

MATERIAL SAFETY DATA SHEET

MSDS Number Monotube 1



GAS CHARGED SHOCK ABSORBER (MONOTUBE)

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

ThyssenKrupp Bilstein of America 8685 Berk Blvd. Hamilton, Ohio 45015 Contact: John McKinnie, 513.881.0984	EMERGENCY TELEPHONE NO.: 513-881-7600 Quality & Environmental Department
TRADE NAME: Gas Charged Shock Absorber (Monotube)	MSDS NUMBER / REVISION: (MSDS No. 1) / 2
This MSDS applies to all Monotube shock absorber part numbers	ORIGINAL ISSUE DATE: Issued: 11/12/02
CHEMICAL NAME: Gas Charged Shock Absorber SYNONYMS: Shock Absorber; Module	PREPARED BY: D.Suffel Revised by: John McKinnie

2. INGREDIENTS

Component	Formula	CAS #	Mass %	ACGIH (TLV) (mg/M ³)	OSHA (PEL) (mg/M ³)
Steel		Not Est.	80-85%	5 *	5 *
Hydraulic fluid Hydro treated light naphthenic distillate	TITAN SAF 4257 NA 50	64742-53-6	10-12%	5	5
Sintered iron	Fe	7439-89-6	3-3,5%	5	5
Synthetic material	-	Not Est.	0,3-0,35%	Not Est.	Not Est.
Aluminum	Al	7429-90-5	2-2,5%	total dust 10 fume 5	total 15 fume 5
Nitrile rubber	NBR	Not Est.	0,03-0,035%	Not Est.	Not Est.
Cured paint		Not Est.	0,15-0,2%	Not Est.	Not Est.
Chrome plating	Cr	7440-47-3	< 0,03%	0.5	1
Pressurized nitrogen gas	N ₂	7727-37-9	< 0,03%	Not Est.	Not Est.

* = Exposure limits are based on iron-containing welding fumes. with your local, state and federal regulator.

*** = SARA 313 reporting requirements will most likely be article exempted, but check

In its manufactured and shipped state, the product may be considered non-hazardous under normal and expected conditions of use. Cutting, grinding, or other abrasive work on the part may result in generation of dusts, fumes, and/or particulate matter that may be hazardous. The shock in this product also contains air or Nitrogen under pressures that can approach 14-18 bar (200-300 psig).

EMERGENCY OVERVIEW

In its manufactured and shipped state the product is considered non-hazardous. Pick up and place in appropriate containers for reuse or disposal. Severely damaged product may release hydraulic fluid. Wear appropriate personal protective equipment. Prevent any released hydraulic fluid from entering storm or sanitary sewers, ground water or soil by diking with sand, earth, or other non-reactive material. Absorb released material with a sorbent suitable for organic materials and place in appropriate containers for disposal. Wastes generated during cleanup operations should be evaluated to determine if they are hazardous wastes and disposed of in accordance with all local, state and federal regulations at a properly permitted facility. Releases may be reportable to local, state and/or federal authorities. Product involved in a fire situation may present a potential bursting hazard due to over-pressuring of the gas reservoir. Cool product in or near fires with a water spray or fog and keep all unnecessary individuals well clear of the area.

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3. POTENTIAL HEALTH EFFECTS:

In its manufactured and shipped state and under normal and expected conditions of use, the product is not expected to cause any acute or chronic health effects. The health effects listed below are for hydraulic fluid and dusts, fumes, and particulate matter that may be generated if product is subjected to cutting, grinding, sanding or other abrasive work practices.

- Eye: Hydraulic fluid may cause irritation. Dusts, fumes, and mists that may be generated by mechanical abrasion or other work practices may cause irritation.
- Skin Contact: Hydraulic fluid may cause irritation on prolonged contact. Dusts, fumes, and mists that may be generated by mechanical abrasion or other work practices may cause irritation.
- Skin Absorption: This is not expected to be an entry route into body.
- Ingestion: This is not expected to be a major route into body. Ingestion of large quantities of hydraulic fluid may cause digestive system distress and may have pronounced laxative effect.
- Inhalation: High concentration of airborne hydraulic fluid aerosols, mists, or vapors may cause irritation of mouth, throat, mucous membranes, and respiratory tract. High concentrations of metal or paint dusts, fumes or particulate matter may cause irritation of mouth, throat, mucous membranes, and respiratory tract.
- Chronic & Carcinogenic Affects: Prolonged skin contact with hydraulic fluid may cause a drying or chapping effect of the exposed area, normally the hands. This condition is known as dermatitis. Inhalation or ingestion of lead-containing materials may cause lead poisoning. Symptoms of lead poisoning may include gastrointestinal disturbances, anemia, muscle weakness, potential paralysis of the hands and feet, and central nervous system dysfunction. Lead is known to have adverse reproductive effects in males and females and may cross-placental barrier and affect fetus. It may possibly aggravate pre-existing skin, respiratory, central nervous system or kidney disorders.

