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1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product name : Dipropylene glycol (DPG)

Product code : U1521

CAS-No. : 25265-71-8

Synonyms : DPG; Oxydipropanol

Manufacturer or supplier's details

Manufacturer/Supplier : SHELL EASTERN CHEMICALS (S)

A REGISTERED BUSINESS OF SHELL EASTERN

TRADING (PTE) LTD (UEN:198902087C)

9 North Buona Vista Drive , #07-01

The Metropolis Tower 1 Singapore 138588

Singapore

Telephone : +65 6384 8737 Telefax : +65 6384 8454

Emergency telephone

number

: +65 6542 9595 (Alert-SGS)

Recommended use of the chemical and restrictions on use

Recommended use : DPG is used in the manufacture of unsaturated polyester

resins and benzoate plasticizers., Chemical Use.

Restrictions on use : Advice in this document relates only to product as originally

supplied. Other derivative chemicals will have different

properties and hazards. Advice should be sought on their safe

handling and use., Do not add directly to food.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous components

Chemical name	CAS-No.	Classification	Classification	Concentration
	EC-No.	(67/548/EEC)	(REGULATION	(% w/w)
	Registration		(EC) No	
	number		1272/2008)	
Dipropylene glycol	25265-71-8			<= 100

3. HAZARDS IDENTIFICATION

Based on available data this substance / mixture does not meet the classification criteria.

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Label elements

Hazard pictograms : No Hazard Symbol required

Signal word : No signal word

Hazard statements : PHYSICAL HAZARDS:

Not classified as a physical hazard according to CLP criteria.

HEALTH HAZARDS:

Not classified as a health hazard under CLP criteria.

ENVIRONMENTAL HAZARDS:

Not classified as environmental hazard according to CLP

criteria.

Precautionary statements : **Prevention:**

No precautionary phrases.

Response:

No precautionary phrases.

Storage:

No precautionary phrases.

Disposal:

No precautionary phrases.

Other hazards

Not classified as flammable but will burn.

4. FIRST-AID MEASURES

General advice : Not expected to be a health hazard when used under normal

conditions.

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.

Most important symptoms and effects, both acute and

delayed

: Not considered to be an inhalation hazard under normal

conditions of use.

Possible respiratory irritation signs and symptoms may include

a temporary burning sensation of the nose and throat,

coughing, and/or difficulty breathing.

No specific hazards under normal use conditions.

Skin irritation signs and symptoms may include a burning

sensation, redness, or swelling.

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No specific hazards under normal use conditions. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.

No specific hazards under normal use conditions.

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 : Call a doctor or poison control center for guidance.

Treat symptomatically. Following cases of gross overexposure, investigation of liver, kidney and eye function may be advisable. Records of such incidents should be maintained

for future reference.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Alcohol-resistant 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

: Material will not burn unless preheated.

Carbon monoxide may be evolved if incomplete combustion

occurs.

Containers exposed to intense heat from fires should be

cooled with large quantities of water.

Specific extinguishing

methods

Standard procedure for chemical fires.

Evacuate the area of all non-essential personnel. Keep adjacent containers cool by spraying with water.

Special protective equipment

for firefighters

: 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).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Observe all relevant local and international regulations. Notify authorities if any exposure to the general public or the

environment occurs or is likely to occur.

Local authorities should be advised if significant spillages

cannot be contained.

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: Avoid contact with skin, eyes and clothing.

Environmental precautions

 Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.
 Use appropriate containment to avoid environmental contamination.

Ventilate contaminated area thoroughly.

Methods and materials for containment and cleaning up

Contain run-off from residue flush and dispose of properly. Soak up residue with an absorbent such as clay, sand or other suitable material.

For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely

Additional advice

: For guidance on selection of personal protective equipment

see Section 8 of this Safety Data Sheet.

For guidance on disposal of spilled material see Section 13 of

this Safety Data Sheet.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or direct contact with material. Only use in

well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see

Section 8 of this Safety Data Sheet.

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.

Ensure that all local regulations regarding handling and

storage facilities are followed.

Advice on safe handling : Use local exhaust extraction over processing area.

Handle and open container with care in a well-ventilated area.

Do not empty into drains.

When handling product in drums, safety footwear should be worn and proper handling equipment should be used.

Handling Temperature:

Ambient.

Avoidance of contact : Strong oxidising agents.

Strong acids. Strong bases.

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Product Transfer : Keep containers closed when not in use. Do not pressurize

drum containers to empty.

Storage

Conditions for safe storage : Refer to section 15 for any additional specific legislation

covering the packaging and storage of this product.

Other data : Tanks must be clean, dry and rust-free.

Keep container tightly closed.

Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat. Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of

strict procedures and precautions.

Drums should be stacked to a maximum of 3 high.

Storage Temperature:

Ambient.

Packaging material : Suitable material: Stainless steel., Mild steel., Carbon steel

Unsuitable material: Data not available

Container Advice : Containers, even those that have been emptied, can contain

explosive vapours. Do not cut, drill, grind, weld or perform

similar operations on or near containers.

