

## Product Data Sheet

# HEX 4460 PE80+

High Density Polyethylene

### Product Description

HEX 4460 PE80+ is a high molecular weight, high-density polyethylene (HDPE) with high melt viscosity for extrusion. This grade, which is produced by 1-hexene co-monomer, is classified as PE 80+ and provides excellent stress crack resistance properties (ESCR) combined with very good long-term hydrostatic strength and good process-ability.

### General Information

|                    |  |                                       |
|--------------------|--|---------------------------------------|
| <b>Status</b>      | Commercial: Active                           |                                       |
| <b>Application</b> | Drinking Water Pipe, Drainage Pipe, Plumbing |                                       |
| <b>Form(s)</b>     | Pellet                                       |                                       |
| <b>Attribute</b>   | Outstanding ESCR                             | Good Resistance to SCG & RCP          |
|                    | Good Creep Strength                          | Good Process-ability                  |
|                    | Good Chemical Resistance                     | Very Good Low Temp. Impact Resistance |
| <b>Additives</b>   | Processing Aid: No                           | Antiblock: No                         |
|                    | Antioxidant: Yes                             | Slip Agent: No                        |

| Typical Properties                          | Typical Value <sup>1</sup> | Unit              | Test Method   |
|---|----------------------------|-------------------|---------------|
| <b>Physical</b>                             |                            |                   |               |
| High Load Melt Flow Index (190°C/ 21.6 kg)  | 6.0                        | g/10 min          | ISO 1133      |
| Melt Flow Index (190°C/ 5.0 kg)             | 0.33                       | g/10 min          | ISO 1133      |
| Density <sup>2</sup>                        | 0.944                      | g/cm <sup>3</sup> | ISO 1183      |
| <b>Mechanical <sup>3</sup></b>              |                            |                   |               |
| Tensile Strength at Yield                   | 25                         | MPa               | ISO 527-1, -2 |
| Elongation at Yield                         | 11                         | %                 | ISO 527-1, -2 |
| Elongation at Break                         | > 1000                     | %                 | ISO 527-1, -2 |
| Tensile Strength at Break                   | 40                         | MPa               | ISO 527-1, -2 |
| Tensile Modulus of Elasticity               | 700                        | MPa               | ISO 527-1, -2 |
| Flexural Modulus - 1% Secant                | > 1000                     | MPa               | ASTM D790     |
| ESCR F <sub>10</sub> (10% Igepal, Method B) | > 1000                     | hrs               | ASTM D1693    |
| FNCT (3.5 MPa, 2% Arkopal N100, 80°C)       | > 120                      | hrs               | ISO 16770     |

## Conformance Testing <sup>4</sup>

|   |        |     |           |
|---|--------|-----|-----------|
| Minimum Required Strength (MRS)                     | > 8.0  | MPa | ISO 9080  |
| Hydrostatic Pressure Test (9.0 MPa @ 20°C)          | > 100  | hrs | ISO 1167  |
| Hydrostatic Pressure Test (4.6 MPa @ 80°C)          | > 165  | hrs | ISO 1167  |
| Hydrostatic Pressure Test (4.0 MPa @ 80°C)          | > 1000 | hrs | ISO 1167  |
| Resistance to Slow Crack Growth (4.0 MPa @ 80°C)    | > 500  | hrs | ISO 13479 |
| Resistance to Rapid Crack Propagation (6 bar @ 0°C) | > 10.0 | mm  | ISO 13477 |

## Impact

|  |     |                   |          |
|--|-----|-------------------|----------|
| Tensile Impact Strength (Notched, Type 1, Method A, -30°C) | 167 | kJ/m <sup>2</sup> | ISO 8256 |
| Izod Impact Strength (Notched, Method A, 23°C)             | 26  | kJ/m <sup>2</sup> | ISO 180  |

## Thermal

|  |      |     |           |
|--|------|-----|-----------|
| Melting Temperature                          | 129  | °C  | ISO 3146  |
| Oxidation Induction Time (200°C)             | > 30 | min | ISO 11357 |
| Vicat Softening Temperature (Method A/ 10N)  | 126  | °C  | ISO 306   |
| Deflection Temperature Under Load (0.45 MPa) | 68   | °C  | ISO 75    |
| Deflection Temperature Under Load (1.8 MPa)  | 50   | °C  | ISO 75    |

## Recommended Process Conditions <sup>5</sup>

|   |                              |
|---|------------------------------|
| Processing Method                       | Pipe Extrusion               |
| Extruder Barrel Temperature: 200-230 °C | Melt Temperature: 205-240 °C |

1. Typical values: these are not to be construed as specifications.
2. The density parameter was determined on compression-molded specimens, which were prepared in accordance with procedure C of ASTM D4703, Annex A1.
3. Properties are based on compression-molded specimens, which were prepared in accordance with procedure B of ASTM D4703, Annex A1, using 100% HEX 4460 PE80+ resin.
4. Values were obtained on 110mm, SDR11 pipe made with 100% HEX 4460 PE80+.
5. Please note that, these processing conditions are recommended by manufacturer only for 100% HEX 4460 PE80+ resin (not in the case of blending with any other compatible material), therefore because of the many particular factors which are outside our current knowledge and control and may affect the use of product, no warranty is given for the foregoing data. Moreover, the specific recommendations for resin type and processing conditions can only be made when the end use, required properties and fabrication equipment are known.

## Further Information

### Health and Safety

The resin is manufactured to the highest standards, but special requirements apply to certain applications such as food end-use contact and direct medical use. Specific information on regulatory compliance can be requested via customer.

Molten polymer may be degraded if it is exposed to air during any of the processing and off-line operations. The products of degradation may have an unpleasant odor. In higher concentrations they may cause irritation of the mucus membranes. Fabrication areas should be ventilated to carry away fumes or vapors. Legislation on the control of emissions and pollution prevention should be observed. Workers should be protected from the possibility of skin or eye contact with molten polymer.

The resin will burn when supplied with excess heat and oxygen. It should be handled and stored away from contact with direct flames and/or ignition sources. While burning, the resin contributes high heat and may generate a dense black smoke.

Recycled resins may have previously been used as packaging for, or may have otherwise been in contact with, hazardous goods. Converters are responsible for taking all necessary precautions to ensure that recycled resins are safe for continued use.

The detailed information about safety, handling, individual protection and waste disposal is provided in the relevant Safety Data Sheet. Additional specific information can be requested via customer.

### **Conveying**

Conveying equipment should be designed to prevent accumulation of fines and dust particles. These particles can, under certain conditions pose an explosion hazard. We recommend that the conveying system will be equipped with adequate filters and be operated and maintained in the way that ensure no leaks develop.

### **Storage**

Polyethylene resins should be protected from direct sunlight and/or heat during storage. The storage location should also be dry, dust free and the storage temperature should not exceed 50°C. It is also advisable to process polyethylene resins (in pelletized or powder form) within 6 months after delivery, because excessive aging of polyethylene can lead to a deterioration in quality. Arya Sasol Polymer Company would not give any warranty to bad storage conditions which may lead to quality deterioration such as color change, bad smell and inadequate product performance.

The information provided in this Product Data Sheet has been based upon the current level of knowledge and experience. They are not to be interpreted as a warranty for specific product characteristics. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. Customer is responsible for determining whether the products and the information in this document are appropriate for customer's use and for ensuring that customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Seller assumes no obligation or liability for the information in this document.

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