



creora[®]

Spandex Fiber for Textile Market

According to Regulation (EC) No. 1907/2006

Material Safety Data Sheet

Revised

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By



 **HYOSUNG
CORPORATION**

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Identification of The Substance/Preparation and Company/Undertaking

Introduction

This Material Safety Data Sheet (MSDS) prepared in accordance with Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 – CHIP 3 Approved Code of Practice (L130) “The Compilation of Safety Data Sheet” Third Edition. This MSDS also provides guidelines and suggested precautions for the safe handling and processing of Hyosung’s spandex fiber, “creora®”, according to Directive 91/155/EC or Regulation (EC) No 1907/2006. All the individuals expected to work with creora® spandex fibers should read and understand the information provided in this MSDS prior to the start of processing.

Product

Product Name	creora®
Synonyms	Spandex Fiber; Elastane Filament Yarn
Chemical Family	Segmented Polyurethane-polyurea

Manufacture Site

Head Quarter Hyosung Corporation
 450, Kogduk-Dong, Mapo-Ku
 Seoul, Korea
 ☎ 82-2-707-7000

Kumi Plant	Hyosung Spandex Kumi Plant 169, Simi-Dong, Kumi-Si, KyungSangbuck-Do, Korea ☎ 82-54-470-9114
China Plant (Jiaxing)	Hyosung Spandex (Jiaxing) Co., Ltd YunHaiLu, Jiaxing Economic Developmet Zone, Jiaxing, Zhejiang, China ☎ 86-573-8222-6500
China Plant (Guangdong)	Hyosung Spandex (Guangdong) Co., Ltd No. 8603, Zhuhai Road, Pingsha Industrial Zone, Zhuhai, Guangdong, China ☎ 86-756-772-6125
China Plant (Zhuhai)	Hyosung Spandex (Zhuhai) Co., Ltd Haicheng Industrial Area, Air Port Road, Sanzao, Jinwan Zhuhai, Guangdong, P.R.China ☎ 86-756-778-5823
China Plant (Quzhou)	Hyosung Spandex (Quzhou) Co., Ltd No 8 xiaoxing road, Kecheng District, Quzhou, ZheJiang, P.R. China ☎ 86-570-805-1100
Vietnam Plant (Dong Nai)	Hyosung Vietnam Co., Ltd N2 St, Nhon Trach 5 Industrial Zone, Dong Nai Province, Vietnam ☎ 84-251-3566-000
Turkey Plant (Istanbyl)	Hyosung Istanbul Tekstil Ltd Sti C.O.S.B Faith Bulvari 13, Sok, No:3 Cerkezkoy, Tekirag, Trukey ☎ 90-282-758-3070
Brazil Plant (Santa Catarina)	Hyosung Brasil Industira E Comercio De Fibras Ltda. BR101, Km 69, S/N, Rainha, Araquari, CEP 89245-000, SC, Brasil ☎ 55-47-3025-9610
India plant (Aurangabad)	Hyosung India Pvt. Ltd Plot No.1, Sector No.11, Auric City, Shendra Aurangabad - 431154, India. ☎ 91-762-098-7262

Representative in EU(Emergency Call)

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 Frankfurt Office 61352 Bad Homburg, Germany
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 Fax 49-6172-85532-90

Composition/Information on Ingredients

“creora®” is a synthetic filament yarn essentially composed of carbon, oxygen, nitrogen and hydrogen. This synthetic yarn contains additives to achieve desired chemical and physical properties. These additives do not cause unexpected hazards when handled and processed under guidance provided in this MSDS.

Ingredient	Major Component	CAS No.	Content
creora® Polymer	Segmented Polyurethaneurea	None	> 90%
Stabilizer	Proprietary	-	0.5% (Max)
Lubricants	Polydimethylsiloxane	63148-62-9	6% (Max)
Residual solvent	Dimethylacetamide	127-19-5	0.2~0.6% (Max 1.2% in a few grades)
Delusterants	Titanium Dioxide	13463-67-7	2% (Max)
Antiblocking Agent	Magnesium Stearate	557-04-0	0.5% (Max)

“creora®” may retain a small amount of residual solvent, Dimethylacetamide(DMAc), which is included in the candidate list of SVHC (Substances of Very High Concern) under REACH (ECHA/PR/11/26). This MSDS contains information to allow safe use of the article. However, the amount of DMAc present on the fibre will significantly diminish with further processing and handling. The DMAc content is expected to be minimal once the fiber reaches the end-user.

