



SAFETY DATA SHEET

Section 1. Identification

Product Name:	Vanadium triisobutoxide oxide
Product Type:	Liquid
CAS Number:	19120-62-8
Product Number:	V0628
Product Manufacturer:	Ereztech LLC 11555 Medlock Bridge Road, Suite 100 Johns Creek, GA 30097
Product Information:	(888) 658-1221
<u>In case of an emergency:</u>	(888) 658-1221 (for spill, leak, fire or exposure) *** Contact manufacturer for all non-emergency calls.

Section 2. Hazards Identification

Emergency Overview

Appearance/Odor: Yellow liquid, alcohol-like odor.

Classification: FLAMMABLE LIQUIDS: - Category 2, H225
SUBSTANCES AND LIQUIDS WHICH IN CONTACT WITH WATER
EMIT FLAMMABLE GASES; - Category 2, H261
ACUTE TOXICITY, ORAL; - Category 5, H303
ASPIRATION HAZARD; - Category 2, H305
ACUTE TOXICITY, DERMAL; - Category 5, H313
SKIN CORROSION/IRRITATION; - Category 2, H315
SERIOUS EYE DAMAGE/IRRITATION; - Category 2A, H319
ACUTE TOXICITY, INHALATION; - Category 5, H333
SENSITIZATION, RESPIRATORY; - Category 1, H334
SPECIFIC ORGAN TOXICITY, SINGLE EXPOSURE; RESPIRATORY
TRACT IRRITATION; - Category 3, H335
SPECIFIC TARGET ORGAN TOXICITY, SINGLE EXPOSURE;
NARCOTIC EFFECTS; - Category 1, H336
HAZARDOUS TO THE AQUATIC ENVIRONMENT, ACUTE TOXICITY;
Category 2, H401
HAZARDOUS TO THE AQUATIC ENVIRONMENT, CHRONIC
TOXICITY; - Category 2, H411
Signal word : DANGER
Hazard statements : H225: Highly flammable liquid and vapor.
H261: In contact with water releases flammable gases.

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Section 2. Hazards Identification

Hazard statements (cont.):

- H303: May be harmful if swallowed.
- H305: May be harmful if swallowed and enters airways.
- H313: May be harmful in contact with skin.
- H315: Causes skin irritation.
- H319: Causes serious eye irritation.
- H333: May be harmful if inhaled.
- H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H335: May cause respiratory irritation.
- H336: May cause drowsiness or dizziness.
- H401: Toxic to aquatic life.
- H411: Toxic to aquatic life with long lasting effects.

Hazard pictograms:



Precautionary statements

Prevention:

- P210: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- P223: Keep away from any possible contact with water, because of violent reaction and possible flash fire.
- P231 + P232: Handle under inert gas. Protect from moisture.
- P233: Keep container tightly closed.
- P240: Ground/Bond container and receiving equipment.
- P241: Use explosion-proof electrical/ ventilating/ lighting/ .../ equipment.
- P242: Use only non-sparking equipment.
- P243: Take precautionary measures against static discharge.
- P261: Avoid breathing dust/fumes/gas/mist/vapors/spray.
- P264: Wash exposed skin thoroughly after handling.
- P271: Use only outdoors or in a well ventilated area.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P285: In case of inadequate ventilation, wear respiratory protection.

Response:

- P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P302 + P352: IF ON SKIN: Wash with plenty of soap and water.

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Section 2. Hazards Identification

Response (cont.):

P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304 + P312: IF INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.

P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P312: Call a POISON CENTER or doctor/physician if you feel unwell.

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P334 + P335: Brush off loose particles from skin and immerse in cool water/wrap in wet bandages.

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

P342 + P311: If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

P362: Take off contaminated clothing and wash before reuse.

P370 + P378: In case of fire: Use foam, carbon dioxide, dry chemical.

P391: Collect spillage.

Storage:

P402 + P404: Store in a dry place. Store in a closed container.

P403 + P233 + P235: Store in a well-ventilated place. Keep container tightly closed. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/ container to an approved waste disposal plant.

GHS label elements**General:**

None.

OSHA/HCS status:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards not otherwise classified:

May be toxic by ingestion, inhalation and skin absorption. May cause toxic effects if inhaled or ingested/swallowed. Contact with substance may cause severe burns to skin and eyes. Liquid will often react with tissues to produce toxic products.

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Section 3. Composition/Information on Ingredients

Substances

Formula : C₁₂H₂₇O₄V
Molecular weight : 288.28
CAS-No. : 19120-62-8

Ingredient Name	%	CAS Number
Vanadium triisobutoxide oxide	>95	19120-62-8

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First Aid Measures

Description of Necessary First Aid Measures

General Advice: Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

Eye Contact: Call a physician or POISON CONTROL CENTER immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue rinsing.

Skin Contact: Wash off contaminated skin with soap and plenty of water. Get medical attention if irritation develops and persists or if burns occur.

