

Material Safety Data Sheet

Teijin Aramid bv

Twaron® para-Aramid Yarn

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Twaron® para-Aramid Yarn
Chemical Name: Poly-paraphenyleneterephthalamide
Synonym: p-Aramid
C.A.S. Registry No.: 26125-61-1
Chemical Formula: Polymer (C₈H₄Cl₂O₂.C₆H₈N₂)_x
Product Uses: Strength member in cables Ballistic protection material
 Elastomer reinforcement Composites, protective apparel

Manufacturer / Supplier

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2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

No health risks have so far become available when this fiber product has been handled/processed properly and used for its intended application.

Wear appropriate personal protective equipment as needed (see section 8 for additional information).

Appearance and odor: odorless yellow filament yarn, spinning fiber, staple fiber, cut fiber

POTENTIAL HEALTH EFFECTS [See section 11 for additional information]

Primary Route(s) of Exposure: Eye contact, skin contact and inhalation.

Acute Exposure: The fiber product (polymer) is non-toxic. Dust may be irritating to the respiratory tract and cause symptoms of bronchitis. This product has a low order of acute toxicity and ingestion is not expected to cause any harm.

Carcinogenicity: IARC, NTP, ACGIH or OSHA does not classify this material as a carcinogen or suspect carcinogen. IARC rated p-Aramid fibrils as “non-classifiable as to its carcinogenicity for animals or humans” (Class III).

Medical conditions aggravated: Inhalation of dust could aggravate existing respiratory condition.

POTENTIAL ENVIRONMENTAL EFFECTS [See Section 12 for additional information]

This product is not considered to be harmful to aquatic life.

3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS	% (w/w)	CAS Number
Poly-(para-phenylene terephthalamide)	50 - 98	26125-61-1

Additives:

- Fiber finish ... < 1.2%
- Sodium sulfate ... < 3%
- Absorbed water ... < 8%
- Pigments ... < 8% [only Twaron type(s) D1026, D2226]
- Water-blocking agents ... < 5% [only Twaron type(s) 1052, 1002, D3052]
- PTFE ... < 40% [only Twaron type(s) 1030, 1031]
- Silicone oil ... < 22% [only Twaron type(s) 1030]

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3. COMPOSITION / INFORMATION ON INGREDIENTS (CONTINUED)

- Medical white oil ... < 10% [only Twaron type(s) 1031]
- Modified polyester resin ... < 7% [only Twaron type(s) 1484, 1486 & 1488]
- Epoxy composition ... < 0.4% [only Twaron type(s) 1014, 1015 & 1016]
- Polyether-polyurethane ... < 7% [only Twaron type(s) 1684, 1686 & 1688]
- Aliphatic polyester urethane ... < 6% [only Twaron type(s) 2800]
- Fiber finish of sodium and potassium salts of carboxylic acid ... < 7% [only Twaron type(s) 2255]
- Fatty alcohol ethoxylate ... < 0.4% [only Twaron type(s) D2204, D2304]

Other information - Fiber finish.

The fiber product itself is not toxic. It may, however, contain up to 1.2% of a fiber finish. If the product is intended for special applications, e.g. in the food industry, please consult the manufacturer prior to application. So far, no impairment of health has become known in cases where the product has been used for its intended application. The applied fiber finish may evaporate or decompose in cases where the product is heat-treated at temperatures of 266-374°F (130-190°C). If water is used for further treatment, the waste water generated by the process must be treated in a water purification plant in compliance with local regulations.

Residual solvents: none.

Fibers and yarns are generally provided with finishes to facilitate processing. If necessary, these finishes, and also coning oils or sizing agents, can generally be removed in an aqueous medium.

4. FIRST AID MEASURES

Inhalation: Remove victim to fresh air if person has been exposed to excessive quantities of fiber dust or fly. If breathing becomes difficult, oxygen may be given, preferably under physician's advice. Get medical attention if coughing or other symptoms develop.

Eye Contact: Flush eyes with large quantities of running water for a minimum of 15 minutes. If easy to do, remove contact lenses, if worn. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids with water. Get medical attention if eye irritation occurs.

Skin Contact: Remove contaminated clothing, shoes and equipment. Flush skin with plenty of water for at least 15 minutes. Wash contaminated clothing and shoes before reuse. Get medical attention if irritation occurs.

