Validated 16-May-2012

#### **Telephone# (514) 489-5711**

Combustible liquid! Corrosive! Highly toxic! Carcinogen! Mutagen! Sensitizer! Embryotoxic! Risk of serious damage to eyes. Lachrymator. Possible risks of irreversible effects. Readily absorbed through skin. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use in a chemical fume hood. Keep away from heat, sparks and flame. Use non-sparking tools. Handle and open container with care. Container should be opened only by a technically qualified person.

Synergistic materials: Alcohols may interact synergistically with chlorinated solvents (example: carbon tetrachloride, chloroform, bromotrichloromethane), dithiocarbamates (example: disulfiram), dimethylnitrosamine and thioacetamide. Formaldehyde: ethyl acetate.

RTECS NO: LP8925000 (Formaldehyde).

RTECS NO: PC1400000 (Methanol).

#### **Special Precautions or comments**

**3**

**2**

**0**

NFPA

## **2. Ethyl Alcohol 95% Solution**

**MATERIAL SAFETY DATA SHEETS**

## SECTION I PRODUCT AND COMPANY IDENTIFICATION

### 190 Proof Ethyl Alcohol 7/2014

**Synonyms:** Ethyl Alcohol 95%; Ethanol; Spirits  
**Formula:** C<sub>2</sub>H<sub>5</sub>OH  
**Manufacturer:** Warner Graham Company  
160 Church Lane  
Cockeysville, Maryland 21030, USA  
Phone (410)667-6200 Fax (410) 6280-617  
**Emergency Contact:** CHEMTREC 1-800-424-9300

## SECTION II COMPOSITION /INFORMATION ON INGREDIENTS

%wt	Material	CAS	Exposure	Limits
92.5(95% v/v)	Ethanol	64-17-5	1000ppm	TWA6.15
	Water 7	732-18-5		None established

## SECTION III HAZARDS IDENTIFICATION

**Carcinogen Status:** Not classifiable as a human carcinogen

**Routes of Exposure:**

**Swallowing:** May cause dizziness, faintness, drowsiness decreased awareness or responsiveness, nausea, vomiting, staggering gait, lack of coordination, and coma.

**Skin Absorption:** No harmful affects with normal skin.

**Inhalation:** High vapor concentration may cause burning sensation in nose and throat and stinging and watering in the eyes. At concentrations which cause irritation, dizziness, faintness, drowsiness, nausea and vomiting may also occur.

**Skin Contact:** No evidence of harmful effects from available information.

**Eye Contact:** May cause irritation including stinging, tearing, and redness.

**Effects of Repeated Overexposure:** Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis

**Other Health Hazards:** Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the central nervous system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.

**Medical Conditions Aggravated by Overexposure:** Repeated exposure to ethanol may aggravate liver injury produced from other causes.

## SECTION IV

### FIRST AID

**Obtain medical attention for all cases of over-exposure.**

**Swallowing:** If patient is fully conscious, give two glasses of water. Induce vomiting. Obtain medical attention.

**Skin:** Wash skin with soap and water for at least 15 minutes.

**Inhalation:** Remove to fresh air; Give artificial respiration if not breathing; If breathing is difficult oxygen may be given by qualified personnel; Obtain medical assistance if discomfort persists.

**Eyes:** Flush eyes with water for at least 15 minutes. Obtain medical assistance.

**Note to Physician:** Symptoms vary with alcohol level of the blood. Mild alcohol intoxication occurs at blood levels between 0.5-.15%. Approximately 25% of individuals show signs of intoxication at these levels. Above .15% the person is definitely under the influence of ethanol; 50-95% of individuals are clinically intoxicated at these levels. Severe poisoning occurs when the blood is ethanol level is 0.3- 0.5%. Above 0.5% the individual will be comatose and death can occur. The unabsorbed ethanol should be removed by gastric lavage after intubating the patient to prevent aspiration. Avoid the use of depressant drugs or the excessive administration of fluids.

