

**NIOBIUM(V) ETHOXIDE**

Safety Data Sheet AKN590

Date of issue: 14/08/2015 Version: 1.0

**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Product form	: Substance
Physical state	: Liquid
Substance name	: NIOBIUM(V) ETHOXIDE
Product code	: AKN590
Formula	: C10H25NbO5
Synonyms	: PENTAETHOXYNIOBIUM; NIOBIUM(5+) ETHANOLATE
Chemical family	: METAL ESTER

**1.2. Relevant identified uses of the substance or mixture and uses advised against****1.2.1. Relevant identified uses**

Use of the substance/mixture : Chemical intermediate

**1.2.2. Uses advised against**

No additional information available

**1.3. Details of the supplier of the safety data sheet****GELEST, INC.**11 East Steel Road  
Morrisville, PA 19067**USA**

T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST

[info@gelest.com](mailto:info@gelest.com) - [www.gelest.com](http://www.gelest.com)**GELEST INC.**Fritz-Klatte-Strasse 8  
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[info@gelestde.com](mailto:info@gelestde.com) - [www.gelestde.com](http://www.gelestde.com)**1.4. Emergency telephone number**

Emergency number : CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

Serious eye damage/eye irritation, Category 2 H319

Full text of H statements : see section 16

**Adverse physicochemical, human health and environmental effects**

No additional information available

**2.2. Label elements****Labelling according to Regulation (EC) No. 1272/2008 [CLP]**

Hazard pictograms (CLP) :



GHS07

Signal word (CLP) :

: Warning

Hazard statements (CLP) :

: H319 - Causes serious eye irritation.

Precautionary statements (CLP) :

: P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
P264 - Wash hands thoroughly after handling.  
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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P337+P313 - If eye irritation persists: Get medical advice/attention.

### 2.3. Other hazards

Other hazards not contributing to the classification : The hydrolysis product of this compound is ethanol. Overexposure to ethanol by skin absorption, inhalation or ingestion may have a narcotic effect (headache, nausea, drowsiness). Ethanol is metabolized to acetaldehyde and acetic acid which in large quantities result in metabolic acidosis, CNS depression and death due to respiratory arrest. This product contains ethanol which is classified as a carcinogen by IARC in alcoholic beverages.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Substance type : Mono-constituent  
Name : NIOBIUM(V) ETHOXIDE  
CAS-No. : 3236-82-6  
EC-No. : 221-795-2

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Niobium(5+) ethanolate	(CAS-No.) 3236-82-6 (EC-No.) 221-795-2	> 90	Eye Irrit. 2, H319
Ethanol	(CAS-No.) 64-17-5 (EC-No.) 200-578-6 (EC Index-No.) 603-002-00-5		Flam. Liq. 2, H225

Full text of H-statements: see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general : Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label. IF exposed or concerned: Get medical advice/attention.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Wash with plenty of water/....

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion : Never give anything by mouth to an unconscious person. Get medical advice/attention.

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

Symptoms/effects after inhalation : May cause irritation to the respiratory tract.

Symptoms/effects after skin contact : May cause skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : May be harmful if swallowed.

Chronic symptoms : On contact with water this compound liberates ethanol which is known to have a chronic effect on the central nervous system.

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

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : Water spray. Water fog. Carbon dioxide. Dry chemical.

Unsuitable extinguishing media : Do not use straight streams.

### 5.2. Special hazards arising from the substance or mixture

Fire hazard : Combustible liquid. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

### 5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

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Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapour and mist.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Remove ignition sources. Use special care to avoid static electric charges.

##### 6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment as described in Section 8.

Emergency procedures : Evacuate unnecessary personnel.

##### 6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".

#### 6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

#### 6.3. Methods and material for containment and cleaning up

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

Methods for cleaning up : Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. Use only non-sparking tools.

#### 6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapour and mist. Provide good ventilation in process area to prevent formation of vapour. Containers and transfer lines require grounding during use. Use only non-sparking tools.

Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

#### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Ground/bond container and receiving equipment.

Storage conditions : Keep container tightly closed.

Incompatible materials : Moist air. Oxidizing agent. Water :

Storage area : Store in a well-ventilated place. Store away from heat.

#### 7.3. Specific end use(s)

No additional information available

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

Ethanol (64-17-5)		
Austria	MAK (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Austria	MAK (ppm)	1000 ppm
Austria	MAK Short time value (mg/m <sup>3</sup> )	3800 mg/m <sup>3</sup>
Austria	MAK Short time value (ppm)	2000 ppm
Belgium	Limit value (mg/m <sup>3</sup> )	1907 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	1000 ppm
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	1000 mg/m <sup>3</sup>
France	VLE (mg/m <sup>3</sup> )	9500 mg/m <sup>3</sup>
France	VLE (ppm)	5000 ppm
France	VME (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
France	VME (ppm)	1000 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	960 mg/m <sup>3</sup> (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	500 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Greece	OEL TWA (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Greece	OEL TWA (ppm)	1000 ppm

