STATE OF WISCONSIN
DEPARTMENT OF JUSTICE

J.B. VAN HOLLEN
ATTORNEY GENERAL

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Email: dci@doj.state.wi.us

May 17, 2010

Re: Fire Date & Location: December 29, 2009; Calumet County, Wisconsin
DCI Case Title/No.: St. Anna Firefighter Death, AI-09-5094

:

This is in response to your request for a copy of the fire marshal's report in the above-referenced case. Pursuant to *State ex rel. Spencer v. Freedy (1929),* 198 Wis. 388, 223 N.W. 861, and *Gilbertson v. State (1931),* 205 Wis. 168, 236 N.W. 539, the Wisconsin Supreme Court has upheld the right of the fire marshal to consider evidence gathered in the course of an investigation as privileged. However, in this instance the conclusion is that the privilege should be waived in part. Deletions from the report include the following:

- Dates of Birth: Birthdates of individual persons have been redacted to protect against identity theft or other unauthorized use following any redisclosure. In performing the balancing test, the conclusion is that the public interest in protecting the confidentiality of this economically valuable individually identifiable information outweighs any public interest in disclosure of the birthdates of individual persons.

- Crime Lab Records: Crime lab records, evidence, information, and/or analyses of information obtained by the crime lab from law enforcement officers have been redacted pursuant to Wis. Stat. § 165.79(1).

- Autopsy Photographs: Autopsy photographs have been redacted pursuant to the Wis. Stat. § 19.35(1)(a) balancing test. In considering whether to release these photographs, the existence of any reasonable public interest in disclosure of these photographs has been weighed against the privacy rights of the surviving family members. The victim's family is entitled to privacy and dignity in the memory of their loved one. Releasing detailed photographs of the victim's body likely would cause further suffering for the surviving family members. Under the circumstances of this case, causing such unnecessary suffering is not warranted where no beneficial public purpose whatsoever could be served by release of the photographs.

This determination is subject to review by mandamus under Section 19.37(1), Wisconsin Statutes, or upon application to a district attorney or the Attorney General.

Wisconsin DOJ Division of Criminal Investigation

ACISS Initiating Case Report Report 09-5094

Report Date: 12/30/2009

Primary Information	
Report Number:	**09-5094**
Report Date:	**12/30/2009**
Type Of Report:	**Initiating Case Report**
Description:	**St. Anna Firefighter Death**
Occurence From:	**12/29/2009 20:30**
Occurence To:	**12/30/2009 03:05**
Dissemination Code:	**Agency**
Reporting LEO:	**Heimerl, Kevin L (Appleton Arson DCI / Wisconsin Department of Justice DCI)**
Backup LEO:	**Rindt, Michael L (Appleton Arson DCI / Wisconsin Department of Justice DCI)**
Approval Status:	**Approved**
Approved Date:	**01/18/2010**
Approved By:	**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**

Related Addresses

Address	Relationship
Calumet County, Wisconsin , United States of America	**Case Request Location**
W2002 CTH-Q, Elkhart Lake, Wisconsin 53020 , United States of America	**Fire Scene**

Related Subjects

Name	Type	Sex	Race	DOB	Relationship
Bremer Manufacturing Company, Inc	**Business**	---	---	---	**Mentioned**
St. Anna Volunteer Fire Department	**Fire Dept**	---	---	---	**Mentioned**

Record Status Information

Record Origination Operator:	**Knutson, Andrea L (DCI Appleton Field Office / Wisconsin Department of Justice DCI)**
Record Origination Date:	**12/30/2009 09:19**
Last Update Operator:	**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**
Last Update Date:	**01/18/2010 08:35**

Reporting LEO	Date	Supervisor	Date
Heimerl, Kevin L (Appleton Arson DCI / Wisconsin Department of Justice DCI)		**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**	**5/11/2010**

Narrative begins on the following page

On December 29, 2009, at 7:32 PM, a Calumet County Deputy Sheriff discovered a dumpster fire at Bremer Manufacturing Company, Inc., located at W2002 CTH-Q, Town of New Holstein, Calumet County, WI. The St. Anna Fire Department was dispatched to the scene to extinguish the fire.

Firefighters began suppression activities by directed hose streams into the burning dumpster when an explosion occurred. The explosion caused the death of one firefighter and eight other firefighters sustained injuries of varying severity.

On 12/29/2009, the Calumet County Sheriff's Department contacted the State Fire Marshal's Office and requested assistance with the investigation. Agents from the Division of Criminal Investigation and the US Bureau of Alcohol, Tobacco, Firearms and Explosives responded to the scene and assisted local authorities with the investigation.

CASE STATUS / RECOMMENDATIONS

S/A Kevin L. Heimerl recommends that a case be opened to allow for the documentation of the fire/explosion scene examination and other investigative activities.

Wisconsin DOJ Division of Criminal Investigation

ACISS Investigative Report 09-5094/1

Report Date: 12/30/2009

Primary Information	
Report Number:	**09-5094/1**
Report Date:	**12/30/2009**
Type Of Report:	**Investigative**
Description:	**St. Anna Firefighter Death: Interview Bradley S. Woelfel**
Occurence From:	**12/29/2009 21:40**
Occurence To:	**12/29/2009 21:55**
Dissemination Code:	**Agency**
Reporting LEO:	**Thelen, Peter M (DCI Appleton Field Office / Wisconsin Department of Justice DCI)**
Approval Status:	**Approved**
Approved Date:	**01/18/2010**
Approved By:	**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**

Related Subjects

Name	Type	Sex	Race	DOB	Relationship
Woelfel, Bradley Steven	**Person**	**Male**	**White**		**Interviewed**

Property

Status	Quantity	Description
Other Agency	**1**	**Clothing of FF Woelfel**

Record Status Information

Record Origination Operator:	**Knutson, Andrea L (DCI Appleton Field Office / Wisconsin Department of Justice DCI)**
Record Origination Date:	**12/30/2009 16:21**
Last Update Operator:	**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**
Last Update Date:	**01/18/2010 08:36**

Reporting LEO	Date	Supervisor	Date
Thelen, Peter M (DCI Appleton Field Office / Wisconsin Department of Justice DCI)		**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**	**5/11/2010**

Narrative begins on the following page.

On Tuesday, December 29, 2009, at approximately 9:40 p.m., SAIC Peter M. Thelen interviewed Bradley Steven Woelfel, DOB , while Woelfel was in the Emergency Room at Theda Clark Hospital, in Neenah, WI. Woelfel is a volunteer firefighter who sustained injuries from an explosion in St. Anna, Calumet County, WI, and was airlifted to Theda Clark Hospital for treatment.

SAIC Thelen asked Woelfel what he remembered regarding the incident. Woelfel indicated he remembered getting into the truck and he remembered checking out at the scene of the fire, at which time two other fire engines were already on location. Woelfel indicated he recalled riding in Engine #14, which is a pumper truck, and upon his arrival they began to set up to extinguish the fire, which was in a dumpster. Woelfel indicated he saw blue flames coming out of the dumpster at about the top of the dumpster, and that all of a sudden an explosion happened and Woelfel did not remember anything after that incident. Woelfel indicated he thought he might have been struck by something, but his memory was vague.

Due to the extent of injuries to Woelfel, SAIC Thelen terminated the interview of Woelfel and advised him that DCI would contact him in the future, if needed. The interview was concluded at approximately 9:55 p.m.

SAIC Thelen recovered Woelfel's clothing, which was worn at the time of the accident, from Dennis Rigo, who is a Trauma Social Worker at Theda Clark Hospital. These items were placed into a plastic bag and transported to the scene of the fire, where they were turned over to Calumet County Investigator Mark Wiegert.

Wisconsin DOJ Division of Criminal Investigation

ACISS Investigative Report 09-5094/2

Report Date: 04/11/2010

Primary Information	
Report Number:	**09-5094/2**
Report Date:	**04/11/2010**
Type Of Report:	**Investigative**
Description:	**St. Anna Firefighter Death: Fire/Explosion Scene Examination**
Occurence From:	**12/29/2009 20:00**
Occurence To:	**12/30/2009 03:05**
Dissemination Code:	**Agency**
Reporting LEO:	**Heimerl, Kevin L (Appleton Arson DCI / Wisconsin Department of Justice DCI)**
Backup LEO:	**Wiegert, Mark (Detective / Calumet County Sheriff's Department)**
Approval Status:	**Approved**
Approved Date:	**05/09/2010**
Approved By:	**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**

Related Addresses

Address	Relationship
W2002 CTH-Q, Elkhart Lake, Wisconsin 53020 , United States of America	**Fire Scene**

Related Subjects

Name	Type	Sex	Race	DOB	Relationship
Bremer Manufacturing Company, Inc	**Business**	---	---	---	**Subject of Interest**
Fromm, Michael W	**Person**	**Male**	**White**		**Injured Person**
Kelling, Kurt P	**Person**	**Male**	**White**		**Injured Person**
Scott, Joshua T	**Person**	**Male**	**White**		**Injured Person**
Winkel, Matthew J	**Person**	**Male**	**White**		**Injured Person**
Woelfel, Bradley Steven	**Person**	**Male**	**White**		**Injured Person**
Dolack, Tom	**Person**	**Male**	**White**	---	**Interviewed**
Schuh, Adam J	**Person**	**Male**	**White**		**Interviewed**
Thome, Robert H	**Person**	**Male**	**White**		**Interviewed**
Koeser, Steven J	**Person**	**Male**	**White**		**Victim**

Record Status Information

Record Origination Operator:	**Heimerl, Kevin L (Appleton Arson DCI / Wisconsin Department of Justice DCI)**
Record Origination Date:	**04/11/2010 21:43**
Last Update Operator:	**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**
Last Update Date:	**05/09/2010 19:59**

Reporting LEO	Date	Supervisor	Date
Heimerl, Kevin L (Appleton Arson DCI / Wisconsin Department of Justice DCI)		**Virgil, Tina R (DCI Administrative Services / Wisconsin Department of Justice DCI)**	**5/11/2010**

Narrative begins on the following page.

SYNOPSIS

On December 29, 2009, at 7:32 PM, a Calumet County Deputy Sheriff discovered a dumpster fire at Bremer Manufacturing Company, Inc., located at W2002 CTH-Q, Town of New Holstein, Calumet County, WI. The St. Anna Fire Department was dispatched to the scene to extinguish the fire.

Firefighters began suppression activities by directing hose streams into the burning dumpster when an explosion occurred. The explosion caused the death of one firefighter and eight other firefighters sustained injuries of varying severity.

On 12/29/2009, the Calumet County Sheriff's Department contacted the State Fire Marshal's Office and requested assistance with the investigation. Agents from the Division of Criminal Investigation and the US Bureau of Alcohol, Tobacco, Firearms and Explosives responded to the scene and assisted local authorities with the investigation.

ASSIGNMENT

On 12/29/2009, at 8:30 PM, S/A Kevin L. Heimerl received a telephone call from Calumet County Sheriff's Department Sergeant Investigator Mark Wiegert. Sgt. Inv. Wiegert informed S/A Heimerl of the on-duty firefighter fatality resulting from the explosion incident and requested assistance from the State Fire Marshal's Office with an immediate response to the scene.

S/A Heimerl subsequently contacted DCI S/A Michael L. Rindt and ATF S/A Michael Quick and requested their response to the scene. S/A Heimerl made additional notifications to DCI supervisors.

ARRIVAL

On 12/29/2010, at 9:49 PM, S/A Heimerl and S/A Rindt arrived on scene at Bremer Manufacturing and met with Sgt. Inv. Wiegert. ATF S/A Quick and ATF S/A Rick Hankins arrived a short time later. Sgt. Inv. Wiegert provided agents with a briefing of information obtained during the initial investigation and information related to the discovery of the dumpster fire, response of firefighter personnel, and the subsequent explosion.

SCENE CONTROL / SECURITY

Control and security of the scene was maintained from the time of the discovery of the dumpster fire and throughout the scene investigation. Control and security of the scene was maintained through the constant presence of the Calumet County Sheriff's Department.

PARTICIPATING FIRE SUPPRESSION AGENCIES

- St. Anna Fire Department – Primary
- New Holstein Fire Department – Mutual Aide
- Kiel Fire Department – Mutual Aide

PARTICIPATING FIRE/EXPLOSION SCENE INVESTIGATORS

- Sgt. Inv. Mark Wiegert – Calumet County Sheriff's Department
- S/A Kevin L. Heimerl, CFI – WI-DOJ/DCI Arson Bureau
- S/A Michael L. Rindt, CFI – WI-DOJ/DCI Arson Bureau
- S/A Michel Quick, CFI – ATF
- S/A Rick Hankins, CFI – ATF

OWNERSHIP OF PROPERTY INVOLVED

The fire/explosion incident was located on the business property of:

Bremer Manufacturing Company, Inc
W2002 CTH-Q
Elkhart Lake, WI 53020

PROPERTY INSURANCE INFORMATION

Bremer Manufacturing Company, Inc maintained an insurance policy through Travelers Insurance Company.

FIRE DISCOVERED / REPORTED BY

S/A Heimerl reviewed a report completed by Calumet County Sheriff's Department Corporal Chris Wendorf regarding his discovery of the fire incident and his observations thereafter.

On 12/29/2010, at approximately 7:30 PM, Cpl. Wendorf was on patrol and traveling westbound on CTH-Q and passing Bremer Manufacturing. Cpl. Wendorf observed an open top refuse container (dumpster) on the west side of the business, which had an orange glow coming from within. Cpl.

Wendorf observed white smoke coming from the dumpster. Cpl. Wendorf drove into the business parking lot and drove past the dumpster and observed that there were flames inside the dumpster. Cpl. Wendorf attempted to determine if there were employees at the business and found no one present.

Cpl. Wendorf returned to the area of the dumpster and approached the west side of the dumpster and looked inside. He observed at least two 55 gallon barrels lying on top of what appeared to be scrap metal and metal shavings. He also observed snow on top of some of the metal shavings. Cpl. Wendorf observed that a 55 gallon barrel near the south end of the dumpster had orange flame coming from the barrel and the metal shavings area. Cpl. Wendorf approached to approximately 15 feet from the dumpster and did not feel much heat coming from the fire.

Cpl. Wendorf then requested the response of the St. Anna Fire Department. While awaiting the arrival of firefighters, Cpl. Wendorf activated his patrol vehicle's dash mounted video camera. Cpl. Wendorf then observed that a hole began to develop on the south side of the dumpster.

Cpl. Wendorf reports that after firefighters arrived, they began to direct water onto the dumpster fire. Cpl. Wendorf was standing on the roadway and observed white sparks coming from the dumpster as firefighters were attempting to suppress the fire, with the sparks rising above the height of the fire trucks.

At 7:53 PM, while standing on the roadway, Cpl. Wendorf heard an explosion. Cpl. Wendorf approached the area and found that firefighters were injured.

LEGAL AUTHORITY FOR CONDUCTING FIRE SCENE INVESTIGATION

The fire/explosion scene investigation was conducted under the legal authority granted to the fire department under Section 165.55 of the Wisconsin Statutes.

WEATHER CONDITIONS

Weather conditions at the time of the fire were obtained from archived weather data records supplied to an Internet based website by the National Weather Service. Weather conditions at the time of the fire were recorded at the nearest weather reporting station in Fond du Lac, WI on 12/29/2009 at 6:53 PM.

