

# Material Safety Data Sheet

Material Name: ASR

## \*\*\* Section 1 - Chemical Product and Company Identification \*\*\*

**Chemical Name:** Composite material.

**Product Use:** Star Process, recycling through mechanical separation.

**Synonyms:** Shredder Residue (SR); Automobile Shredder Residue (ASR); Shredder Heavy Fraction; Dense Media Feedstock; Aluminum Breakage; Aluminum Sweeps; "Rock and Wire"

**Manufacturer Information**

Gerdau Long Steel North America  
4221 West Boy Scout Blvd.  
Suite 600  
Tampa, FL 33607

Phone: (800) 876-3626

Emergency # 800-424-9300 CHEMTREC

## \*\*\* Section 2 - Hazards Identification \*\*\*

**Emergency Overview**

This is generally a non-combustible, non-reactive solid material. Certain residues, coating, and hydrocarbon components may render this mixture combustible. Processing of the product for some final uses can include formation of dusts, particulates or fumes which may present certain health hazards. Generation of large quantities of airborne dusts and particulates may produce a fire hazard. Molten metal may react violently with water. Exposure to powder or dusts may be irritating to eyes and skin.

**Potential Health Effects: Eyes**

Dust or powder may cause irritation and/or inflammation to the eye tissue. Rubbing may cause abrasion of cornea.

**Potential Health Effects: Skin**

Product may contain levels of components that may cause allergic skin reactions. Dust or powder may irritate the skin. This product may produce skin abrasions, lesions, or cuts.

**Potential Health Effects: Ingestion**

Ingestion of this product is unlikely; however if ingested may cause gastrointestinal disturbances, abdominal pain, fever, vomiting, and diarrhea. Ingestion of large amounts of product may produce more serious toxicities including: shock, metabolic acidosis, decreased white blood cell count, neurological damage, cardiovascular shock, anemia, liver damage, renal failure, lethargy and coma.

**Potential Health Effects: Inhalation**

Product may contain levels of components that may cause allergic respiratory sensitization and cancer. Normal use of this product should not generate fumes. Dusts, vapors, and fumes generated during processing may irritate the respiratory system. Severe acute overexposure or chronic overexposure to dusts or processing fumes may produce more serious toxicities including: siderosis, lung damage, weakness, anorexia, impairment of sleep and vision, personality changes, blood formation effects, nervous and circulatory system damage, kidney damage, and may pose a reproductive hazard.

**HMIS Ratings: Health: 1 Fire: 0 HMIS Reactivity 0**

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe \* = Chronic hazard

## \*\*\* Section 3 - Composition / Information on Ingredients \*\*\*

CAS #	Component	Percent
7429-90-5	Aluminum	0-100
7440-44-0	Carbon	0-90
7440-66-6	Zinc	0-50
7440-50-8	Copper	0-50
7440-70-2	Calcium	0-40
7440-21-3	Silicon	0-20
7439-89-6	Iron	0-20
7440-47-3	Chromium	0-5
7439-92-1	Lead	0-5

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

1314-13-2	Zinc oxide	<1
7439-96-5	Manganese	<1
7440-02-0	Nickel	0-2
7440-31-5	Tin	0-1
7440-43-9	Cadmium	<0.1
7440-38-2	Arsenic	<0.1
7440-42-8	Boron	<0.1
7440-32-6	Titanium	<0.1
7440-48-4	Cobalt	<0.1
7440-62-2	Vanadium	<0.1
7440-67-7	Zirconium	<0.1
7439-98-7	Molybdenum	0-0.2
7440-03-1	Niobium	<0.1

## \*\*\* Section 4 - First Aid Measures \*\*\*

### First Aid: Eyes

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of mechanical abrasions and cuts, seek medical attention.

### First Aid: Skin

For skin contact, wash immediately with soap and water. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

### First Aid: Ingestion

Seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

### First Aid: Inhalation

Remove the affected person to fresh air. If the affected person is not breathing, apply artificial respiration. Seek medical attention immediately.