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Ethanol (64-17-5)		
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	1000 ppm
Latvia	OEL TWA (mg/m <sup>3</sup> )	1000 mg/m <sup>3</sup>
USA IDLH	US IDLH (ppm)	3300 ppm (10% LEL)
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
Spain	VLA-EC (mg/m <sup>3</sup> )	1910 mg/m <sup>3</sup>
Spain	VLA-EC (ppm)	1000 ppm
Switzerland	KZGW (mg/m <sup>3</sup> )	1920 mg/m <sup>3</sup>
Switzerland	KZGW (ppm)	1000 ppm
Switzerland	MAK (mg/m <sup>3</sup> )	960 mg/m <sup>3</sup>
Switzerland	MAK (ppm)	500 ppm
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	260 mg/m <sup>3</sup>
Netherlands	Grenswaarde TGG 15MIN (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	1920 mg/m <sup>3</sup>
United Kingdom	WEL TWA (ppm)	1000 ppm
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	5760 mg/m <sup>3</sup> (calculated)
United Kingdom	WEL STEL (ppm)	3000 ppm (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	1000 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (ppm)	1000 ppm
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	1000 ppm
Finland	HTP-arvo (15 min)	2500 mg/m <sup>3</sup>
Finland	HTP-arvo (15 min) (ppm)	1300 ppm
Hungary	AK-érték	1900 mg/m <sup>3</sup>
Hungary	CK-érték	7600 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (ppm)	1000 ppm
Lithuania	IPRV (mg/m <sup>3</sup> )	1000 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	500 ppm
Lithuania	TPRV (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	1000 ppm
Norway	Grenseverdier (AN) (mg/m <sup>3</sup> )	950 mg/m <sup>3</sup>
Norway	Grenseverdier (AN) (ppm)	500 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m <sup>3</sup> )	950 mg/m <sup>3</sup>
Norway	Grenseverdier (Korttidsverdi) (ppm)	500 ppm
Poland	NDS (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Romania	OEL TWA (ppm)	1000 ppm
Romania	OEL STEL (mg/m <sup>3</sup> )	9500 mg/m <sup>3</sup>
Romania	OEL STEL (ppm)	5000 ppm
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	960 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (ppm)	500 ppm
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	1920 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	1000 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (ppm)	500 ppm
Sweden	kortidsvärde (KTV) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Sweden	kortidsvärde (KTV) (ppm)	1000 ppm
Canada (Quebec)	VEMP (mg/m <sup>3</sup> )	1880 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (ppm)	1000 ppm

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Ethanol (64-17-5)		
Australia	TWA (mg/m <sup>3</sup> )	1880 mg/m <sup>3</sup>
Australia	TWA (ppm)	1000 ppm
Portugal	OEL TWA (ppm)	1000 ppm
Portugal	OEL chemical category (PT)	A4 - Not Classifiable as a Human Carcinogen

### 8.2. Exposure controls

#### Appropriate engineering controls:

Provide local exhaust or general room ventilation.

#### Personal protective equipment:

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

#### Hand protection:

Neoprene or nitrile rubber gloves

#### Eye protection:

Chemical goggles. Contact lenses should not be worn

#### Skin and body protection:

Wear suitable protective clothing

#### Respiratory protection:

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified organic vapor (black cartridge) respirator.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid. Viscous.
Molecular mass	: 318.22 g/mol
Colour	: Pale yellow.
Odour	: No data available
Odour threshold	: No data available
Refractive index	: 1.516
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: No data available
Freezing point	: 5 - 6 °C
Boiling point	: 142 °C @ 0.1 mm Hg
Flash point	: 74 °C
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: Combustible liquid
Vapour pressure	: No data available
Relative vapour density at 20 °C	: > 1
Relative density	: 1.268
Solubility	: Reacts with water.
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available

### 9.2. Other information

No additional information available

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### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No additional information available

#### 10.2. Chemical stability

Stable.

#### 10.3. Possibility of hazardous reactions

Material decomposes slowly in contact with moist air or with water liberating ethanol.

#### 10.4. Conditions to avoid

Heat. Open flame. Sparks.

#### 10.5. Incompatible materials

Moist air. Oxidizing agent. Water :

#### 10.6. Hazardous decomposition products

Ethanol. Niobium oxide. Organic acid vapors.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

Ethanol (64-17-5)	
LD50 oral rat	7060 mg/kg
LC50 inhalation rat (mg/l)	124.7 mg/l/4h
LC50 inhalation rat (ppm)	20000 ppm 10 hrs.
LDLo oral rat	1400 mg/kg (Human)
ATE CLP (oral)	7060 mg/kg bodyweight
ATE CLP (vapours)	124.7 mg/l/4h
ATE CLP (dust,mist)	124.7 mg/l/4h

Skin corrosion/irritation : Not classified  
Serious eye damage/irritation : Causes serious eye irritation.  
Respiratory or skin sensitisation : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified

