

# Bormed™ Solutions for Healthcare Moulding and Film Applications



**BOREALIS**

بروج

**Borouge**



Borealis and Borouge are leading providers of innovative plastics solutions that create value for society.

Building on their proprietary Borstar® and Borlink™ technologies and 50 years of experience in polyolefins, Borealis and Borouge support key industries including **infrastructure, automotive and advanced packaging**. Their manufacturing capacity reaches over 5.4 million tonnes of polyethylene and polypropylene per year.

**Borealis** is headquartered in Vienna, Austria, and operates in over 120 countries with around 6,400 employees worldwide. **Borouge**, its joint venture with the Abu Dhabi National Oil Company (ADNOC), employs approximately 3,000 people, has customers in more than 50 countries and its headquarters are in Abu Dhabi in the UAE and Singapore. Together, both companies provide services and products to customers around the world.

Borealis offers a wide range of base chemicals, including melamine, phenol, acetone, ethylene, propylene, butadiene and pygas, servicing a wide range of industries. Together with Borouge the two companies will produce approximately 6 million tonnes of Base Chemicals in 2014.

Borealis also creates real value for the agricultural industry with a large portfolio of fertilizers. The company distributes approximately 2.1 million tonnes per year. This volume will increase to more than 5 million tonnes by the end of 2014.

Borealis and Borouge proactively benefit society by taking on today's challenges and are working to drive ideas forward. Both companies are committed to the principles of Responsible Care®, driving improved safety performance within the chemical industry and contributing to addressing the world's water and sanitation challenges through product innovation and their Water for the World™ programme.

**For more information visit:**

[www.borealisgroup.com](http://www.borealisgroup.com), [www.borouge.com](http://www.borouge.com)  
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## The Bormed™ Concept

We understand that in the healthcare market, safety and efficiency of the product matters most, so you need the right partner to do business with in a reliable and meaningful way. We achieve this through our dedicated, constantly developing range of polyethylene and polypropylene grades, our global team and, critically, the Bormed concept. This is more than simply documentation and technical service, rather it is all encompassing – from product conception to production, procurement, support and distribution. It is based on the three core principles of service, commitment and conformance which cover the different aspects of active information management, change control and security of supply. Additionally, through our technical expertise and an ongoing, clear dialogue with our business partners, we remain at the forefront of healthcare trends and challenges allowing us to evolve our Bormed offering with the industry, providing tailored healthcare solutions for you. Because we care.

### Commitment

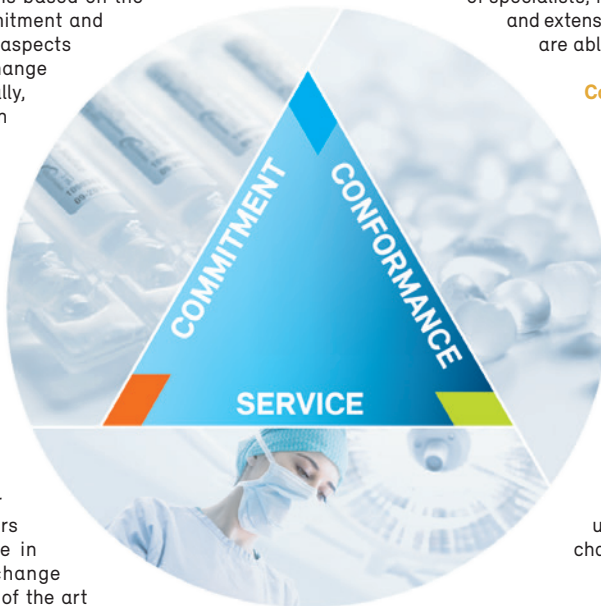
Our commitment to and understanding of the healthcare market is tangible in everything we do. We provide security of supply, for the short and long term, with higher stock levels and planning prioritisation. We seek out cooperation with our business partners, the OEMs, converters and machinery suppliers. We believe in consistency – combined with step change innovation which we drive at our state of the art facility in Linz, Austria. Experience, technical expertise and a forward looking attitude make us the right partner for the healthcare market.

### Service

It is important to have the right material and the right information at the right time in the right place. To achieve this, we steer information and notifications proactively, aiming to provide you with what you need to know, when you need it, in a concise and structured format. We lead open discussions with our business partners which enables us to remain at the forefront of industry trends and challenges. Through our dedicated global team of specialists, from R&D to technical support to sales and extensive dedicated distribution networks, we are able to provide fast and reliable delivery.

### Conformance

Borealis' expertise results in a maintained consistency of the variables used to make polyolefins for the healthcare market – safeguarding continued regulatory compliance, be it the European or US Pharmacopeia, or ISO standards. Going beyond this, we have dedicated procedures in place to avoid uncontrolled changes and variations in quality. Our change control procedure ensures the highest quality standards. This goes hand in hand with enhanced operating instructions, which ensure that anyone involved in Bormed, knows Bormed – from product development to production, supply chain and support functions.