## \*\*\* Section 5 - Fire Fighting Measures \*\*\*

### General Fire Hazards

See Section 9 for Flammability Properties.

Dust accumulation from this product may present an explosion hazard in the presence of an ignition source.

Coatings and oil residue on the product may enhance flammability. Keep product damp to minimize fire hazards.

Avoid welding near product.

### Hazardous Combustion Products

Fire or thermal processing may release products of hydrocarbon decomposition and metal fumes.

### Extinguishing Media

Dry chemical, soda ash, sand. Molten metal may react violently with water.

### Fire Fighting Equipment/Instructions

Fire fighters should wear full-face, self contained breathing apparatus and impervious protective clothing. Fire fighters should avoid inhaling any combustion products.

**NFPA Ratings: Health: 1 Fire: 0 Reactivity: 0**

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

## \*\*\* Section 6 - Accidental Release Measures \*\*\*

### Containment Procedures

If the product is regulated as a PCB Bulk Product Waste, it must be completely contained on-site. If significant concentrations of dusts or particulates are generated, eliminate sources of ignition.

### Clean-Up Procedures

If the product is regulated as a PCB Bulk Product Waste, it must be completely contained and collected in appropriate containers, or returned to product storage.

### Evacuation Procedures

None necessary.

### Special Procedures

This material may be regulated as a PCB Bulk Product Waste.

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

## \*\*\* Section 7 - Handling and Storage \*\*\*

### Handling Procedures

Avoid inhaling dusts or vapors produced during thermal processing. Avoid eye and excessive skin contact. Use only with adequate ventilation. As with all chemicals, good industrial hygiene practices should be followed when handling this material. Special care must be taken to avoid buildup of dusts.

### Storage Procedures

Keep this material in a well-ventilated area. Keep this material slightly damp to avoid fire hazards.

## \*\*\* Section 8 - Exposure Controls / Personal Protection \*\*\*

### A: Component Exposure Limits

#### Aluminum (7429-90-5)

ACGIH: 1 mg/m<sup>3</sup> TWA (respirable fraction)  
OSHA: 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)  
NIOSH: 10 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable dust)

#### Copper (7440-50-8)

ACGIH: 0.2 mg/m<sup>3</sup> TWA (fume); 1 mg/m<sup>3</sup> TWA (dust and mist, as Cu)  
OSHA: 0.1 mg/m<sup>3</sup> TWA (dust, fume, mists, as Cu)  
NIOSH: 1 mg/m<sup>3</sup> TWA (dust and mist)

#### Silicon (7440-21-3)

OSHA: 10 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)  
NIOSH: 10 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable dust)

#### Chromium (7440-47-3)

ACGIH: 0.5 mg/m<sup>3</sup> TWA  
OSHA: 1 mg/m<sup>3</sup> TWA  
NIOSH: 0.5 mg/m<sup>3</sup> TWA

#### Lead (7439-92-1)

ACGIH: 0.05 mg/m<sup>3</sup> TWA  
OSHA: 50 µg/m<sup>3</sup> TWA (as Pb); 30 µg/m<sup>3</sup> Action Level (as Pb, Poison - see 29 CFR 1910.1025)  
NIOSH: 0.050 mg/m<sup>3</sup> TWA

#### Zinc oxide (1314-13-2)

ACGIH: 2 mg/m<sup>3</sup> TWA (respirable fraction)  
10 mg/m<sup>3</sup> STEL (respirable fraction)  
OSHA: 5 mg/m<sup>3</sup> TWA (fume); 10 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)  
10 mg/m<sup>3</sup> STEL (fume)  
NIOSH: 5 mg/m<sup>3</sup> TWA (dust and fume)  
10 mg/m<sup>3</sup> STEL (fume)  
15 mg/m<sup>3</sup> Ceiling (dust)

