



Material Safety Data Sheet  
PTFE Filled Spiral Wound Gasket  
Revised September 16<sup>th</sup>, 2004

*Targeted Organs:* Lungs, skin, eyes, and gastrointestinal tract.

*Carcinogenic:* This product contains nickel and crystalline silica quartz—listed carcinogens by the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program of United States Department of Health and Human Services).

*OSHA Hazardous Communication Standard* (29 CFR 1910.1200 General Industry and 29 CFR 1926.59 Construction): Under normal use, this product is classified as an article and is therefore exempted from the OSHA Hazard Communication standard. However, during abnormal use such as abrasive grinding, torch cutting, welding, machining, drilling, etc. this product may release hazardous chemicals and should then be included in the site's OSHA Hazard Communication Program.

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### SECTION 3: COMPOSITION HAZARDS IDENTIFICATION

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Component	CAS #	% by Weight
PTFE*	116-14-3	< 26
Chromium	7440-47-3	< 18
Nickel	7440-02-0	< 15
Molybdenum	7439-98-7	< 4
Silica, Crystalline Quartz	14808-60-7	< 1

\*PTFE = PolyTetraFluoroEthylene a.k.a. Teflon<sup>®</sup> by E.I. Dupont De Nemours & Co.

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### SECTION 4: FIRST AID MEASURES

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**Inhalation:** Move to fresh air if inhaled high concentrations of dust or metal fumes; obtain medical attention. In the case of thermal decomposition of the PTFE binder, monitor for delayed symptoms of polymer fume fever for several hours after exposure; seek medical attention if flu-like symptoms occur. See Section 8 for exposure limits.

**Eyes:** Flush with clean water to remove particulates or dust; obtain medical attention.

**Skin:** Wash thoroughly with soap and water. If irritation persists, obtain medical attention.

**Ingestion:** Obtain medical attention.

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### SECTION 5: FIRE FIGHTING MEASURES

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**Suitable Extinguishing Media:** Material in or near fires should be cooled with a water spray or fog. Extinguishing media may include carbon dioxide, chemical or foam.

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Products of combustion: Thermal decomposition or combustion may produce dense smoke, metal fumes, toxic fluorine compounds (e.g. hydrogen fluoride and carbonyl fluoride), and low molecular weight organic compounds whose composition has not been characterized.

Protection of Firefighters: NIOSH-approved self-contained breathing apparatus, operating in positive pressure mode and full fire-fighting turnout gear for combating fires.

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## **SECTION 6: ACCIDENTAL RELEASE MEASURES**

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Personal Precautions: If releases of dust occur during conditions of abnormal use (e.g. abrasive grinding, cutting, abrading, sawing, etc.) remove dust by collecting with HEPA vacuum or wet sweeping. Do not use compressed air to blow dust away from release site. Personnel at release site should don personal protective equipment per recommendations of Section 8. Isolate release site and prevent entry of unnecessary and unprotected personnel.

Hygiene Precaution: Avoid contamination of cigarettes with dust from the PTFE filler; smokers should wash hands before handling cigarettes. Temperature of a burning cigarette tip is greater than 660° F and can decompose PTFE dust to toxic fluorine compounds.

Disposal Precautions: Collected dust should be placed in airtight and sealed poly bags or containers and disposed properly in accordance to federal and state laws. Do not permit airborne releases of collected dust into the breathing zone or environment. See Section 13, "Disposal Considerations".

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## **SECTION 7: HANDLING AND STORAGE**

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Handling: Avoid aggressive actions which would result in generation of dust, metal fumes or toxic fluorine fumes. Such actions would include abrading, chipping, sawing, etc.

Storage: Shipping and storage may result in accumulation of dust within shipping containers and boxes. If this should occur, dispose container in airtight and sealed polyethylene bags or remove dust using a HEPA vacuum. Do not use compressed air to blow dust from the container or box. See Section 13, "Disposal Considerations". Personnel cleaning dust should don personal protective equipment per recommendations in Section 8.

General hygiene recommendation: Wash hands thoroughly after handling the product, its shipping boxes, or its collected waste or dust. Hand washing should occur before eating, smoking, and grooming. Avoid contaminating cigarettes with dust; it contains PTFE. Temperature of a burning cigarette tip can decompose PTFE dust into toxic fluorine compounds.

