1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name:	ZF LifeguardFluid 6
Product code:	S671.090.250 S671.090.252 S671.090.253 S671.090.255

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

Use of the Substance/Mixture:	Transmission oil

1.3 Details of the supplier of the safety data sheet

ZF Friedrichshafen AG
ZF Aftermarket
Obere Weiden 12
97424 Schweinfurt
Germany
+49 9721 475 60
www.zf.com/contact

E-Mail: msds.zf-aftermarket@zf.com

1.4 Details of Australian Importer/Supplier

ZF Services Pty Limited
Unit 1, 13 Bessemer Street
Blacktown, NSW 2148
+61 2 9679 5555

1.5 Emergency telephone number

24/7h Emergency telephone number:
Australia ZF 24/7: Tel (+1) 300 938 324 (in English)
International GBK-EMETEL: Tel (+1) 352 323 3500 (in English)
+49 (0)89 19240 Information in German and English

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2. Hazards identification

2.1 Classification of the substance or mixture

GHS Classification
Long-term (chronic) aquatic hazard, Category 3

2.2 Label elements

GHS label elements

Hazard pictograms:	No Hazard Symbol required
Signal word:	No signal word
Hazard statements	
PHYSICAL HAZARDS:	Not classified as a physical hazard under GHS criteria.
HEALTH HAZARDS:	Not classified as a health hazard under GHS criteria.
ENVIRONMENTAL HAZARDS:	H412 Harmful to aquatic life with long lasting effects.
Precautionary statements:	
Prevention:	P273 Avoid release to the environment.
Response:	No precautionary phrases.
Storage:	No precautionary phrases.
Disposal:	P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Used oil may contain harmful impurities.
Not classified as flammable but will burn.

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3. Composition/information on ingredients

3.2 Mixtures

Chemical nature	Synthetic base oil and additives. Highly refined mineral oil. The highly refined mineral oil contains <3% (w/w) DMSOextract, according to IP346. The highly refined mineral oil is only present as additive diluent.

* contains one or more of the following CAS-numbers:
64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-65-0, 68037-01-4, 72623-86-0, 72623-87-1, 8042-47-5, 848301-69-9, 68649-12-7, 151006-60-9, 163149-28-8.

Hazardous components

Chemical name	CAS-No.	Classification	Concentration [%]
Substituted hydrocarbyl sulphide	67124-09-8	Skin Sens.1; H317 Aquatic Acute1; H400 Aquatic Chronic1; H410	0.1 - 0.99
Ethoxylated amine	61791-44-4	Aquatic Acute1; H410	0.1 - 0.99
Calcium alkaryl sulphonate	75975-85-8	Skin Sens.1B; H317	0.1 - 0.99
Borated ester	Not Assigned	Skin Sens.1B; H317	0.1 - 0.99
Interchangeable low viscosity base oil (<20,5 cSt @40°C) *	Not Assigned	Asp. Tox.1; H304	0 - 90

** polymer exempt.
For explanation of abbreviations see section 16.

4. First aid measures

4.1 Description of first aid measures

Protection of first-aiders: When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

If inhaled: No treatment necessary under normal conditions of use.
If symptoms persist, obtain medical advice.

In case of skin contact: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.

	If persistent irritation occurs, obtain medical attention.
In case of eye contact:	Flush eye with copious quantities of water. Remove contact lenses, if present and easy to do. Continue rinsing. If persistent irritation occurs, obtain medical attention.
If swallowed:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms:	Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.
Protection of first-aiders	When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
Notes to physician	Treat symptomatically

5. Firefighting measures

Suitable extinguishing media:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media:	Do not use water in a jet.
Specific hazards during firefighting:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide may be evolved if incomplete combustion occurs. Unidentified organic and inorganic compounds.

Special protective equipment for fire-fighters:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).
Specific extinguishing methods:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Hazchem Code	NONE

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions:	Avoid contact with skin and eyes.
Emergency procedures:	Avoid contact with skin and eyes.

6.2 Environmental precautions

Environmental precautions:	Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up:	Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

6.4 Additional advice

For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet.
For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet.

7. Handling and storage

General Precautions:	Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Advice on safe handling:	Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
Avoidance of contact	Strong oxidising agents
Product Transfer:	Proper grounding and bonding procedures should be used during all bulk transfer operations to avoid static accumulation.