Inhalation: Call a physician or POISON CONTROL CENTER immediately. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Ingestion: Call a physician or POISON CONTROL CENTER immediately. Rinse mouth. Do NOT induce vomiting. Remove dentures if any. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most Important Symptoms/Effects, Acute And Delayed Potential Acute Health Effects

Eye Contact: May cause immediate or delayed severe eye irritation. Symptoms may include stinging, tearing, and redness. Extended contact with eye tissue may result in corrosive damage to tissue.

Inhalation: Inhalation may irritate the respiratory tract. Reaction of product with water will produce vapors which may cause dizziness or suffocation.

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Section 4. First Aid Measures

- Skin Contact:** May produce irritation or contact dermatitis depending upon state of skin (wet/dry).
- Ingestion:** Diarrhea and vomiting may occur. Liquid is irritating to mucous membranes. The product is an organometallic and behaves as a base. May be expected to react with stomach acids with the possible production of toxic byproducts.
- Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary**
- Notes to Physician:** Treat symptomatically.
- Specific Treatments:** No specific treatment.
- Protection of First Responders:** No action taken shall be taken involving any personal risk without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire Fighting Measures

- General Hazards:** Flammable/combustible material. Product vapors and gases produced by reaction of product with water may form explosive mixtures with air. Vapor may travel to source of ignition and flash back. Most vapors formed are heavier than air. Vapors will spread along ground and collect in low or confined areas (sewers, basements, tanks). Runoff to sewer may create fire or explosion hazard. Containers may explode when heated.
- Suitable Extinguishing Media:** Use sand, dry chemical or carbon dioxide (CO₂).
- Unsuitable Extinguishing Media:** Do not use water as an extinguisher, as this product reacts vigorously with water to produce combustible/explosive gases.
- Unusual Fire and Explosion Hazard:** See General Hazards Section above.
- Product of Combustion:** Decomposition products may include carbon oxides and toxic metal oxide fumes.
- Protection of Firefighters:** Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire-fighters should wear appropriate protection equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in a positive pressure mode.

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Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

- For Non-emergency Personnel:** No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid inhalation of vapors or mist. Provide adequate ventilation. Wear respiratory protection. Put on appropriate personal protective equipment.
- For Emergency Responders:** If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For nonemergency personnel".
- Environmental Precautions:** Do not allow dispersal of spilled material and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for Containment

- Small Spill:** Keep away from ignition sources. Use an inert dry binding material (sand, diatomite, acid binders, universal binders) on spill, sweep up and place in an appropriate waste disposal container. Do not flush spill area with water or aqueous cleaning solution. Dispose of via a licensed waste disposal contractor.
- Large Spill:** Keep away from ignition sources. Contain and collect spillage with non-combustible, dry absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in dry container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Minimize exposure to air/water/moisture. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and Storage

- Precautions:** Handle under dry protective gas. Store in cool/dry place in tightly closed container. Keep container tightly sealed. Avoid inhalation of vapors or mist. Avoid prolonged exposure. Provide adequate ventilation.

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Section 7. Handling and Storage

Protective Measures:

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust, vapor or mist. Keep in the original container kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

General Occupational Hygiene:

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Safe Storage Conditions:

Store under dry/inert gas. Keep away from heat, sparks and open flames. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (oxidizing agents, water/moisture, air) and food and drink. Keep container tightly closed and sealed until ready for use. Store locked up.

Section 8. Exposure Controls/Personal Protection

Introductory Remarks:

These recommendations provide general guidance for handling this product. Because work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and conduct regular repairs. Waste from these procedures should be handled in accordance with Section 13.

Occupational Exposure Limits:

No data is available for this product.

Engineering Controls:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute. Provide an eyewash/shower station.

Environmental Exposure Controls:

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

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Section 8. Exposure Controls/Personal Protection

Individual Protection Measures

Hygiene Measures:

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Remove all soiled and contaminated clothing immediately. Do not inhale gases/fumes/vapors. Avoid contact with eyes and skin. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/Face Protection:

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles, faceshield (8-inch minimum). Refer to 29 CFR 1910.133, ANSI Z87.1, or European Standard EN166.

Skin Protection

Hand Protection:

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: Chemical-resistant gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Neoprene or nitrile rubber.

Other Skin Protection:

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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Section 8. Exposure Controls/Personal Protection

Respiratory Protection:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Section 9. Physical and Chemical Properties

Physical State:	Liquid.
Color:	Yellow.
Odor:	Alcohol-like.
Odor Threshold:	No data available.
pH:	No data available.
Melting Point:	-10°C.
Boiling Point:	105°C @ 760 mm Hg.
Flash Point:	27.8°C.
Auto-ignition temperature:	No data available.
Specific Gravity:	1,011 g/cm ³ .
Vapor Pressure:	16.4 mm Hg @ 25°C.
Vapor Density:	No data available.
Water Solubility:	Soluble.
Evaporation Rate:	No data available.
Viscosity:	No data available.
VOC Content:	No data available.

VOCs are calculated following the requirements under 40 CFR, Part 59, Subpart C for Consumer Products and Subpart D for Architectural Coatings.