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## **SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION**

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During normal use of the product, releases of product's hazardous constituents are not expected. The manufacturing process results in a solid, infusible binding that renders the product inert during its normal industrial use. The hazardous constituents present in quantities greater than 1% (0.1% for carcinogens) may be released during abnormal use or fire conditions including burning,

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machining, abrasive grinding, torch cutting, sawing, abrading, drilling or riveting. Personal exposure limits to the hazardous constituents are as follows:

Personal Exposure Limits:				
Component	OSHA PEL	ACGIH <sup>®</sup> TLV <sup>®</sup>	NIOSH REL	Units
Nickel	1.0	1.5	0.015	mg/m <sup>3</sup> TWA
Chromium	1.0	0.5	0.5	mg/m <sup>3</sup> TWA
Molybdenum	15 ----	10 3	None ----	mg/m <sup>3</sup> TWA mg/m <sup>3</sup> TWA, R
PTFE as dust	15	10	10	mg/m <sup>3</sup> TWA
PTFE thermally decomposed @ temp. ≥ 617° F	3 TWA	3 ceiling	3 ceiling	ppm of hydrogen fluoride (HF).
PTFE thermally decomposed @ temp. ≥ 617° F	N.E.	2 TWA 5 STEL	2 TWA 5 STEL	ppm of carbonyl fluoride (COF <sub>2</sub> )
Silica, Crystalline Quartz	10 ÷ (%SiO <sub>2</sub> + 2)	0.05	0.05	mg/m <sup>3</sup> TWA, R

OSHA: United States regulatory agency enforcing the Permissible Exposure Limits (PELs)  
 ACGIH: American Conference of Governmental Industrial Hygienists. Developer of the exposure guidelines—Threshold Limit Values or TLVs<sup>®</sup>.  
 NIOSH: National Institute of Occupational Safety and Health of the U.S. Dept. of Health and Human Services. Developer of the exposure guidelines—Recommended Exposure Limits.  
 TWA = time weighted average for 8 hours of exposure for the PELs and TLVs. For the RELs, exposure time allowance is 10 hours.  
 mg/m<sup>3</sup> = milligrams of contaminant per cubic meter of air.  
 R = respirable dust fraction, particulates less than 10 microns (µm) mean particle diameter.  
 ppm = parts of contaminant per million parts of air.  
 Ceiling = exposure allowance at any given instance in the workshift.  
 STEL = Short-Term Exposure Limit for a 15 minute of exposure period.  
 N.E. = Not Established.

Engineering Controls: No specific engineering controls are needed during normal product use and handling.

Personal Protective Equipment (PPE): No PPE required during normal product use and handling.

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During abnormal use such as abrasive grinding, torch cutting, machining, abrading, etc. the following protective measures should be employed.

Engineering Controls during abnormal operations:

- Operations producing dust or fumes should be provided with exhaust ventilation equipped with a HEPA filter for removing metal contaminants from breathing zone.

PPE during abnormal operations:

- *Respiratory protection against dust.* If dust or metal fume exposure to the above hazardous constituents is expected to be equal or greater than 50% of their exposure limits or if exposure concentrations are unknown, don a NIOSH-approved air-purifying respirator fitted with N95 or P95 particulate filters (i.e. approved as 95% filter efficiency).
- *Respiratory protection against fluorine compounds.* If temperatures are to exceed 617° F (325° C), don NIOSH-approved air-supplied, full-face respirator for protection against toxic fluorine compounds produced from thermal decomposition of the PTFE filler.
- *Eye protection.* Wear safety glasses during abnormal operations. For abrasive grinding, wear safety glasses and a face shield. Safety eyewear should meet requirements of ANSI Z87.1-2003, "American National Standard Practice for Occupational and Educational Personal Eye Protective Devices".
- *Skin and hair protection against metal exposures.* During dust generating activities, wear disposable and dry particulate, impermeable coveralls such as Tyvek® or equivalent.

