

## GPPS – General Purpose Polystyrene

### Facts:

GPPS, General Purpose Polystyrene offers excellent clarity, surface finish, low creep, good dimensional stability but is generally very brittle.

Polystyrenes possess good flow properties and can be easily injection moulded at relatively low process temperatures.

General purpose PS is produced by the polymerization of styrene. Most commercial grades are clear, amorphous polymers. PS offers excellent dimensional and thermal stability, optical clarity, and very little tendency to absorb moisture and has good dilute inorganic acids, but is attacked by strong oxidizing acids such as concentrated sulphuric acid, and is swollen by some organic solvents.

### Applications:

Packaging, tableware, medical trays, transparent housings, light diffusers, toys and disposable items.

### Total Petrochemicals Polystyrene 1540

#### High Heat Resistance, High Flow Crystal Polystyrene

Total Petrochemicals Polystyrene 1540 is high heat resistance, high flow crystal polystyrene for injection molding or extrusion applications. In Injection applications, its high fluidity allows easy injection for parts like CD casings, toys, filling trays, decorative parts among others. In Extrusion, this grade is suitable to be used in Co-extrusion as a capping layer to provide a glossy finish to the extrusion sheet.

Properties	Test Method	S.I.		Metric		English	
		Value	Units	Value	Units	Value	Units
<b>RHEOLOGICAL</b>							
Melt Flow Index (200°C - 5 kg)	ASTM D-1238	0.012	kg/ 10 min	12.00	g/ 10 min	2.65E-02	lb/ 10 min
<b>THERMAL</b>							
Vicat Softening Point 10N (T increase = 50 °C/h)	ASTM D-1525	364	K	91	°C	196	°F
Heat Distortion Temperature (Annealed), 1.8 Mpa	ASTM D-648	356	K	83	°C	181	°F
Coefficient of Linear Thermal Expansion (10 <sup>-5</sup> )	ASTM D-696	2.59E-05	m/K	7.10	mm/°C	8.27E-03	in/°C
<b>MECHANICAL</b>							
Unnotched Izod Impact Strength	ASTM D-256	8.00	kJ/m <sup>2</sup>	7.40	kg-cm/cm	1.36	ft-lb/in
Tensile Strength at Break	ASTM D-638	43	MPa	420	kg/cm <sup>2</sup>	6211	psi
Elongation at Break	ASTM D-638	2	%	2	%	2	%
Flexural Modulus	ASTM D-790	2900	MPa	29000	kg/cm <sup>2</sup>	420725	psi
Rockwell Hardness	ASTM D-785	L - 70	-	L - 70	-	L - 70	-
<b>ELECTRICAL</b>							
Dielectric Strength	ASTM D-149	135000	kV/m	135	kV/mm	3429	kV/in
Surface resistivity	ISO IEC 93	>10e+14	Ohms <sup>-1</sup>	>10e+14	Ohms <sup>-1</sup>	>10e+14	Ohms <sup>-1</sup>
<b>MISCELLANEOUS</b>							
Density	ASTM D-792	1050	kg/m <sup>3</sup>	1.05	g/cm <sup>3</sup>	65.54	lb/ft <sup>3</sup>
Mold Shrinkage	ASTM D-955	0.4 - 0.7	%	0.4 - 0.7	%	0.4 - 0.7	%
Water absorption	ASTM D-570	<0.1	%	<0.1	%	<0.1	%



**RECOMMENDED EXTRUSION PARAMETERS**

Barrel Temperature	Value	Units	Mold Temperature	Value	Units
Zone 1	170 - 180	°C	Die Temperature	210- 240	°C
Zone 2	180 - 220	°C	Adapter	210 - 240	°C
Zone 3	210 - 240	°C			
Zone 4	210 - 240	°C			
Zone 5	210 - 240	°C			

**General Information :**

Standard Properties: All Tests are carried out at 23 °C unless otherwise stated. Mechanical properties are measured on injection moulded test specimens

Bulk Density: Bulk Density of all Natural grades is approximately 0.6 g/cm<sup>3</sup>

Total Petrochemicals Polystyrene 1540 should be kept in a cool and dry place. Avoid direct exposure to sunlight.

**Total Petrochemicals**

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Information contained in this publication is true and accurate at the time of publication and to the best of our knowledge. The nominal values stated herein are obtained using laboratory test specimens. Before using one of the products mentioned herein, customers and other users should take all care in determining the suitability of such product for the intended use. Unless specifically indicated, the products mentioned herein are not suitable for applications in the pharmaceutical or medical sector. The companies within TOTAL PETROCHEMICALS do not accept any liability whatsoever arising from the use of this information or the use, application or processing of any product described herein. No information contained in this publication can be considered as a suggestion to infringe patents. The companies disclaim any liability that may be claimed for infringement or alleged infringement of patents.



# TOTAL PETROCHEMICALS

## Safety and Material Handling

TOTAL PETROCHEMICALS offers a comprehensive range of TOTAL PETROCHEMICALS POLYSTYRENE (PS) specially formulated to suit different needs. This extensive line includes impact polymers, either natural or with additives, with equally wide-ranging properties to fulfill all customer expectations in terms of fire resistance, appearance, cost and processing. Its tremendous ease of processing and its low cost make it one of the most commonly used polymers in the food packaging, audio/video, household appliances and construction industries.