4. FIRST AID MEASURES

- Inhalation: Remove exposed person to fresh air. If breathing is difficult, oxygen may be administered. If breathing has stopped, artificial respiration should be started immediately. Seek medical attention.
- Eyes: Flush with tepid water for at least 20 minutes holding eyelids wide open. Seek medical attention if irritation develops.
- Skin: Wash thoroughly with mild soap and water. Seek medical attention if irritation develops. Remove any contaminated clothing and launder thoroughly before reuse.
- Ingestion: This is not expected to be an important route of entry into body. If large amounts of hydraulic fluid are ingested, do not induce vomiting. Material may be aspirated into lungs and cause severe chemical pneumonitis. Seek medical attention immediately.

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5. FIRE FIGHTING MEASURES

FLASH POINT: >140°C (284°F) LEL: 0.6% UEL: 6.5%

AUTO IGN. TEMP: > 360°C (6804°F).

Use foam, dry chemical or carbon dioxide to extinguish fires involving hydraulic fluid. Water may be ineffective and cause fire to spread. Product in or near fires should be cooled with a water spray or fog to prevent over-pressuring and possible bursting or rupture of product. A self-contained breathing apparatus (SCBA), operating in positive pressure mode and full fire fighting protective clothing should be worn for combating fires.

6. ACCIDENTAL RELEASE MEASURES

Pick up units and return to original packing if reusable. If not reusable, place in DOT approved containers for disposal. Absorb any released hydraulic fluid with a sorbent designed for organic materials and place sorbent and absorbed materials in appropriate containers for disposal. Wastes generated during cleanup operations should be evaluated to determine if they are hazardous wastes and disposed of in accordance with all local, state and federal regulations at a properly permitted facility. Prevent hydraulic fluid from entering storm or sanitary sewers, ground water, or soil. Releases may be reportable to local, state and/or federal authorities. Keep unnecessary individuals out of the area. Wear appropriate personal protective equipment.

7. HANDLING AND STORAGE

Store intact units at ambient temperatures out of contact with the elements. Keep from contact with strong mineral acids and oxidizers. The metal body of product may react with strong acids to produce highly flammable hydrogen gas. Hydraulic fluid that has been removed from the shock body for subsequent disposal should be stored away from strong oxidizers, open flames, or other potential ignition sources.

8. EXPOSURE CONTROL - PERSONAL PROTECTION

ENGINEERING CONTROLS: These are not required under normal and expected conditions of use. If operations or work practices will generate hydraulic fluid aerosols, mists, or vapors or produce metal or paint dusts, fumes, or particulate matter, local exhaust ventilation should be provided to maintain exposures below limits cited in Section 2. Design details for local exhaust ventilation systems may be found in the latest edition of "Industrial Ventilation: A Manual of Recommended Practices": published by ACGIH Committee on Industrial Ventilation, P.O. Box 16153, Lansing, MI 48910. Need for local exhaust ventilation should be evaluated by a professional industrial hygienist. A professional engineer should design local exhaust ventilation systems.

RESPIRATORY: Respiratory controls are not required under normal and expected conditions of use. If operations or work practices may produce hydraulic fluid aerosols, mists, or vapors or metal or paint dusts, fumes, or particulate matter, and exposures may exceed the limits cited in Section 2 by less than a factor of ten, use as a minimum a NIOSH approved 1/2 face piece respirator equipped with cartridges approved for organic vapors and particulate matter with an exposure limit of not less than 0.05 mg/M³. If exposures exceed 10 times the recommended limits or 1,000 ppm, consult a professional industrial hygienist or your respiratory protective equipment supplier for selection of proper equipment. A professional industrial hygienist should evaluate and determine the need for respiratory protection.

EYE PROTECTION: Safety glasses with side shields are recommended.

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PROTECTIVE GLOVES: These are not required under normal and expected conditions of use. Nitrile gloves are recommended if it is necessary to handle hydraulic fluid.

GENERAL: All soiled or dirty clothing and personal protective equipment should be thoroughly cleaned before reuse. Wash hands and/or other body part frequently with fresh water and soap.

9. PHYSICAL AND CHEMICAL PROPERTIES

The following apply to the hydraulic fluid contained in product. Product itself is an elongated, painted, metallic shape with no odor and has a density of approximately 6.

