	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	1 / 11

1. IDENTIFICATION

A. Product name

- Product name: Hanwha Total Petrochemical Terpolymer TF451

B. Recommended Use and Restriction on Use

- General Use: CPP film
- Restriction in use: Not available

C. Manufacturer/Distributor Information

- Manufacturer Information

Company	Hanwha Total Petrochemical Co., Ltd.		
Address	103, Dokgot 2-ro, Daesan-eup, Seosan-si, Chungcheongnam-do, Korea 356-711		
Phone	82-41-660-6190	FAX	82-41-660-6189

2. HAZARDS IDENTIFICATION


A. GHS Classification:

- Physical Hazards
 - Not Classified
- Health Hazards
 - Not Classified
- Environmental Hazards
 - Not Classified

B. GHS label elements, including precautionary statements:

- Hazard symbols: Not applicable
- Signal word: Not applicable
- Hazard statement: Not applicable
- Precautionary statements:
 - Prevention: Not applicable
 - Response: Not applicable
 - Storage: Not applicable



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23	
		Revision date	2015.04.30	
	Hanwha Total Petrochemical Terpolymer TF451		Revision No.	REV.2
			Pages	2 / 11

- Disposal: Not applicable

C. Other hazards which do not result in classification:

- NFPA rating(0-4 steps): Health=0, Flammability=0, Reactivity=0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Other name	CAS No. or Identification No	Content (%)
Propylene-1-butene- ethylene copolymer	-	25895-47-0	> 98
Additive	-	-	< 2

※ Identification No.: KE(Korea Existing Chemicals Registration Number)

4. FIRST-AID MEASURES

A. Eye Contact:

- Take medical action.
- In case of contact with substances, rinse your skin and eyes immediately with running water for at least 20 minutes.


B. Skin Contact:

- Take medical action.
- Thoroughly clean clothes and shoes before reuse.
- Remove the contaminated cloths including shoes immediately.
- In case of contact with substances, rinse your skin immediately with running water for at least 20 minutes.

C. Inhalation:

- Take medical action.
- Move into fresh air.



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23	
		Revision date	2015.04.30	
	Hanwha Total Petrochemical Terpolymer TF451		Revision No.	REV.2
			Pages	3 / 11

- If short of breathing, provide oxygen supply system.

D. Ingestion:

- Take medical action.
- Do not put anything into the mouth of an uncounscious person.

E. Delay and immediate effects and also chronic effects from short and long term exposure: Not available

F. Notice to Physician:

- Let a medical provider know about the substance and take appropriate protection.

5. FIRE FIGHTING MEASURE

A. Suitable (Unsuitable) extinguishing media:

- Extinguishing media: Mist, fine water spray, chemical desiccant, carbon dioxide, foam.
- Unsuitable Extinguishing media: water jet
- Large Fire: Not available


B. Specific hazards arising from chemicals:

- Thermal decomposition products:
 - Pyrolysis or combustion cause irritative gases or carbon oxides.
- Fire and Explosion Hazards: Not available

C. Fire fighting procedures and equipments:

- Some are possibly at high temperature during transfer.
- Move the containers out of the fire areas, if possible to do without risk.
- Direct contact may cause burning on the skin and eyes.
- Immediately evacuate, in case of noise from pressure relief units or discoloration of the tank.



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	4 / 11

- For a fire on tank, cool down the containers with cool water after being extinguished.
- For disposal of fire water, dig a ditch to trap and prevent the spread of substances.
- For a fire on tank, step back from the tank engulfed in flames.

6. ACCIDENTAL RELEASE MEASURES

A. Personal Precautions, Protective Equipment and Emergency procedures:

- Remove all flammable sources.
- If it is not dangerous, stop leaking.
- Take caution of substances and conditions that should be avoided.
- Ventilate properly.
- DO NOT touch the effluents or walk around the area.
- Prevent producing dust.


B. Environmental Precautions:

- Spill in air: Not available
- Spill in soil: Not available
- Spill in water: Not available
- Sewage water leak, water will be prevented from entering.
- Leakage in many cases be reported to the fire department and related departments.

C. Methods and materials for containment and cleaning up:

- Small leak:
 - Put in proper containers for waste.
 - Wipe out
- Large leak:
 - Powder emission: To minimize the spread, cover it with plastic sheets or water-proof cloths and keep it away from water.



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	5 / 11

7. HANDLING AND STORAGE

A. Handling:

- Wash thoroughly after use.
- Take caution against high temperature.
- Refer Engineering Maintenance and Personal Protective Gears at work.

B. Storage Precautionary Statements:

- Seal it before storage.
- Store in cool and dry places.
- Take caution of substances and conditions that should be avoided.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure Limits By Material:

Chemical Name	Exposure limit under ISHL	ACGIH	OSHA
-	-	-	-

Biological exposure limits: Not applicable

B. Engineering Controls

- The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.


C. Personal Protective Equipment:

Respiratory protection: Frequent use or heavy exposure, respiratory protection if needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.

※ When take shelter

- Dust, mist, fume-purifying respiratory protection
- Any air-purifying respirator with a corpuscle filter of high



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	6 / 11

efficiency

- Any respiratory protection with a electromotion fan(for dust, mist, fume-purifying)

※ For Unknown Concentration or Immediately Dangerous to Life or Health

- Self-contained breathing apparatus(pressure-demand or other positive-pressure mode in combination)

- Supplied-air respirator with full facepiece


- Eye protection: Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield. Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Hand protection: Where there is potential for hand contact, wear appropriate gloves.
- Body protection: Where there is potential for skin contact, wear appropriate clothing.