Hazards Identification

Hyosung’s spandex (creora®) has been produced and processed without any report of adverse human health effects until now. Under recommended processing and ventilation conditions, there is no health hazard which might be caused by “creora®”. “creora®” is expected to present minimal risk to human health and nature.

Classification of the substance or mixture

creora®, as a fiber, is not a hazardous substance or preparation according to EC-directive 67/548/EEC or EC-regulation 1907/2006

Other Hazards

Materials: N,N-Dimethylacetamide (Cas No.: 127-19-5 / EC No.: 204-826-4)

R20/21 – Harmful by inhalation and in contact with skin

R36 – Irritating to eyes

R61 – May Cause harm to the unborn child

Residual DMAc solvent and lubricant oil can be given off into the air or extracted from the fiber during aqueous or solvent finishing. During processing operations, there is some possibility that insufficient ventilation could cause airborne DMAc and lubricant oil to exceed the exposure limits, which may cause a skin rash, allergic reaction, abnormal liver function, nausea, vomiting, or

abdominal pain by skin or eye contact, inhalation, and ingestion. And hence, safe handling should be necessary. And also, there is little possibility that physical contact to spandex yarn may cause acute or chronic health hazard because Titanium dioxide and other inorganic are additives bound within the polymer matrix. In some case of certain dyeing and finishing conditions, some specific inorganic may be transformed to a soluble form, which is expected to cause no adverse health effect.

First-Aid Measures

Inhalation

If sufficient ventilation fails, or if DMAc (or Lubricant oil) could be accumulated or condensed in work area, remove personnel from the area. If symptoms of overexposure to DMAC or Lubricant Oil appear, remove personnel to fresh air. There is no specific antidote. If symptoms persist, call a physician.

Skin

This product has very low possibility to cause a hazardous by skin contact. If irritations occur, Wash hands thoroughly after handling

Eye

In the case of eye contact, flush with flowing fresh water and seek a medical care.

Fire-Fighting Measures

Fire & Explosion Hazards

“creora®” is composed of some kinds of polymer, and which means that creora® burns well like most natural and synthetic fibers under some circumstances. Precautions similar to those taken with other fibers should be taken. However, “creora®” should not be ignited by itself without any heat source like other combustible fibers.

When creora® burns, it is decomposed readily with hazardous gases such as carbon monoxide, nitrogen oxides and other incompletely oxidized organic products which are usually produced when other natural and synthetic fibers burn.

Extinguishing Media

All extinguishing media are suitable. Dry chemical, CO₂, water sprayer or regular foam is available.

Special Firefighting Equipments & Instructions

Self-contained breathing apparatus should be worn to protect from hazardous gases which may be generated by thermal decomposition and combustion. Keep away from all sources of ignition including static charges.

Accidental Release Measures

Normally, there has been no serious problem related to the spill/leak because “creora®” is a solid and stable substance. However, fiber fly, DMAc or Lubricant oils may come from the spandex yarn during yarn handling and processing. If accumulation of airborne dust, DMAc or Lubricant oils occurs on work place, remove it by suitable absorbent or mechanical cleaner. If the extent or area contaminated is abnormal, wear appropriate protective equipment.

Handling and Storage

Packaging Information

“creora®” is packaged and shipped as single continuous fibers wound on plastic laminated paper tubes or recyclable all-plastic tubes in cartons and multiple continuous fibers wound on beams in racks.

Storage Information

A clean, cool, and dry environment is recommended to store “creora®”. Avoid excessive heat, flames and exposure to exhaust gases from internal combustion engines.