7.2 Conditions for safe storage, including any incompatibilities

Other data:	Keep container tightly closed and in a cool, well-ventilated place. Use properly labeled and closable containers. Store at ambient temperature.
Packaging material:	Suitable material: For containers or container linings, use mild steel or high density polyethylene. Unsuitable material: PVC.
Container Advice:	Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters/Permissible concentration	Basis
Oil mist, mineral	Not Assigned	TWA (Mist)	5 mg/m³	AU OEL
Oil mist, mineral	Not Assigned	TWA (Mist)	5 mg/m³	Australia. Workplace Exposure Standards for Airborne Contaminants.
Oil mist, mineral	Not Assigned	TWA (Mist)	5 mg/m³	OSHA Z-1
Oil mist, mineral	Not Assigned	TWA (Inhalable fraction)	5 mg/m³	ACGIH

Biological occupational exposure limits
No biological limit allocated.

Monitoring Methods
Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls.
For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods
http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods
http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances
http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany
http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France
http://www.inrs.fr/accueil

Engineering measures
The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:
Adequate ventilation to control airborne concentrations.

Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

General Information:
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or subsequent recycle.
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping

Personal protective equipment
Protective measures
Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Eye protection:	If material is handled such that it could be splashed into eyes, protective eyewear is recommended.
Hand protection:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. PVC, neoprene or nitrile rubber gloves Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly.

	Application of a non-perfumed moisturizer is recommended. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model.
Skin and body protection:	Skin protection is not ordinarily required beyond standard work clothes. It is good practice to wear chemical resistant gloves.
Respiratory protection:	No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for the combination of organic gases and vapours and particles [Type A/Type P boiling point >65°C (149°F)].
Thermal hazards:	Not applicable

Environmental exposure controls

General advice:	Take appropriate measures to fulfill the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. Physical and chemical properties

Appearance:	Liquid at room temperatur
Colour:	Amber
Odour:	Slight hydrocarbon
Odour Threshold:	Data not available
pH:	Not applicable

Pour point	-30°C / -22°F	ASTM D97
Melting point/freezing point	Data not available	
Initial boiling point and boiling range	> 280°C / 536°F	estimated value(s)
Flash point	230°C / 446°F	ASTM D92 (COC)
Evaporation rate	Data not available	
Flammability (solid, gas)	Data not available	
Upper explosion limit	Typical 10 %(V)	
Lower explosion limit	Typical 1 %(V)	
Vapour pressure	< 0,5 Pa (20°C / 68°F)	estimated value(s)
Relative vapour density	> 1	estimated value(s)

Relative density	0,840 (15°C / 59°F)	
Density	840 kg/m³ (15°C / 59°F)	ASTM D4052
Solubility(ies)		
Water solubility	negligible	
Solubility in other solvents Partition coefficient: n-octanol/water	Data not available Pow: > 6 (based on information on similar products)	
Auto-ignition temperature	> 320°C /608°F	
Viscosity, dynamic	Data not available	
Viscosity, kinematic	26,8 mm²/s (40°C / 104°F) 5,6 mm²/s (100°C / 212°F)	ISO 3104
Explosive properties	Not classified	
Oxidizing properties	Data not available	

9.2 Other information

Conductivity: This material is not expected to be a static accumulator.

Decomposition temperature: Data not available

10. Stability and reactivity

10.1 Reactivity The product does not pose any further reactivity hazards in addition to those listed in the following subparagraph.

10.2 Chemical stability: Stable.

10.3	**Possibility of hazardous reactions:**	Reacts with strong oxidising agents.
10.4	**Conditions to avoid:**	Extremes of temperature and direct sunlight
10.5	**Incompatible materials:**	Strong oxidising agents.
10.6	**Hazardous decomposition products:**	No decomposition if stored and applied as directed.

11. Toxicological information

Basis for assessment: Information given is based on data on the components and the toxicology of similar products.Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Exposure routes: Skin and eye contact are the primary routes of exposure although exposure may occur following accidental ingestion.

Acute toxicity
Product:

Acute oral toxicity: LD50 rat: > 5.000 mg/kg
Remarks: Low toxicity:
Based on available data, the classification criteria are not met.

Acute inhalation toxicity: Remarks: Based on available data, the classification criteria are not met.

Acute dermal toxicity: LD50 Rabbit: > 5.000 mg/kg
Remarks: Low toxicity:
Based on available data, the classification criteria are not met.

Skin corrosion/irritation
Product:
Remarks: Slightly irritating to skin., Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis., Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation
Product:

Remarks: Slightly irritating to the eye., Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation
Product:
Remarks: Not a skin sensitiser. Based on available data, the classification criteria are not met.

Components:
Calcium alkaryl sulphonate:
Remarks: May cause an allergic skin reaction in sensitive individuals.