Temperature: 10°F
Humidity: 80%
Visibility: 10 miles
Wind Direction: SSE
Wind Speed: 4.6 mph

Precipitation: N/A
Conditions: Clear

FIREFIGHTER OBSERVATIONS

Chief Robert Thome

St. Anna Fire Department Chief Robert Thome provided the following information during interviews conducted by the Calumet County Sheriff's Department and S/A Heimerl.

Chief Thome stated that he was one of the first arriving firefighters to the report of the dumpster fire at Bremer Manufacturing. Chief Thome observed an 18" "cherry red" circle in the center of the south end of the dumpster, near the base. Chief Thome stated that a water stream was directed into the dumpster from an elevated position to the west. Chief Thome utilized a ladder to look into the dumpster and observed one barrel inside the dumpster, which appeared to be very hot. He also observed aluminum shavings and other material in the dumpster, which were burning. Chief Thome also observed a bluish green flame inside the dumpster after water had been applied.

Chief Thome believed that the east end of the dumpster was nearly full of material and this pile of material tapered down toward the center of the dumpster. Chief Thome recalled seeing sparks coming from the highest part of the pile of material in the northeast quadrant of the dumpster.

Chief Thome stated that the initial suppression efforts consisted of a water hose stream, which produced a large amount of steam. After some time, Chief Thome requested that foam be added to the hose stream. As the foam stream was being directed into the dumpster, Chief Thome descended the ladder as he observed that the production of sparks had intensified. Chief Thome began to signal for the foam to be stopped, and as he was turning away from the dumpster, the explosion occurred. Chief Thome stated that after the explosion occurred, the fire within the dumpster was no longer burning.

Captain Adam Schuh

St. Anna Fire Department Captain Adam Schuh provided the following information during interviews conducted by the Calumet County Sheriff's Department and S/A Heimerl.

Capt. Schuh stated that upon his arrival at the fire scene he was operating the pumper and supplying water for the suppression efforts. Capt. Schuh stated that the water capacity for the truck he was operating is 1200 gallons. He estimated that approximately 500-700 gallons of water was applied to the fire prior to the explosion. This water was applied through a single 1 ¾" hose line with a 6" fog pattern.

Capt. Schuh stated that prior to the explosion, Chief Thome requested foam to be initiated. The foam began at 1% concentration and increased per the chief's directions to 2%, then 3% at 100psi. Capt. Schuh estimated that the increase from 1% to 3% occurred over a 45 second duration.

Capt. Schuh stated that he was inside the pumper and as he was increasing the foam concentration, the explosion occurred.

Capt. Schuh stated that when he arrived at the scene he observed "very little" flame within the dumpster. He stated that the longer they were on the scene, the higher the flames became and the fire began to produce heavy smoke. Capt. Schuh also stated that after the foam was being applied he observed that the flames became a bluish green color.

FIRE / EXPLOSION SCENE DESCRIPTION

The fire/explosion scene was located at a physical address of W2002 CTH-Q, Town of New Holstein, Calumet County, WI. The property is located on the north side of the roadway, approximately ¾ mile west of the Village of St. Anna. A gravel area located on the west side of the facility is utilized for refuse containers. This gravel area is below the grade of the roadway to the south creating an earthen embankment surrounding the south and west sides of the explosion scene.

Bremer Manufacturing's business involves aluminum sand casting of automotive and other parts with aluminum alloy materials. Aluminum alloy ingots are brought to the facility and melted in furnaces. The molten aluminum is then poured into sand molds. The finished parts are extracted from the molds, excess material is shaved off the part and the part undergoes additional finishing. The excess shavings are collected and removed to a storage container outside the facility for resale to a metals recycling company. Additional refuse material consisting of aluminum dross (slag) is skimmed from the tops of the furnaces, placed into 55 gallon steel barrels and removed to the refuse containers outside the facility.

The gravel area southwest of the building, bordered by the earthen embankments, contained three large steel refuse containers prior to the explosion. One container was positioned in an east/west direction at the base of the south embankment. A second container was positioned in an east/west direction approximately 30' north of the south embankment with its west end at the west embankment. A third container was positioned in an east/west direction off the northeast corner of the second container. This third container was involved in fire and subsequently exploded.

After the explosion occurred, the third container was tipped onto its north side and turned approximately 25°. The south side wall of the container was peeled back, separating at the southwest corner and folded to the east. Eight 55 gallon barrels were distributed around the damaged container, and two 55 gallon barrels were inside the container. The container also contained a large amount of metal shavings.

FIRE / EXPLOSION SCENE EXAMINATION

On 12/29/2009 and into the morning hours of 12/30/2009, S/A Heimerl and other investigators conducted an examination of the scene to identify the origin and cause of the fire and subsequent explosion. The scene examination was conducted in a systematic and methodical manner to identify all relevant evidence and to examine the explosive damage. The scene investigation also incorporated a tour of the manufacturing facility, along with demonstrations and descriptions of the manufacturing process provided by employees. Investigators also reviewed video footage from the dash mounted video camera in Cpl. Wendorf's patrol vehicle.

A review of the video footage from Cpl. Wendorf's patrol vehicle revealed the following observations:

- 7:31 PM – Cpl. Wendorf activates the camera at the scene. Cpl. Wendorf subsequently repositions his patrol vehicle pointing the camera at the refuse container. Fire is visible in the central area of the container with flames extending approximately 2' above the top of the container. The south side panel of the container displays a large, steaming hot spot near the center of the side panel. Cpl. Wendorf repositions patrol vehicle to the roadway and the refuse container is no longer visible.
- 7:41 PM – First and second fire apparatus arrive on scene
- 7:44 PM – Third and fourth fire apparatus arrive on scene
- 7:53 PM – Explosion occurs producing a large bright flash of light, followed by a large shower of burning material falling onto the roadway

S/A Heimerl and other investigators met with Bremer Manufacturing President Tom Dolack who provided background information concerning the business' manufacturing process. Dolack identified the materials utilized in the manufacturing process and provided Material Safety Data Sheets for the following materials, which have been attached to this report and submitted to DCIR:

- Aluminum Casting Alloy #535
- Aluminum Casting Alloy #319
- Aluminum Casting Ally #356
- ALpHASET 9010
- ALpHACURE 110
- RF118 Aluminum Flux
- SYNTILO AL 20

Dolack and Foundry Supervisor Mark Schoenborn led investigators into the foundry and provided an opportunity to view a functioning aluminum furnace and the process of adding aluminum flux to the

furnace, skimming aluminum oxide from the furnace and the disposal of the aluminum oxide to a 55 gallon steel barrel adjacent to the furnace.

Schoenborn indicated that the operating temperature for the furnace was approximately 1425°F. The aluminum flux powder was sprinkled onto the pooled molten aluminum, creating the aluminum oxide to float on the top of the molten aluminum. A metal skimmer was used to collect the aluminum oxide layer from the top of the pool. This aluminum oxide was dumped into the 55 gallon steel barrel. Schoenborn completed approximately 5 skims from the furnace and on one occasion he dumped the aluminum oxide into the top of the barrel of hardened slag and flaming combustion occurred. Schoenborn stated that he believed the flaming combustion was as a result of foreign materials in the aluminum alloy and oxide burning.

Schoenborn estimated that it takes approximately 3-5 days to fill a 55 gallon barrel with aluminum oxide slag, dependant on how busy the foundry is. Dolack estimated that the dumpster outside the foundry is removed by the metal recycling firm 2-4 times per month, dependant on how busy the foundry is.

S/A Heimerl examined the refuse container damaged by the explosion and observed that the south side of the container had been torn and peeled back, separating along the west end and bottom seams. In the area of the seam of the south side and base, near the center of the south side, several penetrations in the steel base were observed. The penetrations appeared to be as a result of melt-through of the steel base of the container.

S/A Heimerl examined the area where FF Koeser was found deceased. FF Koeser was found on the ground in the narrow space between the south side of the southern most refuse container and the south earthen embankment. This location was approximately 60' from FF Koeser's position at the time of the explosion. FF Koeser's protective helmet was found approximately 8' up the embankment. The snow and soil on the embankment in this area was disturbed.

EVIDENCE COLLECTION

During the course of the scene examination, investigators documented and collected evidence relevant to the explosion and the resultant injuries and death. All evidence was documented as to location by the Wisconsin State Patrol Technical Reconstruction Unit. All evidence collected from the scene remained in the custody of the Calumet County Sheriff's Department.

S/A Heimerl collected the following items of evidence for submission to the Wisconsin State Crime Laboratory in Madison, WI.

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The above two items of evidence were submitted to the Wisconsin State Crime Laboratory in Madison, WI and received under Laboratory Case #M10-62. S/A Heimerl reviewed a Confidential Report of Laboratory Findings authored by Analyst Joseph R. Wermeling, Ph.D. Analyst Wermeling reports that he analyzed the above two items of evidence and made the following observations:

A copy of the Confidential Report of Laboratory Findings is electrically attached to this report and will be submitted to DCIR.

FIRE / EXPLOSION SCENE DOCUMENTATION

Scene documentation was completed through photography by the Calumet County Sheriff's Department and Wisconsin State Patrol, with all photographs maintained by those respective agencies.

Forensic mapping of the scene was completed by the Wisconsin State Patrol Technical Reconstruction Unit.

INTERVIEWS CONDUCTED BY LOCAL AUTHORITIES

Inv. Sgt. Wiegert interviewed Alan Schad, maintenance technician, and Mark Schoenborn, foundry supervisor at Bremer Manufacturing. The following is a summary of the information provided by Alan Schad and Mark Schoenborn.

Schoenborn stated that on 12/29/2009, a 55 gallon barrel of slag was placed outside the foundry on the west side of the building to allow the barrel to cool prior to it being placed into the refuse container in the parking lot. Schoenborn stated that the barrel had been outside cooling for approximately 1 ½ - 3 hours.

Schad stated that on 12/29/2009, at approximately 1:30 PM, he used a skid loader to move the 55 gallon barrel from its location in the parking lot, to be dumped into the refuse container. Schad observed that the barrel had a small amount of snow in the barrel and when he moved it with the skid loader, steam came off the barrel, indicating that it was still warm. Schad moved the barrel to the refuse container and dumped it into the northwest corner of the container. Schad stated that it is common for the barrels to tip over when they are dumped into the container.

Calumet County Sheriff's Department Inv. Gary Steier also interviewed Alan Schad regarding the placement of the 55 gallon barrel of slag into the refuse container. Schad stated that at the time that he moved the barrel into the container, he believed that the barrel would have been too hot to touch and that touching the barrel would produce a severe burn to the hand.

INTERVIEWS CONDUCTED BY DCI AGENTS

S/A Heimerl and other investigators met with Bremer Manufacturing President Tom Dolack and obtained background information regarding the manufacturing process. Information obtained from Dolack is documented in other areas of this report.

DCI SAIC Peter Thelen conducted an interview of St. Anna Fire Department Firefighter Bradley Woelfel, who was injured as a result of the explosion. FF Woelfel was able to recall few specific details about the incident.

FIRE RELATED INJURIES / DEATHS

Deceased:

Steven J. Koeser – St. Anna Fire Department
Death as a result of "multiple traumatic injuries"

Injured:

Bradley S. Woelfel – St. Anna Fire Department
Back injury
Michael W. Fromm – St. Anna Fire Department
Burns, abrasions, contusions
Joshua T. Scott – St. Anna Fire Department
Ringing in ears
Matthew J. Winkel – St. Anna Fire Department
General soreness

Joshua P. Mertens – St. Anna Fire Department
Hearing, low back pain
Kurt P. Kelling – St. Anna Fire Department
Severe soreness, confusion
Chase J. Fritsch – St. Anna Fire Department
Minor injuries
Jeffery L. Fliss – St. Anna Fire Department
Minor injuries

FIRE / EXPLOSION ORIGIN & CAUSE DETERMINATION

Based on information obtained from witnesses and the examination of the fire/explosion scene, S/A Heimerl and other investigators made the following determinations regarding the origin and cause of the fire/explosion incident, based on all available information at this time:

The fire originated within the damaged refuse container, which contained aluminum alloy shavings and 55 gallon steel barrels of aluminum dross (slag).

The cause of the fire is classified as *"undetermined"*, however there is no information available to indicate that the fire was as a result of an intentional act.

The explosion occurred from within the refuse container.

The cause of the explosion was as a result of the fire suppression efforts and the introduction of water and fire suppressant foam.

CASE STATUS / RECOMMENDATIONS

S/A Heimerl has spoken with Calumet County Sheriff's Department Inv. Sgt. Mark Wiegert regarding the status of this investigation. It has been agreed that further investigation is not required. S/A Heimerl recommends that this case be closed.

09-5094

JOHN A. GRINER IV
PATRICIA A. CHUCKA
RICHARD C. DAVIS

GRINER & ASSOCIATES
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STEPHEN W. PASHOLK
JOHN H. SCHROTH
CATHERINE A. THOMAS

Writer's Direct Dial Number: (262) 825-9310
Direct Email:jgriner@travelers.com

January 15, 2010

To:
St. Anna Fire Department
Schuster Metals
U.S. Chemical Safety Board
(Mary Beth Mulcahy)
Kubitz & Associates
The Aluminum Assoc.
(Sey Epstien)
OSHA (Skye Fatland)
Trialco, Inc.
Liberty Mutual (Kathryn Jensen)
Lighthouse Claim Service (Steve Hauck)
Associated Claims (Jim Pohlman)
Calumet County Sheriff's Dept. (M. Wiegert)
NIOSH (Matt Bowyer)
Dept. of Commerce (Carl Frisque)
State Fire Marshall (Kevin Heimerl)
Dept. of Justice (Michael Quick)
Alcoa Corporate Center

Re: Site Examination and Evidence Retention
9:00 a.m. Friday January, 22, 2009
Bremer Manufacturing
W2002 County Road Q
Elkhart Lake (St. Anna), WI

To those identified above:

You have expressed an interest in, or have been identified as a party that may have interest in, an accident that happened at **Bremer Manufacturing**, W2002 County Road Q, Elkhart Lake, WI (St. Anna, WI) on Tuesday, 12/29/10.

On that date, the **St. Anna Fire Department** responded to a "dumpster fire" at that location and was fighting that fire at the time of an explosion. The dumpster has been identified as belonging to **Schuster Metal**. It was utilized by Bremer Manufacturing as a repository of scrap aluminum alloy for recycling by Schuster Metals. The products identified by Bremer as having been placed in the dumpster were aluminum alloy manufactured by **Trialco** and **Reynolds Metals Co. / Alcoa**.

Bremer Manufacturing has scheduled a joint inspection and evidence retention for the time and place listed above. Please contact the undersigned if you wish to participate in that inspection. A protocol will be prepared and, if possible, will be distributed in advance to all who have requested it.

Please contact the undersigned immediately if you believe there to be a party (or parties) other than those listed above that may have an interest in these proceedings.

As soon as possible after completion of this inspection the evidence will be removed and will be retained by one or more of the parties for possible subsequent inspection and testing, or disposal.