# Polypropylene Homopolymer

| Product name    | MFR<br>230°C/2.16kg<br>[g/10min]<br>ISO 1133 | Flexural<br>Modulus [MPa]<br>ISO178 | Charpy Notched<br>impact 23°C [kJ/m²]<br>ISO 179 /1eA | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|-----------------|----------------------------------------------|-------------------------------------|-------------------------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| PP Homopolymers |                                              |                                     |                                                       |                              |                     |     |          |    |      |    |     |     |              |
| DM55pharm       | 2.8                                          | 1,350                               | 4.0                                                   | 164                          |                     |     |          | ●  | ●    | ✓  | ✓   | ✓   | ✓            |
| HD800CF         | 8                                            | 1,400                               | 4.3                                                   | 164                          |                     |     |          | ●  | ●    | ✓  | ✓   | ✓   | -            |
| HD850MO         | 8                                            | 1,850                               | 5.5                                                   | 162                          |                     |     |          | ●  | ●    | ✓  | ✓   | ✓   | ✓            |
| HD810MO         | 10                                           | 1,250                               | 4.5                                                   | 164                          | Nu, Rad             |     |          | ●  |      | -  | ✓   | ✓   | ✓            |
| HF840MO         | 19                                           | 1,250                               | 3.5                                                   | 160                          | SA                  |     |          | ●  |      | -  | ✓   | ✓   | ✓            |
| HG820MO         | 28                                           | 1,900                               | 1.8                                                   | 162                          | Nu                  |     |          | ●  |      | -  | ✓   | ✓   | ✓            |
| HJ875MO         | 75                                           | 1,600                               | 1.8                                                   | 160                          |                     |     |          | ●  |      | ✓  | ✓   | *   | ✓            |

**Key:**

Nu: Nucleation

Rad: Radiation package

SA: Contains slip agent

● Main application

● Secondary application

✓ tested

- test not performed

\* in preparation

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All figures are typical values -  
data should not be used for  
specification work

# Polypropylene Random Copolymers

| Product name        | MFR<br>230°C/2.16kg<br>[g/10min]<br>ISO 1133 | Flexural<br>Modulus [MPa]<br>ISO 178 | Charpy Notched<br>impact 23°C [kJ/m²]<br>ISO179/1eA | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|---------------------|----------------------------------------------|--------------------------------------|-----------------------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| PP Random copolymer |                                              |                                      |                                                     |                              |                     |     |          |    |      |    |     |     |              |
| RB845MO             | 1.9                                          | 1,100                                | 7.0                                                 | 145                          |                     | ●   | ●        | ●  | ●    | ✓  | ✓   | ✓   | -            |
| RB801CF-01          | 1.9                                          | 750                                  | 11.0                                                | 140                          |                     | ●   | ●        |    | ●    | ✓  | ✓   | ✓   | -            |
| RD804CF             | 8                                            | 1,000                                | 4.8                                                 | 151                          |                     |     | ●        | ●  | ●    | ✓  | ✓   | ✓   | -            |
| RD808CF             | 8                                            | 700                                  | 9.0                                                 | 140                          |                     |     | ●        | ●  | ●    | ✓  | ✓   | ✓   | -            |
| RE816CF             | 11                                           | 800                                  | 5,5                                                 | 145                          | AB                  |     |          |    | ●    | ✓  | ✓   | ✓   | -            |
| RF825MO             | 20                                           | 1,100                                | 6.0                                                 | 150                          | Nu                  |     |          | ●  |      | -  | ✓   | ✓   | ✓            |
| RF830MO             | 20                                           | 1,100                                | 6.0                                                 | 150                          | Nu, Rad             |     |          | ●  |      | -  | ✓   | ✓   | ✓            |
| RG835MO             | 30                                           | 1,200                                | 6.0                                                 | 150                          | Nu, SA              |     |          | ●  |      | -  | ✓   | ✓   | ✓            |
| RJ880MO             | 45                                           | 1,050                                | 5.0                                                 | 150                          | Nu                  |     |          | ●  |      | -  | ✓   | ✓   | ✓            |

**Key:**

AB: Antiblock

Nu: Nucleation

Rad: Radiation package

SA: Contains slip agent

● Main application

● Secondary application

✓ tested

- test not performed

All figures are typical values - data should not be used for specification work

# PP Heterophasic (Block) Copolymers

| Product name                       | MFR<br>230°C/2.16kg<br>[g/10min]<br>ISO 1133 | Flexural<br>Modulus [MPa]<br>ISO 178 | Charpy Notched<br>impact 23°C [kJ/m²]<br>ISO 179/1eA | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|------------------------------------|----------------------------------------------|--------------------------------------|------------------------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| PP Heterophasic (Block) Copolymers |                                              |                                      |                                                      |                              |                     |     |          |    |      |    |     |     |              |
| BE860MO                            | 13                                           | 1,400                                | 8.0                                                  | 164                          |                     |     |          | ●  |      | ✓  | ✓   | ✓   | ✓            |