TOTAL PETROCHEMICALS is committed to providing information to assist our customers in reducing the risks of handling and using our products. This bulletin sheet is intended to be a quick reference guide for TOTAL PETROCHEMICALS customers to store, handle and use our products safely and in an environmentally sound manner. We aim to minimize the impact on mankind and the environment during production, storage, transportation, sale, use and disposal of our products.

Safety Data Sheets are updated regularly, to reflect changes and updates on information in an SDS. Before handling or using any product, please request and assess the most current Safety Data Sheets. The information provided below is appropriate only to TOTAL PETROCHEMICALS' s products as delivered. In the course of fabrication, many additives and ingredients may be added before the finished product. These must be explored *thoroughly for their* respectively health and safety considerations.

### Product Stewardship Program

The aim of the product stewardship code of the responsible care initiative, which makes health, safety and environmental protection an integral part of designing, manufacturing, marketing, distributing, using, recycling and disposing our products. Successful implementation of these initiatives is a shared responsibility that includes all who come into contact with a product. TOTAL PETROCHEMICALS will work with customers to help ensure that all who use and handle our products follow safe and environmentally sound practices.

### General Safe Handling Information

TOTAL PETROCHEMICALS POLYSTYRENE are relatively inert and have a very low degree of toxicity under normal conditions of use. TOTAL PETROCHEMICALS POLYSTYRENE should be kept in cool and dry place. Avoid direct exposure to sunlight. Keep at temperatures below 70C. Nevertheless, safety and health

precautions should be observed in the handling and fabrication of plastic materials.

*Noise* is a common problem in the molding and compounding process. If possible, no worker should be exposed to excessive noise (Leq8hours 85dBA). Proper hearing protectors should be provided for workers, coupled with regular audiometric examinations.

*Air borne dusts* often result from sawing, filing, and sanding of plastic parts in post-moulding operations. These may cause irritation to eyes and the upper respiratory tract. Processing may also release fumes, which may contain irritating decomposition products. Adequate exhaust ventilation is recommended. Good housekeeping and controlling of dusts are necessary for safe handling of product. Workers should use approved respirators. If vapours cause irritation to eyes, a full-face respirator is recommended. Avoid accumulation of static charges during transfers in metallic systems.

Workers should be protected from the possibility of contact with *molten PS* during fabrication. Molten material may cause burns. Wash affected areas abundantly and thoroughly with water. In case of adhesion, do not try to remove product. Treat the affected areas as burns.

*Proper manual handling practices* should be observed in the lifting and transportation of PS packages. Occurrences in back and arm injuries are common in erroneous lifting techniques.

### Flammability and Combustibility

Thermal decomposition at 200oC gives off flammable and harmful products such as styrene, ketones, toluenes and alcohol. There would be formation of toxic products, such as carbon oxides through combustion.

In fighting fire, wear a self-contained breathing apparatus and protective suit. Water or water fog are the preferred extinguishing media. Foam, alcohol resistant foam, carbon dioxide, or dry chemicals may also be used.

### Safe Disposal

Disposal methods must be in compliance with international, national and local laws and regulations. Destroy the product by incineration at an approved waste disposal site.

However, Polystyrene offers many possibilities for post consumer recycling such as: (1) Energy recycling using heat recovery systems for urban and industrial heating systems, (2) Material recycling. Polystyrene should be recycled whenever possible. Because of their high energy content, plastics can help the entire waste mix burn hotter and more completely in a waste-to-energy incinerator.

### Care for the Environment

PS must not be discarded indiscriminately into the waterways nor land.

Heavy metals is not used in the manufacture of TOTAL PETROCHEMICALS POLYSTYRENE. As such, disposal of HIPS via convention methods would be safe for the environment. Incineration of HIPS would not emit heavy metals or deleterious dioxins into the environment. There would be no leaching of heavy metals into the earth when the incineration ash is land filled.

### Customer Notice

TOTAL PETROCHEMICALS stresses the importance of health and environmental protection during the entire lifetime of all TOTAL PETROCHEMICALS products, and calls for TOTAL PETROCHEMICALS to cooperate closely with its customers and partners. To help ensure that TOTAL PETROCHEMICALS' s products are not used improperly, TOTAL PETROCHEMICALS' s personnel will assist customers in dealing with product safety, health and environmental considerations.

This information is provided for GENERAL INFORMATION ONLY. TOTAL PETROCHEMICALS and its affiliates provide a Safety Data Sheet (SDS) for this product, in the appropriate language, according to applicable laws and regulations. Copies in your language can be obtained free of charge from your TOTAL PETROCHEMICALS representative.

Anyone using this product should carefully review the SDS, as well as any other applicable precautions and instructions for use. No liability whatsoever can be accepted by TOTAL PETROCHEMICALS and its affiliates with regard to the handling, processing or use of the product or products concerned which must in all cases be used in accordance with all applicable laws and regulations.

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