Very truly yours,

GRINER & ASSOCIATES

John A Griner IV

JG:slf

cc: Tom Dolack, Bremer Manufacturing
William Duffin
Scott Tebo, UIS
Tim Myers, Exponent
David Beauregard
Julie Stolte, Claim No. EHS1593

09-50941Z

MATERIAL SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

DESCRIPTION: ALpHASET® 9010

1. Chemical Product and Company Identification

DESCRIPTION:	**ALpHASET® 9010**
PRODUCT CODE:	60-9010B-.
PRODUCT TYPE:	Liquid Phenolic Resin
APPLICATION:	No Bake Foundry Resin
	Sold Under U.S. Patent Numbers - 426,467 & 4,474,904

Manufacturer/Supplier Information

MSDS prepared by:
HA International, LLC
630 Oakmont Lane
Westmont, IL
60559

For Emergency Medical Assistance
Call Health & Safety Information Services
1-866-303-6949

For additional health and safety or regulatory information, call (630)575-5722, or (630)575-5705.

2. Hazards Identification

2.1 Emergency Overview

Appearance	Dark liquid
Odor	Mild

WARNING!
May become unstable at high temperatures.
Hazardous polymerization may occur.
Overexposure may cause central nervous system effects. May cause irritation of nose, throat and lungs if allowed to become airborne.
Causes chemical burns to eyes.

NORTH AMERICAN EMERGENCY RESPONSE GUIDE, 2000, NO: 154

HMIS Rating

HEALTH	=	3 (serious)
FLAMMABILITY	=	0 (minimal)
REACTIVITY	=	1 (slight)
CHRONIC	=	*

HMIS® ratings involve data interpretations that may vary from company to company. They are intended only for the rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

2.2 Potential Health Effects

Immediate Hazards

INGESTION:	No hazards known to company.
INHALATION:	Not expected to be harmful under normal conditions of use. However, overexposure may cause central nervous system effects. Also, if allowed to become airborne, may cause irritation of nose, throat and lungs.
SKIN:	May cause irritation on prolonged or repeated contact.
EYES:	Causes chemical burns.

108-95-2 Phenol
Can cause central nervous system effects. Signs and symptoms may include headache, dizziness, nausea, vomiting, motor difficulties and unconsciousness.

Delayed Hazards

50-00-0 Formaldehyde
May cause cancer. OSHA regulates formaldehyde as a potential human carcinogen. See the OSHA Formaldehyde Workplace Standard at 29CFR 1910.1048. Rats chronically exposed to 14 ppm formaldehyde contracted nasal cancer. The National Toxicology Program (NTP) has listed formaldehyde as a probable human carcinogen. The International Agency for Research on Cancer (IARC) has concluded formaldehyde is carcinogenic to humans.

Safe handling and use instructions are provided in this MSDS and in the OSHA Formaldehyde Workplace Standard at 29CFR1910.1048. OSHA has identified 0.5 ppm as the "Action Level". Please review and understand the guidance contained in this MSDS and refer to the OSHA Formaldehyde Standard for regulatory requirements that may be applicable to your operation and use.

For further information and a review of various studies, go to www.osha.gov/SLTC/formaldehyde, www.iarc.fr and other authoritative websites.
May cause allergic skin reaction. Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that preexisting respiratory and skin disorders may be aggravated by exposure.

108-95-2 Phenol
Can cause liver and kidney damage. Signs and symptoms of chronic poisoning may include vomiting, difficulty in swallowing, diarrhea, lack of appetite, jaundice, fatigue, bleeding or easy bruising and sometimes pain and swelling in the upper right abdomen, changes in urine output or dark urine, pain upon urination or in the lower back, or general edema. Can also cause cardiac damage evidenced by shortness of breath and in severe cases cardiac arrest. Preexisting medical conditions of the heart, kidney, liver, lung, eyes and skin may be aggravated by exposure.
-- See Footnote at end of section

Footnote: As of the date of issuance of this document, this material has not been listed by NTP, classified by IARC nor regulated by OSHA as a carcinogen.

3. Composition, Information on Ingredients

The ingredients listed below have been associated with one or more immediate and/or delayed(*) health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THE MSDS.

% by weight

108-95-2	*Phenol	1.0 - 5.0
50-00-0	*Formaldehyde	0.1 - 1.0

Any applicable Canadian trade secret numbers will be listed in Section 15.2.

4. First Aid Measures

INGESTION: If accidentally swallowed, dilute by drinking large quantities of water. If the individual is drowsy or unconscious, do not give anything by mouth. Immediately contact poison control center or hospital emergency room for advice on whether to induce vomiting or for any other additional treatment directions.

INHALATION: Remove to fresh air.

SKIN: In case of irritation, flush with water.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held apart during irrigation to ensure water contact with entire surface of eyes and lids. Call a physician.

5. Fire Fighting Measures

Suitable Extinguishing Media: In case of fire, water should be used to keep fire-exposed containers cool. Combustion products may include oxides of carbon, aldehydes (including formaldehyde), phenols and aromatic hydrocarbons.

Will not burn unless water has evaporated. Dried material may burn.
Wear full emergency protective equipment including NIOSH approved pressure demand self-contained breathing apparatus.

6. Accidental Release Measures

Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in a suitable container. For large spills, use water spray to disperse vapors and flush spill area. Prevent runoff from entering waterways or sewers. Use appropriate Personal Protective Equipment (PPE).

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from eyes, skin and clothing. Wash thoroughly after handling. Always use appropriate Personal Protective Equipment (PPE).

INHALATION: Avoid prolonged or repeated breathing of vapor.

SKIN: Avoid prolonged or repeated contact with skin and clothing.

EYES: Do not get in eyes.

7.2 Storage

Do not expose to direct sunlight for long periods of time.
Empty container may contain product residues. DO NOT cut, torch or reuse without commercial cleaning.
Bulk shipments should be stored between 60-80°F (15.5-26.7°C).
Limited storage life - Refer to product specifications.
Use with adequate ventilation.
Do not store or mix with strong acids or alkali.
Violent polymerization may occur at elevated temperatures.

8. Exposure Controls/Personal Protection

8.1 Exposure Guidelines

108-95-2	Phenol			
ACGIH TLV	8-hr TWA	5 ppm	19 mg/m3	Skin
OSHA PEL	8-hr TWA	5 ppm	19 mg/m3	Skin
50-00-0	**Formaldehyde**			
ACGIH TLV	Ceiling	0.3 ppm	0.37 mg/m3	A2 - Suspected Human Carcinogen; SEN
OSHA PEL	8-hr TWA	0.75 ppm	0.9 mg/m3	
	STEL (15 min)	2 ppm	2.5 mg/m3	

8.2 Exposure Controls

ENGINEERING CONTROLS: The following exposure control techniques may be used to effectively minimize employee exposure: local exhaust ventilation, enclosed system design, process isolation and remote control in combination with appropriate use of personal protective equipment and prudent work practices. These techniques may not necessarily address all issues pertaining to your operations. We, therefore, recommend that you consult with experts of your choice to determine whether or not your programs are adequate.

If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria.

8.3 Personal Protection

Where air contaminants can exceed acceptable criteria, use NIOSH (42 CFR Part 84) approved respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminants in air in accordance with OSHA laws and regulations or other applicable standards or guidelines, including ANSI standards regarding respiratory protection. Use goggles if contact is likely. Wear impervious gloves as required to prevent skin contact.

9. Physical and Chemical Properties

Appearance	Dark liquid
Color	Dark amber
Odor	Mild
Odor threshold	Not available
pH	12.8 - 13.3
Freezing point	Not available

Boiling point, 760 mm Hg	102 °C (216 °F)
Flash point	Greater than 93.3 °C (199.9 °F) Tag Closed Cup ASTM D 56
Evaporation rate	Not available
Lower explosion limit	Not available
Upper explosion limit	Not available
Vapor pressure	23 mm Hg @25 °C (77 °F)
Vapor density	1
Specific gravity	1.268 - 1.283
Solubility in water	Soluble
Octanol/water partition coefficient	Not available
Autoignition temperature	Not available
Viscosity	95 - 135 cPs Brookfield

10. Stability and Reactivity

Chemical Stability

Normally stable, but may become unstable at high temperatures.

Incompatible Materials

Oxidizers, acids

Hazardous Decomposition Products

Oxides of carbon, aldehydes (including formaldehyde), phenols and aromatic hydrocarbons.

Possibility of Hazardous Reactions

Hazardous polymerization may occur.

Other Hazards

DO NOT add ALpHACURE esters to drums containing ALpHASET resins or vice versa.

11. Toxicological Information

INGESTION: A similar product was found to be non-toxic orally when tested as described in 16 CFR Part 1500.3(c)(1) and (2).

INHALATION: A similar product was found to be non-toxic by inhalation when tested as described in 16 CFR Part 1500.3 (c)(1) and (2).

SKIN ABSORPTION: A similar product was found to be non-toxic dermally when tested as described in 16 CFR Part 1500.3 (c)(1) and (2).

SKIN: A similar product was not a primary irritant (primary skin irritation index less than 5.0/8.0) when tested as described in 16 CFR Part 1500.41.

EYES: A similar product was severely irritating when tested as described in 16 CFR Part 1500.42.

108-95-2 Phenol
LC50: rat=0.316 mg/l (RTECS)
LD50: Oral-rat= 414 mg/kg (Sax); Skin-rabbit= 850 mg/kg (Sax)

50-00-0 Formaldehyde
LC50: rat=0.59 mg/l (Sax)
LD50: Oral-rat= 800 mg/kg (Merck); Skin-rabbit= 270 mg/kg (Sax)

12. Ecological Information

No data for ecotoxicity has been found. Effects are expected to be minimal. Phenol-formaldehyde polymers have a very low rate of biodegradation. Bioaccumulation is expected to be minimal. Product is initially a mobile liquid which will solidify on aging. Unreacted monomer may be leached into ground water even after normal curing has occurred.

13. Disposal Considerations

Recover free liquid. Absorb residue and dispose of according to local, state/provincial, and federal requirements.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

Proper shipping name	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (Potassium Hydroxide)
UN/NA number	3266
Class	8
Packing group	II
Label	8
RQ Ingredients	Formaldehyde

14.2 Canadian Transportation of Dangerous Goods (TDG)

Proper shipping name	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
UN number:	3266
Class	Class 8
Packing group	II
Label	8

14.3 Other Regulations

- ***IMO/IMDG***

Proper shipping name	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
UN Number	3266
Class	Class 8
Packing group	II
Label	8

- ***IATA* (Passenger)**

Proper shipping name	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
UN/ID number	3266
Class	Class 8
Packing group	II
Label	8

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

OSHA Hazards Communication Standard 29CFR1910.1200

This material is a "health hazard" and/or a "physical hazard" as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200 "Hazard Communication" Standard.

SARA Title III: Section 311/312

Reactivity hazard
Immediate health hazard
Delayed health hazard

SARA Title III: Section 313 and 40 CFR Part 372

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Phenol	108-95-2	1.50%
Formaldehyde	50-00-0	0.99%

TSCA Section 8(b) Inventory

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by us.

15.2 Canadian Regulations

Workplace Hazardous Materials Information System (WHMIS)

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

Class D2A
Class D2B

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

Class D2A
Class D2B
Class E

Canadian Environmental Protection Act (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

National Pollutant Release Inventory (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

Phenol (and its salts)	108-95-2	1.50%

16. Other Information

User's Responsibility

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

Disclaimer

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE, except that the product shall conform to contracted specifications, and that the product does not infringe any valid United States or Canadian patent. No claim of any kind shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

09-50912

date prepared 9/17/1999

Product name

RF118 ALUMINUM FLUX

SECTION I - PRODUCT IDENTITY

Manufacturer's name: **Synex, Inc.**

EMERGENCY TELEPHONE: 770-253-7652, FAX 770-253-7685

address: Syn*thetic* Ex*othermics*, Inc.; p.o. box 2216, Newnan, Georgia 30264

Chemical name: aluminum flux trade name and synonyms: RF118

PRODUCT IDENTIFICATION

Chemical Name: Inorganic Salts Chemical Family: Chlorides, Carbonates, Fluorides

Formula: Mixture NFPA/HMIS: Health -2, Fire -0, Reactivity-0, Specific hazard

SECTION II HAZARDOUS INGREDIENTS/ IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity: Common Name(s)	OSHA PEL	ACGIH TLV	other limits recommended
Fluorides as Cryolite (CAS NO. 13775-53-6, less than 10%)	2.5mg/m3	2.5mg/m3	N/A
Nuisance Dust Respirable	5mg/m3	5mg/m3	N/A
Total Dust	15mg/m3	10mg/m3	N/A

SECTION III - PHYSICAL PROPERTIES

molecular weight:nd

melting point (deg. F):1150-1250

water solubility (wt.%) 8.5gr/LT

vapor pressure (mmhg):na

evaporation rate: nd

specific gravity(water=1):nd

boiling point (deg. C):na

volatiles (wt.%)nd

vapor density (air =1):na

appearance : white

SECTION IV- FIRE AND EXPLOSION HAZARD DATA

Flash point (method used): nd flammable limits: nd

extinguishing media: this product is not considered flammable, nor will it support combustion

special fire fighting procedures: wear respirator for fluorides

unusual fire and explosion hazards: fumes of f sif4 and na2 may be given off

SECTION V- REACTIVITY DATA

stability: unstable stable X factors promoting instability:

hazardous polymerization: will not occur incompatibility: acid, acidferous vapors

avoid contact with:acids or high temperatures except under controlled conditions. Avoid dampness. Keep container closed

hazardous decomposition products: fumes of F, Cl, and NaO2 may be given off when heated to decomposition.

na= not applicable nd= not determined unk=unknown

09-5094/Z

A.F. GELHAR CO., INC..
GELHAR TRANSIT, INC

MATERIAL SAFETY DATA SHEET
Effective Date: 1/1/2000
Revision Date: 8 Mar, 2002

SECTION I - IDENTIFY: CRYSTALLINE SILICA (QUARTZ)

Manufacturer's Name:
A.F. Gelhar Co., Inc.
Physical Address:
N2402 County Road A
Markesan, WI 53946
Mail Address:
P.O. Box 126
Fairwater, WI 53931-0126

Emergency Telephone Number:
920-398-3566
920-667-4792

Telephone Number for Information:
920-398-3566
(Fax) 920-398-3567

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components: Silica, Crystalline Quartz (respirable)
Specific Chemical Identity: Silicon Dioxide SiO_2 (CAS 14808-60-7)
Common Names: Silica, Sand, Crystalline Silica, Crystalline Free Silica, Quartz, Industrial Sand, Silicon Dioxide, Play Sand, Foundry Sand, and Grinding Sand.
Gelhar Trade Names: Filtration, Bank, Silica, and Foundry Sand.

OSHA PEL (Permissible Exposure Limit):
Exposure to airborne crystalline silica shall not exceed an 8-hour time-weighted limit as stated in 29 CFR 1910.100 Table Z-1-A, Air Contaminants, specifically:

$$\frac{10.0\ mg/m^3}{\%SiO_2 + 2}$$

ACGIH TLV (Threshold Limit Value):
Crystalline Silica (Quartz)
TLV-TWA = 0.05 mg/m^3 Respirable Crystalline Silica (Quartz)
See Threshold Limit Value and Biological Exposure Indices for American Conference of Governmental Industrial Hygienists (2001edition).