Specific use(s) : Not applicable

Ensure that all local regulations regarding handling and

storage facilities are followed.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

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

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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

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

General Information:

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.

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.

Personal protective equipment

Protective measures

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

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.

Hand protection

Remarks

: 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. Longer term protection: Nitrile rubber. Incidental contact/Splash protection: PVC, neoprene or nitrile rubber gloves 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

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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. 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 nonperfumed moisturizer is recommended.

Eye protection : If material is handled such that it could be splashed into eyes,

protective eyewear is recommended.

Skin and body protection : Skin protection is not ordinarily required beyond standard

work clothes.

It is good practice to wear chemical resistant gloves.

Hygiene measures : Wash hands before eating, drinking, smoking and using the

toilet.

Launder contaminated clothing before re-use.

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances

must be observed for the discharge of exhaust air containing

vapour.

Minimise release to the environment. An environmental assessment must be made to ensure compliance with local

environmental legislation.

Information on accidental release measures are to be found in

section 6.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid.

Colour : colourless
Odour : odourless

Odour Threshold : Data not available

pH : 7

Melting / freezing point : $-20 \,^{\circ}\text{C}$ / $-4 \,^{\circ}\text{F}$ Boiling point/boiling range : $227 \,^{\circ}\text{C}$ / $441 \,^{\circ}\text{F}$ Flash point : $130 \,^{\circ}\text{C}$ / $266 \,^{\circ}\text{F}$

Method: ASTM D-93 / PMCC

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Evaporation rate : Data not available Flammability (solid, gas) : Not applicable

Upper explosion limit : 12.6 %(V)

Lower explosion limit : 2.9 %(V)

Vapour pressure : 1.3 Pa (25 °C / 77 °F)

Relative vapour density : 4.6 (20 °C / 68 °F)

Relative density : 1.023

Density : 1.03 g/cm3 (20 °C / 68 °F)

Solubility(ies)

Water solubility : Completely miscible.

Partition coefficient: n-

octanol/water

: log Pow: 0.462 (21.7 °C / 71.1 °F)

Auto-ignition temperature : 327 - 337 °C / 621 - 639 °F

Decomposition temperature : Data not available

Viscosity

Viscosity, dynamic : 116 mPa.s (25 °C / 77 °F)

Viscosity, kinematic : 118 mm2/s (20 °C / 68 °F)

32 mm2/s (40 °C / 104 °F)

Explosive properties : Not applicable

Oxidizing properties : Data not available

Surface tension : 71.4 mN/m, $22 ^{\circ}\text{C} / 72 ^{\circ}\text{F}$

Conductivity: > 10,000 pS/m

A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid, This material is not expected to be

a static accumulator.

Particle size : Data not available

Molecular weight : 134.2 g/mol

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10. STABILITY AND REACTIVITY

Reactivity The product does not pose any further reactivity hazards in

addition to those listed in the following sub-paragraph.

Chemical stability : No hazardous reaction is expected when handled and stored

according to provisions Oxidises on contact with air.

Possibility of hazardous

reactions

Conditions to avoid : Extremes of temperature and direct sunlight.

: None known.

Product cannot ignite due to static electricity.

Incompatible materials Strong oxidising agents.

> Strong acids. Strong bases.

Hazardous decomposition

products

Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative

degradation.

Carbonyl and dioxolane derivatives may be formed.

11. TOXICOLOGICAL INFORMATION

Basis for assessment Information given is based on product testing, and/or similar

products, and/or components.

Information on likely routes of

exposure

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

Acute toxicity

Product:

Acute oral toxicity : LD 50 Rat, male and female: > 5,000 mg/kg

Method: US EPA Test Guideline OPP 81-1

Remarks: Based on available data, the classification criteria

are not met.

Acute inhalation toxicity : LC 50 Rat, male and female: > 2.34 mg/l

> Exposure time: 4 h Test atmosphere: Aerosol Method: Other guideline method.

Remarks: Based on available data, the classification criteria

are not met.

: LD 50 Rabbit, male and female: > 5,000 mg/kg Acute dermal toxicity

Method: Other guideline method.

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

Skin corrosion/irritation

Product:

Species: Rabbit

Method: Other guideline method.

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

Serious eye damage/eye irritation

Product:

Species: Rabbit

Method: Other guideline method.

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

Respiratory or skin sensitisation

Product:

Species: Guinea pig

Method: Other guideline method.

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

Germ cell mutagenicity

Product:

Method: Acceptable non-standard method.

Remarks: Based on available data, the classification criteria

are not met.

Method: Test(s) equivalent or similar to OECD Test Guideline

476

Remarks: Based on available data, the classification criteria

are not met.

Test species: MouseMethod: OECD Test Guideline 474 Remarks: Based on available data, the classification criteria

are not met.

