



SAFETY DATA SHEET

MATERION

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name or designation of the mixture Ge-Sb-Te targets
Registration number -
Document number 2LR
Synonyms None.
Materion Code 2LR
Issue date 11-December-2019

1.3. Details of the supplier of the safety data sheet

Supplier

Company name Materion Advanced Chemicals Inc.
Address 407 N. 13th Street
1316 W. St. Paul Avenue
Milwaukee, WI 53233
United States
Division Milwaukee
Telephone 414.212.0257
e-mail advancedmaterials@materion.com
Contact person Laura Hamilton

1.4. Emergency telephone number

Version number 01

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses The chemical(s) listed herein is not found on the Toxic Substance Control Act chemical substance inventory. This chemical may not be used for commercial purposes. This chemical may be used for research and development purposes only as defined at 40 CFR 710,2(y).
Uses advised against None known.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended

Health hazards
Acute toxicity, oral Category 3
Environmental hazards
Hazardous to the aquatic environment, long-term aquatic hazard Category 2

Hazard summary The material as sold in solid form is generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulate could be generated. The products are classified as articles and, as such, do not present a physical or health hazard in the present form. If the products are processed or handled in ways that generate particles (dust, fume, particles or powder) and/or chemical compounds, a potential health hazard could exist and risk management measures must be taken to minimize risk.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains: Antimony, Germanium, Tellurium
Hazard pictograms None.
Signal word None.

Hazard statements

The material as sold in solid form is generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulate could be generated. The products are classified as articles and, as such, do not present a physical or health hazard in the present form. If the products are processed or handled in ways that generate particles (dust, fume, particles and/or powder), a potential health hazard could exist and risk management measures must be taken to minimize risk.

Precautionary statements**Prevention**

P280

Minimise dust generation and accumulation.
Wear protective gloves/protective clothing/eye protection/face protection.

Response

P302 + P350
P301 + P330 + P331
P314

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF ON SKIN: Gently wash with plenty of soap and water.
IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
Get medical advice/attention if you feel unwell.

Storage

Store away from incompatible materials.

Disposal

P501

Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information

None.

2.3. Other hazards

None known.

SECTION 3: Composition/information on ingredients**3.2. Mixtures****General information**

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Antimony	1 - 99	7440-36-0 231-146-5	-	051-003-00-9	
Classification:	Acute Tox. 4;H302, Acute Tox. 4;H332, Aquatic Chronic 2;H411				
Germanium	1 - 99	7440-56-4 231-164-3	-	-	
Classification:	-				
Tellurium	1 - 99	13494-80-9 236-813-4	-	-	
Classification:	Acute Tox. 3;H301				

SECTION 4: First aid measures**General information**

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

4.1. Description of first aid measures**Inhalation**

Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact

Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact

Rinse with water. Get medical attention if irritation develops and persists.

Ingestion

Rinse mouth. Get medical attention if symptoms occur.

4.2. Most important symptoms and effects, both acute and delayed

Exposure may cause temporary irritation, redness, or discomfort.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures**General fire hazards**

No unusual fire or explosion hazards noted.

5.1. Extinguishing media**Suitable extinguishing media**

Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
5.2. Special hazards arising from the substance or mixture	During fire, gases hazardous to health may be formed.
5.3. Advice for firefighters	
Special protective equipment for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Special firefighting procedures	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
For emergency responders	Keep unnecessary personnel away. Use personal protection recommended in Section 8 of the SDS.

6.2. Environmental precautions Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up Stop the flow of material, if this is without risk. Following product recovery, flush area with water.

6.4. Reference to other sections For personal protection, see section 8. For waste disposal, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling	Observe good industrial hygiene practices.
7.2. Conditions for safe storage, including any incompatibilities	Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).
7.3. Specific end use(s)	Not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	MAK	0,5 mg/m ³	Inhalable fraction.
	STEL	5 mg/m ³	Inhalable fraction.
Tellurium (CAS 13494-80-9)	MAK	0,1 mg/m ³	Inhalable fraction.
	STEL	0,5 mg/m ³	Inhalable fraction.

Belgium. Exposure Limit Values.

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Bulgaria. OELs. Regulation No 13 on protection of workers against risks of exposure to chemical agents at work

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Croatia. Dangerous Substance Exposure Limit Values in the Workplace (ELVs), Annexes 1 and 2, Narodne Novine, 13/09

Components	Type	Value
Antimony (CAS 7440-36-0)	MAC	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	MAC	0,1 mg/m ³

Cyprus. OELs. Control of factory atmosphere and dangerous substances in factories regulation, PI 311/73, as amended.