## SECTION V FIRE FIGHTING MEASURES

Fire/Explosive Properties

**Flash Point:** 60F (16C) Tag Closed Cup 68F (18C) Tag Open Cup

**Flammable Limits in Air:** 3.3 - 19.0% (by volume) for 100% ethanol

**Flammability Classification:** 3 (NFPA)

**1993 Emergency Response Guidebook:** Guide 26

**1996 North American Emergency Response Guidebook:** Guide 127

**Extinguishing Media:** Apply alcohol-type or all-purpose foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

**Special Fire Fighting Procedures:** Use water spray to cool fire-exposed containers and structures; Use water spray to disperse vapors - re-ignition is possible; Use self-contained breathing apparatus and protective clothing.

**Unusual Fire and Explosion Hazards:**

- Vapors may travel to source of ignition and flash back.
- Vapors may settle in low or confined spaces.
- May produce a floating fire hazard.
- Static ignition hazard can result from handling and use.

## SECTION VI SPILL/ACCIDENTAL RELEASE MEASURES

**Small spills** can be flushed with large amounts of water.

**Large spills:** Eliminate all ignition sources; ground all equipment; do not walk through spill; stop spill if possible; prevent entry into sewers, confined spaces, etc.; use a vapor suppressing foam to reduce vapors; absorb spill with noncombustible matter and transfer to containers; use non-sparking tools to collect absorbed material.

## SECTION VII HANDLING AND STORAGE

• **Flammable material** - keep away from heat, sparks, and flame; sudden releases of hot organic vapors or mists from process equipment operating at elevated temperature may result in ignitions without the presence of obvious ignition sources.

- *Avoid contact with eyes.*
- *Keep container closed.*
- *Use with adequate ventilation.*
- *Ground container when transferring product.*
- *Vapors may collect in containers; treat empty containers as hazardous.*
- *Wash thoroughly after handling.*
- *Vapors may settle in low or confined areas.*

## SECTION VIII

### EXPOSURE CONTROLS / PERSONAL PROTECTION

**Ventilation:** Special, local ventilation is needed where vapors escape to the workplace air

**Respiratory Protection:** Use self-contained breathing apparatus in high vapor concentration.

**Personal Protective Equipment:** gloves, lab coat or uniform, safety glasses, eyewash, safety shower.

## SECTION IX

### PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** clear, colorless liquid

**Odor:** characteristic

**Vapor pressure @ 20C:** 41.4 mm Hg for 100% ethanol

**Vapor density:** 1.6 (air =1)

**Boiling point @ 760mm Hg:** 78C

**Freezing Point:** -118

**Solubility in Water:** 100% @ 20C

**Specific Gravity :** .815 @ 15.56C

**Density @ 15.56C (60F):** 6.8 lbs/gal

**Evaporation Rate:** 3.0 (butyl acetate = 1)

**Percent Volatiles:** 100%

## SECTION X

### STABILITY/REACTIVITY INFORMATION

**Stability:** Stable

**Conditions to avoid:** None known

**Incompatibility/Materials to avoid:** strong oxidizing agents; strong inorganic acids

**Hazardous Combustion/Decomposition Products:** Carbon monoxide and/or carbon dioxide

**Hazardous Polymerization:** Will not occur

## SECTION XI DISPOSAL CONSIDERATIONS

*Vapors may collect in empty containers. Treat empty containers as hazardous.*

*Dispose of spill-clean up and other wastes in accordance with Federal, State, and local regulations.*

## SECTION XII

### TRANSPORTATION INFORMATION

**Proper Shipping Name:** Ethyl Alcohol

**Hazard Class:** 3

**UN Number:** 1170

**IMO Information:** Ethanol or ethanol solutions

**Class:** 3.2 - Flammable Liquids, Packing Group II, Intermediate flashpoint group

## SECTION XIII

### REGULATORY INFORMATION

#### Federal EPA

Comprehensive Environmental Response Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in CFR. Components present in this product at a level which could require reporting under this statute are:

Chemical CAS Number Upper Bound Conc. %

Acetaldehyde 75-07-0 .0019

Acetone 67-64-1 .0002

Methanol 67-56-1 .0144

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on threshold planning quantities and release reporting based on reportable quantities in 40 CFR 355 (used for SARA 302, 304, 311, and 312). Components present in this product at a level which could require reporting under this statute are: none.

#### Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III

requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDS's that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are: none.

Toxic Substances Control Act (TSCA) Status: The ingredients of this product are on the TSCA inventory.