Exposure Controls/Personal Protection

Under normal processing conditions, there is no dust hazard from this product. When fiber products are cut, chopped or manipulated in other similar handling methods, some dust may be produced. However, in case that significant fiber flies are generated, exposure limit of airborne fiber is recommended as 10mg/m³ in air. In case that there is a potential to generate a mist or dripping of lubricant oil finish, exposure limit of it is recommended as 5mg/m³ in air. Under conditions of insufficient ventilation (especially when severe thermal conditions are employed), DMAc concentrations in air may exceed the exposure limits. Laboratory tests detects that overexposure to DMAc (which can vaporize over 266°F) by inhalation, ingestion, skin or eye contact may cause symptoms of nausea, headache, eye and skin irritation could be followed by jaundice, vomiting, abdominal pain, and abnormal liver and kidney function. According to some reports, workers in plant exposed repeatedly to 10 to 40ppm may get symptoms of lethargy, dizziness, and weakness.

Personal Protection

No special protective equipment is necessary under normal processing conditions in which there is sufficient ventilation done.

Ventilation Required:

Sufficient local exhaust ventilation is recommended during yarn handling and processing to keep fiber fly (dust), vapor levels of DMAc, and Lubricant oils below the exposure limits. During certain heat treatment, effective ventilation is more important.

Skin Protection:

If prolonged handling of unprocessed yarn causes temporary discomfort due to skin contact with lubricants and other surface deposits, wearing impermeable gloves is recommended.

Eye Protection:

Safety goggles are recommended to protect from fragmented wire and straps when unpacking product boxes.

Respirator:

A dust respirator approved by NIOSH and MSHA is necessary if dust concentration exceeds dust exposure limits. A respirator with organic vapor cartridge is recommended if DMAc or Lubricant Oil concentration exceeds the exposure levels.

The followings are occupational exposure limits values related to DMAc (Dimethylacetamide, CAS No. 127-19-5) at the workplace.

National	Regulation	OELs Values				BLV
		8hours		15minutes		
		mg/m ³ (ppm)	mg/m ³	mg/m ³ (ppm)	mg/m ³	
Austria	BGBl. II Nr. 242/2006 (MAK-Werte)	Tagemittelwert		Kurzzzeitwerte		-
		10	36	20	72	
Belgium	Belgisch Staatsblad 19 mei 2009; N.2009 - 2065	TWA		STEL		-
		10	36	20	72	
Bulgaria	Regulation No 13 of Ministry of Labor & Social Policy, with Ministry of Health, on protection of workers related	TWA		STEL		-
		10	36	20	72	
Canada	Table of exposure limits for chemical and biological substances 2012 (British Columbia) Règlement sur la santé et la sécurité du travail, c. S-2.1, r.19.01, 2009 (Québec)	-		-		-
		VEMP				
Czech Republic	Government Decree 361	TWA		STEL		-
		10	36		60	
Cyprus	K.Δ.Π. 268 2001	TWA		STEL		-
		10	36	20	72	
Denmark	Grænseværdier for stoffer og materialer	TWA		STEL		-
		10	35	-	-	
Estonia	TÖÖKESKONNA KEEMILISTE OHUTEGURITE PIIRNORMID 2007	TWA		STEL		-
		10	36	20	72	
Finland	HTP-VARDEN 2012	8H		15min		-
		10	36	20	72	
France	INRS ED984 2007	VME		VLE		-
		2	7.2	10	36	
Germany	TRGS 900			AGW		BGW
		-	-	10	36	
Greece	Decree No. 90/1999, as amended	TWA		STEL		-
		10	36	20	72	