APPEARANCE & PHYSICAL STATE:	Red liquid	MELTING POINT:	≈ -55°C (-67°F)
VAPOR DENSITY (AIR=1):	Not Applicable	OCTANOL/WATER PARTITION COEFFICIENT:	Not Determined
VAPOR PRESSURE @ 20°C (70°F):	<< 1 mm Hg	EVAPORATION RATE BuOAC = 1:	<< 1
ODOR:	Mineral Oil	SPECIFIC GRAVITY / BULK DENSITY @ 15°C (59°F):	SG = 0.84 - 0.87
% VOLATILE BY VOLUME:	Not Volatile	BOILING POINT:	> 300°C (572°F)
% SOLUBILITY (H₂ O):	Insoluble	pH:	Not Applicable
OTHER:	Not Applicable	VISCOSITY @ 40°C (104°F)	≈ 12.9 mm ² /s

10. STABILITY AND REACTIVITY

STABILITY & POLYMERIZATION: Product is stable. Hazardous polymerization will not occur.

INCOMPATIBILITY (CONDITIONS TO AVOID): Do not store product at temperatures above 50°C (122°F). Do not expose to strong acids or oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: When burned, hydraulic fluid may produce dense smoke, oxides of carbon, phosphorus and sulfur and low molecular weight organic species whose composition and toxicity have not been determined.

SPECIAL SENSITIVITY: None that are known.

11. TOXICOLOGICAL INFORMATION

Base oil contained in hydraulic fluid is hydro treated light naphthenic distillate (64742-53-6). This material has a low degree of acute toxicity (LD₅₀ Rat > 5000 mg/kg, (LD₅₀ Rabbit Skin > 3000 mg/kg), and has not been specifically listed as a carcinogen or potential carcinogen. Hydraulic fluid contains a proprietary additive package that contains small amounts of nitrogen, phosphorus and sulfur-containing materials. The manufacturer of hydraulic fluid does not indicate materials in additive package are highly toxic at concentrations present in hydraulic fluid.

12. ECOLOGICAL INFORMATION

Detailed studies have not been conducted concerning the environmental fate of the product. Hydraulic fluid may be toxic to aquatic and terrestrial flora and fauna.

13. DISPOSAL CONSIDERATIONS

Prior to disposal of metal shock body, gas pressure inside shock absorber body must be relieved and hydraulic fluid drained by a knowledgeable, qualified mechanic. Recycling of removed hydraulic fluid and metal

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shock body is recommended method of disposal. All wastes should be evaluated in conjunction with applicable solid and hazardous waste regulations and disposed of as appropriate. It is the user's responsibility to dispose of all wastes in accordance with all local, state and federal regulations at properly permitted or authorized facilities.

14. TRANSPORTATION INFORMATION

DOT CLASSIFICATION:

THIS PRODUCT IS NOT CONSIDERED HAZARDOUS [PER 49 CFR §173.306 (f) (4)] AND DOES NOT NEED TO BE CLASSIFIED FOR TRANSPORTATION BY SHIP, RAIL, TRUCK, OR AIR . The following classification is for reference purposes only.

UN 3164 Articles, Pressurized, Pneumatic; Class 2.2; Packing Authorization 208.

LABELS: No special labeling is required for transport by ship, rail, truck, or air.

RESTRICTION: No restrictions exist for passenger or cargo aircraft.

15. REGULATORY INFORMATION

OSHA Hazard Communication Classification: Intact Product: Non-Hazardous
Hydraulic Fluid: Irritant

SARA Title III Classification: Sudden Release of Pressure.

SARA 313 reporting requirements: Reporting will most likely be article exempted, but check with your local, state and federal regulator.

WHMIS Classification: Compressed Gas

16. OTHER INFORMATION

HMIS Classifications: Intact product: Health = 0, Fire = 0, Reactivity = 0
Hydraulic Fluid: Health = 1, Fire = 1, Reactivity = 0

All components of the product are included in the Toxic Substances Control Act (TSCA) inventory.

Revision	Date	Approved	Change
Release	11/12/02	D.Suffel	Initial release
Revised	4.29.11	J. McKinnie	Updated contact and part number information

NOTICE TO USERS:

ThyssenKrupp Bilstein requests product users study this material safety data sheet (MSDS) and become aware of product hazards and safety information. To promote safe product use, 1) notify employees, agents, and contractors of MSDS information and any product hazard and safety information, 2) furnish same information to all customers for this product and 3) request customers notify their employees and customers of product hazards and safety information.

Opinions expressed herein are those of qualified experts within ThyssenKrupp Bilstein. We believe information contained herein is current as of the date of this MSDS. Since product use is not within control of ThyssenKrupp Bilstein, it is user's obligation to determine conditions of safe product use.