

# TA 1108 HD

## Cross-linkable Polyethylene Compound

TA 1108 HD is for use in residential and commercial applications. TA 1108 HD is primarily used in flexible pipe intended for potable hot and cold water plumbing. It is also used extensively in radiant heating applications. Crosslinked TA 1108 HD has a combination of properties which result in tubing with excellent flexibility, superior mechanical and thermal performance, and outstanding aesthetics. TA 1108 HD is suitable for SDR 9 tubing applications in continuous service at operating conditions of 140°F (60°C) and 80 psi.

### Description:

TA 1108 HD PEX-b 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, tubing 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. After these 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.

Pipe or tubing produced with TA 1108 HD fulfills and exceeds the requirements of ASTM F876/F877, ASTM F2023, ASTM F2657, CSA B137.5 and all related standards.

### Physical Properties:

| Properties                | Test methods  | Typical Values                 |
|---------------------------|---|--------------------------------|
| Density                   | ASTM D 792  | 0.944 g/cm <sup>3</sup>        |
| Bulk Density              | ASTM D 1895<br>(ISO R 60)                                 | 0.54 g/cm <sup>3</sup>         |
| Melt Flow Rate            | ASTM D 1238 (190°C/5.0 kg)<br>ASTM D 1238 (190°C/21.6 kg) | 2.70 g/10 min.<br>45 g/10 min. |
| Volatiles total           | SIL 4.3   | ≤ 0.12%                        |
| Moisture (water)          | Karl Fischer titration<br>(SIL 4.4)                       | < 0.02%                        |
| Tensile strength at yield | ASTM D 638  | 20 MPa                         |
| Elongation at break       | ASTM D 638  | >300%                          |
| Gel Content               | ASTM D 2765 /<br>ASTM F 876                               | 71%                            |

| Properties (continued)                       | Test methods | Typical Values               |
|--|--------------|------------------------------|
| Hydrostatic Design Basis (HDB) (crosslinked) | ASTM D 2837  | 1250 psi (11.03 MPa) at 73°F |
|  |              | 800 psi (6.89 MPa) at 180°F  |
|  |              | 630 psi (5.51 MPa) at 200°F  |
| Heat Deflection Temperature (66 psi)         | ASTM D648    | 99.7°C (212°F)               |
| Brittleness Temperature                      | D 746        | < -60°C (< -76°F)            |

## Processing TA 1108 HD:

TA 1108 HD may be processed on most modern thermoplastic extruders. High quality products may be expected when TA 1108 HD is processed with an extruder designed for polyethylene. Adequate blending of the catalyst masterbatch and the TA 1108 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 1108 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 1108 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  $\leq 2.0$  before extruding TA 1108 HD again.

## Crosslinking (Curing):

Crosslinking of TA 1108 HD extruded with catalyst may be completed by immersion in or flushing with hot water at 160°F - 195°F (70°C - 90°C) or exposure to low pressure steam to heat the pipes to similar temperatures.

In some cases in situ crosslinking is advantageous. Please consult with Kafrit NA regarding in situ crosslinking of TA 1108 HD.

The time required to obtain the desired degree of crosslinking (gel content) depends on the pipe wall thickness, relative humidity, and the temperature. The rate of crosslinking is predominantly influenced by temperature. While higher temperature crosslinking results in greater production throughput, crosslinking pipes at lower temperatures normally results in superior quality.

## Storage:

Unopened packages of TA 1108 HD have a shelf life of 9 months from the production date. Packages of TA 1108 HD should only be opened immediately before processing. Exposure of TA 1108 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 1108 HD is available in cardboard gaylords of 1322 pound (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 1108 HD may be provided in 55 pound (25 kg) moisture resistant multi-layer bags.

Catalyst masterbatch is available in 1322 pound (600 kg) cardboard gaylords. By special request catalyst masterbatch may also be provided in 55 pound (25 kg) moisture resistant multi-layer bags.

## Catalyst Masterbatches:

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

The information contained in this document represents our best available knowledge and experience at the time of this documents last revision. This document by itself makes no warranties and puts Kafrit NA Ltd. 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.