#### Manganese (7439-96-5)

ACGIH: 0.2 mg/m<sup>3</sup> TWA  
OSHA: 1 mg/m<sup>3</sup> TWA (fume)  
3 mg/m<sup>3</sup> STEL (fume)  
5 mg/m<sup>3</sup> Ceiling  
NIOSH: 1 mg/m<sup>3</sup> TWA (fume)  
3 mg/m<sup>3</sup> STEL

#### Nickel (7440-02-0)

ACGIH: 1.5 mg/m<sup>3</sup> TWA (inhalable fraction)  
OSHA: 1 mg/m<sup>3</sup> TWA  
NIOSH: 0.015 mg/m<sup>3</sup> TWA

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

## Tin (7440-31-5)

ACGIH: 2 mg/m3 TWA  
OSHA: 2 mg/m3 TWA  
NIOSH: 2 mg/m3 TWA

## Cadmium (7440-43-9)

ACGIH: 0.01 mg/m3 TWA; 0.002 mg/m3 TWA (respirable fraction)  
OSHA: 2.5 µg/m3 Action Level; 5 µg/m3 TWA (Do not eat, drink or chew tobacco or gum or apply cosmetics in regulated areas. Carcinogen - dust can cause lung and kidney disease. see 29 CFR 1910.1027)

## Molybdenum (7439-98-7)

ACGIH: 10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)  
OSHA: 10 mg/m3 TWA

## Cobalt (7440-48-4)

ACGIH: 0.02 mg/m3 TWA  
OSHA: 0.05 mg/m3 TWA (dust and fume)  
NIOSH: 0.05 mg/m3 TWA (dust and fume)

## Vanadium (7440-62-2)

OSHA: 0.05 mg/m3 TWA (respirable dust, as V2O5); 0.05 mg/m3 TWA (fume, as V2O5)  
NIOSH: 1 mg/m3 TWA (dust, listed under Ferrovandium dust)  
3 mg/m3 STEL (dust, listed under Ferrovandium dust)

## Arsenic (7440-38-2)

ACGIH: 0.01 mg/m3 TWA  
OSHA: 0.5 mg/m3 TWA  
NIOSH: 0.002 mg/m3 Ceiling (15 min)

## Zirconium (7440-67-7)

ACGIH: 5 mg/m3 TWA  
10 mg/m3 STEL  
OSHA: 5 mg/m3 TWA  
10 mg/m3 STEL  
NIOSH: 5 mg/m3 TWA  
10 mg/m3 STEL

## Engineering Controls

Ventilation should be sufficient to effectively remove and prevent buildup of any dusts or fumes that may be generated during handling or thermal processing.

## PERSONAL PROTECTIVE EQUIPMENT

### Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields.

### Personal Protective Equipment: Skin

Use impervious gloves.

### Personal Protective Equipment: Respiratory

When dusts or thermal processing fumes are generated and ventilation is not sufficient to effectively remove them, appropriate NIOSH/MSHA approved respiratory protection must be provided.

### Personal Protective Equipment: General

Use good industrial hygiene practices in handling this material.

\*\*\* Section 9 - Physical & Chemical Properties \*\*\*

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

<b>Appearance:</b>	Depends on scrap composition.	<b>Odor:</b>	NA
<b>Physical State:</b>	Solid	<b>pH:</b>	NA
<b>Vapor Pressure:</b>	NA	<b>Vapor Density:</b>	NA
<b>Boiling Point:</b>	NA	<b>Melting Point:</b>	NA
<b>Solubility (H2O):</b>	Insoluble	<b>Specific Gravity:</b>	NA
<b>Evaporation Rate:</b>	NA	<b>VOC:</b>	NA
<b>Octanol/H2O Coeff.:</b>		<b>Flash Point:</b>	NA
<b>Flash Point Method:</b>	NA	<b>Upper Flammability Limit (UFL):</b>	NA
<b>Lower Flammability Limit (LFL):</b>	NA	<b>Burning Rate:</b>	NA
<b>Auto Ignition:</b>	NA		

## \*\*\* Section 10 - Chemical Stability & Reactivity Information \*\*\*

### Chemical Stability

This is a stable material.