Firefighting: For combating fires don a NIOSH-approved self-contained breathing apparatus, operating in positive pressure mode and full fire-fighting turnout gear. For additional fire fighting measures, see Section 5.

General Hygiene Considerations: Wash hands thoroughly after normal handling and before eating, smoking, and grooming. Hand washing is recognized as a good industrial hygiene practice when handling metal products. Avoid contaminating cigarettes with PTFE dust; smokers should wash hands before handling cigarettes. Temperature of a burning cigarette tip is greater than 660° F and can decompose PTFE dust to toxic fluorine compounds.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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Color: Off-white	Odor: None
Odor threshold: Not applicable	Physical state: solid
pH: Not applicable	Freezing point: Not applicable
Boiling point: Not applicable	Flash point: Not applicable
Evaporation rate: Not applicable	
Flammability: Not applicable	
Upper flammability Limit: Not applicable	Lower Flammability Limit: Not applicable



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with pre-existing lung diseases may have increased susceptibility to the toxicity of the thermal decomposition products of PTFE.

*Hydrogen Fluoride produced from overheating PTFE.* Initial exposure to hydrogen fluoride (HF), a corrosive gas, can result in responses including coughing, choking, and severe eye and throat irritations. Delayed flu-like symptoms may then occur including fever, chills, difficulty in breathing, cyanosis and pulmonary edema.

*Carbonyl Fluoride produced from overheating PTFE.* Initial exposure to carbonyl fluoride (CPF<sub>2</sub>) may include irritation of the throat and upper respiratory passages, temporary lung irritations with cough and labored breathing, and shortness of breath. Inhalation of high concentrations may cause lung edema. Symptoms may be delayed by several hours from initial exposure. Carbonyl fluoride is a corrosive to the skin and eyes causing redness, discomfort and/or rashes. Eyes may develop corneal or conjunctival ulceration.

**Nickel Metal (Ni, < 15%):**

*Inhalation hazards:* Repeated or acute inhalation of nickel metal fumes may cause pneumonitis and/or pulmonary asthma. Symptoms often do not manifest until a few hours after exposure; symptoms are aggravated by physical effort. Anyone showing symptoms of asthma due to nickel exposure should avoid further exposure to this substance. Nickel dusts and fumes may cause mechanical irritation to nasal cavities. Nickel is listed by the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen—possibly carcinogenic to humans and by the NTP (National Toxicology Program) as *reasonably anticipated to be human carcinogen*. Immediately Dangerous to Life and Health (IDLH) at air-borne concentration of 10 mg/m<sup>3</sup>.

*Skin and Eyes:* Contact exposure may cause allergic contact dermatitis, conjunctivitis, and inflammatory reactions around nickel-containing medical implants and prostheses.

**Chromium Metal (Cr, < 18%):**

*Inhalation hazards:* Acute exposure may result in cough and irritation of respiratory system. Chronic exposure may cause histologic fibrosis of the lungs. Immediately Dangerous to Life and Health (IDLH) at air-borne concentration of 250 mg/m<sup>3</sup>.

*Skin and eye contact:* Repeated or prolonged exposure may cause skin and eye irritation and sensitization.

*Ingestion:* Poisonous by ingestion; may cause severe gastrointestinal irritation.

**Molybdenum (Mo, < 4%):**

*Inhalation hazards:* Dust may cause irritation of nasal and respiratory passages. Immediately Dangerous to Life and Health (IDLH) at air-borne concentration of 5000 mg/m<sup>3</sup>.

*Skin and eye:* Irritant to eyes and skin.

*Ingestion:* May cause diarrhea, loss of weight and damage to liver and kidney.

**Silica, Crystalline Quartz (SiO<sub>2</sub>, < 1%):**

*Inhalation hazards:* Acute exposure to silica dust may cause paroxysmal coughing, dyspnea (breathing difficulty), and wheezing. Chronic exposure may result in decreased pulmonary

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function and silicosis—a progressive respiratory illness involving lung fibrosis. Crystalline silica quartz is listed by the IARC (International Agency for Research on Cancer) as a Group 1 carcinogen—carcinogenic to humans and by the NTP (National Toxicology Program) as *known human carcinogen*. Immediately Dangerous to Life and Health (IDLH) at air-borne concentration of 50 mg/m<sup>3</sup>. *Eyes*: Mechanical irritation to eyes.