National	Regulation	OELs Values				BLV mg/g
		8hours		15minutes		
		mg/m ³ (ppm)	mg/m ³	mg/m ³ (ppm)	mg/m ³	
Hungary	A munkahelyek kémiai biztonságáról szóló 25/2000. (IX. 30.) EüM-SZCSM rendelet	TWA	36	STEL	72	-
		TWA	-	STEL	-	-
Iceland	Reguaction 154/1999 on occupational exposure limits	TWA	36	STEL	72	-
		TWA	10	STEL	71	-
Ireland	2007 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 (S.I. No. 2001/200)	8 ore	36	Breve Termine	72	-
		TWA	10	STEL	72	-
Italy	Pubblicato nella Gazzetta Ufficiale italiana n. 58 del 10 marzo 2003	IPRV	36	TPRV	72	-
		TWA	10	STEL	72	-
Lavita	Occupational exposure limit values of chemical substances in work environment	IPRV	36	TPRV	72	-
		TWA	10	STEL	72	-
Lithuania	2001 m. gruodžio 13 d. Nr.645/169	TWA	36	STEL	72	-
		TWA	10	STEL	72	-
Luxembourg	AGENTS CHIMIQUES, CANCÉRIGÈNES OU MUTAGÈNES AU TRAVAIL, A -- N° 96 26 août 2002	TWA	36	STEL	72	-
		TWA	10	STEL	72	-
Malaysia	Schedule 1 of the Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 1995	TWA	36	STEL	72	-
		TWA	10	STEL	72	-
Melta	L.N. 227. of Occupational Health and Safety Authority Act (CAP. 424), Schedules	TWA	36	STEL	72	-
		TWA	10	STEL	72	-
Netherland	Scientific Committee for Occupational Exposure Limits (SCOEL) 2007	TWA	36	STEL	72	-
		TWA	10	STEL	72	-
Mexico	the Official Mexican Standard (NORMA Oficial Mexicana) NOM-010-STPS-1999, issued by the Secretaría del Trabajo y Previsión Social	LMPE-PPT	35	LMPE-CT	50	-
		TLV	10	STEL	72	-
Norway	Administrative normer for forurenning i arbeidsatmosfaere; 13. utgave november 2009	NDS	35	NDSCH	70	-
		TWA	10	STEL	72	-
Poland	Dz. U. z dnia 18 grudnia 2002 r.	TWA	35	STEL	70	-
		TWA	10	STEL	72	-

National	Regulation	OELs Values				BLV
		8hours		15minutes		
		ml/m ³ (ppm)	mg/m ³	ml/m ³ (ppm)	mg/m ³	mg/g
Portugal	Decree-Law n.290/2001 (Journal of the Republic - 1 Series A, n.266)	10	36	20	72	
		TWA		STEL		
Romania	Protection of workers from exposure to chemical agents at the workplace	10	36	-	72	
Slovakia	Zbierka zákonov č. 45/2002	10	36	-	72	
Slovenia	Uradni List 2007	10	36	-	-	
Spain	Límites de Exposición Profesional para Agentes Químicos en España, Mayo 2010; Ministerio de Trabajo e Inmigración	10	36	20	72	
Sweden	ARBETSMILJÖVERKETS FÖRFATTNINGSSAMLING AFS 2005:17	10	35	20	70	
Switzerland	SuvaPro Grenzwerte am Arbeitsplatz 2009	10	35	20	70	
United Kingdom	EH40 2007	10	36	20	72	
United of States	Table AC-1, California Code of Regulations, Control of Hazardous Substances Order (California) MIOSHA-STD-1224, the Occupational Health Standards published by the Department of Consumer and Industry SUBDIVISION Z: TOXIC AND HAZARDOUS SUBSTANCES OREGON RULES FOR AIR CONTAMINANTS (OAR 437- Airborne Contaminants Chapter 296-841 WAC, Airborne Contaminants (2007 Edition) (Washington)	10	35			

※ **Abbreviation**

OELs (Occupational Exposure Limits)	TLV (Threshold Limit Values)
BLV (Biological Limit Values)	NDS (najwyższe dopuszczalne stężenie)
TWA (Total Weight Average)	NDSCH (najwyższe dopuszczalne stężenie chwilowe)
STEL (Short-term exposure limits)	LLV (Level Limit Value)
VME (Valeurs Limites de moyenne d'Exposition)	STV (Short Term Value)
VLE ((Valeurs Limites d'Exposition)	VEMP(VALEUR D'EXPOSITION MOYENNE PONDÉRÉE)
AGW (Arbeitsplatzgrenzwert)	LMPE-PPT (límite máximo permisible de exposición ponderado en tiempo)
BGW (Biologischen Grenzwertes)	LMPE-CT (límite máximo permisible de exposición de corto tiempo)
IPRV (ilgalaikio poveikio ribinė vertė)	NGV(Nivågränsvärde)
TPRV (trumpalaikio poveikio ribinė vertė)	KTV(Korttidsvärde)
	PEL (Permissible Exposure Limit)