#### State Right to Know

California Proposition 65: This product contains trace levels of acetaldehyde known to the State of California to cause cancer.

Massachusetts: Hazardous substances and extraordinarily hazardous substances must be identified. Components present which could require reporting:

Extraordinarily Hazardous ( $\geq 0.0001\%$ ): Acetaldehyde (CAS 75-07-0)  
upper bound conc. .0019%

Hazardous ( $\geq 1\%$ ): Ethanol (CAS 64-17-5) upper bound conc. 93.85%

Pennsylvania: Hazardous substances must be identified.

Hazardous ( $\geq 1\%$ ): Ethanol

California SCAQMD Rule 443.1 (VOC's)

*A Volatile Organic Compound (VOC) is any volatile compound of carbon excluding methane, carbon monoxide, carbonic acid, metallic carbides, or carbonates, ammonium carbonate, 1,1,1 tri-chloroethane, methylene chloride, (FC-23), (CFC-113), (CFC-12), (CFC-11), (CFC-22), (CFC-114) and (CFC-115). VOC 800g/l; vapor pressure 1.4 mm Hg @20C*

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of the data or the results to be obtained from the use thereof. It is the user's obligation

3. Acetone



## SAFETY DATA SHEET

Creation Date **28-Apr-2009**

Revision Date **12-Mar-2014**

Revision Number **1**

### 1. Identification

**Product Name**

**Acetone**

Cat No. : AC177170000; AC177170010; AC177170025; AC177170050;  
AC177170100; AC177170250

Synonyms

**2-Propanone**

Recommended Use

**Laboratory chemicals.**

Uses advised against

**No Information available**

Details of the supplier of the safety data sheet

### 1. Identification

Company

**Fisher Scientific One Reagent Lane  
Fair Lawn, NJ 07410 Tel: (201) 796-7100**

### 1. Identification

Entity / Business Name

**Acros Organics One Reagent Lane  
Fair Lawn, NJ 07410**

### 1. Identification

Emergency Telephone Number

**For information US call: 001-800-ACROS-01**

/ Europe call: +32 14 57 52 11  
Emergency Number US:001-201-796-7100 /  
Europe: +32 14 57 52 99  
CHEMTREC Tel. No.US:001-800-424-9300 /  
Europe:001-703-527-3887

## 1. Identification

## 2. Hazard(s) identification

### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, spleen, Blood.	

### Label Elements

## 1. Identification

## 2. Hazard(s) identification

### Signal Word

**Danger**

### Hazard Statements

**Highly flammable liquid and vapor** Causes serious eye irritation  
May cause drowsiness or dizziness  
May cause damage to organs through prolonged or repeated exposure

## 1. Identification

## 2. Hazard(s) identification



#### Precautionary Statements Prevention

Wash face, hands and any exposed skin thoroughly after handling Do

not breathe dust/fume/gas/mist/vapors/spray

Use only outdoors or in a well-ventilated area

Keep away from heat/sparks/open flames/hot surfaces. - No smoking Keep container tightly closed

Ground/bond container and receiving equipment

Use explosion-proof electrical/ventilating/lighting/equipment Use only non-sparking tools

Take precautionary measures against static discharge

Wear protective gloves/protective clothing/eye protection/face protection Keep cool

Response

Get medical attention/advice if you feel unwell

Inhalation

**IF INHALED:** Remove victim to fresh air and keep at rest in a position comfortable for breathing Call a POISON CENTER or doctor/physician if you feel unwell

Skin

**IF ON SKIN (or hair):** Take off immediately all contaminated clothing. Rinse skin with water/shower

Eyes

**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 advice/attention

Fire

**In case of fire:** Use CO<sub>2</sub>, dry chemical, or foam for extinction

Storage

Store in a well-ventilated place. Keep container tightly closed Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Repeated exposure may cause skin dryness or cracking

### 3. Composition / information on ingredients

Component	CAS-No	Weight %
Acetone	67-64-1	>95

### 4. First-aid measures

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

### 3. Composition / information on ingredients

### 4. First-aid measures

Skin Contact

### 3. Composition / information on ingredients

### 4. First-aid measures

Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

### 3. Composition / information on ingredients

## 4. First-aid measures

Inhalation **Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.**

## 3. Composition / information on ingredients

## 4. First-aid measures

Ingestion **Do not induce vomiting. Obtain medical attention.**

## 3. Composition / information on ingredients

## 4. First-aid measures

**Page 2 / 8**

Acetone

Revision Date 12-Mar-2014

Most important symptoms/effects **Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: May cause pulmonary edema: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting**