### Chemical Stability: Conditions to Avoid

In case of fire, molten metal may react violently with water.

### Incompatibility

None under normal use.

### Hazardous Decomposition

Decomposition of this product may yield metallic oxides.

### Possibility of Hazardous Reactions

Will not occur.

## \*\*\* Section 11 - Toxicological Information \*\*\*

### Acute Dose Effects

#### A: General Product Information

Operations or fire which supply sufficient energy to the product (i.e. welding, high speed grinding or melting) can release dust or fumes which may make components of the product biologically available. Exposure to dusts or fumes from some metals including iron, zinc, manganese, chromium, cobalt and copper can produce a condition known as metal fume fever. Iron dust can irritate the eyes and respiratory tract by mechanical action. Acute iron poisoning may involve hemorrhagic vomiting and diarrhea, abdominal pain, acidosis, coagulaopathy, shock, coma and convulsions followed by hepatic and renal failure and perhaps cardiovascular collapse. Chronic inhalation of iron has resulted in mottling of the lungs, a condition referred to as siderosis. Zinc poisoning can cause anemia, lethargy and dizziness. Early signs of manganese poisoning are sluggishness, loss of appetite, sleepiness, weakness in the legs, uncontrollable laughter, hallucinations, delusions, spastic or slow gait, speech impairment, aggressiveness, tremor, mask-like faces, and clumsy movements. May also result in CNS effects, anemia and lung damage.

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

Aluminum soluble compounds, when ingested or inhaled, may have neurotoxic effects evidently due to the metal binding to nervous tissue. Chronic overexposure to aluminum can result in lung damage and has been associated with asthma-like syndrome. Accumulation of aluminum in the body may result in neurological damage, anemia and bone softening. With acute exposure, arsenic can cause damage to mucous membranes and skin, and is a severe eye and respiratory tract irritant. Arsenic can also cause severe gastrointestinal damage, muscle cramps, cardiac abnormalities, anemia, decreased white blood cell count, and enlargement of the liver. Ingestion of boron in humans can cause gastrointestinal effects. There are also reports of effects of boron on the liver and kidney. Systemic effects from ingestion of nickel include capillary damage, kidney damage, myocardial weakness and central nervous system depression. Allergic skin sensitization reactions are the most frequent effect of exposure to nickel compounds. Exposure to nickel compounds may also result in allergic lung sensitization. Exposure to copper fume or dust can cause respiratory tract irritation, hemolytic anemia and allergic contact dermatitis. Lead has been found to have toxic effects on both the central and peripheral nervous systems. Acute exposure to lead may cause acute encephalopathy which is accompanied by the symptoms of ataxis, coma, and convulsions. As toxicity progresses, symptoms of peripheral neuropathy can develop, as well as some cases of irreversible kidney damage. Effects of overexposure to cobalt include lung effects (irritation, fibrosis, asthma, pneumoconiosis), goiter and cardiovascular effects (cardiomyopathy), and allergic skin and lung sensitization reactions. Dusts and fumes from this product may cause cancer, reproductive and/or birth defects. Cadmium is a cancer suspect agent. May cause lung, kidney and liver damage. Causes digestive and respiratory tract irritation. May cause reproductive and fetal effect.

