

Polyethylene

**BorSafe™ HE3493-LS-H**

**High Density Polyethylene Compound for Pressure Pipes**

**Description**

BorSafe™ HE3493-LS-H is a bimodal polyethylene compound produced by the advanced Borstar technology. The natural product is a readymade compound, including carefully selected stabilizers to ensure excellent long-term thermal stability and UV-resistance for limited outdoors storage of the final product.

BorSafe HE3493-LS-H is classified as  
 - a PE100 material with MRS > 10 MPa  
 - a PE100-RC material following the draft EN/ISO PE pressure pipe standards as currently revised.  
 - PE-RT Type II material where pipe pressure testing results between 20°C and 110°C are analyzed according to ISO 9080, showing conformity to the reference lines for PE-RT Type II rating. The grade is intended to be used for industrial applications.

**Applications**

BorSafe™ HE3493-LS-H is intended for following applications:

- |   |   |
|---|---|
| Industrial applications                   | Technical components exposed to high heat and loads |
| Cable protection pipes                    | Sheets and profiles                                 |
| Relining                                  | Glass fibre ducts                                   |
| Co-extrusion of layers for pressure pipes |   |

High temperature EHV- and HV- cable protection pipes

Geothermal applications and storage

Low temperature District Heating (4th generation)

Oil & Gas Applications

BorSafe HE3493-LS-H is a high-density hexene copolymer compound with an outstanding resistance to slow crack growth and used for non-conventional pipe installation technologies, like No Dig. It shows excellent resistance to rapid crack propagation. Thanks to the molecular structure, it offers outstanding extrudability and good melt strength, supporting a problem-free extrusion process to tight tolerances also for higher wall thicknesses. BorSafe HE3493-LS-H provides an improved performance level in terms of drinking water related requirements for low temperature outdoor piping such as migration limits and intended to be used for different food contact applications. BorSafe HE3493-LS-H in the form of different products and solutions can contribute to many de-carbonization initiatives as currently developed in the areas Energy, Heat, Infrastructure, Mobility etc

**Specifications**

EN ISO 15494

BorSafe HE3493-LS-H is intended to be used for industrial applications. Pipe testing has shown conformity to PE-RT Type II requirements of ISO 15494, ISO 24033, DIN 16833 and EN ISO 22391-2. The product meets the "PE100-RC" Slow Crack Growth (SCG) requirements of EN 1555 and the draft standards under revision prEN 12201, ISO/DIS 4427 and ISO/DIS 4437.

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### Physical properties

Property	Typical value *	Unit	Test method
Density <sup>1</sup>	949	kg/m <sup>3</sup>	ISO 1183-1
Melt flow rate ( 190 °C/5 kg)	0.23	g/10min	ISO 1133-1
Tensile modulus ( 1 mm/min)	950	MPa	ISO 527-2
Tensile strain at break ( 50 mm/min)	> 600	%	ISO 527-2
Tensile stress at yield ( 50 mm/min)	23	MPa	ISO 527-2
Oxidation induction time ( 210 °C)	≥ 30	min	ISO 11357-6
Resistance to rapid crack propagation ( S4 test, Pc at 0°C, Test pipe 250mm, SDR11)	> 10	bar	ISO 13477
Strain Hardening Modulus Test ( SHT)	≥ 65	MPa	ISO 18488
Accelerated Notched Pipe Test ( ANPT) in 2% Arkopal N-100 solution ( 9,2 bar, 80 °C)	≥ 300	h	ISO 13479
Accelerated Full Notch Creep Test ( AFNCT) in 2% Dehyton solution ( 4 MPa, 90 °C)	≥ 500	h	ISO 16770
Cracked Round Bar ( CRB) , converted to 14,0 mm and initial crack length 1,40 mm ( 12,5 MPa, 23°C)	> 1.5	Million cycles	ISO 18489
Resistance to weathering ≥ 7GJ/m <sup>2</sup> , tests acc. to EN 12201-1	pass	Pass	EN ISO 16871

\* Data should not be used for specification work

<sup>1</sup> Compound, Method A

### Processing techniques

The actual conditions will depend on the type of equipment used.

Processing setting	Typical value/range
Cylinder temperature	190 - 210 °C
Head temperature	200 - 210 °C
Die temperature	200 - 210 °C
Melt temperature	190 - 220 °C

Specific recommendations for processing conditions can be determined only when the application and type of equipment are known. For normal conditions and applications we suggest preheating and drying. Please contact your local Borealis representative for such particulars.

### Packaging and storage

BorSafe HE3493-LS-H shall be stored indoors below 50°C in unopened original packaging in clean and dry environment.

It is recommended to ensure proper stock rotation by using first in – first out principle. Following afore-mentioned conditions the material can safely be stored for a period of up to 3 years after production. However, caution shall be taken regarding the moisture level. It is recommended to measure the moisture after longer storage periods prior to processing.

### Product compliance documents

Latest versions of product safety information sheets (PSIS), product safety data sheets (SDS) and other product liability documents are available in our website [www.borealisgroup.com](http://www.borealisgroup.com).

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### Sustainability aspects

Borealis is ever mindful of the impact of our products on the planet. We promote Design for Circularity (DfC) and Design for Recycling (DfR) to conserve natural resources and to reduce the environmental impact of products over their entire lifetime (including production, use phase and after phase). DfR helps ensure that material can be effectively recycled while maximizing the material performance efficiency.

Further information on sustainability and Design for Recycling (DfR) can be found from our websites [www.borealisgroup.com](http://www.borealisgroup.com) and [www.borealiseverminds.com](http://www.borealiseverminds.com).

### Disclaimer

The product(s) mentioned herein are not intended to be used for medical, pharmaceutical or healthcare applications and we do not support their use for such applications.

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication; however we do not assume any liability whatsoever for the accuracy and completeness of such information.

Borealis makes no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose.

It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

No liability can be accepted in respect of the use of any Borealis product in conjunction with any other products and/or materials. The information contained herein relates exclusively to our products when not used in conjunction with any other material unless as specifically provided for in the test methods stated above.