Ingestion: Do not induce vomiting, unless instructed by a physician. If victim is conscious, rinse mouth and give water to drink. If vomiting occurs, keep head below the hips to reduce risk of aspiration. Give fluids again. Never give anything by mouth to an unconscious person. Get medical attention as warranted.

Note to Physician: Attending physician should treat exposed patients symptomatically.

5. FIRE FIGHTING MEASURES

Conditions of Flammability:	not flammable or combustible
Flash Point (Method):	not determined
Upper Flammable Limit (% by volume):	not determined
Lower Flammable Limit (% by volume):	not determined
Auto-Ignition Temperature:	not determined

Extinguishing Media: This product is not flammable or combustible. If involved in a fire, use extinguishing agents suitable for surrounding materials, such as water fog or spray, dry chemical, foam, carbon dioxide or other Class B agents. Avoid solid water stream. Do not use water if fire was caused by an electrical short circuit.

Fire Fighting Procedures: As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate all non-essential personnel from the fire area. Fire fighters should wear full-face, self-contained breathing apparatus approved by MSHA/NIOSH and impervious protective clothing.

Fire & Explosion Hazards: This product is not defined as flammable or combustible and should not be a fire hazard under normal use conditions. Organic dust can be explosive when ideal conditions of concentration, humidity, temperature and source are met.

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5. FIRE FIGHTING MEASURES (CONTINUED)

Hazardous Combustion Products: Do not inhale explosion or combustion vapors. Thermal decomposition may release toxic and/or hazardous products such as carbon oxides, organic compounds of low molecular weight and hydrogen cyanide in low concentration. Decomposition products are roughly comparable to those of wool.

NFPA Hazard Rating – Health: 1 **Fire:** 1 **Instability:** 0 **Other:** None
[0 - Minimal 1 - Slight 2 - Moderate 3 - High 4 - Extreme]

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak: Safely stop source of spill. Restrict non-essential personnel from area. All personnel involved in spill cleanup should avoid skin and eye contact by wearing appropriate personal protective equipment (see section 8). Do not breathe dust.

Cleanup: Sweep or vacuum spilled solid material, being careful not to create dust. Return sweepings to stock or, if contaminated, place into a chemical waste container for disposal according to local, state or federal regulations. To minimize dust, vacuum cleaning is preferred.

7. HANDLING AND STORAGE

Handling: Avoid prolonged and/or repeated skin and eye contact. Do not breathe dust.

Storage: Store this material in a cool, dry and well-ventilated area. Observe good housekeeping practices. Contain and prevent dust collection. If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow should be provided. (See section 8).

Maximum Storage Temperature: Store in a cool and dry place at ambient temperature (below 25°C / 77°F).

Other Precautions: All cardboard containers, storage cartons, bobbins, bales and bags must be stored in compliance with relevant regulations and in accordance with good handling and storage practice.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits: *p*-Aramid fibers as such are not subject to any exposure regulation. *p*-Aramid respirable fiber-shaped particulates (RFP) may be released from pulp, cut-fiber and staple fiber or may be formed during abrasive processing of Twaron and it is recommended to keep these levels below 1 RFP (Respirable Fiber Particulates) per cm³ of air.

Engineering Controls - Ventilation: Use extraction and ventilation equipment to reduce the occurrence of fiber fly, fiber dust and decomposition products of the finish.

Personal Protective Equipment (PPE): Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from the eyes, skin, and clothing.

- **Respiratory Protection:** MSHA/NIOSH approved respiratory protection should be worn when maximum concentration of 1 RFP (respirable fiber-shaped particulate) per cm³ of air is exceeded.
- **Skin Protection:** Skin contact with the product should be minimized or prevented through the use of suitable protective clothing, gloves and footwear selected according to use condition exposure potential.
- **Eye Protection:** Safety glasses are generally not required when manually handling yarn. However, wear safety glasses with side shields in the vicinity of rapidly rotating yarn processing equipment.