**Aggravation of Pre-existing Health Conditions.** Persons with pre-existing respiratory or cardiopulmonary problems may be more susceptible to the effects of exposure to the above hazardous constituents.

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## SECTION 12: ECOLOGICAL INFORMATION

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No ecological test data has been developed. Impact to aquatic, terrestrial and air environmental media is judged as insignificant.

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## SECTION 13: DISPOSAL CONSIDERATIONS

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Dispose of solid waste in accordance with federal, state and local regulations. Waste should be placed in airtight containers and properly disposed. Contact local regulatory agency for guidance.

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## SECTION 14: TRANSPORT INFORMATION

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Not regulated as a hazardous material by DOT (United States Department of Transportation) or IMO.

Ship in sealed boxes appropriately rated for weight capacity.

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## SECTION 15: REGULATORY INFORMATION

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*OSHA:*

Product is considered to be an article under normal conditions and use. During conditions of abnormal use (e.g. abrasive grinding, machining, sawing, torch cutting, etc.) the following OSHA Standards may apply: 29 Code of Federal Regulations (CFR) 1910.1200--*Hazard Communication*, 1910.1000--*Tables Z-1 and Z-3--Air Contaminants*, 1910.134--*Respiratory Protection*, 1910.132--*Personal Protective Equipment General Requirements*, and 1910.1020--*Access to Employee Exposure and Medical Records*.

*SARA Title III:*

Sections 302, 311 and 312: Product contains no SARA listed “extremely hazardous substances”. No reporting requirements for hazardous chemicals; product considered an article.

Section 313: This product contains nickel and chromium which are listed chemicals per 40 CFR Part 372.65. These chemicals are to be reported when facility consumption exceeds the Section 313 threshold reporting quantity.

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*CERCLA*: This product contains nickel and chromium. These substances are listed CERCLA substances when used in excess of reportable quantities (RQ) per 40 CFR 302.

*CAA*: This product contains the listed chemical PTFE which is subject to the EPA's accident release prevention regulations (Clean Air Act, Section 112 (r)) when at the threshold quantity (TQ) of 10,000 lbs.

*TSCA*: Not applicable

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## SECTION 16: OTHER INFORMATION

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National Paint and Coating Association's (NPCA) HMIS<sup>®</sup> III (Hazardous Materials Identification System, Third Version) Label Ratings:

*Ratings based on normal use*: HEALTH 0, FLAMMIBILITY 0, PHYSICAL HAZARDS 1, PPE: None Required.

*Ratings based on abrasive grinding, machining and other abnormal uses*: HEALTH \*3, FLAMMABILITY 0, PHYSICAL HAZARDS 1, PPE rating to be supplied by user depending on specific operations and safety engineering controls available.

NOTE: HMIS<sup>®</sup> ratings involve data review and interpretation that may vary among operations. The HMIS<sup>®</sup> ratings are intended only for rapid, general identification of the magnitude of potential hazards. The ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. An asterisk (\*) in the HMIS<sup>®</sup> health field, designates potential chronic health hazards such as cancer, reproductive effects, or chronic injury to a specific organ of the body. Further explanation and definitions HMIS<sup>®</sup> ratings of available at <http://www.paint.org/hmis/index.cfm>

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The data in this material safety data sheet (MSDS) relates only to the specific material designated herein and does not relate to use in combination with any other material. It is the user's responsibility to satisfy oneself as to the suitability of this information for the particular use or activity involving this product. No warranty or representation with respect to information in this MSDS is intended or given. Flexitallic, L.P. will not be responsible for damages resulting from use of or reliance upon this information.  
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This MSDS is intended to comply with the format of ANSI Z400.1-2004, *American National Standard for Hazardous Industrial Chemicals—Material Safety Data Sheets—Preparation* and the United States' Occupational Safety and the Hazard Communication Standard (29 CFR 1910.1200 General Industry and 29 CFR 1926.59) enforced through OSHA (Occupational Safety and Health Administration) of the U.S. Department of Labor.  
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