Notes to Physician **Treat symptomatically**

## 5. Fire-fighting measures

Suitable Extinguishing Media **CO<sub>2</sub>, dry chemical, dry sand, alcohol-resistant foam. Water spray. Cool closed containers exposed to fire with water spray.**

Unsuitable Extinguishing Media **Water may be ineffective**

Flash Point **-20 °C / -4 °F**  
Method - **Closed cup**

Autoignition Temperature **465 °C / 869 °F**

Explosion Limits

Upper **12.8 vol %**  
Lower **2.5 vol %**

Oxidizing Properties **Not oxidising**

Sensitivity to Mechanical Impact **No information available**

Sensitivity to Static Discharge **No information available**

Specific Hazards Arising from the Chemical

**Flammable. Risk of ignition. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.**

Hazardous Combustion Products

**Carbon monoxide (CO) Carbon dioxide (CO<sub>2</sub>) Formaldehyde Methanol**

Protective Equipment and Precautions for Firefighters

**As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.**

## 5. Fire-fighting measures

NFPA

## 5. Fire-fighting measures

## 5. Fire-fighting measures

Flammability  
3

## 5. Fire-fighting measures

Instability  
0

## 5. Fire-fighting measures

Physical hazards  
N/A

## 5. Fire-fighting measures

## 6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and inhalation of vapors.
Environmental Precautions	Should not be released into the environment.

Methods for Containment and Clean Remove all sources of ignition. Take precautionary measures against static discharges.

## 5. Fire-fighting measures

## 6. Accidental release measures

Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment.
----	---

## 5. Fire-fighting measures

## 6. Accidental release measures

## 7. Handling and storage

Handling	Wear personal protective equipment. Ensure adequate ventilation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. Use only non-sparking tools. Use explosion-proof equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.
----------	---

## 5. Fire-fighting measures

## 6. Accidental release measures

## 7. Handling and storage

Storage	Flammables area. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Keep container tightly closed in a dry and well-ventilated place.
---------	--

## 8. Exposure controls / personal protection

### Exposure Guidelines

## 8. Exposure controls / personal protection

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Acetone	TWA: 500 ppm STEL: 750 ppm	(Vacated) TWA: 750 ppm (Vacated) TWA: 1800 mg/m <sup>3</sup> (Vacated) STEL: 2400 mg/m <sup>3</sup> (Vacated) STEL: 1000 ppm TWA: 1000 ppm TWA: 2400 mg/m <sup>3</sup>	IDLH: 2500 ppm TWA: 250 ppm TWA: 590 mg/m <sup>3</sup>

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Acetone	TWA: 500 ppm TWA: 1190 mg/m <sup>3</sup> STEL: 1000 ppm STEL: 2380 mg/m <sup>3</sup>	TWA: 1000 ppm TWA: 2400 mg/m <sup>3</sup> STEL: 1260 ppm STEL: 3000 mg/m <sup>3</sup>	TWA: 500 ppm STEL: 750 ppm

### Legend

## 8. Exposure controls / personal protection

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

### Engineering Measures

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

### Personal Protective Equipment

## 8. Exposure controls / personal protection

### Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

### Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

## 8. Exposure controls / personal protection

### Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## 8. Exposure controls / personal protection

### Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

## 8. Exposure controls / personal protection

## 9. Physical and chemical properties

### Physical State Appearance

Liquid  
Colorless

Odor	sweet
Odor Threshold	19.8 ppm
pH	7
Melting Point/Range	-95 °C / -139 °F
Boiling Point/Range	56 °C / 132.8 °F
Flash Point	-20 °C / -4 °F
Method -	Closed cup
Evaporation Rate	5.6 (Butyl Acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	12.8 vol %
Lower	2.5 vol %
Vapor Pressure	247 mbar @ 20 °C
Vapor Density	2.0
Relative Density	0.790
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available