## B: Component Analysis - LD50/LC50

### Carbon (7440-44-0)

Oral LD50 Rat: >10000 mg/kg

### Iron (7439-89-6)

Oral LD50 Rat: 984 mg/kg

### Silicon (7440-21-3)

Oral LD50 Rat: 3160 mg/kg

### Zinc oxide (1314-13-2)

Oral LD50 Rat: >5000 mg/kg

### Manganese (7439-96-5)

Oral LD50 Rat: 9 g/kg

### Nickel (7440-02-0)

Oral LD50 Rat: >9000 mg/kg

### Cadmium (7440-43-9)

Oral LD50 Rat: 2330 mg/kg; Inhalation LC50 Rabbit:8 mg/L/4H

### Cobalt (7440-48-4)

Inhalation LC50 Rat: >10 mg/L/1H; Oral LD50 Rat:6170 mg/kg

### Arsenic (7440-38-2)

Oral LD50 Rat: 763 mg/kg

### Boron (7440-42-8)

Oral LD50 Rat: 650 mg/kg

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

## Carcinogenicity

### A: General Product Information

Although some lead salts have produced tumors in animals, the evidence is insufficient to determine the carcinogenicity of lead in humans. Inorganic arsenic can produce lung, skin and lymphatic cancer with long term occupational exposure above the established limits. A significant excess of lung cancer mortality was seen in a study of hard metal workers with at least one year of cobalt exposure. The carcinogenic effect of nickel has been well documented in occupationally exposed nickel refinery workers. Lung and nasal cancers were the predominant forms of cancer in the exposed workers. Studies indicate workers exposed to cadmium have an increased rate of prostate and respiratory tract cancer.

### B: Component Carcinogenicity

#### Aluminum (7429-90-5)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

#### Chromium (7440-47-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 49 [1990] (listed under Chromium and Chromium compounds), Supplement 7 [1987] (Group 3 (not classifiable))

#### Lead (7439-92-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

OSHA: 50 µg/m<sup>3</sup> TWA (as Pb); 30 µg/m<sup>3</sup> Action Level (as Pb, Poison - see 29 CFR 1910.1025)

NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)

IARC: Monograph 87 [2006] evaluates inorganic lead compounds as Group 2A and organic lead compounds as Group 3. (Group 2A (probably carcinogenic to humans))

#### Nickel (7440-02-0)

ACGIH: A5 - Not Suspected as a Human Carcinogen

NIOSH: potential occupational carcinogen

NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)

IARC: Monograph 49 [1990], Supplement 7 [1987] (Group 2B (possibly carcinogenic to humans))

#### Cadmium (7440-43-9)

ACGIH: A2 - Suspected Human Carcinogen

OSHA: 2.5 µg/m<sup>3</sup> Action Level; 5 µg/m<sup>3</sup> TWA (Do not eat, drink or chew tobacco or gum or apply cosmetics in regulated areas. Carcinogen - dust can cause lung and kidney disease. see 29 CFR 1910.1027)

NIOSH: potential occupational carcinogen

NTP: Known Human Carcinogen (Select Carcinogen)

IARC: Monograph 58 [1993], Supplement 7 [1987] (Group 1 (carcinogenic to humans))

#### Cobalt (7440-48-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 86 [2006] (without tungsten carbide), Monograph 52 [1991] (Group 2B (possibly carcinogenic to humans))

#### Arsenic (7440-38-2)

ACGIH: A1 - Confirmed Human Carcinogen

NIOSH: potential occupational carcinogen

IARC: Monograph 84 [2004] (in drinking water), Supplement 7 [1987], Monograph 23 [1980] (Group 1 (carcinogenic to humans))

#### Zirconium (7440-67-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

## Mutagenicity

Aluminum and cobalt have been shown to increase the number of sister chromatid exchanges. Nickel inhibited DNA repair and induced transformation in experimental assays.

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

## Teratogenicity

Manganese and aluminum have been shown to have teratogenic effects. Manganese, copper and nickel have been reported to have adverse reproductive effects in experimental animals. Copper and nickel have been shown to be fetotoxic in experimental animals. Excessive zinc levels have been reported to be associated with increased risk for neural tube defects. Lead has a wide variety of reproductive effects in humans. It can affect the male and female reproductive organs as well as egg and sperm production and development. Lead can also cause neurodevelopmental debilitations in children from both prenatal and postnatal exposures.

## Neurological Effects

Chronic overexposure to manganese compounds may result in CNS effects such as weakness, sleepiness, emotional instability and spastic gait. These effects can be permanent. Symptoms of lead toxicity include behavioral disturbances including irritability, restlessness, insomnia, and other sleep disturbances, fatigue, vertigo, headache, poor memory, tremor, depression, and apathy. In acute lead encephalopathy, neurological damage can be permanent. Inhalation of fine aluminum particles has produced progressive encephalopathy, followed by dementia and convulsions.