Other Limits Recommended: National Institute for Occupational Safety and Health (NIOSH). Recommended standard maximum permissible concentration = 0.05 mg/m^3 (respirable free silica) as determined by a full-shift sample up to 10-hour working day, 40-hour week. See NIOSH Criteria for a Recommended Standard Occupational Exposure to Crystalline Silica.

CAUTION: Crystalline silica exists in several forms, the most common of which is *quartz*. If crystalline silica(quartz) is heated to more than 870°C, it can change to a form of crystalline silica known as *tridymite*, and if crystalline silica(quartz) is heated to more than 1470°C, it can change to a form known as *crystobalite*. Crystalline silica as tridymite and cristobalite are more fibrogenic than crystalline silica as quartz. The OSHA PEL for cystalline silica as tridymite and crystobalite is one-half the PEL for crystalline silica(quartz). The ACGIH TLV for crystalline silica as tridymite and crystobalite is the same as for cryatalline silica as quartz (0.05mg/m^3).

SECTION III - HAZARDOUS IDENTIFICATION

A.F. Gelhar Co., Inc. industrial sand (quartz) is white, tan or brown in appearance. It is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in adverse health effects. Crystalline Silica (Quartz) is not known to be an environmental hazard. Crystalline Silica (Quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

POTENTIAL HEALTH EFFECTS:

Inhalation:

a:	Silicosis:	Respirable Crystalline Silica (Quartz) can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death.
b:	Cancer:	Crystalline Silica (Quartz) inhaled from occupational sources is classified as carcinogenic to humans.
c:	Scleroderma:	There is evidence that exposure to Respirable Crystalline Silica or that the disease silicosis is associated with the increased incidence of scleroderma, an autoimmune disorder manifested by a fibrosis (scarring) of the skin and internal organs.
d:	Tuberculosis:	Silicosis increases the risk of tuberculosis.
e:	Nephrotoxicity:	There are some studies that show and increased incidence of chronic kidney disease and end-stage renal disease in workers exposed to respirable crystalline silica..

Eye Contact: Crystalline Silica (Quartz) may cause abrasion of the cornea.

Skin Contact: Not applicable.

Ingestion: Not applicable.

Chronic Health Effects: The adverse health effects - silicosis, cancer, scleroderma, tuberculosis, and nephrotoxicity - are chronic effects.

Signs and Symptoms of Exposure: There are generally no signs or symptoms of exposure to Crystalline Silica (Quartz) . Often, chronic silicosis has no symptoms. The symptoms of chronic silicosis, if present, are shortness of breath, wheezing, cough and sputum production. The symptoms of acute silicosis are the same; additionally, weight loss and fever are associated with acute silicosis. The symptoms of scleroderma include thickening and stiffness of the skin, particularly in the fingers, shortness of breath, difficulty swallowing, and joint problems.

Medical Conditions Generally Aggravated by Exposure: The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

SECTION IV - FIRST AID MEASURES

Inhalation: No specific first-aid is necessary since the adverse health effects associated with exposure to Crystalline Silica (Quartz) result from chronic exposures. If there is a gross inhalation of Crystalline Silica (Quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

Eye Contact: Wash immediately with water. If irritation persists, seek medical attention.
Skin Contact: Not applicable.
Ingestion: Not applicable.

SECTION V - FIRE FIGHTING MEASURES

Flammability: Crystalline Silica (Quartz) is non-flammable and non-explosive.
Extinguishing Media: None required.
Flash Point: None.
Flammable Limits: None.

Special Fire Fighting Procedures: Not applicable.

Unusual Fire and Explosion Hazards: None.

SECTION VI - ACCIDENTAL RELEASE MEASURES

Spills: Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. Wear protective equipment specified below.

Waste Disposal Method: See Section 13.

SECTION VII - HANDLING AND STORAGE

Precautions During Handling and Use: Do not breath dust. Use adequate ventilation and dust collection. Keep airborne dust concentrations below PEL. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing which has become dusty. Also see control measures in Section 8.

Precautions During Storage: Avoid breakage of bagged material or spills of bulk material. See control measures in Section 8.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59, and 1928.21, and state and local worker or community "right to know" laws and regulations should be strictly followed. *Warn your employees (and your customers in case of resale) by posting and other means of the hazards and the required OSHA precautions. Provide training for your employees about the OSHA precautions.*

Also see *American Society for Testing and Materials* (ASTM) standard practice E-1132-99a, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica."

SECTION VIII - EXPOSURE CONTROLS AND PERSONAL PROTECTION

Local Exhaust: Use sufficient local exhaust to reduce the level of Respirable Crystalline Silica to below the PEL. See ACGIH *Industrial Ventilation, A Manual of Recommended Practice* (latest edition).

Respiratory Protection: The following chart specified the types of respirators which may provide respiratory protection for Crystalline Silica (Quartz).

CONDITION Particulate Concentration	MINIMUM RESPIRATORY PROTECTION* *Use only NIOSH - approved equipment. See 42 CFR § 84
10 x PEL or less	Any particulate respirator, except single-use ro quarter-mask respirator. Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
50 x PEL or less	A high efficiency particulate filter respirator with a full face piece. Any supplied-air respirator with a full face piece, helmet, or hood. Any self-contained breathing apparatus with a full face piece.
500 x PEL or less	A powered air-purifying respirator with a high efficiency particulate filter. A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
Greater than 500 x PEL or entry and escape from unknown concentrations.	Self-contained breathing apparatus with a full face piece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full face piece operated in pressure-demand or other positive pressure continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

Also see ANSI standard Z88.2 (latest revision) *American National Standard for Respiratory Protection.*

Component	CAS No	Percentage (by wt)	OSHA		ACGIH		NIOSH	
			TWA	STEL	TWA	STEL	TWA	STEL
Crystalline Silica (Quartz)	14808-60-7	98.0-99.9	$\frac{10\ mg/m^3}{\%\ SiO_2 + 2}$	None	.05 mg/m^3	None	.05 mg/m^3	None

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White, tan or brown sand; granular
Boiling Pint: 4046°F
Specific Gravity (Water-1): 2.65
Melting Point: 2930°F
Odor: None
Solubility in Water: Insoluble in water
Vapor Pressure (mm Hg): None
Vapor Density (Air-1): None
Evaporation Rate (Butyl Acetate =1): None

SECTION X - STABILITY AND REACTIVITY

Stability: Crystalline Silica (Quartz) is stable.

Incompatibility (materials to avoid): Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, oxygen difluoride, may cause fires.

Hazardous Decomposition or By-products: Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride.

Hazardous Polymerization: Will not occur.

SECTION XI - TOXICOLOGICAL INFORMATION

A. **SILICOSIS:**

The major concern is ***silicosis***, caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms: chronic (or ordinary), accelerated, or acute.

Chronic or ordinary silicosis is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne Respirable Crystalline Silica dust. It is further defined as either simple or complicated silicosis.

Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function, or disability.

Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pumonale).

Accelerated silicosis can occur with exposure to high concentrations of Respirable Crystalline Silica over a relatively short period; the lung lesions can appear within five (5) years of the initial exposure. The progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that the lung lesions appear earlier and progression is more rapid.

Acute silicosis can occur with exposure to very high concentrations of Respirable Crystalline Silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

B. **CANCER:**

The International Agency for Research on Cancer (IARC) concluded that there was "sufficient evidence in humans for the carcinogenicity of Crystalline Silica in the forms of quartz or cristobalite from occupational sources" and that there is "sufficient evidence in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "Crystalline Silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependant on inherent characteristics of the Crystalline Silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997).

The National Toxicology Program (**NTP**), in its *Ninth Annual Report on Carcinogens,* classified 'silica, crystalline(respirable)' as a known human carcinogen.

The U.S. Occupational Safety and Health Administration (**OSHA**) does not regulate Crystalline Silica (Quartz) as a carcinogen.

There is substantial literature on the issues of the carcinogenicity of crystalline Silica, which the reader should consult for additional information; the following are examples of recently published articles: (1) "Crystalline Silica and Lung Cancer: The Problem of Conflicting Evidence", Indoor Built Environ, Volume 8, pp. 121-126(1998); (2) "Crystalline Silica and the risk of lung cancer on the potteries". Occup. Environ. Med. Volume 55, pp 779-785 (1998); (3) "Is Silicosis Required for Silica-Associated Lung Cancer?", American Journal of Industrial Medicine, Volume 37, pp. 252-259 (2000); (4) "Silica, Silicosis, and Lung Cancer: A Risk Assessment", American Journal of Industrial Medicine, volume 38, pp 8-18 (2000): (5) "Silica, Silicosis, and Lung Cancer: A Response to a Recent Working Group Report", Journal of Occupational and Environmental Medicine, Volume 42, pp. 704-720 (2000).

C. AUTOIMMUNE DISEASES

There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis is associated with the increased incidence of autoimmune disorders, –Scleroderma, Systemic Lupus Erythematosus, Rheumatoid Arthritis and diseases affecting the kidneys. To review of the subject, the following may be consulted: "Occupational Exposure of Crystalline Silica and Autoimmune Disease", Environmental Health Perspectives, Volume 107, Supplement 5, pp 793-802(1999); "Occupational Scleroderma". Current Opinion in Rheumatology, Volume 11, pp. 490-94 (199)

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: Occupational Lung Disorders, Third Edition, Chapter 12, *Silicosis and Related Diseases,* Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," Occup. Environ. Med., Volume 55, pp. 496-502 (1998)

E. NEPHROTOXICITY

There is evidence that exposure to respirable crystalline silica(without silicosis) or that the disease silicosis is associated with the increased incidence of kidney diseases, including end stage renal disease. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85 pp. 14-19 (2000).

SECTION XII - ECOLOGICAL INFORMATION

Crystalline Silica (Quartz) is not known to be ecotoxic; i.e., there is no data which suggests that Crystalline Silica (Quartz) is toxic to birds, fish, invertebrates, microorganisms or plants. For additional information on Crystalline Silica (Quartz), see Section 9 (physical and chemical properties) and 10 (stability and reactivity) of this MSDS.

SECTION XIII - DISPOSAL CONSIDERATIONS

General: The packaging and material may be land filled; however, material should be covered to minimize generation of airborne dust.

RCRA: Crystalline Silica (Quartz) is not classified as a hazardous waste under the Resource Conversation and Recovery Act, or its regulations, 40 CFR §261 et seq.

The above applies to materials sold by A.F. Gelhar Co., Inc. The material may be contaminated during use, and it is the responsibility of the user to assess the appropriate disposal of the used material.

SECTION XIV - TRANSPORT INFORMATION

Crystalline Silica (Quartz) is not hazardous material for purposes of transportation under the U.S. Department of Transportation Table of Hazardous Material, 49 CFR §172.101.

SECTION XV - REGULATORY INFORMATION

UNITED STATES (FEDERAL AND STATE):

TSCA No.: Crystalline Silica (Quartz) appears on the EPA Toxic Substances Control Act inventory under the CAS No 14808-60-7.

RCRA: Crystalline Silica (Quartz) is not classified as a hazardous waste under the Resource Conservation & Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: Crystalline Silica (Quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act: Crystalline Silica (Quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline Silica (Quartz) mined an processed by A.F. Gelhar Co., Inc. was not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300 (b) (3) (xxvi).

NTP: Respirable Crystalline Silica (Quartz) is classified as a carcinogen.

CA Proposition 65: Crystalline Silica (Quartz) is classified as a substance known to the state of California to be a carcinogen.

OSHA: Crystalline Silica (quartz) is not listed as a carcinogen.

CANADA:

Domestic Substances List: A.F. Gelhar Co., Inc. products, naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D-2A

OTHER:

IARC: Crystalline Silica (Quartz) is classified in IARC Group I.

EINECS No.: 231-545-4

EEC Label (Risk/Safety Phrases): R48/20, R40/20, S22, S38

National, state, provincial, or local emergency planning, community right to know or other laws, regulations or ordinances may be applicable. Consult applicable national, state, provincial, or local laws.

HEALTH = 2 (moderate)
FLAMMABILITY = 1 (slight)
REACTIVITY = 0 (minimal)

3.2 Potential Health Effects

Immediate Hazards

INGESTION: May be harmful if swallowed.
Can cause central nervous system depression.

INHALATION: Not expected to be harmful under normal conditions of use. However, if allowed to become airborne, may cause irritation of nose, throat and lungs.
Can cause central nervous system depression.

SKIN: May cause irritation on prolonged or repeated contact.
Can cause central nervous system depression.

EYES: Causes irritation.

96-48-0 Butyrolactone
Can cause central nervous system depression. Signs and symptoms may include headache, dizziness, nausea, vomiting and drowsiness.

Delayed Hazards

None of the components present in this product at concentrations equal to or greater than 0.1% have been listed by NTP, classified by IARC, nor regulated by OSHA as a carcinogen.

4. First Aid Measures

INGESTION: If accidentally swallowed, dilute by drinking large quantities of water. If the individual is drowsy or unconscious, do not give anything by mouth. Immediately contact poison control center or hospital emergency room for advice on whether to induce vomiting or for any other additional treatment directions.

INHALATION: Remove to fresh air.

SKIN: Immediately flush with plenty of water for at least 15 minutes.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held apart during irrigation to ensure water contact with entire surface of eyes and lids. Call a physician.

5. Fire Fighting Measures

Flash point	Greater than 94 °C (201 °F)
Lower explosion limit	Not available
Upper explosion limit	Not available
Autoignition temperature	Not available

Will burn.
In case of fire, use water spray, dry chemical, "alcohol" foam or CO2. Use water to keep fire-exposed containers cool.

MATERIAL SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

DESCRIPTION: ALpHACURE® 110

1. Chemical Product and Company Identification

DESCRIPTION:	**ALpHACURE® 110**
PRODUCT CODE:	71-A010B-
PRODUCT TYPE:	Liquid Ester
APPLICATION:	CoReactant for ALpHASET Resins Sold Under U.S. Patent Number - 4,988,745

Manufacturer/Supplier Information

MSDS prepared by:
HA International, LLC
630 Oakmont Lane
Westmont, IL
60559

For Emergency Medical Assistance
Call Health & Safety Information Services
1-866-303-6949

For additional health and safety or regulatory information, call (630)575-5722, or (630)575-5705

2. Composition, Information on Ingredients

The ingredients listed below have been associated with one or more immediate and/or delayed(*) health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THE MSDS.

		% by weight
96-48-0	**Butyrolactone**	**10.0 - 30.0**

Any applicable Canadian trade secret numbers will be listed in Section 15.2

3. Hazards Identification

3.1 Emergency Overview

Appearance	Clear, light yellow liquid
Odor	Characteristic

CAUTION!
Will burn.
Can cause central nervous system depression.
Causes eye irritation.
May be harmful if swallowed.

HMIS Rating

HEALTH = 2 (moderate)
FLAMMABILITY = 1 (slight)
REACTIVITY = 0 (minimal)

3.2 Potential Health Effects

Immediate Hazards

INGESTION: May be harmful if swallowed.
Can cause central nervous system depression.

INHALATION: Not expected to be harmful under normal conditions of use. However, if allowed to become airborne, may cause irritation of nose, throat and lungs.
Can cause central nervous system depression.

SKIN: May cause irritation on prolonged or repeated contact.
Can cause central nervous system depression.

EYES: Causes irritation.