## 8. Exposure controls / personal protection

## 9. Physical and chemical properties

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Acetone

Revision Date 12-Mar-2014

Autoignition Temperature	465 °C / 869 °F
Decomposition Temperature	> 4°C
Viscosity	0.32 mPa.s @ 20 °C
Molecular Formula	C3 H6 O
Molecular Weight	58.08
Refractive index	1.358 - 1.359

## 10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Heat, flames and sparks. Incompatible products. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents, Strong reducing agents, Strong bases, Peroxides, Halogenated compounds, Alkali metals, Amines
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> ), Formaldehyde, Methanol
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

## 10. Stability and reactivity

## 11. Toxicological information

Acute Toxicity

## 10. Stability and reactivity

## 11. Toxicological information

## 10. Stability and reactivity

## 11. Toxicological information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Acetone	5800 mg/kg ( Rat )	> 15800 mg/kg (rabbit) > 7400 mg/kg (rat)	76 mg/l, 4 h, (rat)

## Toxicologically Synergistic Products

## 10. Stability and reactivity

## 11. Toxicological information

**Carbon tetrachloride; Chloroform; Trichloroethylene; Bromodichloromethane; Dibromochloromethane; N-nitrosodimethylamine; 1,1,2-Trichloroethane; Styrene; Acetonitrile, 2,5-Hexanedione; Ethanol; 1,2-Dichlorobenzene**

## 10. Stability and reactivity

## 11. Toxicological information

## Delayed and immediate effects as well as chronic effects from short and long-term exposure

## 10. Stability and reactivity

## 11. Toxicological information

**Irritation** **Irritating to eyes and skin**

Sensitization **No information available**

**The table below indicates whether each agency has listed any ingredient as a carcinogen.**

## 10. Stability and reactivity

## 11. Toxicological information

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Acetone	67-64-1	Not listed				

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)**

## 10. Stability and reactivity

## 11. Toxicological information

## STOT - repeated exposure

## 10. Stability and reactivity

## 11. Toxicological information

Kidney Liver spleen Blood

## 10. Stability and reactivity

## 11. Toxicological information

Aspiration hazard

## 10. Stability and reactivity

## 11. Toxicological information

No information available

## 10. Stability and reactivity

## 11. Toxicological information

Symptoms / effects, both acute and Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting:

## 10. Stability and reactivity

## 11. Toxicological information

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Acetone

Revision Date 12-Mar-2014

delayed May cause pulmonary edema: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects Neurotoxic effects have occurred in experimental animals.

## 12. Ecological information

Ecotoxicity

## 12. Ecological information

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Acetone	NOEC = 430 mg/l (algae; 96 h)	Oncorhynchus mykiss: LC50 = 5540 mg/l 96h Alburnus alburnus: LC50 = 11000 mg/l 96h Leuciscus idus: LC50 = 11300 mg/L/48h Salmo gairdneri: LC50 = 6100 mg/L/24h	EC50 = 14500 mg/L/15 min	EC50 = 8800 mg/L/48h EC50 = 12700 mg/L/48h EC50 = 12600 mg/L/48h

Persistence and Degradability  
Bioaccumulation/ Accumulation

**Persistence is unlikely based on information available.**  
**No information available.**

Mobility

**Will likely be mobile in the environment due to its volatility.**

## **12. Ecological information**

<b>Component</b>	<b>log Pow</b>
Acetone	-0.24

## **13. Disposal considerations**

Waste Disposal Methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## **12. Ecological information**

## **13. Disposal considerations**

<b>Component</b>	<b>RCRA - U Series Wastes</b>	<b>RCRA - P Series Wastes</b>
Acetone - 67-64-1	U002	-

## **14. Transport information**

DOT

UN-No	<b>UN1090</b>
Proper Shipping Name	<b>ACETONE</b>
Hazard Class	<b>3</b>
Packing Group	<b>II</b>

TDG

UN-No	<b>UN1090</b>
Proper Shipping Name	<b>ACETONE</b>
Hazard Class	<b>3</b>
Packing Group	<b>II</b>

IATA

UN-No	<b>UN1090</b>
Proper Shipping Name	<b>ACETONE</b>
Hazard Class	<b>3</b>
Packing Group	<b>II</b>

IMDG/IMO

UN-No	<b>UN1090</b>
Proper Shipping Name	<b>ACETONE</b>
Hazard Class	<b>3</b>
Packing Group	<b>II</b>