Ethanol (64-17-5)	
IARC group	1 - Carcinogenic to humans

Reproductive toxicity : Not classified  
STOT-single exposure : Not classified  
STOT-repeated exposure : Not classified  
Aspiration hazard : Not classified  
Symptoms/effects after inhalation : May cause irritation to the respiratory tract.  
Symptoms/effects after skin contact : May cause skin irritation.  
Symptoms/effects after eye contact : Causes serious eye irritation.  
Symptoms/effects after ingestion : May be harmful if swallowed.  
Chronic symptoms : On contact with water this compound liberates ethanol which is known to have a chronic effect on the central nervous system.  
Reason for classification : Expert judgment

### SECTION 12: Ecological information

#### 12.1. Toxicity

Acute aquatic toxicity : Not classified  
Chronic aquatic toxicity : Not classified

Ethanol (64-17-5)	
LC50 fish 1	> 10000 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [rainbow trout])
LC50 fish 2	> 13400 mg/l (Exposure time: 96 h - Species: Pimephales promelas [fathead minnow])

#### 12.2. Persistence and degradability

No additional information available

#### 12.3. Bioaccumulative potential

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### Ethanol (64-17-5)

Log Pow	-0.32
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#### 12.4. Mobility in soil

No additional information available

#### 12.5. Results of PBT and vPvB assessment

No additional information available

#### 12.6. Other adverse effects

No additional information available

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Sewage disposal recommendations : Do not dispose of waste into sewer.  
Product/Packaging disposal recommendations : Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.  
Ecology - waste materials : Avoid release to the environment.

### SECTION 14: Transport information

#### 14.1. UN number

In accordance with ADR / RID / IMDG / IATA / ADN

#### 14.1. UN number

UN-No. (ADR) : Not applicable  
UN-No. (IMDG) : Not applicable  
UN-No. (IATA) : Not applicable  
UN-No. (ADN) : Not applicable  
UN-No. (RID) : Not applicable

#### 14.2. UN proper shipping name

Proper Shipping Name (ADR) : Not applicable  
Proper Shipping Name (IMDG) : Not applicable  
Proper Shipping Name (IATA) : Not applicable  
Proper Shipping Name (ADN) : Not applicable  
Proper Shipping Name (RID) : Not applicable

#### 14.3. Transport hazard class(es)

##### ADR

Transport hazard class(es) (ADR) : Not applicable

##### IMDG

Transport hazard class(es) (IMDG) : Not applicable

##### IATA

Transport hazard class(es) (IATA) : Not applicable

##### ADN

Transport hazard class(es) (ADN) : Not applicable

##### RID

Transport hazard class(es) (RID) : Not applicable

#### 14.4. Packing group

Packing group (ADR) : Not applicable  
Packing group (IMDG) : Not applicable  
Packing group (IATA) : Not applicable  
Packing group (ADN) : Not applicable  
Packing group (RID) : Not applicable

#### 14.5. Environmental hazards

Dangerous for the environment : No  
Marine pollutant : No

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Other information : This product is Combustible as defined by the US Department of Transportation (DOT). It is regulated for transport in the US in container > 119 gallons (450 liters). The product is not regulated for transport by the IATA, ADR/RID, ADNR or the IMDG regulations.

### 14.6. Special precautions for user

#### - Overland transport

No data available

#### - Transport by sea

No data available

#### - Air transport

No data available

#### - Inland waterway transport

Not applicable

#### - Rail transport

Not applicable

### 14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

## SECTION 15: Regulatory information

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

#### 15.1.1. EU-Regulations

No REACH Annex XVII restrictions

NIOBIUM(V) ETHOXIDE is not on the REACH Candidate List

NIOBIUM(V) ETHOXIDE is not on the REACH Annex XIV List

NIOBIUM(V) ETHOXIDE is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

NIOBIUM(V) ETHOXIDE is not subject to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC

#### 15.1.2. National regulations

##### Germany

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

##### Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

##### Denmark

Class for fire hazard : Class III-1

Store unit : 50 liter

Classification remarks : Flammable according to the Danish Ministry of Justice; Emergency management guidelines for the storage of flammable liquids must be followed

### 15.2. Chemical safety assessment

No additional information available

## SECTION 16: Other information

Abbreviations and acronyms:



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Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor

Other information : Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids, Category 2
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.

SDS EU (REACH Annex II) - Custom

*The information contained in this document has been gathered from reference materials and/or Gelest, Inc. test data and is to the best knowledge and belief of Gelest, Inc. accurate and reliable. Such information is offered solely for your consideration, investigation and verification. It is not suggested or guaranteed that the hazard precautions or procedures described are the only ones which exist. Gelest, Inc. makes no warranties, express or implied, with respect to the use of such information and assumes no responsibility therefore. Information on this safety data sheet is not intended to constitute a basis for product specifications.*

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The logo for Gelest, Inc. features the word "Gelest" in a large, white, serif font. The letters are set against a light blue background that is shaped like a right-angled triangle pointing to the right. The "G" is partially cut off on the left side of the frame.