Carcinogenicity

Product:

Species: Mouse, (male and female)

Application Route: Oral

Method: Acceptable non-standard method.

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

Material	GHS/CLP Carcinogenicity Classification
Dipropylene glycol	No carcinogenicity classification.

Reproductive toxicity

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Product:

Species: Mouse Sex: male and female Application Route: Oral

Method: Literature data

Remarks: Based on available data, the classification criteria

are not met.

Effects on foetal development

Species: Rat, female Application Route: Oral

Method: Test(s) equivalent or similar to OECD Test Guideline

Remarks: Based on available data, the classification criteria

are not met.

Species: Rabbit, female **Application Route: Oral**

Method: Test(s) equivalent or similar to OECD Test Guideline

Remarks: 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.

Repeated dose toxicity

Product:

Rat, male and female: Application Route: Oral

Method: Acceptable non-standard method. Target Organs: No specific target organs noted

Aspiration toxicity

Product:

Based on available data, the classification criteria are not met.

Further information

Product:

Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

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12. ECOLOGICAL INFORMATION

Basis for assessment : Incomplete ecotoxicological data are available for this product.

The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.

Ecotoxicity

Product:

Toxicity to fish (Acute

toxicity)

: LC50 (Oryzias latipes (Japanese medaka)): > 1,000 mg/l

Exposure time: 96 h

Method: OECD Test Guideline 203 Remarks: Practically non toxic:

LL/EL/IL50 > 100 mg/l

Toxicity to crustacean (Acute

toxicity)

: EC50 (Daphnia magna (Water flea)): > 100 mg/l

Exposure time: 48 h

Method: OECD Test Guideline 202 Remarks: Practically non toxic:

LL/EL/IL50 > 100 mg/l

Toxicity to algae/aquatic

plants (Acute toxicity)

: EC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201 Remarks: Practically non toxic:

LL/EL/IL50 > 100 mg/l

Toxicity to fish (Chronic

toxicity)

: Chronic Toxicity Value: 1,340 mg/l

Exposure time: 30 d

Method: Based on quantitative structure-activity relationship

(QSAR) modelling

Remarks: NOEC/NOEL > 100 mg/l

Toxicity to crustacean

(Chronic toxicity)

: Chronic Toxicity Value: 466 mg/l

Exposure time: 16 d

Species: Daphnia (water flea)

Method: Based on quantitative structure-activity relationship

(QSAR) modelling

Remarks: NOEC/NOEL > 1.0 - <= 10 mg/l

Toxicity to microorganisms

(Acute toxicity)

: EC10 (Pseudomonas putida): >= 1,000 mg/l

Exposure time: 18 h

Method: Test(s) equivalent or similar to OECD Guideline 209

Remarks: Practically non toxic:

LL/EL/IL50 > 100 mg/l

Persistence and degradability

Product:

Biodegradability : Biodegradation: 84.4 %

Exposure time: 28 d

Method: OECD Test Guideline 301F Remarks: Readily biodegradable.

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Bioaccumulative potential

Product:

Bioaccumulation : Species: Cyprinus carpio (Carp)

Exposure time: 42 d

Bioconcentration factor (BCF): 0.3 - 4.6 Method: OECD Test Guideline 305C

Remarks: Does not bioaccumulate significantly.

Partition coefficient: n-

octanol/water

: log Pow: 0.462 (21.7 °C)

Mobility in soil

Product:

Mobility : Remarks: If the product enters soil, one or more constituents

will or may be mobile and may contaminate groundwater.

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : F

: 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. Remove all packaging for recovery or waste disposal. Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.

Do not dispose into the environment, in drains or in water

courses

Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised 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 regulations may be more stringent than regional or national requirements and must be complied with.

MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

Contaminated packaging : Dispose in accordance with prevailing regulations, preferably

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to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.

14. TRANSPORT INFORMATION

International Regulations

ADR

Not regulated as a dangerous good

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

Not regulated as a dangerous good

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

Pollution category : Z Ship type : 3

Product name : Dipropylene glycol

Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage,

for special precautions which a user needs to be aware of or

needs to comply with in connection with transport.

Additional Information: This product may be transported under nitrogen blanketing.

Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a

confined space entry.

15. REGULATORY INFORMATION

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

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

The Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 (amended version issued 2000). The Factories Act, 1948, The Second Schedule: Permissible levels of certain chemical substances in work environment, as amended through 1987. India Central motor Vehicles (Amendment) Rules 1993.

Other international regulations

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

AIIC : Listed
DSL : Listed
IECSC : Listed
ENCS : Listed
KECI : Listed
NZIOC : Listed
PICCS : Listed

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TSCA : Listed **TCSI** : Listed

16. OTHER INFORMATION

Abbreviations and Acronyms : The standard abbreviations and acronyms used in this

document can be looked up in reference literature (e.g.

scientific dictionaries) and/or websites.

SDS Regulation Regulation 1907/2006/EC

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 guoted 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).

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.