## **12. Ecological information**

## **13. Disposal considerations**

## **14. Transport information**

## **15. Regulatory information**

## **12. Ecological information**

## **13. Disposal considerations**

## **14. Transport information**

**12. Ecological information****13. Disposal considerations****14. Transport information****Page 6 / 8**

Acetone

Revision Date **12-Mar-2014**

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Acetone	X	X	-	200-662-2	-		X	X	X	X	X

Legend: X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA. F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA. S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

**U.S. Federal Regulations**TSCA 12(b) **Not applicable**SARA 313 **Not applicable**

## SARA 311/312 Hazardous Categorization

Acute Health Hazard	<b>Yes</b>
Chronic Health Hazard	<b>Yes</b>
Fire Hazard	<b>Yes</b>
Sudden Release of Pressure Hazard	<b>No</b>
Reactive Hazard	<b>No</b>

Clean Water Act **Not applicable**Clean Air Act **Not applicable**

**OSHA Occupational Safety and Health Administration** **Not applicable**

## CERCLA

**This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)**

Component	Hazardous Substances RQs	CERCLA EHS RQs
Acetone	5000 lb	-

California Proposition 65 **This product does not contain any Proposition 65 chemicals**

## State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
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Acetone	X	X	X	-	X
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U.S. Department of Transportation

**Reportable Quantity (RQ):** Y  
**DOT Marine Pollutant** N

**DOT Severe Marine Pollutant** N

U.S. Department of Homeland Security

**This product contains the following DHS chemicals:**

Component	DHS Chemical Facility Anti-Terrorism Standard
Acetone	2000 lb STQ

Other International Regulations

Mexico - Grade

**Serious risk, Grade 3**

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

**B2**  
Flam  
mable  
liquid  
D2B  
Toxic  
mater  
ials



**16. Other information**

Prepared By

Regulatory  
Affair  
s  
Ther  
mo  
Fishe  
r  
Scient  
ific  
Email:EMSDS.RA@thermofisher.com

Creation Date

**28-Apr-2009**

Revision Date

**12-Mar-2014**

Print Date

**12-Mar-2014**

Revision Summary  
**Standard**

This document has been updated to comply with the US OSHA HazCom 2012

replacing the current legislation under 29 CFR 1910.1200 to align with  
the Globally Harmonized System of Classification and Labeling of  
Chemicals (GHS)

**Disclaimer**

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

**End of SDS**



**Material Safety Data Sheet Mercuric Chloride Solutions**

## Section 1 - Chemical Product and Company Identification

**MSDS Name:**

Mercuric Chloride Solutions

**Catalog Numbers:**

LC16600, LC16620

**Synonyms:**

None

**Company Identification:**

LabChem Inc

200 William Pitt Way Pittsburgh,  
PA 15238

**Company Phone Number:**

(412) 826-5230

**Emergency Phone Number:**

(800) 424-9300

**CHEMTREC Phone Number:**

(800) 424-9300 or 011-703-527-3887

## Section 2 – Composition, Information on Ingredients

CAS#	Chemical Name:	Percent
7732-18-5	Water	balance
7487-94-7	Mercuric chloride	5-6.5

## Section 3 - Hazards Identification

### Emergency Overview

**Appearance:** clear, colorless solution

**Danger!** May be fatal if swallowed or absorbed through the skin. May cause eye and skin irritation and possible burns. May cause respiratory and digestive tract irritation. May cause kidney damage, allergic skin reaction, and central nervous system effects. May impair fertility and cause harm to the unborn child.

**Target Organs:** kidneys, central nervous system, reproductive system.

### Potential Health Effects

**Eye:**

May cause severe eye irritation and possible burns. May cause ulceration of the conjunctiva and cornea. Exposure to mercury or mercury compounds can cause discoloration on the front surface of the lens, which does not interfere with vision.

**Skin:**

May be fatal if absorbed through the skin. Causes severe skin irritation and possible burns. May cause allergic contact dermatitis.



## Material Safety Data Sheet Mercuric Chloride Solutions

### Ingestion:

May be fatal if swallowed. Causes gastrointestinal irritation and possible burns with nausea, vomiting and diarrhea. May cause muscle tremor and impaired motor function. May cause cardiac disturbances.