## Other Toxicological Information

Under normal conditions of handling, the likelihood of inhaling or ingesting amounts necessary for these effects to occur is very small.

## \* \* \* Section 12 - Ecological Information \* \* \*

## Ecotoxicity

### A: General Product Information

No information available for the product.

### B: Component Analysis - Ecotoxicity - Aquatic Toxicity

#### Copper (7440-50-8)

##### Test & Species

	Conditions
96 Hr LC50 Pimephales promelas	23 µg/L
96 Hr LC50 Oncorhynchus mykiss	13.8 µg/L
96 Hr LC50 Lepomis macrochirus	236 µg/L
72 Hr EC50 Scenedesmus subspicatus	120 µg/L
96 Hr EC50 water flea	10 µg/L
96 Hr EC50 water flea	200 µg/L

#### Zinc (7440-66-6)

##### Test & Species

	Conditions
96 Hr LC50 Pimephales promelas	6.4 mg/L
96 Hr EC50 Selenastrum capricornutum	30 µg/L
72 Hr EC50 water flea	5 µg/L

#### Iron (7439-89-6)

##### Test & Species

	Conditions
96 Hr LC50 Morone saxatilis	13.6 mg/L [static]

#### Lead (7439-92-1)

##### Test & Species

	Conditions
96 Hr LC50 Pimephales promelas	6.5 mg/L
48 Hr EC50 water flea	600 µg/L

#### Nickel (7440-02-0)

##### Test & Species

	Conditions
96 Hr LC50 Oncorhynchus mykiss	31.7 mg/L
96 Hr LC50 Pimephales promelas	3.1 mg/L
96 Hr LC50 Brachydanio rerio	>100 mg/L



# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

72 Hr EC50 freshwater algae (4 species)	0.1 mg/L
72 Hr EC50 Selenastrum capricornutum	0.18 mg/L
96 Hr EC50 water flea	510 µg/L

## Cadmium (7440-43-9)

### Test & Species

96 Hr LC50 Oncorhynchus mykiss	0.0013 mg/L
96 Hr EC50 water flea	9.9 µg/L

### Conditions

swimup

## Cobalt (7440-48-4)

### Test & Species

96 Hr LC50 Brachydanio rerio	>100 mg/L [static]
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### Conditions

## \*\*\* Section 13 - Disposal Considerations \*\*\*

### US EPA Waste Number & Descriptions

#### Component Waste Numbers

##### Chromium (7440-47-3)

RCRA: 5.0 mg/L regulatory level

##### Lead (7439-92-1)

RCRA: 5.0 mg/L regulatory level

##### Cadmium (7440-43-9)

RCRA: 1.0 mg/L regulatory level

##### Arsenic (7440-38-2)

RCRA: 5.0 mg/L regulatory level

#### Disposal Instructions

Byproducts and residues from this product may be reprocessed or recycled. Whatever cannot be recycled should be managed in an appropriate and approved waste disposal facility. Dispose in accordance to local, state, and federal regulations.

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

## \*\*\* Section 14 - Transportation Information \*\*\*

#### US DOT Information

Shipping Name: Not Regulated

#### TDG Information

Shipping Name: Not Regulated

## \*\*\* Section 15 - Regulatory Information \*\*\*

#### US Federal Regulations

#### A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

##### Aluminum (7429-90-5)

SARA 313: 1.0 % de minimis concentration (dust or fume only)

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

## Copper (7440-50-8)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

## Zinc (7440-66-6)

SARA 313: 1.0 % de minimis concentration (dust or fume only)

CERCLA: 1000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is larger than 100 micrometers)

## Chromium (7440-47-3)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

## Lead (7439-92-1)

SARA 313: 0.1 % Supplier notification limit; 0.1 % de minimis concentration (when contained in stainless steel, brass, or bronze)

CERCLA: 10 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 4.54 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

## Nickel (7440-02-0)

SARA 313: 0.1 % de minimis concentration

CERCLA: 100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

## Cadmium (7440-43-9)

CERCLA: 10 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 4.54 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

## Arsenic (7440-38-2)

CERCLA: 1 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 0.454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal release is larger than 100 micrometers)

# Material Safety Data Sheet

**Material Name: ASR**

**ID: GER-11**

**B: Component Marine Pollutants**

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Copper	7440-50-8	DOT regulated severe marine pollutant

**State Regulations**

**A: General Product Information**

Other state regulations may apply. Check individual state requirements.

