

## **XL-PEARL™ 23 HDPE 40**

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#### **Description**

XL-PEarl 23 silane is specially developed for the manufacture of XL-PEarl masterbatches based on porous polymer carriers. The technology is described in EP 0 426 073 and US 5,112,919 patents. XL-PEarl 23 silane is designed for crosslinking high-density polyethylene (HDPE) "PEX" pipe using XL-PEarl silane or the Spherisil<sup>(1)</sup> one step process.

This product must be used in combination with a catalyst and antioxidant masterbatch such as (PEarlstab\* C-13'000, PEarlstab S-12'000 or PEarlstab I-14'000). It is only available for licensees of XL-PEarl silane technology.

(1) Silon International GmbH

#### **Key Features and Benefits**

- XL-PEarl 23 silane is based on a unique peroxide and silane combination that provides high grafting efficiency.
- A high onset temperature of the XL-PEarl 23 silane ensures good process stability and minimizes pregrafted and crosslinked particles during extrusion.
- XL-PEarl 23 silane is particularly suitable for low-odor applications.
- XL-PEarl silane can also be used with a wide range of polyethylene grades, including LDPE, LLDPE, MDPE, HDPE and the new single site catalyst resins, for optimum cost-effectiveness.
- Pipes manufactured using XL-PEarl silane technology show excellent mechanical properties and outstanding chemical resistance.
- Use of the quality-controlled XL-PEarl silane system results in pipes with high quality surface finish.

### Typical Physical Properties

Appearance	Clear liquid
Color	Colorless
Viscosity, mPa s (cP), @ 23°C	2.5
Specific Gravity, g/cm <sup>3</sup> , @ 23°C	0.970

### Potential Applications

- Crosslinking of high-density polyethylene pipes for:
- Domestic hot and cold water distribution
- Under-floor heating
- Central and district heating
- Transport of gases, compressed air and fluids
- Industrial pipes

XL-PEarl 23 silane status under European and national food contact regulations on plastic materials. The silane component in XL-PEarl 23 silane is listed with ref PM nr 26328 in the EU Directive 90/128/EEC on plastics for use as food contact, with a maximum QM of 'residual' silane of 5 mg/kg (QM = maximum permitted quantity of the 'residual' substance in the food product).

A European reference for the peroxide ingredients is the German BgVV, Section XLVI. It allows the use of these peroxides for food contact applications in crosslinked PE, with the restriction that the total amount of decomposition products in the final resin does not exceed 0.2%.

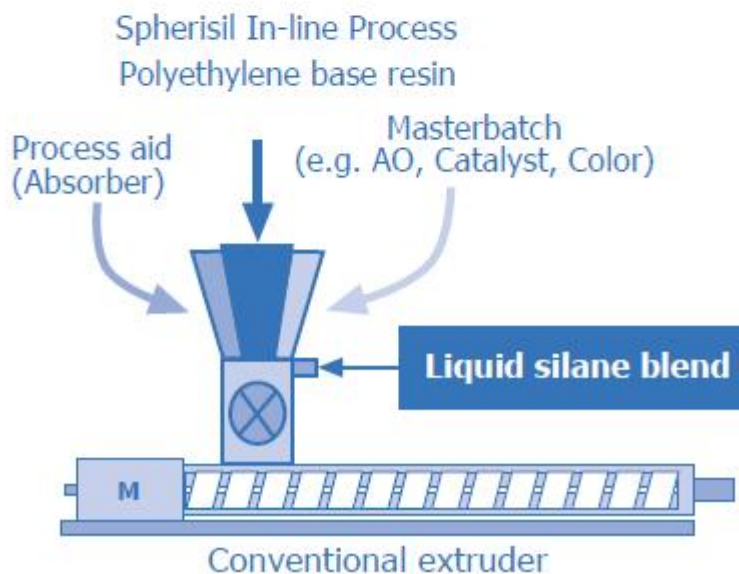
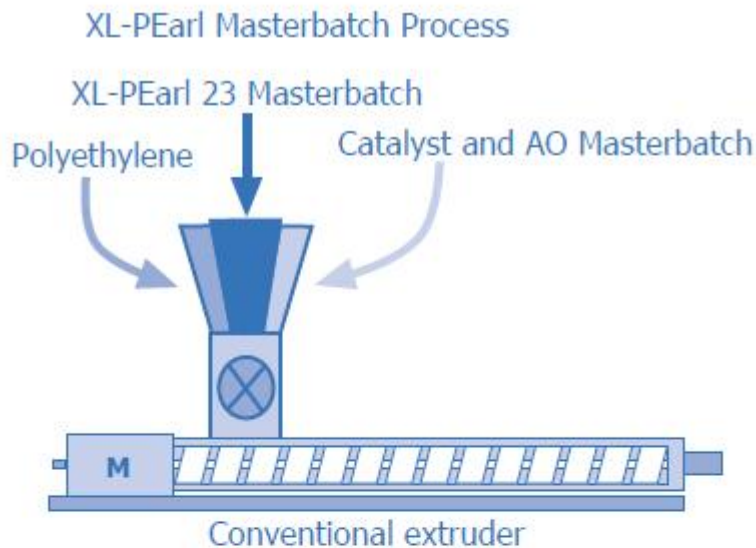
### Patent Status

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### Product Safety, Handling and Storage

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### Processing Recommendations



#### A) Extrusion Process

Addition of a catalyst AO masterbatch is required (PEARlstab\* C-13'000, PEARlstab S-12'000 or PEARlstab I-14'000). Moisture content of the polyethylene base resin must be less than 200 ppm. Pre-drying the poly ethylene base resin as well as catalyst and AO masterbatches at 70°C (158°F) by means of an air desiccator is highly recommended.

Optimum addition levels for a given application must be determined experimentally and

depend on the properties (MFI and density) of the polyethylene resin used in production.

Recommended Resins Are:

Type of HDPE resin:

MeltIndex (190°C/2.16 kg)	0.2 to 8g/10min.
Density	0.940 to 0.960 g/cm <sup>3</sup>

Optimum addition level of XL-PEarl 23 silane has to be determined experimentally. A starting point dose level is as follows:

XL-PEarl 23 silane	1.6 - 1.8%
CAT/AO Masterbatch (PEarlstab S-12'000)	3 - 5%
Melt temperature during the grafting	215 - 225°C

Our technical personnel will advise you regarding the proper operating conditions for the compounding equipment.

Commercially Available HDPE Resins:

HDPE	From	MFI	Density
Lupolen 5031L	Basell	5-7	0.952
Eltex/Fortiflex A4040	Solvay	4	0.944
Politeno IH57	Politeno	2.5	0.953
Nova 76 A	Nova	3.3	n/a
HDPE M 40060S	Sabic	4.0	0.960

**B) Crosslinking**

Rate of cure is dependent upon time, temperature and thickness of the article and available moisture. Sufficient crosslinking can be achieved by any of the following methods:

- Immersion in water at 80-90°C (176-195°F), or
- Exposure to low pressure steam at 105°C (221°F), or
- Exposure to steam at atmospheric pressure (i.e., a sauna at 100°C (212°F)), or
- Ambient curing (only applicable to certain polymers)

### Limitations

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