### Inhalation:

May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability. May cause gastrointestinal effects including gum and mouth inflammation, jaw necrosis, and loosening of the teeth. May cause burns to the respiratory tract. Acute exposure to high concentrations of mercury vapors may cause severe respiratory tract irritation.

### Chronic:

Chronic exposure to mercury may cause permanent central nervous system damage, fatigue, weight loss, tremors, and personality changes. Prolonged ingestion may cause metallic taste, gingivitis, pyorrhea with loosening teeth, gastrointestinal tract disorders, kidney and liver disorders. Prolonged or repeated skin contact may cause dermatitis. May cause reproductive and fetal effects. Chronic ingestion may cause accumulation of mercury in body tissues. Laboratory experiments have resulted in mutagenic effects. May be rapidly transferred across the placenta and cause adverse fetal effects.

## Section 4 - First Aid Measures

### Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids until no evidence of chemical remains. Get medical aid at once.

### Skin:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid at once.

### Ingestion:

Give conscious victim 2-4 cupfuls of milk or water. Get medical aid at once.

### Inhalation:

Move victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid at once.

### Notes to Physician:

The concentration of mercury in whole blood is a reasonable measure of the body-burden of mercury and thus is used for monitoring purposes. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.

### Antidote:

The use of Dimercaprol, BAL (British Anti-Lewisite), or d-Penicillamine as a chelating agent should be determined by qualified medical personnel.

## Section 5 - Fire Fighting Measures

### General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Substance is noncombustible.

### Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.



**Material Safety Data Sheet  
Mercuric Chloride Solutions**

**Autoignition Temperature:**

No information found.

**Flash Point:**

No information found.

**NFPA Rating:**

CAS# 7732-18-5: Health- 0, Flammability- 0, Instability- 0.

CAS# 7487-94-7: Health- 4, Flammability- 0, Instability- 0.

**Explosion Limits:**

Lower: n/a      Upper: n/a

## Section 6 - Accidental Release Measures

**General Information:**

Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:**

Absorb spills with absorbent (vermiculite, sand, fuller's earth) and place in suitable containers labeled for later disposal. Keep out of sewers and drains.

## Section 7 - Handling and Storage

**Handling:**

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only with adequate ventilation. Extreme care should always be taken to prevent skin and gastrointestinal absorption because these routes of entry can greatly increase the total body burden and are often overlooked in occupational settings.

**Storage:**

Store in a tightly closed container. Keep away from food and drinking water. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:**

Facilities using or storing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

**Exposure Limits:**

Chemical Name:	ACGIH	NIOSH	OSHA
Water	None of the components are on this list.	None of the components are on this list.	None of the components are on this list.
Mercuric chloride	0.025 mg/m <sup>3</sup> TWA (as Hg) (listed under Mercury inorganic compounds)	0.05 mg/m <sup>3</sup> TWA (vapor, as Hg) (listed under Mercury compounds) 0.1 mg/m <sup>3</sup> IDLH (as Hg) (listed under Mercury compounds)	None of the components are on this list.

**OSHA Vacated PELs:**

None.



# Material Safety Data Sheet Mercuric Chloride Solutions

## Personal Protective Equipment

### Eyes:

Do not wear contact lenses when working with chemicals. Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

### Skin:

Wear appropriate protective gloves to prevent skin exposure.

### Clothing:

Wear appropriate protective clothing to prevent skin exposure.

### Respirators:

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

Physical State:	Clear liquid
Color:	Colorless
Odor:	Odorless
pH:	4-5
Vapor Pressure:	No information found.
Vapor Density:	No information found.
Evaporation Rate:	No information found.
Viscosity:	No information found.
Boiling Point:	> 212°F (> 100°C)
Freezing/Melting Point:	< 32°F (< 0°C)
Decomposition Temperature:	No information found.
Solubility in water:	Soluble
Specific Gravity/Density:	1.2
Molecular Formula:	No information found.
Molecular Weight:	No information found.

## Section 10 - Stability and Reactivity

### Chemical Stability:

Stable under normal temperatures and pressures.

### Conditions to Avoid:

Incompatible materials.