Other Protection – General Hygiene Considerations: Wear aprons, boots, and other suitable body protection appropriate to the existing work environment. Yarns that are processed at high speeds can cause abrasions and cuts. Make eyewash stations, washing facilities, safety showers available in areas of use and handling. All food and smoking materials should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Wash hands before eating, drinking, smoking or using washroom. Adhere to sanitation requirements of 29CFR1910.141.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State / Appearance / Odor:	odorless yellow filament yarn, spinning fiber, staple fiber, cut fiber
Boiling Point:	not applicable
Bulk Density:	not applicable
Cloud Point:	not determined
Evaporation Rate (Butyl Acetate=1):	not applicable
Melting Point:	does not melt
Odor Threshold:	not determined
pH:	not determined
Partition Coefficient (n-octanol/water):	not determined
Pour Point:	not determined
Solubility in water:	negligible
Solubility in other solvents:	not determined
Specific Gravity / Density:	1440 kg/m ³
Vapor Density (Air = 1):	not applicable
Vapor Pressure:	not applicable
Viscosity:	not applicable
Conditions of Flammability:	not flammable or combustible
Flash Point (Method):	not applicable
Upper Flammable Limit (% by volume):	not applicable
Lower Flammable Limit (% by volume):	not applicable
Auto-Ignition Temperature:	not applicable

< : less than > : greater than ~ : approximately

10. STABILITY AND REACTIVITY

Stability: This product is stable at ambient temperatures and atmospheric pressures under recommended storage and handling conditions (see section 7). It is not self-reactive and is not sensitive to physical impact.

Conditions to avoid: Temperatures over 932°F (500°C) will cause decomposition of the products and molecular disintegration. Strong bases and acids will cause chemical decomposition (hydrolysis) of the molecules if allowed to react for a relatively long duration.

Incompatibilities: Aromatic polyamides react with strong oxidizing agents. If allowed to act on the fibers for a relatively long time, UV light will cause a darkening of their inherent yellow color and will also adversely affect their strength.

Polymerization: Hazardous polymerization is not expected to occur under normal temperatures and pressures.

Hazardous Decomposition Products: Thermal decomposition may release toxic and/or hazardous products such as carbon oxides, organic compounds of low molecular weight and hydrogen cyanide in low concentration.

11. TOXICOLOGICAL INFORMATION

The fiber product (polymer) is non-toxic. Usually the fibers are treated with about 1% finish. All additives are non-toxic according to the safety data sheets of their manufacturers.

INHALATION

- **Acute exposure:** The acute LC₅₀ for this product is not available.
- **Repeated dose exposure:** The following information does not relate to the intact fibers but only to **respirable, fiber-shaped particulates (RFP)**, which may be found in small numbers in the workplace atmosphere due to abrasive processing. RFP are fragments with diameters of less than 3 µm, lengths up to 100 µm and a length/diameter ratio of at least 3:1.
 - **Subacute and subchronic exposure:** Short term and subchronic (3 months) inhalation studies in rats and hamsters with an extended follow-up of up to nine months have demonstrated that p-Aramid RFP are not biopersistent. Long p-Aramid RFP are quickly transversely broken into smaller fragments and then removed from the lung. However, extremely high amounts of inhaled p-Aramid RFP may inhibit the clearance mechanism. 25 RFP/ml of air has been established as the "no observed adverse effect level" in subchronic study. Inhalation of high concentrations of RFP causes pulmonary inflammation in rats and hamsters and overload phenomena in rats.

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11. TOXICOLOGICAL INFORMATION (CONTINUED)

- **Chronic exposure:** Lifelong exposure to concentrations of 100 and 400 RFP/ml caused pulmonary fibrosis in rats. The fibrosis was largely reversible after cessation of exposure. No malignant tumors resulted from the lifelong inhalation tests in rats. Instead, proliferative cystic tissue changes were observed in rats after exposure to particulates. They occur mainly in (female) rats and have never been observed in human beings. These cysts were subject of scientific debate for an extended period of time, but current consensus holds that they are not malignant and that their occurrence in animals has no relevance to humans.
- **Other routes of exposure:** Intraperitoneal injections of excessive amounts of p-Aramid RFP caused only a non significant increase in the observed number of mesotheliomas. The validity of the intraperitoneal test for the prediction of carcinogenicity is questionable.

SKIN

Acute contact: Dermal toxicity for this product is not available. Slight skin irritation has been observed in isolated cases.

Chronic contact: No known effects for this product.

EYES: While this product has not been tested, it is expected that it would be minimally irritating to the eyes based on tests with similar products.

INGESTION

Acute exposure: The oral LD₅₀ is not available for this product.

Chronic exposure: No known effects.

Sensitization: Not data available for this product.