Borated ester **:
Remarks: May cause an allergic skin reaction in sensitive individuals.

Substituted hydrocarbyl sulphide:
Remarks: Experimental data has shown that the concentration of potentially sensitising components present in this product does not induce skin sensitisation.
May cause an allergic skin reaction in sensitive individuals.

11.2 Chronic toxicity

Germ cell mutagenicity
Product:
Remarks: Non mutagenic, Based on available data, the classification criteria are not met.

Carcinogenicity
Product:
Remarks: Not a carcinogen., Based on available data, the classification criteria are not met.

Material	GHS/CLP Carcinogenicity Classification
Highly refined mineral oil	No carcinogenicity classification

Reproductive toxicity
Product:
Remarks: Not a developmental toxicant., Does not impair fertility., Based on available data, the classification criteria are not met.

STOT - single exposure
Product:
Remarks: Based on available data, the classification criteria are not met.

STOT - repeated exposure
Product:
Remarks: Based on available data, the classification criteria are not met.

Aspiration toxicity
Product:
Not an aspiration hazard.

Further information
Product:
Remarks: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

Remarks: Slightly irritating to respiratory system.

12. Ecological information

Basis for assessment:	Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s). (LL/EL/IL50 expressed as the nominal amount of product required to prepare aqueous test extract).
Product: Toxicity to fish (Acute toxicity):	Remarks: LL/EL/IL50 10-100 mg/l Harmful
Toxicity to crustacean (Acute toxicity)	Remarks: LL/EL/IL50 10-100 mg/l Harmful
Toxicity to algae/aquatic plants (Acute toxicity)	Remarks: LL/EL/IL50 10-100 mg/l Harmful
Toxicity to fish (Chronic toxicity)	Remarks: Data not available
Toxicity to crustacean (Chronic toxicity)	Remarks: Data not available
Toxicity to microorganisms (Acute toxicity)	Remarks: Data not available

Components:

Ethoxylated amine M-Factor:	10
Substituted hydrocarbyl sulphide M-Factor:	1

12.2 Persistence and degradability

Product: Biodegradability	Remarks: Not readily biodegradable., Major constituents are inherently biodegradable, but contains components that may persist in the environment.

12.3 Bioaccumulative potential

Product: Bioaccumulation	Remarks: Contains components with the potential to bioaccumulate.
Partition coefficient: n-octanol/water	Pow: > 6 Remarks: (based on information on similar products)

12.4 Mobility in soil

Product: Mobility	Remarks: Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Remarks: Floats on water.

12.5 Other adverse effects

no data available

Product: Additional ecological information	Does not have ozone depletion potential, photochemical ozone creation potential or global warming potential., Product is a mixture of non-volatile components, which will not be released to air in any significant quantities under normal conditions of use. Poorly soluble mixture., Causes physical fouling of aquatic organisms.

13. Disposal considerations

13.1 Disposal methods

Waste from residues	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to

	determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or ground water or be disposed of into the environment. Waste, spills or used product is dangerous waste.
Contaminated packaging:	Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand. Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local legislation Remarks	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. Transport information

14.1 National Regulations

ADG	Not regulated as a dangerous good

14.2 International Regulations

IATA-DGR	Not regulated as a dangerous good
IMDG-Code	Not regulated as a dangerous good

14.3 Special precautions for user

Remarks:	Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

14.4 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied. MARPOL Annex 1 rules apply for bulk shipments by sea.

15. Regulatory information

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

Standard for the Uniform: No poison schedule number allocated

15.2 Scheduling of Medicines and Poisons

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.
Product classified as per Work Health Safety Regulations – Implementation of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) 2012 and SDS prepared as per national model code of practice for preparation of safety data sheet for Hazardous chemicals 2011 based on Globally Harmonized Classification version 3.
National Model Code of Practice for the Labelling of Workplace Hazardous Chemicals (2011).
Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code). Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

15.3 Other international regulations

The components of this product are reported in the following inventories:

EINECS:	Not established.
TSCA:	Notified with Restrictions.
AIIC:	All components listed.

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16. Other information

Full text of H-Statements

H304	May be fatal if swallowed and enters airways.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Aquatic Acute	Short-term (acute) aquatic hazard
Aquatic Chronic	Long-term (chronic) aquatic hazard
Asp. Tox.	Aspiration hazard
Skin Sens.	Skin sensitisation

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing

and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Further information

Training advice:	Provide adequate information, instruction and training for operators.
Other information:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
Sources of key data used to compile the Safety Data Sheet	The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not

be valid for such material used in combination with any other materials or in any process, unless specified in the text.