### Incompatibilities with Other Materials:

Strong oxidizing agents, strong bases, ammonia, copper, iron, silver salts, potassium, antimony, sodium, lead, hypophosphites, formates, sulfites, phosphates, albumin, gelatin, alkalies, alkaloid salts, lime water, arsenic, bromides, borax, carbonates, reduced iron, infusions of cinchona, columbo, oak bark or senna, tannic acid, metallic halides, vegetable astringents.

### Hazardous Decomposition Products:

Mercury, mercury oxides.

### Hazardous Polymerization:

Has not been reported.



## Section 11 - Toxicological Information

### RTECS:

CAS# 7732-18-5: ZC0110000.

CAS# 7487-94-7: OV9100000.

### LD50/LC50:

CAS# 7732-18-5:

Oral, rat: LD50 = >90 mL/kg.

CAS# 7487-94-7:

Oral, mouse: LD50 = 6 mg/kg

Oral, rat: LD50 = 1 mg/kg Skin,  
rat: LD50 = 41 mg/kg.

### Carcinogenicity:

CAS# 7732-18-5: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65.

CAS# 7487-94-7: Listed as Group 3 (Not classifiable as to carcinogenicity) by IARC.

### Epidemiology:

See entry in the Documentation of the Threshold Limit Values and Biological Exposure Indices issued by ACGIH.

### Teratogenicity:

Mercuric chloride has been embryotoxic, fetotoxic, and teratogenic in experimental animals, and has affected fertility in male mice. Inorganic mercury has been implicated in male impotence, menstrual disorders, and spontaneous abortions in humans.

### Reproductive:

Data clearly indicate that mercury can affect both male & female reproductive outcomes. It has not been possible to unequivocally determine a safe exposure level for protection of reproduction function in either male or female workers, particularly since many studies didn't adequately evaluate dermal exposure. Those planning to have children should keep their exposure to mercury as low as possible by engineering controls, personal protective equipment for skin & respiratory tract, & good personal hygiene.

### Mutagenicity:

No information found

### Neurotoxicity:

No information found

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: LC50 = 0.903 mg/L; 24 Hr; Unspecified Fish:

Fathead Minnow: LC50 = 0.037 mg/L; 48 Hr; Unspecified

Fish: Bluegill/Sunfish: LC50 = 0.16 mg/L; 96 Hr; Static at 13.5-16.2°C (pH 7.1-7.3) Water

flea Daphnia: LC50 = 0.093 mg/L; 48 Hr; Unspecified

## Section 13 - Disposal Considerations

Dispose of in accordance with Federal, State, and local regulations.



Material Safety Data Sheet Mercuric Chloride  
Solutions

## Section 14 - Transport Information

### US DOT

**Shipping Name:** Mercury compounds, liquid, n.o.s. (Mercuric chloride)  
**Hazard Class:** 6.1  
**UN Number:** UN2024  
**Packing Group:** PG II

## Section 15 - Regulatory Information

### US Federal TSCA:

CAS# 7732-18-5 is listed on the TSCA Inventory. CAS# 7487-94-7 is listed on the TSCA Inventory.

### SARA Reportable Quantities (RQ):

None of the components are on this list.

### CERCLA/SARA Section 313:

This material contains Mercury(II) chloride (listed as Mercury compounds), 5-6.5%, (CAS# 7487- 94-7), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

### OSHA - Highly Hazardous:

None of the components are on this list.

### US State

#### State Right to Know:

Mercuric chloride can be found on the following state Right-to-Know lists: New Jersey, Florida, Pennsylvania, Massachusetts, California (listed as Mercury compounds).

#### California Regulations:

WARNING: This product contains Mercury(II) chloride, listed as 'Mercury compounds', a chemical known to the state of California to cause birth defects or other reproductive harm.

### European/International Regulations

#### Canadian DSL/NDSL:

CAS# 7732-18-5 is listed on Canada's DSL List. CAS# 7487-94-7 is listed on Canada's DSL List.

#### Canada Ingredient Disclosure List:

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List. CAS# 7487-94-7 is listed on Canada's Ingredient Disclosure List.

## Section 16 - Other Information

MSDS Creation Date: February 17, 1998

Revision Date: October 11, 2011

*Information in this MSDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc. assumes no liability resulting from the use of this MSDS. The user must determine suitability of this information for his application.*