Carcinogenicity: IARC, NTP, ACGIH or OSHA does not classify this material as a carcinogen or suspect carcinogen. IARC rated p-Aramid fibrils as "non-classifiable as to its carcinogenicity for animals or humans" (Class III).

Mutagenicity / Teratogenicity / Embryotoxicity: No data available.

Target Organs: Skin, eyes and respiratory tract.

Other Toxicological Effects: In the event that the product is to be used in special areas of application, e.g. food industry or the medical/surgical sector, please consult manufacturer beforehand.

12. ECOLOGICAL INFORMATION

Ecotoxicity: No experimental ecological data are available for this product. The fiber product (polymer) is ecologically safe. In cases where the product is heat-treated at temperatures above 120°C (248°F), the applied fiber finish may evaporate or decompose.

Chemical Fate / Biodegradation: No data available.

Other Ecotoxicity information: If water is used for further treatment, the waste water generated by the process must be treated in a water purification plant in compliance with local regulations. If necessary, these finishes can generally be removed in an aqueous medium.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: In its unused condition, this product is not considered to be a RCRA-defined hazardous waste by characteristics or listings. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristic or listing. Dispose in accordance with all local, state and federal regulations.

NOTE – State and local regulations may be more stringent than federal regulations.

Container Disposal: Containers should be cleaned of residual product before disposal or return. Since emptied containers retain product residue, follow label warnings even after container is emptied. Empty containers should be disposed of or shipped in accordance with all applicable laws and regulations.

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14. TRANSPORT INFORMATION

Shipping Information: Not regulated for transport.

Required Labels: No transport label required.

Environmentally Hazardous Substances [49 CFR 172.101, Appendix A]: None

15. REGULATORY INFORMATION

The components are subject to the following environmental regulatory lists:

Substance Name	CAA	CERCLA	IARC	US State Right-To-Know Lists	CA Prop 65	SARA
Poly-(para-phenylene terephthalamide)	N/R	N/R	N/R	N/R	N/R	N/R

National Chemical Inventories Status:

Substance Name	US TSCA	Canada		EU EINECS	Australia AICS	New Zealand NZIoC	Japan ENCS	Korea KECI	Philippines PICCS	China IECSC
		DSL	NDSL							
Poly-(para-phenylene terephthalamide)	X	X		Polymer		X	X	X	X	X

N/R = Non Regulated

X = Listed / Regulated

Legend

- AICS Australian Inventory of Chemical Substances
- CA List California – Directors List of Hazardous Substances
- Ca Prop 65 California Proposition 65
- CAA Clean Air Act, Section 112
- CERCLA CERCLA Hazardous Substances
- DSL Domestic Substances List – Canada
- EINECS European Inventory of Existing Commercial Chemical Substances
- ENCS Japan Existing and New Chemical Substances
- IARC International Agency for Research on Cancer – Carcinogens – Groups 1, 2A or 2B
- IECSC China – Inventory of Existing Chemical Substances
- IL List Illinois Toxic Substances Disclosure to Employees Act
- KECI Korea Existing Chemicals Inventory
- LA List Louisiana Right-to-Know Reporting List
- MA List Massachusetts – R-T-K Substance List
- MN List Minnesota – Hazardous Substance List
- NDSL Non-Domestic Substances List – Canada
- NJ R-T-K New Jersey – R-T-K Hazard List
- NZIoC New Zealand Inventory of Chemicals
- PA List Pennsylvania Hazardous Substance List
- PICCS Philippines Inventory of Chemicals and Chemical Substances
- RI List Rhode Island – Hazardous Substance List
- SARA SARA Title III, Section 302 / 313
- TSCA Toxic Substances Control Act – USA

CANADA – WHMIS (Workplace Hazardous Materials Information System): Not controlled

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* (CPR) and the MSDS contains all the information required by the CPR.

Other Regulatory Information: None available.

This MSDS contains valuable information critical to the safe handling and proper use of this product. This MSDS should be retained and made available to employees and other users of this product.

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*Twaron® para-Aramid Yarn***16. OTHER INFORMATION**

Other Information: The information given in this Material Safety Data Sheet (MSDS) for Man-made Fibers refers exclusively to the fiber product described herein. It covers neither its use in combination with any other material / preparation / product nor its use in any process.

Changes: Section 3 [Fatty alcohol ethoxylate]

Date of Issue: April 28, 2011

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