9. Physical and Chemical Properties

- A. Appearance (physical state, color, etc.): Not available
- B. Smell: Not available
- C. Odor threshold: Not available
- D. pH: Not available
- E. Melting / freezing range: 120~150℃
- F. Initial boiling point and boiling point range: Not available
- G. Flash point: Not available
- H. Evaporation Rate: Not available
- I. Flammability (solid, liquid): Not available
- J. Explosion range of prints or high / low: Not available
- K. VAPOR PRESSURE: Not available
- L. Solubility: Not available
- M. Vapor Density: Not available
- N. Specific gravity: 0.89~0.92



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	7 / 11

- O. n-octanol / water partition coefficient: Not available
- P. Autoignition temperature: > 380°C
- Q. Decomposition temperature: Not available
- R. Viscosity: Not available
- S. Molecular Weight: > 1,000

10. STABILITY AND REACTIVITY

A. Stability:

- This product is stable at steady-state when stored and handled under recommended conditions, temperature and pressure.

B. Possibility of Hazardous Reaction:

- No report about harmful polymerized reactions in the room temperature and pressure.

C. Conditions to Avoid:

- Avoid contact with heat, flame, spark and other ignition sources.

D. Materials to Avoid:

- Flammable substance

E. Hazardous Decomposition Products:


- Thermal decomposition product → carbon oxides

11. Toxicological Information

A. Information on the likely routes of exposure:

- (Respiratory system): Not available
- (Oral): Not available
- (Eyes · Skin): Not available

B. Delayed and immediate effects and also chronic effects from short and long term exposure


	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	8 / 11

- Acute Toxicity:
 - Oral: (LD50) > 8000 mg/kg Rat
 - Skin: Not available
 - Respiratory: Not available
- Skin corrosiveness or irritation: Not available
- Severe eye damage or irritation: Not available
- Respiratory sensitization: Not available
- Skin sensitization: Not available
- Carcinogenicity:
 - Industrial Safety & Health Law: Not available
 - OSHA: Not available
 - NTP: Not available
 - IARC(GROUP): Not available
 - ACGIH: Not available
 - EC: Not available
- Germ cell mutagenicity: Not available
- Reproductive toxicity: Not available
- Specific target organ toxicity (single exposure): Not available
- Specific target organ toxicity (repeated exposures): Not available
- Aspiration hazard: Not available

12. ECOLOGICAL INFORMATION

- A. Ecotoxicity:
- Acute aquatic toxicity:
 - Fish: Not available
 - Invertebrate: Not available
 - Algae: Not available
- B. Persistence and degradability:
- Persistent: Not available
 - Biodegradable: Not available



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	9 / 11

- C. Bioaccumulative potential:
- Bioaccumulation: Not available
 - Biodegradability: Not available
- D. Mobility in soil: Not available
- E. Other adverse effects: Not available

13. Disposal Considerations

A. Disposal method

- More than two kinds of wastes are a mixture if it is difficult to separate treatment by incineration or a similar process may stabilize the reducing. The possible to separate oil water separation must be disposed of Priority. Incinerate the waste in incinerator. Evaporated and the residue is treated by the method of incineration be disposed.


B. Special precautions for disposal:

- The user of this product must properly characterize the waste generated from the use of this product in accordance with all applicable federal, state and/or local laws and regulations in order to determine the proper disposal of the waste in accordance with all applicable federal, state and/or local laws and regulations. Observe of Wastes Control Act.

14. TRANSPORT INFORMATION

- A. UN No.: Not regulated as a hazardous material.
- B. UN Proper Shipping Name: Not available
- C. Hazard class: Not available



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	10 / 11

D. Packing group: Not available

E. Marine pollutant: Not applicable

F. Special precautions for user related to transport or transportation measures:

- EmS FIRE SCHEDULE: Not available
- EmS SPILLAGE SCHEDULE: Not available

15. REGULATORY INFORMATION

A. Korea Industry Safety and Health Law (ISHL):


- Working Environment Measurement materials
: Not applicable
- Material exposure standard
: Not applicable
- Hazardous substances by the management target
: Not applicable
- Special health check
: Not applicable

B. The Chemical Management Act in Korea

- Toxic Chemical
: Not applicable
- Permissible chemical
: Not applicable
- Limited Chemical
: Not applicable
- Prohibition Chemical
: Not applicable

C. Dangerous goods Safety Management Law in Korea



	Material Safety Data Sheet (MSDS)	Issue date	2011.09.23
		Revision date	2015.04.30
	Hanwha Total Petrochemical Terpolymer TF451	Revision No.	REV.2
		Pages	11 / 11

Dangerous Goods
: Not applicable

D. Waste Management Law in Korea

Industrial waste
: Not Applicable (Designated Waste(Waste polymer compound))

E. Other local or international regulation

Persistent Organic Pollutants Management Law: Not applicable

EU classification:

- Classification: Not classified
- Risk Phrases: Not Applicable
- Safety Phrases: Not Applicable

US regulations

- OSHA regulation (29 CFR1910.119): Not Applicable
- CERCLA section 103 (40 CFR302.4): Not Applicable
- EPCRA section 302 (40 CFR355.30): Not Applicable
- EPCRA section 304 (40 CFR355.40): Not Applicable
- EPCRA section 311/312 (40 CFR355.40): Not Applicable
- EPCRA section 313 (40 CFR372.65): Not Applicable
- U.S. waste disposal regulations:

Hazardous Waste Number: Not Applicable

Regulatory Standard: Not Applicable

Rotterdam Convention material: Not Applicable

Stockholm Convention material: Not Applicable

Montreal Protocol on Substances: Not Applicable

16. OTHER INFORMATION

A. References :

- Chemwatch AuthorITe(MSDS Authoring Software)
- KOSHA