96-48-0 Butyrolactone
Can cause central nervous system depression. Signs and symptoms may include headache, dizziness, nausea, vomiting and drowsiness.

Delayed Hazards

None of the components present in this product at concentrations equal to or greater than 0.1% have been listed by NTP, classified by IARC, nor regulated by OSHA as a carcinogen.

4. First Aid Measures

INGESTION: If accidentally swallowed, dilute by drinking large quantities of water. If the individual is drowsy or unconscious, do not give anything by mouth. Immediately contact poison control center or hospital emergency room for advice on whether to induce vomiting or for any other additional treatment directions.

INHALATION: Remove to fresh air.

SKIN: Immediately flush with plenty of water for at least 15 minutes.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held apart during irrigation to ensure water contact with entire surface of eyes and lids. Call a physician.

5. Fire Fighting Measures

Flash point	Greater than 94 °C (201 °F)
Lower explosion limit	Not available
Upper explosion limit	Not available
Autoignition temperature	Not available

Will burn.
In case of fire, use water spray, dry chemical, "alcohol" foam or CO2. Use water to keep fire-exposed containers cool.

6. Accidental Release Measures

Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in a suitable container. For large spills, use water spray to disperse vapors and flush spill area. Prevent runoff from entering waterways or sewers. Use appropriate Personal Protective Equipment (PPE).

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from eyes, skin and clothing. Wash thoroughly after handling. Always use appropriate Personal Protective Equipment (PPE).

INHALATION:	Avoid prolonged or repeated breathing of vapor.
SKIN:	Avoid prolonged or repeated contact with skin and clothing.
EYES:	Avoid contact with eyes.

7.2 Storage

Keep container closed.
Store in a cool, dry place.
Empty container may contain product residues. DO NOT cut, torch or reuse without commercial cleaning.
This product is incompatible with water. Water contamination will render the material unusable.
Limited storage life - Refer to product specifications.
Keep away from heat, sparks, flame and other ignition sources.
Use with adequate ventilation.
Keep away from acids and oxidizing agents.

8. Exposure Controls/Personal Protection

8.1 Exposure Controls

ENGINEERING CONTROLS: The following exposure control techniques may be used to effectively minimize employee exposure: local exhaust ventilation, enclosed system design, process isolation and remote control in combination with appropriate use of personal protective equipment and prudent work practices. These techniques may not necessarily address all issues pertaining to your operations. We, therefore, recommend that you consult with experts of your choice to determine whether or not your programs are adequate.

If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria.

8.2 Personal Protection

Where air contaminants can exceed acceptable criteria, use NIOSH (42 CFR Part 84) approved respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminants in air in accordance with OSHA laws and regulations or other applicable standards or guidelines, including ANSI standards regarding respiratory protection. Use goggles if contact is likely. Wear impervious gloves as required to prevent skin contact.

8.3 Exposure Guidelines

96-48-0	Butyrolactone
ACGIH TLV	None established
OSHA PEL	None established

9. Physical and Chemical Properties

Appearance	Clear, light yellow liquid
Odor	Characteristic
Odor threshold	Not available
Specific gravity	Approx. 1.168
pH	Not applicable
Viscosity	Approx. 155 cPs Brookfield
Freezing point	Not available
Solubility in water	Immiscible
Octanol/water partition coefficient	Not available
Vapor pressure	Not available
Vapor density	Not available
Evaporation rate	Not available
Boiling point, 760 mm Hg	Not available

10. Stability and Reactivity

Normally stable as defined in NFPA 704-12(4-3.1).

Incompatibilities:

Water

Decomposition products may include:

Oxides of carbon.

Hazardous polymerization:

Will not occur.

Other Hazards:

DO NOT add ALpHACURE esters to drums containing ALpHASET resins or vice versa.

11. Toxicological Information

See Section 3 Hazards Identification information.
96-48-0 Butyrolactone

LC50: rat=5.1 mg/l/4 h (aerosol)
LD50: Oral-rat= 1,800 mg/kg (RTECS)

12. Ecological Information

Not determined

13. Disposal Considerations

Recover free liquid. Absorb residue and dispose of according to local, state/provincial, and federal requirements.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

The data provided in this section is for information only and may not be specific to your package size. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

Regulation: Non regulated

14.2 Canadian Transportation of Dangerous Goods (TDG)

Regulation: Non regulated

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

OSHA Hazards Communication Standard 29CFR1910.1200

This material is a "health hazard" and/or a "physical hazard" as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200 "Hazard Communication" Standard.

SARA Title III: Section 311/312

Immediate health hazard

SARA Title III: Section 313 and 40 CFR Part 372

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

None required per SARA TITLE III SECTION 313

TSCA Section 8(b) Inventory

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by us.

15.2 Canadian Regulations

Workplace Hazardous Materials Information System (WHMIS)

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

Class D1B
Class D2B

Canadian Environmental Protection Act (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

National Pollutant Release Inventory (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

None required.

16. Other Information

User's Responsibility

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

Disclaimer

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE, except that the product shall conform to contracted specifications, and that the product does not infringe any valid United States or Canadian patent. No claim of any kind shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

09-5094/2

MATERIAL SAFETY DATA SHEET

TRIALCO, INC.

ALUMINUM CASTING ALLOY 356

(Prepared February 20, 1990)

IDENTITY

TRADE NAME
Aluminum Association Registration Number 356.X (formerly 356)
(where X is 0 for castings, 1 or 2 for ingot)

PRODUCT
Aluminum foundry ingot and weld wire

CHEMICAL NAME
Mixture

CHEMICAL FAMILY
Aluminum (Al) alloys containing Si, Fe, Cu, Mn, Mg, Cr, Ni, Zn, Sn, Ti, Be, Pb and/or Sr.

SECTION I

MANUFACTURER'S NAME
Trialco, Inc.

ADDRESS
900 East 14th Street
Chicago Heights, IL 60411

EMERGENCY TELEPHONE NUMBER
(708)757-4200
(800)424-9300 - CHEMTREC

TELEPHONE NUMBER FOR INFORMATION
(708)757-4200 Telefax: (708)757-3933

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

MATERIAL	FORMULA	PERCENT BY WEIGHT	CAS NUMBER	HUMAN* CARCIN-OGEN?	FORM	OSHA** 8-hr PEL mg/m^3	OSHA 8-hr TWA (15-min STEL) mg/m^3	ACGIH 8-hr TLV (15-min STEL) mg/m^3
Aluminum	Al	Remainder	7429-90-5		dust	15 TD	15 TD	10
					dust	5 RF	5 RF	
					fume	----	5	5
Beryllium	Be	----------	7440-41-7	Yes		0.002 Be1	0.002 Be2	ALARA
Chromium	Cr	----------	7440-47-3	Yes?		1	1	0.5
Copper	Cu	0.40 max.	7440-50-8		dust	1	1	1
					fume	0.1	0.1	0.2
Iron	Fe	0.6 max.	7439-89-6			----	----	----
Lead	Pb	----------	7439-92-1	Yes		0.05 Pb1	0.05 Pb1	----
Magnesium	Mg	0.20 - 1.30	7439-95-4			----	----	----
Manganese	Mn	0.35 max.	7439-96-5		dust	5 C	5 C	5
					fume	5 C	1(3)	1(3)
Nickel	Ni	----------	7440-02-0	Yes		1	1	1
Silicon	Si	6.5 - 10.0	7440-21-3			15 TD	10 TD	10
						5 RF	5 RF	
Strontium	Sr	0.02 max.	unknown			----	----	----
Tin	Sn	----------	7440-31-5			----	----	2
Titanium	Ti	0.03 - 0.25	7440-32-6			----	----	----
Zinc	Zn	0.35 max.	7440-66-6		dust	----	----	----
					fume	----	----	----

GENERAL NOTES

*Identified as a potential human carcinogen.

**For dusts without an explicit OSHA PEL, a nuisance dust PEL applies: 15 mg/m^3 total dust, 5 mg/m^3 respirable dust.

ALARA: As Low As Reasonably Achievable.
BEI: A ACGIH Biological Exposure Index exists.
C: Ceiling limit.
RF: Respirable fraction of dust.
S: Skin.
TD: Total dust.

MATERIAL-SPECIFIC NOTES
Be1: Ceiling: 0.005 mg/m^3, 30-minute STEL: 0.025 mg/m^3.
Be2: Ceiling: 0.025 mg/m^3, 30-minute STEL: 0.005 mg/m^3.
Ni1: Assumes compound is insoluble.
Pb1: See also 29 CFR 1910.1025.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT	3733°F(2056°C)	SPECIFIC GRAVITY (H_2O=1)	2.6-2.9
VAPOR PRESSURE (mm Hg)	NA	MELTING POINT	1050-1220°F(566-660°C)
VAPOR DENSITY (Air=1)	NA	EVAPORATION RATE (Butyl acetate=1)	NA
SOLUBILITY IN WATER (at 20°C)	Insoluble		
APPEARANCE AND ODOR	Silvery gray color, odorless solid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE LIMITS	LEL	UEL
NA	Nonflammable	NA	NA

EXTINGUISHING MEDIA
Aluminum alloys will not burn in the solid state. Like other metallic and organic dust and fine powder, aluminum alloy dust and powder may burn under some conditions. To extinguish, use Class D extinguishing agents (Lith X).

SPECIAL FIRE FIGHTING PROCEDURES
Confine metal powder or dust fire, avoid spreading. Apply Class D (Lit X) powder in heavy quantities. DO NOT USE WATER OR MOIST SAND. Fire fighters should wear self-contained breathing apparatus and protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Fire or explosion may occur when material is in the form of dust and exposed to heat or flames, chemical reaction, or contact with powerful oxidizers. In solid ingot form, there is no fire or explosion hazard. NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE.

SECTION V - REACTIVITY DATA

STABILITY	Stable at room temperature.
INCOMPATIBILITY (MATERIALS TO AVOID)	NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE. Reaction with mineral acids, water-soluble cutting oils, dilute hydrochloric acid, sulfuric acid, potassium hydroxide or sodium hydroxide may liberate hydrogen. Avoid contact with acids, bases and oxidizing agents. For additional information, consult Material Safety Data Sheets for component elements.
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS	Evolved hydrogen in confined areas may be an explosive hazard (see directly above). Potentially hazardous oxides of metals may be produced when aluminum alloys are heated, welded, or in molten state.
HAZARDOUS POLYMERIZATION	Will not occur.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY INHALATION? Yes SKIN? Yes INGESTION? No

HEALTH HAZARDS (ACUTE AND CHRONIC)

Aluminum and aluminum alloys are not generally regarded as industrial toxins. In normal use, few health hazards occur.

Inhalation

Cutting, melting or welding may produce dusts or fumes containing the component elements and their oxides. Breathing these dust or fumes may present potentially significant health hazards. These may include mucous membrane irritation and lung changes in workers, potentially leading to pulmonary diseases.

Inhalation of finely divided aluminum powder may cause pulmonary fibrosis (aluminosis). Symptoms include anorexia, shortness of breath, dry cough, chest pain on respiration and epigastric abdominal pain.

Fumes of copper, magnesium, manganese and zinc oxide may cause metal fume fever with flu-like symptoms. Overexposure to manganese fumes may cause chronic manganese poisoning. Early symptoms include headaches, apathy, sleepiness, and weakness or cramps in the legs. Chronic overexposure may affect the central nervous system, ultimately leading to emotional disturbances, gait and balance difficulties, and paralysis.

Overexposure to tin dusts may cause irritation of the skin and mucous membranes, and may result in a benign pneumoconiosis (stannosis).

Beryllium, chromium and nickel compounds have been associated with allergic reactions, rashes and lung changes. Beryllium and nickel are respiratory irritants and may cause pneumonitis. Chronic beryllium overexposure may cause lung diseases, characterized by shortness of breath, cough, and fatigue, and may ultimately lead to respiratory and cardiac failure.

Skin

Dusts or fumes containing component elements of aluminum alloys may cause skin or mouth irritation. Copper may cause skin and hair discoloration. Magnesium particles imbedded in the skin may cause sever lesions, with slow healing.

Eyes

Dusts or fumes containing component elements of aluminum alloys may cause eye irritation.

Ingestion

Ingestion of significant amounts of material is unlikely.

Unusual Chronic Toxicity

Beryllium, chromium, cobalt, lead and nickel have been identified as potential human carcinogens.

CARCINOGENICITY NTP? No IARC MONOGRAPHS? No OSHA REGULATED? No

SIGNS AND SYMPTOMS OF EXPOSURE

Irritation of skin and mucous membranes; cough; difficulty in breathing.

EMERGENCY AND FIRST AID PROCEDURES	
Eyes	Flush with copious amount of water to remove particles. Contact a Physician.
Skin	Brush off excess dust. Wash area with plenty of soap and water. Skin cuts and abrasion can be treated with standard first aid. If material is molten, treat as a burn.
Inhalation	Remove to fresh air. Contact a Physician.
Ingestion	Ingestion of significant amounts of material is unlikely. If large quantities of material are ingested, contact a Physician.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	No special precautions are necessary for spills of bulk material. Wear gloves to prevent metal cuts. If quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentrations of airborne dust. Do not use compressed air for cleaning. Cleanup personnel should wear approved respirators and protective clothing. Place all collected metal or particulates in a labeled container. Molten metal spills can cause concrete to explode. Spilled molten metal can be reclaimed for reuse.
CERCLA Reportable Quantity (RQ)	(None)
WASTE DISPOSAL METHOD	In the United States, this product must be disposed of in accordance with applicable federal, state and local solid waste labeling, shipping and disposal laws and regulations.
RCRA Classification	(None)
RCRA Hazardous Waste Number	(None)
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Use good housekeeping practices to prevent accumulations of dust and keep airborne dust concentrations at a minimum. Avoid breathing dust or fumes. Store metal in a dry area away from incompatible materials. Keep dust away from sources of ignition. Preheat metal when required to evaporate surface moisture prior to melting. Ice, snow, grease, oil or moisture can cause explosions. Remove these contaminants before charging ingot to melting furnace.
OTHER PRECAUTIONS	Handling molten aluminum presents special hazards. Refer to Aluminum Association Publication 69, "Guidelines For Handling Molten Aluminum". For extensive information, write the Aluminum Association, 818 Connecticut Ave., N.W., Washington., DC 20006 for a copy of this publication.

SARA Title III Threshold Planning Quantity (TPQ) (None)

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION	Employees may wear NIOSH or MSHA approved respirators as specified by an Industrial Hygienist or qualified Safety Engineer for protection against airborne dusts or fumes.
VENTILATION	Local exhaust ventilation is required when dust or fumes are generated. Use general and local exhaust ventilation to keep airborne concentrations of dust or fume below the OSHA PEL and TWA shown in Section II.
PROTECTIVE GLOVES	Advisable to avoid cuts and skin abrasions. Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis.
EYE PROTECTION	Approved safety glasses or goggles should be worn when exposed to dusty or hot material. Face shields should be worn around hot metal. Safety eyewash stations should be provided near work areas.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT	Full protective clothing should be worn by workers exposed to heavy concentrations of dust or high heat and during alloying operations to prevent injury from molten metal splashing, spilling, etc.
WORK/HYGIENIC PRACTICES	Do not eat, drink or use tobacco products in work areas. Wash thoroughly after skin contact and before eating, drinking, use of tobacco products or using restrooms. Take a shower and change clothes at the end of the shift. All protective and contaminated clothing must be left at the plant. Launder all other work clothing separately from other household laundry. Pre-employment medical evaluations should be provided. Attention should be directed to skin, eyes, respiratory tract, blood, kidneys, pulmonary function and neurological health. Chest X-rays should be included if symptoms are present.