Section 10. Stability and Reactivity

Reactivity:	Liquid is organometallic and behaves as a base. Corrosive to metal surfaces. Reactive with acids, other bases and oxidizing agents.
Chemical Stability:	Stable at normal ambient temperature and pressure and under recommended storage conditions.
Conditions to Avoid:	Exposure to moisture/water and elevated temperatures.
Incompatible Materials:	Acids and other bases. Oxidizing agents.

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Section 10. Stability and Reactivity

- Hazardous Decomposition Products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products formed under fire conditions: carbon oxides and toxic metal oxide fumes. Hazardous decomposition products formed from exposure to water: isobutanol and vanadium oxide gel. In the event of a fire: see section 5.
- Possibility of Hazardous Reactions:** Under normal conditions of storage and use, hazardous reactions will not occur.

Section 11. Toxicological Information

Information on Toxicological Effects

Acute Toxicity

Product/Ingredient Name	Test	Species	Dose	Exposure
Vanadium triisobutoxide oxide	LD50 Oral	Rat	293 mg/kg	-
	LD50 Dermal	Rabbit	1930 mg/kg	-

Irritation/Corrosion

Product/Ingredient Name	Test	Species	Dose	Exposure	Result
Vanadium triisobutoxide oxide	Draize (Skin)	Rabbit	500 mg/kg	24 h	Severe
	Draize (Eye)	Rabbit	100 mg	-	Severe

Sensitization : No specific data available.

Germ Cell Mutagenicity : No effects known.

Carcinogenicity

IARC : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by ACGIH.

NTP : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by NTP.

OSHA : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by OSHA.

Reproductive Toxicity : No specific data available.

Teratogenicity : No specific data available.

Specific Target Organ Toxicity (single exposure) : Respiratory tract irritation. Possible narcotic effects.

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Section 11. Toxicological Information

Specific Target Organ Toxicity (repeated exposure)	: No specific data available.
Aspiration Hazard	: No specific data available.
Information on the likely routes of exposure	: Inhalation, dermal, eyes, oral.
Additional Information	: None

Section 12. Ecological Information

Numerical Measures of Toxicity

Toxicity to Fish	: No specific data available.
Toxicity to daphnia and other aquatic invertebrates	: No specific data available.
Toxicity to algae	: No specific data available.

Persistence and Degradability

Biodegradability	: No specific data available.
Bioaccumulative potential	: No specific data available.
Mobility in soil	: No specific data available.
Other Adverse Effects	: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13. Disposal Considerations

Waste Treatment Methods

Product	Dispose of in accordance with local, state, and federal regulations. Refer to 40 CFR 260-299 for complete waste disposal regulations. Consult your local, state, or federal agency before disposing of any chemicals.
Contaminated packaging	Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT EXPOSE SUCH CONTAINERS TO AIR, MOISTURE, WATER AS FLAMMABLE/EXPLOSIVE GASES MAY BE GENERATED. DO NOT EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

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Section 14. Transport Information

	DOT	IMDG	IATA
UN Number	UN 3398	UN 3398	UN 3398
UN Proper Shipping Name	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE (Vanadium triisobutoxide oxide)	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE (Vanadium triisobutoxide oxide)	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE (Vanadium triisobutoxide oxide)
Transport Hazard Classes	4.3	4.3	4.3
Packing Group	III	III	III
Environmental Hazards	Yes	Yes	Yes
Additional Information	Warning: Substances which, in contact with water, emit flammable gases.	Warning: Substances which, in contact with water, emit flammable gases.	Warning: Substances which, in contact with water, emit flammable gases.

Special Precautions for User : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transporting in Bulk According to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

Section 15. Regulatory Information

TSCA (Toxic Substance Control Act):

This product is not listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory). Use of this product is restricted to research and development only. This product must be used under the supervision of a technically qualified individual as defined by the TSCA. This product must not be used for commercial purposes or in formulations for commercial purposes.

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

None known.

Massachusetts Right To Know Components

No components are subject to Massachusetts Right to Know Act.

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Section 15. Regulatory Information

Pennsylvania Right To Know Components

No components are subject to Pennsylvania Right to Know Act.

New Jersey Right To Know Components

No components are subject to New Jersey Right to Know Act.

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Label for Supply



Section 16. Other Information

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

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Section 16. Other Information

History

Date of printing : 1/6/16

Date of issue/Date of Revision : 1/6/16

Date of previous issue : None

References : None available

Abbreviations and Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstracts Service (division of the American Chemical Society)

DOT: US Department of Transportation

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Materials Identification System

IARC: International Agency For Research on Cancer

IATA: International Air Transport Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)

IMDG: International Maritime Code for Dangerous Goods

NFPA: National Fire Protection Association

NIOSH: National Institute of Occupational Safety and Health

NTP: National Toxicology Program

OSHA: Occupational Safety and Health Administration

SARA: Superfund Amendments and Reauthorization Act

VOC: Volatile Organic Compound

Disclaimer

The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by Ereztech LLC regarding the accuracy or completeness of the information. Ereztech LLC shall not be liable for any damages resulting from the handling, or from the contact with the above product.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.