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³

Czech Republic. OELs. Government Decree 361

Components	Type	Value
Antimony (CAS 7440-36-0)	Ceiling	1,5 mg/m ³
	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	Ceiling	0,5 mg/m ³
	TWA	0,1 mg/m ³

Denmark. Exposure Limit Values

Components	Type	Value	Form
Tellurium (CAS 13494-80-9)	TLV	0,1 mg/m ³	Dust.

Estonia. OELs. Occupational Exposure Limits of Hazardous Substances. (Annex of Regulation No. 293 of 18 September 2001)

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Finland. Workplace Exposure Limits

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	STEL	0,3 mg/m ³
	TWA	0,1 mg/m ³

France. Threshold Limit Values (VLEP) for Occupational Exposure to Chemicals in France, INRS ED 984

Components	Type	Value
Antimony (CAS 7440-36-0)	VME	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	VME	0,1 mg/m ³

Regulatory status: Indicative limit (VL)

Greece. OELs (Decree No. 90/1999, as amended)

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Hungary. OELs. Joint Decree on Chemical Safety of Workplaces

Components	Type	Value
Antimony (CAS 7440-36-0)	STEL	2 mg/m ³
	TWA	0,5 mg/m ³

Iceland. OELs. Regulation 154/1999 on occupational exposure limits

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³	Dust.
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³	Dust.

Ireland. Occupational Exposure Limits

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Italy. Occupational Exposure Limits

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Latvia. OELs. Occupational exposure limit values of chemical substances in work environment

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	STEL	0,5 mg/m ³	Dust.
	TWA	0,2 mg/m ³	Dust.
Tellurium (CAS 13494-80-9)	TWA	0,01 mg/m ³	

Lithuania. OELs. Limit Values for Chemical Substances, General Requirements

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Germanium (CAS 7440-56-4)	TWA	2 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Netherlands. OELs (binding)

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³

Norway. Administrative Norms for Contaminants in the Workplace

Components	Type	Value
Antimony (CAS 7440-36-0)	TLV	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TLV	0,1 mg/m ³

Ordinance of the Minister of Labour and Social Policy on 6 June 2014 on the maximum permissible concentrations and intensities of harmful health factors in the work environment, Journal of Laws 2014, item 817

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	STEL	0,03 mg/m ³
	TWA	0,01 mg/m ³

Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Romania. OELs. Protection of workers from exposure to chemical agents at the workplace

Components	Type	Value
Antimony (CAS 7440-36-0)	STEL	0,5 mg/m ³
	TWA	0,2 mg/m ³
Germanium (CAS 7440-56-4)	STEL	5 mg/m ³
	TWA	2 mg/m ³
Tellurium (CAS 13494-80-9)	STEL	0,15 mg/m ³
	TWA	0,05 mg/m ³

Slovakia. OELs. Regulation No. 300/2007 concerning protection of health in work with chemical agents

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³	Inhalable fraction.
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³	Inhalable fraction.

Spain. Occupational Exposure Limits

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Sweden. OELs. Work Environment Authority (AV), Occupational Exposure Limit Values (AFS 2015:7)

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	TWA	0,25 mg/m ³	Inhalable dust.
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³	Total dust.

Switzerland. SUVA Grenzwerte am Arbeitsplatz

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³	Inhalable dust.
Tellurium (CAS 13494-80-9)	STEL	0,2 mg/m ³	Inhalable fraction.
	TWA	0,1 mg/m ³	Inhalable fraction.

UK. EH40 Workplace Exposure Limits (WELs)

Components	Type	Value
Antimony (CAS 7440-36-0)	TWA	0,5 mg/m ³
Tellurium (CAS 13494-80-9)	TWA	0,1 mg/m ³

Biological limit values No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures Follow standard monitoring procedures.

Derived no effect levels (DNELs) Not available.

Predicted no effect concentrations (PNECs) Not available.

8.2. Exposure controls

Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

- Hand protection Wear appropriate chemical resistant gloves.

- Other Wear suitable protective clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

Hygiene measures Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental exposure controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties****Appearance**

Physical state Solid.

Form Solid.

Colour Not available.

Odour Not available.

Odour threshold Not available.

pH Not available.

Melting point/freezing point 449,8 °C (841,64 °F) estimated

Initial boiling point and boiling range 989,9 °C (1813,82 °F) estimated

Flash point Not available.

Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	0,00001 hPa estimated
Vapour density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.
9.2. Other information	
Density	6,04 g/cm3 estimated
Specific gravity	6,04 estimated

SECTION 10: Stability and reactivity

10.1. Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
10.2. Chemical stability	Material is stable under normal conditions.
10.3. Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
10.4. Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.
10.5. Incompatible materials	Strong oxidising agents.
10.6. Hazardous decomposition products	No hazardous decomposition products are known.

SECTION 11: Toxicological information

General information Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	May cause discomfort if swallowed. However, ingestion is not likely to be a primary route of occupational exposure.

Symptoms Exposure may cause temporary irritation, redness, or discomfort.

11.1. Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
Tellurium (CAS 13494-80-9)		
Acute		
Oral		
LD50	Rat	83 mg/kg
Skin corrosion/irritation	Due to partial or complete lack of data the classification is not possible.	
Serious eye damage/eye irritation	Due to partial or complete lack of data the classification is not possible.	
Respiratory sensitisation	Due to partial or complete lack of data the classification is not possible.	
Skin sensitisation	Due to partial or complete lack of data the classification is not possible.	
Germ cell mutagenicity	Due to partial or complete lack of data the classification is not possible.	

Carcinogenicity	Due to partial or complete lack of data the classification is not possible.
Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)	
	Not listed.
Reproductive toxicity	Due to partial or complete lack of data the classification is not possible.
Specific target organ toxicity - single exposure	Due to partial or complete lack of data the classification is not possible.
Specific target organ toxicity - repeated exposure	Due to partial or complete lack of data the classification is not possible.
Aspiration hazard	Due to partial or complete lack of data the classification is not possible.
Mixture versus substance information	No information available.
Other information	Not available.

SECTION 12: Ecological information

12.1. Toxicity Due to partial or complete lack of data the classification for hazardous to the aquatic environment, is not possible.

Product	Species		Test Results
Ge-Sb-Te targets			
Aquatic			
Fish	LC50	Fish	6,2626 mg/l, 96 hours estimated
Components	Species		Test Results
Antimony (CAS 7440-36-0)			
Aquatic			
Fish	LC50	Sheepshead minnow (Cyprinodon variegatus)	6,2 - 8,3 mg/l, 96 hours

12.2. Persistence and degradability No data is available on the degradability of this substance.

12.3. Bioaccumulative potential No data available.

Partition coefficient n-octanol/water (log Kow) Not available.

Bioconcentration factor (BCF) Not available.

12.4. Mobility in soil No data available.

12.5. Results of PBT and vPvB assessment Not a PBT or vPvB substance or mixture.

12.6. Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

12.7. Additional information

Estonia Dangerous substances in soil Data

Antimony (CAS 7440-36-0)	Antimony (Sb) 10 mg/kg
	Antimony (Sb) 100 mg/kg
	Antimony (Sb) 20 mg/kg

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
EU waste code	The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Special precautions	Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. UN number	UN3288
14.2. UN proper shipping name	Toxic solid, inorganic, n.o.s. (Tellurium)
14.3. Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
Hazard No. (ADR)	60
Tunnel restriction code	E
14.4. Packing group	III
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number	UN3288
14.2. UN proper shipping name	Toxic solid, inorganic, n.o.s. (Tellurium)
14.3. Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
14.4. Packing group	III
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number	UN3288
14.2. UN proper shipping name	Toxic solid, inorganic, n.o.s. (Tellurium)
14.3. Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
14.4. Packing group	III
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. - 14.6.: Not regulated as dangerous goods.

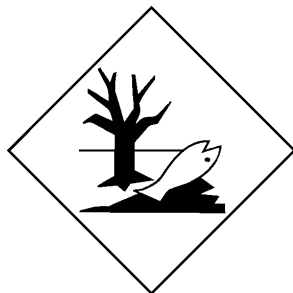
IMDG

14.1. - 14.6.: Not regulated as dangerous goods.

ADN; ADR; RID



Marine pollutant



SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Not listed.

Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006, as amended.

National regulations

Follow national regulation for work with chemical agents in accordance with Directive 98/24/EC, as amended.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

Not available.

References

Not available.

Training information

Follow training instructions when handling this material.

Disclaimer

Materion Advanced Chemicals Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. This document has been prepared using data from sources considered to be technically reliable and the information is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and its products may be used and the actual conditions of use are beyond its control. The user is responsible to evaluate all available information when using this product for any particular use and to comply with all Federal, State, Provincial and Local laws, statutes and regulations.