

PetroPEX™ TA 1141 HD

TA 1141 HD is a crosslinkable high density polyethylene compound for use in industrial applications. Crosslinked TA 1141 HD has a beneficial combination of high density and gel content which result in exceptional chemical, abrasion, and heat resistance. The properties of TA 1141 HD make it a preferred choice for oil and gas, and other aggressive industrial applications. TA 1141 HD is suitable for continuous service exposed to hydrocarbons at temperatures of 230°F (110°C).

Description:

TA 1141 HD crosslinkable polyethylene compound, sometimes referred to as graft, is a silane grafted ethylene copolymer. The graft and a masterbatch containing a crosslinking catalyst and various stabilizers are required together to produce crosslinked pipes and other profiles. This system is referred to as the “SIOPLAS-System”.

This system allows crosslinked polyethylene products to be extruded as normal thermoplastic polymers. When the two components are combined and extruded together in the proper proportions the resulting product is crosslinked by immersion in hot water at 205°F (95°C) or by exposure to low pressure steam.

Physical Properties:

Property	Typical Values	Method and Comments	US / Other Units
Density	0.952 g/cm ³	ASTM D792, (Natural, not crosslinked)	0.952 g/cc
Melt Flow Index	0.50 g/10 min	ASTM D1238, (190°C/5.0 kg)	0.5 g/10 min
Melt Flow Index	20 g/10 min	ASTM D1238, (190°C/21.6 kg)	20 g/10 min
Gel Content	68 %	ASTM D2765 as per ASTM F 876	68 %
Tensile Strength at Yield	25 MPa	ASTM D638 (50 mm/min)	3,600 psi
Tensile Elongation at Break	490 %	ASTM D638 (50 mm/min)	490 %
Flexural Modulus	841 MPa	ASTM D790 (2% secant, Method 1)	122,000 psi
Impact Strength, Notched Izod*	0.87 kJ/m	D256	16.4 ft-lb _f /in
Izod Failure Type	Non-break	D256	Non-break

Properties (cont.)	Typical Values	Method and Comments	US / Other Units
Hydrostatic Design Basis (HDB)	ASTM D 2837	1600 psi 1250 psi 1000 psi 800 psi	(11.03 MPa) at 73°F (8.62 MPa) at 140°F (6.89 MPa) at 180°F (5.51 MPa) at 200°F
Environmental Stress Crack Resistance	>5,000 hours (no failure)	ASTM D1693	>5,000 hours (no failure)
Vicat Softening Point	127°C	D 1525	261°F
Brittleness Temperature	< -60°C	D 746	< -76°F
Hardness, Shore D	61	D 2240	61
Volatiles Total	< 0.10 %	SILON method 4.3 (as packaged)	< 0.10 %
Moisture	< 0.02 %	SILON method 4.4 (as packaged)	< 0.02 %
Bulk Density	0.55 g/cm ³	ASTM D1895 (as packaged)	0.55 g/cc

* A 2.75J pendulum was used obtaining all non-breaks. A non-break value is for reference and is not considered a standard result.

Processing TA 1141 HD:

TA 1141 HD may be processed on most modern thermoplastic extruders. High quality products may be expected when TA 1141 HD is processed with an extruder designed for polyethylene. Adequate blending of the catalyst masterbatch and the TA 1141 HD is important to the final properties of the product, so use of a barrier flight or other mixing type screw is preferred.

It is important to accurately blend the graft and catalyst masterbatch in the ratio of 95.0% TA 1141 HD and 5.0% catalyst masterbatch by weight. Use of a gravimetric feeding system is recommended for optimum results.

Screw Parameters:

- Length to diameter ratio (L/D) : 25 to 1
- Compression ratio : between 3.0 to 1 and 2.5 to 1

Extrusion Temperature Profile:

The following temperature profile is intended as a starting point only. When extruding PEX compound it is important to assure adequate mixing of the catalyst masterbatch with the TA 1141 HD. Poor mixing as a result of low back pressure and low temperature may result in poor surface finish and a lack of homogenous distribution of the catalyst additives through the wall of the pipe. Excessive shear and temperature may result in degradation of the material and the performance of the pipe.

Extruder Zone	Temperature (Fahrenheit)	Temperature (Celsius)
Zone 1	310 – 350	154 - 177
Zone 2	330 – 370	165 - 188
Zone 3	350 – 390	177 - 200
Zone 4	370– 390	188 - 200
Head	390 – 410	200 - 210
Die	375 – 420	190 - 215
Screw*	160 – 195	70 - 90

* Control of the screw temperature may improve processing results.

To Optimize Extrusion Performance:

- Pre-dry the catalyst masterbatch for 2 hours at 140°F - 175°F (60°C -80°C).
- Allow the raw material to warm up to ambient factory temperature before opening packaging to avoid moisture condensing on the material.
- The extruder, head and die tooling should be constructed to streamline the flow of the melt and to avoid stagnation of the material anywhere in the system.
- In case of a pause in extrusion longer than 10 or 15 minutes, purge the extruder with HDPE that has a MFI ≤ 2.0 before extruding TA 1141 HD again.

Crosslinking (Curing):

Crosslinking of TA 1141 HD extruded with catalyst may be completed by immersion in or flushing with hot water at 195°F - 205°F (90°C - 95°C) or exposure to low pressure steam

The time required to obtain the desired gel content depends on the pipe wall thickness, relative humidity, and the temperature. The rate of crosslinking is predominantly influenced by temperature.

Storage:

Unopened packages of TA 1141 HD have a shelf life of 9 months from the production date. Packages of TA 1141 HD should only be opened immediately before processing. Exposure of TA 1141 HD to direct sunlight, moisture, or atmosphere must be avoided.

Shelf life of opened packages is up to 5 or 6 weeks, provided packages are resealed completely airtight using a tape with strong adhesive and barrier properties (i.e. aluminum tape).

Packaging:

TA 1141 HD is available in cardboard gaylords of 1322 lb (600 kg). The material is preserved by a moisture resistant multi-layer lining inside the box which is sealed under vacuum. By special request TA 1141 HD may be provided in 55 lb (25 kg) moisture resistant multi-layer bags.

Catalyst masterbatch is available in 55 lb (25 kg) moisture resistant multi-layer bags. By special request catalyst masterbatch may also be provided in cardboard gaylords.

Catalyst Masterbatches:

A variety of catalyst masterbatches are available in different colors and with different stabilization additives. Please contact your SILON sales representative for more information about selecting SILON catalyst masterbatches.

SILON Compounds Ltd. is certified to:
ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007



The information contained in this document represents our best available knowledge and experience at the time of this document's last revision. This document by itself makes no warranties and puts SILON under no obligations with regard to the products described above. Existing third party patent rights must be observed in the use of the described product.

SILON Compounds Ltd. is a joint endeavor of the Kafrit Group and the SILON Group.

Document #: RP SA 1141
Revised: February 7, 2011