Physical and Chemical Properties

General Information

Physical Appearance	Solid Filament Yarn
Color	Colorless or White
Odor	Odorless at room temperature; at higher temperature an ammonia-like odor of DMAc may be detectable

Important Health, Safety and Environmental Information

pH	Not Applicable
Boiling Point	Not Applicable
Flash Point	Not Applicable
Flammability	Not Applicable
Explosive Properties	Not Applicable
Oxidising Properties	Not Applicable
Vapour Pressure	Non-Volatile at 20°C(68°F)
Relative Density	Not Applicable
Solubility	Insoluble in Water(@ 20°C / 68°F)
Partition Coefficient	N-Octanol/water
Viscosity	Not Applicable
Vapour Density	Not Applicable

Evaporation Rate	Not Applicable
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Other Information

Melting Point	About 250°C(437°F) (with decomposition)
Softening Point	170 ~ 180°C (338 ~ 356°F)
Specific Gravity	1.0 – 1.2 (@ 20°C / 68°F)
% Volatile by Weight	Below 1%(DMAc)

Stability and Reactivity

Stability	Stable at room temperature
Incompatibility	Not Known
Hazardous Polymerization	Will not occur
Decomposition Product	Thermal decomposition may start at about 250°C (437°F) by high heat or fire. This thermal decomposition produces carbon dioxide, carbon monoxide, nitrogen oxides, nitriles, cyanides and other undetermined organic compounds.

Toxicological Information

Carcinogenicity

Hyosung’s spandex, “creora®” and the components of this product are not

listed nor regulated as a carcinogen by OSHA, ACGIH, NTP, EPA and IARC.

Animal Toxicity Data

Acute toxicity data of DMAc (Dimethylacetamide) are as followed.

Oral LD 50	4300mg/kg (In case of Rat)
Dermal LD 50	2,240mg/kg (In case of Rabbit)
Inhalation LC 50	2,475ppm/1hr (In case of Rat)
Carcinogenicity	Negative
Mutagenicity	Negative
Eye Effect	Mild irritation (rabbit)
Skin Effect	Human patch testing indicates that creora® is not a skin irritant nor skin sensitizer.

DMAc is present in the fiber and may be released during processing of this fiber. The effects of DMAc have been presented above based on animal testing of high concentration DMAc and may not representative of the toxicity of the fiber containing DMAc.

Ecological Information

This product is not associated with any known negative ecological effects. However DMAc and some specific inorganic will be removed by water, which should be treated by in a waste water plant to comply with local regulations.

Disposal Considerations

“creora®” is not a hazardous material in itself as a waste disposed, and may be incinerated or landfilled in compliance with federal, state, and local laws and regulations.

“creora®” may contain small amount of DMAc as residual spinning solvent. Waste water containing DMAc and some specific inorganics must be disposed (or treated) in a waste water treatment plant in accordance with existing regulations, because the DMAc in waste water contributes to the Biological Oxygen Demand (BOD), and some specific inorganics could be partially soluble during dyeing and other fiber processing.

Transport Information

Shipping Information

Technical Shipping Name Filament yarn or Hyosung “creora®” Spandex
 Hazardous Class/Label/Substance..... Nonregulated
 (by Department of Transportation)

MDG Code (Sea) Nonregulated
 IATA (Air) Nonregulated
 ADR (Road – Directive 94/55/EEC) Nonregulated
 RID (Rail – Directive 96/49/EC) Nonregulated

Regulatory Information

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I

Not listed

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V

Not listed

Other Information

The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.

The conditions of your use and application of our products, technical assistance and information including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, and check technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications.

The information on the suitability of creora® to the specific and detailed working conditions is not provided in this MSDS. It is expressly understood and agreed that the customer assumes and hereby expressly releases Hyosung Corporation from all liability, tort, and contract or otherwise, incurred in connection with the use of our products, technical assistance and information. Purchasers and users of the product are for determining that the product is suitable for the intended use and that their workers and the general public are advised of any risks resulting from such use. The data provided in this sheet relate only to the specific material designated herein and do not relate to the use in combination with any other material or process. Nothing herein should be construed and stretched in favor.