SECTION IX - SARA SECTION 313 SUPPLIER NOTIFICATION

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

CAS #	CHEMICAL NAME	PERCENT BY WEIGHT
7429-90-5	Aluminum (fume or dust only)	[a][b]
7440-41-7	Beryllium	[a]
7440-47-3	Chromium	[a]
7440-50-8	Copper	[a]
7439-92-1	Lead	[a]
7439-96-5	Manganese	[a]
7440-02-0	Nickel	[a]
7440-66-6	Zinc (fume or dust only)	[a][b]

[a] See Section II, Hazardous Ingredients/Identity Information, for percents by weight.
[b] Must be adjusted by the fraction of the material that exists as fume or dust.

This information must be included in all MSDSs that are copied and distributed for this material.

SECTION X - ADDITIONAL INFORMATION

This Material Safety Data Sheet should be made available by the buyer to each of the buyer's plant workers.

REFERENCES

U.S. Dept. of Labor, OSHA Regulations 29 CFR 1910.1000 through 29 CFR 1910.1200, January 19, 1989.

American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1989-1990, Cincinnati, 1989.

U.S. Environmental Protection Agency, Title III List of Lists, Pub. EPA 560/4-88-003, Washington, D.C., December 1988.

Merck & Co., Inc., The Merck Index, 10th edition, Rahway, NJ, 1983.

U.S. Dept. of Health and Human Services, NIOSH, Registry of Toxic Effects of Chemical Substances, April 1989.

Sax, N. Irving, Dangerous Properties of Industrial Materials, 5th edition, Van Nostrand, New York, 1979.

U.S. Dept. of Health and Human Services, NIOSH, Pocket Guide To Chemical Hazards, fifth printing, Pub. No. 85-114, September 1985.

Plunkett, E.R., Handbook of Industrial Toxicology, Chemical Publishing Co., New York, 1976.

Bretherton, Handbook or Reactive Chemical Hazards, Butterworths, 1979.

NOTICE

The Buyer assumes all risk in connection with the use of the material. Trialco, Inc. assumes no responsibility or liability in connection with the information supplied on this sheet for any damage or injury caused by the material if reasonable safety procedures are not followed as stipulated. Trialco, Inc. assumes no responsibility for injury or damage caused by abnormal use of the material even if reasonable safety procedures are followed. The information contained in this sheet is developed from what are believed to be accurate and reliable sources and is based on the best opinions and authoritative facts available at the time of issue. No warranty, expressed or implied, can be made.

PREPARED BY

Charles Licht Engineering, Inc.
P.O. Box 315
Olympia Fields, IL 60461 USA
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09-50941Z

MATERIAL SAFETY DATA SHEET

TRIALCO, INC.

ALUMINUM CASTING ALLOY 319

(Prepared February 20, 1990)

IDENTITY

TRADE NAME
Aluminum Association Registration Number 319.X (formerly 319, AllCast)
(where X is 0 for castings, 1 or 2 for ingot)

PRODUCT
Aluminum foundry ingot and weld wire

CHEMICAL NAME
Mixture

CHEMICAL FAMILY
Aluminum (Al) alloys containing Si, Fe, Cu, Mn, Mg, Cr, Ni, Zn, Sn, Ti, Be, Pb and/or Sr.

SECTION I

MANUFACTURER'S NAME
Trialco, Inc.

ADDRESS
900 East 14th Street
Chicago Heights, IL 60411

EMERGENCY TELEPHONE NUMBER
(708)757-4200
(800)424-9300 - CHEMTREC

TELEPHONE NUMBER FOR INFORMATION
(708)757-4200 Telefax: (708)757-3933

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

MATERIAL	FORMULA	PERCENT BY WEIGHT	CAS NUMBER	HUMAN* CARCIN-OGEN?	FORM	OSHA** 8-hr PEL mg/m^3	OSHA 8-hr TWA (15-min STEL) mg/m^3	ACGIH 8-hr TLV (15-min STEL) mg/m^3
Aluminum	Al	Remainder	7429-90-5		dust	15 TD	15 TD	10
					dust	5 RF	5 RF	
					fume	----	5	5
Beryllium	Be	----------	7440-41-7	Yes		0.002 Be1	0.002 Be2	ALARA
Chromium	Cr	0.10 max.	7440-47-3	Yes?		1	1	0.5
Copper	Cu	3.0 - 4.0	7440-50-8		dust	1	1	1
					fume	0.1	0.1	0.2
Iron	Fe	1.0 max.	7439-89-6			----	----	----
Lead	Pb	0.15 max.	7439-92-1	Yes		0.05 Pb1	0.05 Pb1	----
Magnesium	Mg	0.6 max.	7439-95-4			----	----	----
Manganese	Mn	0.50 max.	7439-96-5		dust	5 C	5 C	5
					fume	5 C	1(3)	1(3)
Nickel	Ni	0.50 max.	7440-02-0	Yes		1	1	1
Silicon	Si	5.5 - 7.0	7440-21-3			15 TD	10 TD	10
						5 RF	5 RF	
Strontium	Sr	0.01 max.	unknown			----	----	----
Tin	Sn	0.10 max.	7440-31-5			----	----	2
Titanium	Ti	0.03 - 0.25	7440-32-6			----	----	----
Zinc	Zn	1.0 max.	7440-66-6		dust	----	----	----
					fume	----	----	----

GENERAL NOTES

*Identified as a potential human carcinogen.

**For dusts without an explicit OSHA PEL, a nuisance dust PEL applies: 15 mg/m^3 total dust, 5 mg/m^3 respirable dust.

ALARA: As Low As Reasonably Achievable.
BEI: A ACGIH Biological Exposure Index exists.
C: Ceiling limit.
RF: Respirable fraction of dust.
S: Skin.
TD: Total dust.

MATERIAL-SPECIFIC NOTES
Be1: Ceiling: 0.005 mg/m^3, 30-minute STEL: 0.025 mg/m^3.
Be2: Ceiling: 0.025 mg/m^3, 30-minute STEL: 0.005 mg/m^3.
Ni1: Assumes compound is insoluble.
Pb1: See also 29 CFR 1910.1025.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT	3733°F(2056°C)	SPECIFIC GRAVITY (H_2O=1)	2.6-2.9
VAPOR PRESSURE (mm Hg)	NA	MELTING POINT	1050-1220°F(566-660°C)
VAPOR DENSITY (Air=1)	NA	EVAPORATION RATE (Butyl acetate=1)	NA
SOLUBILITY IN WATER (at 20°C)	Insoluble		
APPEARANCE AND ODOR	Silvery gray color, odorless solid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE LIMITS	LEL	UEL
NA	Nonflammable	NA	NA

EXTINGUISHING MEDIA
Aluminum alloys will not burn in the solid state. Like other metallic and organic dust and fine powder, aluminum alloy dust and powder may burn under some conditions. To extinguish, use Class D extinguishing agents (Lith X).

SPECIAL FIRE FIGHTING PROCEDURES
Confine metal powder or dust fire, avoid spreading. Apply Class D (Lit X) powder in heavy quantities. DO NOT USE WATER OR MOIST SAND. Fire fighters should wear self-contained breathing apparatus and protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Fire or explosion may occur when material is in the form of dust and exposed to heat or flames, chemical reaction, or contact with powerful oxidizers. In solid ingot form, there is no fire or explosion hazard. NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE.

SECTION V - REACTIVITY DATA

STABILITY	Stable at room temperature.
INCOMPATIBILITY (MATERIALS TO AVOID)	NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE. Reaction with mineral acids, water-soluble cutting oils, dilute hydrochloric acid, sulfuric acid, potassium hydroxide or sodium hydroxide may liberate hydrogen. Avoid contact with acids, bases and oxidizing agents. For additional information, consult Material Safety Data Sheets for component elements.
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS	Evolved hydrogen in confined areas may be an explosive hazard (see directly above). Potentially hazardous oxides of metals may be produced when aluminum alloys are heated, welded, or in molten state.
HAZARDOUS POLYMERIZATION	Will not occur.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY INHALATION? Yes SKIN? Yes INGESTION? No

HEALTH HAZARDS (ACUTE AND CHRONIC)

Aluminum and aluminum alloys are not generally regarded as industrial toxins. In normal use, few health hazards occur.

Inhalation

Cutting, melting or welding may produce dusts or fumes containing the component elements and their oxides. Breathing these dust or fumes may present potentially significant health hazards. These may include mucous membrane irritation and lung changes in workers, potentially leading to pulmonary diseases.

Inhalation of finely divided aluminum powder may cause pulmonary fibrosis (aluminosis). Symptoms include anorexia, shortness of breath, dry cough, chest pain on respiration and epigastric abdominal pain.

Fumes of copper, magnesium, manganese and zinc oxide may cause metal fume fever with flu-like symptoms. Overexposure to manganese fumes may cause chronic manganese poisoning. Early symptoms include headaches, apathy, sleepiness, and weakness or cramps in the legs. Chronic overexposure may affect the central nervous system, ultimately leading to emotional disturbances, gait and balance difficulties, and paralysis.

Overexposure to tin dusts may cause irritation of the skin and mucous membranes, and may result in a benign pneumoconiosis (stannosis).

Beryllium, chromium and nickel compounds have been associated with allergic reactions, rashes and lung changes. Beryllium and nickel are respiratory irritants and may cause pneumonitis. Chronic beryllium overexposure may cause lung diseases, characterized by shortness of breath, cough, and fatigue, and may ultimately lead to respiratory and cardiac failure.

Skin

Dusts or fumes containing component elements of aluminum alloys may cause skin or mouth irritation. Copper may cause skin and hair discoloration. Magnesium particles imbedded in the skin may cause sever lesions, with slow healing.

Eyes

Dusts or fumes containing component elements of aluminum alloys may cause eye irritation.

Ingestion

Ingestion of significant amounts of material is unlikely.

Unusual Chronic Toxicity

Beryllium, chromium, cobalt, lead and nickel have been identified as potential human carcinogens.

CARCINOGENICITY NTP? No IARC MONOGRAPHS? No OSHA REGULATED? No

SIGNS AND SYMPTOMS OF EXPOSURE

Irritation of skin and mucous membranes; cough; difficulty in breathing.

EMERGENCY AND FIRST AID PROCEDURES	
Eyes	Flush with copious amount of water to remove particles. Contact a Physician.
Skin	Brush off excess dust. Wash area with plenty of soap and water. Skin cuts and abrasion can be treated with standard first aid. If material is molten, treat as a burn.
Inhalation	Remove to fresh air. Contact a Physician.
Ingestion	Ingestion of significant amounts of material is unlikely. If large quantities of material are ingested, contact a Physician.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	No special precautions are necessary for spills of bulk material. Wear gloves to prevent metal cuts.
	If quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentrations of airborne dust. Do not use compressed air for cleaning. Cleanup personnel should wear approved respirators and protective clothing. Place all collected metal or particulates in a labeled container.
	Molten metal spills can cause concrete to explode. Spilled molten metal can be reclaimed for reuse.
CERCLA Reportable Quantity (RQ)	(None)
WASTE DISPOSAL METHOD	In the United States, this product must be disposed of in accordance with applicable federal, state and local solid waste labeling, shipping and disposal laws and regulations.
RCRA Classification	(None)
RCRA Hazardous Waste Number	(None)
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Use good housekeeping practices to prevent accumulations of dust and keep airborne dust concentrations at a minimum. Avoid breathing dust or fumes.
	Store metal in a dry area away from incompatible materials. Keep dust away from sources of ignition.
	Preheat metal when required to evaporate surface moisture prior to melting. Ice, snow, grease, oil or moisture can cause explosions. Remove these contaminants before charging ingot to melting furnace.
OTHER PRECAUTIONS	Handling molten aluminum presents special hazards. Refer to Aluminum Association Publication 69, "Guidelines For Handling Molten Aluminum". For extensive information, write the Aluminum Association, 818 Connecticut Ave., N.W., Washington., DC 20006 for a copy of this publication.

SARA Title III Threshold Planning Quantity (TPQ) (None)

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION	Employees may wear NIOSH or MSHA approved respirators as specified by an Industrial Hygienist or qualified Safety Engineer for protection against airborne dusts or fumes.
VENTILATION	Local exhaust ventilation is required when dust or fumes are generated. Use general and local exhaust ventilation to keep airborne concentrations of dust or fume below the OSHA PEL and TWA shown in Section II.
PROTECTIVE GLOVES	Advisable to avoid cuts and skin abrasions. Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis.
EYE PROTECTION	Approved safety glasses or goggles should be worn when exposed to dusty or hot material. Face shields should be worn around hot metal. Safety eyewash stations should be provided near work areas.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT	Full protective clothing should be worn by workers exposed to heavy concentrations of dust or high heat and during alloying operations to prevent injury from molten metal splashing, spilling, etc.
WORK/HYGIENIC PRACTICES	Do not eat, drink or use tobacco products in work areas. Wash thoroughly after skin contact and before eating, drinking, use of tobacco products or using restrooms. Take a shower and change clothes at the end of the shift. All protective and contaminated clothing must be left at the plant. Launder all other work clothing separately from other household laundry. Pre-employment medical evaluations should be provided. Attention should be directed to skin, eyes, respiratory tract, blood, kidneys, pulmonary function and neurological health. Chest X-rays should be included if symptoms are present.

SECTION IX - SARA SECTION 313 SUPPLIER NOTIFICATION

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

CAS #	CHEMICAL NAME	PERCENT BY WEIGHT
7429-90-5	Aluminum (fume or dust only)	[a][b]
7440-41-7	Beryllium	[a]
7440-47-3	Chromium	[a]
7440-50-8	Copper	[a]
7439-92-1	Lead	[a]
7439-96-5	Manganese	[a]
7440-02-0	Nickel	[a]
7440-66-6	Zinc (fume or dust only)	[a][b]

[a] See Section II, Hazardous Ingredients/Identity Information, for percents by weight.
[b] Must be adjusted by the fraction of the material that exists as fume or dust.

This information must be included in all MSDSs that are copied and distributed for this material.

SECTION X - ADDITIONAL INFORMATION

This Material Safety Data Sheet should be made available by the buyer to each of the buyer's plant workers.

REFERENCES

U.S. Dept. of Labor, OSHA Regulations 29 CFR 1910.1000 through 29 CFR 1910.1200, January 19, 1989.

American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1989-1990, Cincinnati, 1989.

U.S. Environmental Protection Agency, Title III List of Lists, Pub. EPA 560/4-88-003, Washington, D.C., December 1988.

Merck & Co., Inc., The Merck Index, 10th edition, Rahway, NJ, 1983.

U.S. Dept. of Health and Human Services, NIOSH, Registry of Toxic Effects of Chemical Substances, April 1989.

Sax, N. Irving, Dangerous Properties of Industrial Materials, 5th edition, Van Nostrand, New York, 1979.

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PREPARED BY

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04-5044/2

MATERIAL SAFETY DATA SHEET

TRIALCO, INC.