**B: Component Analysis - State**

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	Yes	Yes
Carbon	7440-44-0	No	No	No	No	No	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes
Zinc	7440-66-6	Yes	Yes	No	Yes	Yes	Yes
Calcium	7440-70-2	Yes	Yes	No	Yes	Yes	Yes
Iron	7439-89-6	Yes	No	No	No	No	No
Silicon	7440-21-3	No	Yes	Yes	Yes	Yes	Yes
Chromium	7440-47-3	Yes	Yes	Yes	Yes	Yes	Yes
Lead	7439-92-1	Yes	Yes	Yes	Yes	Yes	Yes
Zinc oxide	1314-13-2	Yes	Yes	Yes	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes	Yes	Yes	Yes
Nickel	7440-02-0	Yes	Yes	Yes	Yes	Yes	Yes
Tin	7440-31-5	Yes	Yes	Yes	Yes	Yes	Yes
Cadmium	7440-43-9	Yes	Yes	Yes	Yes	Yes	Yes
Molybdenum	7439-98-7	Yes	Yes	Yes	Yes	Yes	Yes
Cobalt	7440-48-4	Yes	Yes	Yes	Yes	Yes	Yes
Titanium	7440-32-6	Yes	No	No	Yes	No	No
Vanadium	7440-62-2	Yes	Yes	No	Yes	Yes	No
Arsenic	7440-38-2	Yes	Yes	Yes	Yes	Yes	Yes
Zirconium	7440-67-7	Yes	Yes	No	Yes	Yes	Yes
Boron	7440-42-8	No	No	No	Yes	No	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.  
 WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

# Material Safety Data Sheet

Material Name: ASR

ID: GER-11

## Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Aluminum	7429-90-5	1 %
Copper	7440-50-8	1 %
Chromium	7440-47-3	0.1 %
Lead	7439-92-1	0.1 %
Nickel	7440-02-0	0.1 %

## Additional Regulatory Information

### A: General Product Information

No information available for the product.

### B: Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Aluminum	7429-90-5	Yes	DSL	EINECS
Carbon	7440-44-0	Yes	DSL	EINECS
Copper	7440-50-8	Yes	DSL	EINECS
Zinc	7440-66-6	Yes	DSL	EINECS
Calcium	7440-70-2	Yes	DSL	EINECS
Iron	7439-89-6	Yes	DSL	EINECS
Silicon	7440-21-3	Yes	DSL	EINECS
Chromium	7440-47-3	Yes	DSL	EINECS
Lead	7439-92-1	Yes	DSL	EINECS
Zinc oxide	1314-13-2	Yes	DSL	EINECS
Manganese	7439-96-5	Yes	DSL	EINECS
Nickel	7440-02-0	Yes	DSL	EINECS
Tin	7440-31-5	Yes	DSL	EINECS
Cadmium	7440-43-9	Yes	DSL	EINECS
Molybdenum	7439-98-7	Yes	DSL	EINECS
Niobium	7440-03-1	Yes	DSL	EINECS
Cobalt	7440-48-4	Yes	DSL	EINECS
Titanium	7440-32-6	Yes	DSL	EINECS
Vanadium	7440-62-2	Yes	DSL	EINECS
Arsenic	7440-38-2	Yes	DSL	EINECS
Zirconium	7440-67-7	Yes	DSL	EINECS
Boron	7440-42-8	Yes	DSL	EINECS

## \*\*\* Section 16 - Other Information \*\*\*

### Other Information

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use.

### Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average