ALUMINUM CASTING ALLOY 535

(Prepared March 7, 1990)

IDENTITY

TRADE NAME
Aluminum Association Registration
Number 535.X (formerly Almag 35)
(where X is 0 for castings, 1 or 2 for ingot)

PRODUCT
Aluminum foundry ingot and weld wire

CHEMICAL NAME
Mixture

CHEMICAL FAMILY
Aluminum (Al) alloys containing Si, Fe, Cu, Mn, Mg, Cr, Ni, Zn, Sn, Ti, Be, Pb and/or Sr.

SECTION I

MANUFACTURER'S NAME
Trialco, Inc.

ADDRESS
900 East 14th Street
Chicago Heights, IL 60411

EMERGENCY TELEPHONE NUMBER
(708)757-4200
(800)424-9300 - CHEMTREC

TELEPHONE NUMBER FOR INFORMATION
(708)757-4200 Telefax: (708)757-3933

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

MATERIAL	FORMULA	PERCENT BY WEIGHT	CAS NUMBER	HUMAN* CARCIN-OGEN?	FORM	OSHA** 8-hr PEL mg/m^3	OSHA 8-hr TWA (15-min STEL) mg/m^3	ACGIH 8-hr TLV (15-min STEL) mg/m^3
Aluminum	Al	Remainder	7429-90-5		dust	15 TD	15 TD	10
					dust	5 RF	5 RF	
					fume	----	5	5
Beryllium	Be	0.003-0.007	7440-41-7	Yes		0.002 Be1	0.002 Be2	ALARA
Chromium	Cr	----------	7440-47-3	Yes?		1	1	0.5
Copper	Cu	0.05 max.	7440-50-8		dust	1	1	1
					fume	0.1	0.1	0.2
Iron	Fe	0.10 max.	7439-89-6			----	----	----
Lead	Pb	----------	7439-92-1	Yes		0.05 Pb1	0.05 Pb1	----
Magnesium	Mg	6.6 - 7.5	7439-95-4			----	----	----
Manganese	Mn	0.10 - 0.25	7439-96-5		dust	5 C	5 C	5
					fume	5 C	1(3)	1(3)
Nickel	Ni	----------	7440-02-0	Yes		1	1	1
Silicon	Si	0.10 max.	7440-21-3			15 TD	10 TD	10
						5 RF	5 RF	
Strontium	Sr	----------	unknown			----	----	----
Tin	Sn	----------	7440-31-5			----	----	2
Titanium	Ti	0.10 - 0.25	7440-32-6			----	----	----
Zinc	Zn	----------	7440-66-6		dust	----	----	----
					fume	----	----	----

GENERAL NOTES

*Identified as a potential human carcinogen.

**For dusts without an explicit OSHA PEL, a nuisance dust PEL applies: 15 mg/m^3 total dust, 5 mg/m^3 respirable dust.

ALARA: As Low As Reasonably Achievable.
BEI: A ACGIH Biological Exposure Index exists.
C: Ceiling limit.
RF: Respirable fraction of dust.
S: Skin.
TD: Total dust.

MATERIAL-SPECIFIC NOTES
Be1: Ceiling: 0.005 mg/m^3, 30-minute STEL: 0.025 mg/m^3.
Be2: Ceiling: 0.025 mg/m^3, 30-minute STEL: 0.005 mg/m^3.
Ni1: Assumes compound is insoluble.
Pb1: See also 29 CFR 1910.1025.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT	3733°F(2056°C)	SPECIFIC GRAVITY (H_2O=1)	2.6-2.9
VAPOR PRESSURE (mm Hg)	NA	MELTING POINT	1050-1220°F(566-660°C)
VAPOR DENSITY (Air=1)	NA	EVAPORATION RATE (Butyl acetate=1)	NA
SOLUBILITY IN WATER (at 20°C)	Insoluble		
APPEARANCE AND ODOR	Silvery gray color, odorless solid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE LIMITS	LEL	UEL
NA	Nonflammable	NA	NA

EXTINGUISHING MEDIA
Aluminum alloys will not burn in the solid state. Like other metallic and organic dust and fine powder, aluminum alloy dust and powder may burn under some conditions. To extinguish, use Class D extinguishing agents (Lith X).

SPECIAL FIRE FIGHTING PROCEDURES
Confine metal powder or dust fire, avoid spreading. Apply Class D (Lit X) powder in heavy quantities. DO NOT USE WATER OR MOIST SAND. Fire fighters should wear self-contained breathing apparatus and protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Fire or explosion may occur when material is in the form of dust and exposed to heat or flames, chemical reaction, or contact with powerful oxidizers. In solid ingot form, there is no fire or explosion hazard. NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE.

SECTION V - REACTIVITY DATA

STABILITY	Stable at room temperature.
INCOMPATIBILITY (MATERIALS TO AVOID)	NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE. Reaction with mineral acids, water-soluble cutting oils, dilute hydrochloric acid, sulfuric acid, potassium hydroxide or sodium hydroxide may liberate hydrogen. Avoid contact with acids, bases and oxidizing agents. For additional information, consult Material Safety Data Sheets for component elements.
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS	Evolved hydrogen in confined areas may be an explosive hazard (see directly above). Potentially hazardous oxides of metals may be produced when aluminum alloys are heated, welded, or in molten state.
HAZARDOUS POLYMERIZATION	Will not occur.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY INHALATION? Yes SKIN? Yes INGESTION? No

HEALTH HAZARDS (ACUTE AND CHRONIC)

Aluminum and aluminum alloys are not generally regarded as industrial toxins. In normal use, few health hazards occur.

Inhalation

Cutting, melting or welding may produce dusts or fumes containing the component elements and their oxides. Breathing these dust or fumes may present potentially significant health hazards. These may include mucous membrane irritation and lung changes in workers, potentially leading to pulmonary diseases.

Inhalation of finely divided aluminum powder may cause pulmonary fibrosis (aluminosis). Symptoms include anorexia, shortness of breath, dry cough, chest pain on respiration and epigastric abdominal pain.

Fumes of copper, magnesium, manganese and zinc oxide may cause metal fume fever with flu-like symptoms. Overexposure to manganese fumes may cause chronic manganese poisoning. Early symptoms include headaches, apathy, sleepiness, and weakness or cramps in the legs. Chronic overexposure may affect the central nervous system, ultimately leading to emotional disturbances, gait and balance difficulties, and paralysis.

Overexposure to tin dusts may cause irritation of the skin and mucous membranes, and may result in a benign pneumoconiosis (stannosis).

Beryllium, chromium and nickel compounds have been associated with allergic reactions, rashes and lung changes. Beryllium and nickel are respiratory irritants and may cause pneumonitis. Chronic beryllium overexposure may cause lung diseases, characterized by shortness of breath, cough, and fatigue, and may ultimately lead to respiratory and cardiac failure.

Skin

Dusts or fumes containing component elements of aluminum alloys may cause skin or mouth irritation. Copper may cause skin and hair discoloration. Magnesium particles imbedded in the skin may cause sever lesions, with slow healing.

Eyes

Dusts or fumes containing component elements of aluminum alloys may cause eye irritation.

Ingestion

Ingestion of significant amounts of material is unlikely.

Unusual Chronic Toxicity

Beryllium, chromium, cobalt, lead and nickel have been identified as potential human carcinogens.

CARCINOGENICITY NTP? No IARC MONOGRAPHS? No OSHA REGULATED? No

SIGNS AND SYMPTOMS OF EXPOSURE

Irritation of skin and mucous membranes; cough; difficulty in breathing.

EMERGENCY AND FIRST AID PROCEDURES

Eyes	Flush with copious amount of water to remove particles. Contact a Physician.
Skin	Brush off excess dust. Wash area with plenty of soap and water. Skin cuts and abrasion can be treated with standard first aid. If material is molten, treat as a burn.
Inhalation	Remove to fresh air. Contact a Physician.
Ingestion	Ingestion of significant amounts of material is unlikely. If large quantities of material are ingested, contact a Physician.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	No special precautions are necessary for spills of bulk material. Wear gloves to prevent metal cuts. If quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentrations of airborne dust. Do not use compressed air for cleaning. Cleanup personnel should wear approved respirators and protective clothing. Place all collected metal or particulates in a labeled container. Molten metal spills can cause concrete to explode. Spilled molten metal can be reclaimed for reuse.
CERCLA Reportable Quantity (RQ)	(None)
WASTE DISPOSAL METHOD	In the United States, this product must be disposed of in accordance with applicable federal, state and local solid waste labeling, shipping and disposal laws and regulations.
RCRA Classification	(None)
RCRA Hazardous Waste Number	(None)
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Use good housekeeping practices to prevent accumulations of dust and keep airborne dust concentrations at a minimum. Avoid breathing dust or fumes. Store metal in a dry area away from incompatible materials. Keep dust away from sources of ignition. Preheat metal when required to evaporate surface moisture prior to melting. Ice, snow, grease, oil or moisture can cause explosions. Remove these contaminants before charging ingot to melting furnace.
OTHER PRECAUTIONS	Handling molten aluminum presents special hazards. Refer to Aluminum Association Publication 69, "Guidelines For Handling Molten Aluminum". For extensive information, write the Aluminum Association, 818 Connecticut Ave., N.W., Washington., DC 20006 for a copy of this publication.

SARA Title III Threshold Planning Quantity (TPQ) (None)

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION	Employees may wear NIOSH or MSHA approved respirators as specified by an Industrial Hygienist or qualified Safety Engineer for protection against airborne dusts or fumes.
VENTILATION	Local exhaust ventilation is required when dust or fumes are generated. Use general and local exhaust ventilation to keep airborne concentrations of dust or fume below the OSHA PEL and TWA shown in Section II.
PROTECTIVE GLOVES	Advisable to avoid cuts and skin abrasions. Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis.
EYE PROTECTION	Approved safety glasses or goggles should be worn when exposed to dusty or hot material. Face shields should be worn around hot metal. Safety eyewash stations should be provided near work areas.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT	Full protective clothing should be worn by workers exposed to heavy concentrations of dust or high heat and during alloying operations to prevent injury from molten metal splashing, spilling, etc.
WORK/HYGIENIC PRACTICES	Do not eat, drink or use tobacco products in work areas. Wash thoroughly after skin contact and before eating, drinking, use of tobacco products or using restrooms. Take a shower and change clothes at the end of the shift. All protective and contaminated clothing must be left at the plant. Launder all other work clothing separately from other household laundry. Pre-employment medical evaluations should be provided. Attention should be directed to skin, eyes, respiratory tract, blood, kidneys, pulmonary function and neurological health. Chest X-rays should be included if symptoms are present.

SECTION IX - SARA SECTION 313 SUPPLIER NOTIFICATION

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

CAS #	CHEMICAL NAME	PERCENT BY WEIGHT
7429-90-5	Aluminum (fume or dust only)	[a][b]
7440-41-7	Beryllium	[a]
7440-47-3	Chromium	[a]
7440-50-8	Copper	[a]
7439-92-1	Lead	[a]
7439-96-5	Manganese	[a]
7440-02-0	Nickel	[a]
7440-66-6	Zinc (fume or dust only)	[a][b]

[a] See Section II, Hazardous Ingredients/Identity Information, for percents by weight.
[b] Must be adjusted by the fraction of the material that exists as fume or dust.

This information must be included in all MSDSs that are copied and distributed for this material.

SECTION X - ADDITIONAL INFORMATION

This Material Safety Data Sheet should be made available by the buyer to each of the buyer's plant workers.

REFERENCES

U.S. Dept. of Labor, OSHA Regulations 29 CFR 1910.1000 through 29 CFR 1910.1200, January 19, 1989.

American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1989-1990, Cincinnati, 1989.

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Sax, N. Irving, Dangerous Properties of Industrial Materials, 5th edition, Van Nostrand, New York, 1979.

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Bretherton, Handbook or Reactive Chemical Hazards, Butterworths, 1979.

NOTICE

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Material Safety Data Sheet

("Essentially Similar" to Form OSHA 174)

Reynolds Metals Company

R-1087-19

09-5094/2

DATE PREPARED	REVISION DATE	MSDS #
3/13/91	6/29/94	5111

SECTION 1 - MATERIAL IDENTIFICATION

MANUFACTURER: Reynolds Metals Company
P. O. Box 27003
Richmond, Virginia 23261-7003

EMERGENCY TELEPHONE NUMBER:
(804) 281-2265

PRODUCT CLASS: Cast Aluminum Alloy
TRADE NAME: 3XX.X Series Alloys
(for alloy A357.0, A357.2, C357.0 C357.2, 358.0, 358.2, 364.0, 364.2 see MSDS #5273; for A356.2-type alloys see MSDS #5331)

MANUFACTURER'S CODE IDENTIFICATION
3XX.X Series; RA2; RA137; RA141; RA142; RA143; RA147; RA148; RA152; RA153; RA162; RA164; RA166; RA172; RA181; RA182; RA188; RA189; RA193; RA194; RA196; RA198; RA200; RA205; RA213; RA232; RA233; RA234

SECTION 2 - HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	Typical Percent	OSHA PEL Gas ppm	OSHA PEL Respirable Dust/Mist mg/m³	OSHA PEL Total Dust mg/m³	ACGIH TLV Gas ppm	ACGIH TLV Respirable Dust/Mist mg/m³	ACGIH TLV Total Dust mg/m³	CAS Numbers
Aluminum *	min 70.0		5	15		5	10	7429-90-5
Silicon	max 23.0		5	15			10	7440-21-3
Iron	max 2.0		10			5		7439-89-6
Copper *	max 6.0		0.1	1		0.2	1	7440-50-8
Magnesium	max 1.5		5	15		10		7439-95-4
Chromium *	max 0.5			1			0.5	7440-47-3
Nickel *	max 3.0			1			0.05	7440-02-0
Zinc *	max 4.5		5	15		5	10	7440-66-6

* On SARA Section 313 list.

SECTION 3 - PHYSICAL DATA OF MATERIAL

BOILING POINT: N/A
SPECIFIC GRAVITY: 2.5-2.9
VAPOR PRESSURE: N/A
VAPOR DENSITY: N/A
COEFFICIENT OF WATER/OIL DIST: N/A
ODOR THRESHOLD: N/A

FREEZING POINT: 502-642C
SOLUBILITY IN WATER: N/A
PHYSICAL STATE: Solid
pH: N/A
EVAPORATION RATE: N/A
APPEARANCE/ODOR: Odorless, silvery gray color

SECTION 4 - FIRE AND EXPLOSION HAZARD OF MATERIAL

FLAMMABILITY: YES? NO? X
FLASH POINT (Method Used): N/A

WHAT CONDITIONS? N/A
UEL: N/A
LEL: N/A

MEANS OF EXTINCTION:

This product is non-combustible in bulk form. For fires involving aluminum fines or chips, use dry sand or Class D extinguishing agents approved for this use. DO NOT USE water or other liquids, foam, or halogenated extinguishing agents.

SPECIAL PROCEDURES:

Suspended aluminum dust, allowed to accumulate in a confined area, may be explosive. If remelted, moisture present in cavities or on external surfaces may cause an explosion.

AUTO IGNITION TEMPERATURE: N/A
SENSITIVITY TO IMPACT: None known

HAZARDOUS COMBUSTION PRODUCTS: None known
SENSITIVITY TO STATIC DISCHARGE: None known

ND = NOT DETERMINED N/A = NOT APPLICABLE

SECTION 7 - PREVENTIVE MEASUR

PERSONAL PROTECTIVE EQUIPMENT:

GLOVES: As needed.

EYEWEAR: Safety glasses, goggles, face shield, or welding helmet, etc., as needed.

RESPIRATORY: Use NIOSH/MSHA-approved respirator for dusts/fume/mist, if TLVs or PELs are exceeded.

FOOTWEAR: Safety shoes, as needed.

CLOTHING:

Appropriate welding protective equipment. If remelted, see Aluminum Association publication "Guidelines for Handling Molten Aluminum", #69. The Aluminum Association, 900 19th St., N.W., Suite 300, Washington, D.C. 20006.

ENGINEERING CONTROLS:

If ventilation is used to convey aluminum dust, generated by grinding, sawing, etc., special ventilation procedures may be necessary to avoid explosion hazards. See National Fire Protection Association codes #65 and #651 (See address in Section 5).

LEAK AND SPILL PROCEDURE: If remelted, see Aluminum Association publication #69 listed above.

WASTE DISPOSAL:

For disposal of this material as a waste, act in accordance with all applicable federal, state, and local waste management regulations.

HANDLING PROCEDURES AND EQUIPMENT: See Aluminum Association publication #69 listed above.

STORAGE REQUIREMENTS: If remelted, make certain no water or moisture is present in cavities or on external surfaces.

SPECIAL SHIPPING INFORMATION: None known

SECTION 8 - FIRST AID MEASURES

SKIN: For minor burns, apply cold water. For severe burns, seek immediate medical attention.

EYE: Immediately flush with water for 15 minutes. Seek medical attention if irritation persists.

INHALATION: Remove to fresh air.

INGESTION: None necessary.

R-342-82(2)

Label No.
5111

CAST ALUMINUM PRODUCTS

3xx.x Series Alloys

WARNING: This product is not a physical or health hazard in bulk form. Welding or machining aluminum may generate dusts and fumes which may cause eye, nose, and throat irritation. Ozone may be emitted as a by-product during welding or plasma arc cutting. Prolonged exposure to ozone may result in nausea, headache, and lung damage. Suspended aluminum dust, allowed to accumulate in a confined area, may be explosive. Nickel and chromium are listed by the International Agency for Research on cancer and the National Toxicology Program as carcinogens.

Molten metal can explode — If remelted, make certain no water or moisture is present in cavities or on external surfaces.

For further information, refer to Reynolds Material Safety Data Sheet.

Ingredients	CAS Number
Aluminum	7429905
Silicon	7440213
Iron	7439896
Copper	7440508
Magnesium	7439954
Chromium	7440473
Nickel	7440020
Zinc	7440666

REYNOLDS METALS COMPANY
P. O. Box 27003
Richmond, Virginia 23261-7003

This label is required by the OSHA Hazard Communication Standard.

09-5094/2

Material Safety Data Sheet

Section 1. Chemical Product and Company Identification

Common Name	SYNTILO AL 20
Supplier	CASTROL INDUSTRIAL NORTH AMERICA INC. 1001 WEST 31ST STREET DOWNERS GROVE, IL 60515-1280
Synonym	Not available.
Trade name	Not available.
Material Uses	Not available.
Manufacturer	CASTROL INDUSTRIAL NORTH AMERICA INC 1001 WEST 31ST STREET DOWNERS GROVE, IL 60515-1280

Code	02112-BM
Validation Date	10/23/2001.
Print Date	10/23/2001.
Responsible Name	Product Stewardship

In Case of Emergency: CHEMTREC (800) 424-9300

Section 2. Composition, Information on Ingredients

Name	CAS #	% by Weight	Exposure Limits
1) ETHANOL, 2,2',2"-NITRILOTRIS-	102-71-6	5-10	ACGIH (United States, 1994). TWA: 5 mg/m³ TWA: 5 mg/m³ ACGIH TLV (United States, 2000). TWA: 5 mg/m³
2) CARBAMIC ACID, BUTYL-, 3-IODO-2-PROPYNYL ESTER	55406-53-6	0.1-1	Not available.

Section 3. Hazards Identification

Physical State and Appearance: Liquid. (Clear yellow fluid; amine odor)

Emergency Overview:

CAUTION!

MAY CAUSE EYE IRRITATION.

Avoid contact with eyes. Wash thoroughly after handling.

CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION. MISTS MAY CAUSE RESPIRATORY TRACT IRRITATION. AVOID CONTACT WITH EYES AND SKIN. AVOID BREATHING MISTS-IN ACCORDANCE WITH GOOD SAFETY AND INDUSTRIAL HYGIENE PRACTICES AIRBORNE EXPOSURE SHOULD BE CONTROLLED TO THE LOWEST EXTENT PRACTICABLE. WASH THOROUGHLY AFTER HANDLING. Typical recommended in use dilutions of this product (e.g. 10% or less) would warrant an NFPA health hazard rating of 1 under anticipated normal conditions of use. The ratings below pertain to the undiluted product concentrate.

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Potential Acute Health Effects

Eyes Moderately irritating to the eyes.

Ingestion Practically non-toxic if swallowed.

Concentrate will cause eye irritation. Oral LD50 not established. Do not ingest. TLV for product not established. Refer to hazardous ingredients list for any ingredient TLV's. Mists of the concentrate and dilutions may cause respiratory irritation. No acute effects expected. Concentrate may cause skin irritation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not known to be carcinogen.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.

Medical Conditions Aggravated by Overexposure: Repeated or prolonged exposure is not known to aggravate medical condition.

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SYNTILO AL 20

Overexposure /Signs/Symptoms	Not available.

See Toxicological Information (section 11)

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention. Finish by rinsing thoroughly with running water to avoid a possible infection.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Notes to Physician	Not available.

Section 5. Fire Fighting Measures

Flammability of the Product	May be combustible at high temperature.
Autoignition Temperature	The lowest known value is 373.9°C (705°F) (DIISOPROPANOLAMINE).
Flash Points	The lowest known value is CLOSED CUP: >109.9°C (229.8°F). (POLYETHYLENE GLYCOL MONOOLEYL ETHER)
Flammable Limits	Not available.
Products of Combustion	These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...).
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks and static discharge, of oxidizing materials. Slightly flammable to flammable in presence of reducing materials.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet. Carbon dioxide, dry chemical, foam. Wear self-contained breathing apparatus when fire fighting in a confined space. Cool fire exposed containers with waterspray to prevent rupture.
Protective Clothing (Fire)	Be sure to use an approved/certified respirator or equivalent.
Special Remarks on Fire Hazards	Formaldehyde. Upon combustion: oxides of carbon, nitrogen, and sulfur.
Special Remarks on Explosion Hazards	Not available.

Section 6. Accidental Release Measures

Small Spill and Leak	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.
Large Spill and Leak	Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Continued on Next Page

Section 7. Handling and Storage

Avoid contact with eyes. Wash thoroughly after handling.

Keep container tightly closed. Keep container in a cool, well-ventilated area.

Avoid contact with skin and eyes. Avoid breathing mists-in accordance with safety and industrial hygiene practices airborne exposures should be controlled to the lowest extent practicable. Do not take internally. Keep container closed when not in use. Bring product to room temperature before use. Do not store near heat, flame or strong oxidizing agents.

Section 8. Exposure Controls, Personal Protection

Engineering Controls Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the threshold limit value (TLV) or permissible exposure limit (PEL),if applicable. If any associated TLV or PEL is exceeded, provide NIOSH approved respiratory protection.

Personal Protection

Eyes Splash goggles.

Body Lab coat. Eyewash facility. Appropriate clothing to avoid skin contact.

Respiratory Wear appropriate respirator when ventilation is inadequate.

Hands Impervious gloves such as rubber should be used when handling this product.

Feet Not applicable.

Protective Clothing (Pictograms)

Personal Protection in Case of a Large Spill Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product Name	Exposure Limits
1) ETHANOL, 2,2',2"-NITRILOTRIS-	ACGIH (United States, 1994). TWA: 5 mg/m³ TWA: 5 mg/m³ ACGIH TLV (United States, 2000). TWA: 5 mg/m³
2) CARBAMIC ACID, BUTYL-, 3-IODO-2-PROPYNYL ESTER	Not available.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid. (Clear yellow fluid; amine odor)
Boiling/Condensation Point	The lowest known value is 99.9°C (211.8°F) (WATER). Weighted average: 138.84°C (281.6°F)
Melting/Freezing Point	0°C (32°F)
pH Concentrate	9.8 to 10 [Basic.]

Odor	Not available.
Taste	Not available.
Color	Not available.

Continued on Next Page

pH Dilution % and Value	9.2 - 9.6 5%
Critical Temperature	The lowest known value is 398.9°C (750°F) (DIISOPROPANOLAMINE).
Specific Gravity	0.982 to 1.002 (Water = 1)
Vapor Pressure	The highest known value is 0.001 kPa (0.01 mmHg) (at 20°C) (TRIETHANOLAMINE).
Vapor Density	The highest known value is 5.14 (Air = 1) (TRIETHANOLAMINE). Weighted average: 4.97 (Air = 1)
Volatility	42% (w/w).
Odor Threshold	Not available.
Evaporation Rate	The highest known value is 0.36 (WATER) Weighted average: 0.31compared to (n-BUTYL ACETATE=1)
VOC	130.61 (g/l). VOC Method Determinod
Viscosity	Not available.
Dispersion Properties	See solubility in water, methanol.
Solubility	Easily soluble in cold water, hot water. Soluble in methanol. Very slightly soluble in diethyl ether, n-octanol.
Physical Chemical Comments	Not available.

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	None known.
Incompatibility with Various Substances Strong oxidizing agents.	Reactive with oxidizing agents, acids. Slightly reactive to reactive with reducing agents, organic materials, metals.
Hazardous Decomposition Products	Not available.
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

Toxicity to Animals	Acute oral toxicity (LD50): 2150 mg/kg [Mouse]. (1-PROPANOL, 2-AMINO-2-METHYL-).
Chronic Effects on Humans	CARCINOGENIC EFFECTS: Not known to be carcinogen. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available.
Other Toxic Effects on Humans	Hazardous in case of eye contact (irritant), of ingestion. Slightly hazardous in case of skin contact (permeator), of inhalation.
Special Remarks on Toxicity to Animals	Not available.
Special Remarks	In case of contact, flush eyes with plenty of water. Get medical attention if irritation persists. Get medical attention immediately. If respiratory discomfort or irritation occurs, move the person to fresh air. See a doctor if discomfort or irritation continues. Wash skin with soap and water. If irritation occurs, get medical attention. Wash clothing before reuse.

Continued on Next Page

Special Remarks on Other Toxic Effects on Humans	Concentrate will cause eye irritation. Oral LD50 not established. Do not ingest. TLV for product not established. Refer to hazardous ingredients list for any ingredient TLV's. Mists of the concentrate and dilutions may cause respiratory irritation. No acute effects expected. Concentrate may cause skin irritation.

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD and COD	Not available.
Biodegradable/OECD	Not available.
Mobility	Not available.
Products of Degradation	These products are carbon oxides (CO, CO2) and water, nitrogen oxides (NO, NO2...).
Toxicity of the Products of Biodegradation	The products of degradation are more toxic than the product itself.
Special Remarks on the Products of Biodegradation	Not available.

Section 13. Disposal Considerations

Waste Information

Type: Non-hazardous chemical waste.
Location: not available
Classification: not available
Disposal.: Waste must be disposed of in accordance with federal, state and local environmental control regulations.
Storage: not available
Recycling: not available

Recover free liquid. Keep product out of streams and waterways by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses or extensive land areas. Dispose of in accordance with local, state and federal regulations. Disposal of this material to the land may be banned by federal law (40 CFR 268).

RCRA Waste Code(s)

Waste Stream: Not available.

Consult your local or regional authorities.

Section 14. Transport Information

DOT Classification	Not available.
	Not regulated.
Marine Pollutant	Not available.
Special Provisions for Transport	NOT REGULATED
ADR/RID Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

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Section 15. Regulatory Information

U.S. Federal Regulations

TSCA 8(a) PAIR: TRIETHANOLAMINE
TSCA 8(d) H and S data reporting: TRIETHANOLAMINE: 1989; 1H-BENZOTRIAZOLE: 1989
TSCA precursor chemical list: TRIETHANOLAMINE

SARA 302/304 emergency planning and notification: No products were found.

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: SYNTILO AL 20: Immediate health hazard.

Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean air act (CAA) 112 accidental release prevention: No products were found.
Clean air act (CAA) 112 regulated toxic substances: No products were found.
Clean air act (CAA) 112 regulated flammable substances: No products were found.

State Regulations

Pennsylvania RTK: TRIETHANOLAMINE (generic environmental hazard); DIISOPROPANOLAMINE (generic environmental hazard); 1-PROPANOL, 2-AMINO-2-METHYL- (generic environmental hazard)
Florida: TRIETHANOLAMINE
Minnesota: TRIETHANOLAMINE
Massachusetts RTK: TRIETHANOLAMINE; DIISOPROPANOLAMINE; 1-PROPANOL, 2-AMINO-2-METHYL-
California prop. 65: No products were found.

Inventory Lists

TSCA 8(b) inventory: All components of this product are listed on (or meet the exemption requirements of) the applicable inventory list.

CEPA DSL: One or more of the materials contained in this product may not appear on the applicable inventory list. Please consult the manufacturer for additional information.

Australia (NICNAS): All components of this product are listed on (or meet the exemption requirements of) the applicable inventory list.

Korea (TCCL): One or more of the materials contained in this product may not appear on the applicable inventory list. Please consult the manufacturer for additional information.

Philippines (RA6969): One or more of the materials contained in this product may not appear on the applicable inventory list. Please consult the manufacturer for additional information.

MITI: One or more of the materials contained in this product may not appear on the applicable inventory list. Please consult the manufacturer for additional information.

EINECS: One or more of the materials contained in this product may not appear on the applicable inventory list. Please consult the manufacturer for additional information.

Section 16. Other Information

Label Requirements MAY CAUSE EYE IRRITATION.

Hazardous Material Information System (U.S.A.)

Health	2
Fire Hazard	1
Reactivity	0
Personal Protection	J

National Fire Protection Association (U.S.A.)

References Not available.

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SYNTILO AL 20

Other Special Considerations	Alkanolamine This product contains an alkanolamine. In all metalworking fluids containing amines, there is a potential for forming nitrosamines which are animal carcinogens. Therefore, no nitrites or related nitrosating agents should be added to such compositions. This product contains a preservative which may release trace amounts of formaldehyde during use. Employers are required under 29 CFR 1910.1048, Formaldehyde, to determine if formaldehyde levels exceed 0.1 ppm in the work place. Employers may be required to provide employee information and training regarding hazards of formaldehyde unless the employer can show, using objective data, that employees aren't exposed to formaldehyde at or >0.1 ppm. Employers should consult the Formaldehyde Standard for information. No component known to be present in this product at >0.1% is presently listed as a carcinogen by IARC, NTP or OSHA.

Validated by Larry J. Barder-CINA on 10/23/2001.	**Printed 10/23/2001.**

CHEMTREC (800) 424-9300