# Polypropylene Random Hetero- phasic Copolymers (Soft PP)

| Product name                      | MFR<br>230°C/2.16kg<br>[g/10min]<br>ISO 1133 | Flexural<br>Modulus [MPa]<br>ISO 178 | Charpy Notched<br>impact 23°C [kJ/m²]<br>ISO 179/1eA | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|-----------------------------------|----------------------------------------------|--------------------------------------|------------------------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| PP Random Heterophasic Copolymers |                                              |                                      |                                                      |                              |                     |     |          |    |      |    |     |     |              |
| SB815MO                           | 1.5                                          | 425                                  | 80                                                   | 145                          |                     | ●   | ●        | ●  | ●    | ✓  | ✓   | ✓   | ✓            |
| SC820CF                           | 3.9                                          | 550                                  | 26                                                   | 141                          |                     |     |          | ●  | ●    | ✓  | ✓   | ✓   | -            |
| SC876CF                           | 3.8                                          | 330                                  | 77                                                   | 149                          |                     |     |          |    | ●    | ✓  | ✓   | ✓   | -            |

**Key:** ● Main application  
 ● Secondary application  
 ✓ tested  
 - test not performed

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All figures are typical values -  
 data should not be used for  
 specification work

# Low Density Polyethylene

| Product name | MFR<br>190°C/2.16kg<br>[g/10min]<br>ISO 1133 | Density [kg/m³]<br>ISO 1183 | Flexural<br>Modulus [MPa]<br>ISO 178 | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|--------------|----------------------------------------------|-----------------------------|--------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| LD-PE        |                                              |                             |                                      |                              |                     |     |          |    |      |    |     |     |              |
| LE6607-PH    | 0.3                                          | 927                         | 290                                  | 114                          |                     | ●   |          |    |      | ✓  | ✓   | ✓   | -            |
| LE6609-PH    | 0.3                                          | 930                         | 330                                  | 117                          |                     | ●   |          |    |      | ✓  | ✓   | ✓   | -            |
| LE6600-PH    | 1.5                                          | 919                         | 250                                  | 110                          |                     | ●   | ●        |    |      | ✓  | ✓   | ✓   | -            |

# High Density Polyethylene

| Product name | MFR<br>190°C/2.16kg<br>[g/10min]<br>ISO 1133 | Density [kg/m³]<br>ISO 1183 | Flexural<br>Modulus [MPa]<br>ISO 178 | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|--------------|----------------------------------------------|-----------------------------|--------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| HD-PE        |                                              |                             |                                      |                              |                     |     |          |    |      |    |     |     |              |
| HE2581-PH    | 0.3                                          | 958                         | 1,250                                | 131                          |                     | ●   | ●        | ●  |      | ✓  | ✓   | ✓   | ✓            |
| HE7541-PH    | 4                                            | 954                         | 950                                  | 129                          |                     |     |          | ●  |      | ✓  | ✓   | ✓   | ✓            |
| HE9621-PH    | 12                                           | 962                         | 1,300                                | 133                          |                     |     |          | ●  |      | ✓  | ✓   | ✓   | ✓            |

**Key:** ● Main application  
● Secondary application  
✓ tested  
- test not performed

All figures are typical values -  
data should not be used for  
specification work

# PP Terpolymer

| Product name  | MFR<br>230°C/2.16kg<br>[g/10min]<br>ISO 1133 | Density [kg/m³]<br>ISO 1183 | Flexural<br>Modulus [MPa]<br>ISO 178 | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|---------------|----------------------------------------------|-----------------------------|--------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| PP Terpolymer |                                              |                             |                                      |                              |                     |     |          |    |      |    |     |     |              |
| TD109CF       | 6                                            | 900                         | 700                                  | 131                          |                     |     |          | •  | ●    | ✓  | ✓   | ✓   | -            |

# PO Specialties

| Product name         | MFR<br>230°C/2.16kg<br>[g/10min]<br>ISO 1133 | Flexural<br>Modulus [MPa]<br>ISO 178 | Charpy Notched<br>impact 23°C [kJ/m²]<br>ISO 179/1eA | Melting<br>Point [°C]<br>DSC | Special<br>Features | EBM | IBM/ISBM | IM | Film | EP | USP | DMF | ISO<br>10993 |
|----------------------|----------------------------------------------|--------------------------------------|------------------------------------------------------|------------------------------|---------------------|-----|----------|----|------|----|-----|-----|--------------|
| PO Specialties       |                                              |                                      |                                                      |                              |                     |     |          |    |      |    |     |     |              |
| WD170CF <sup>1</sup> | 6.5                                          | 910                                  | 800                                                  | 151                          |                     |     |          |    | ●    | ✓  | ✓   | ✓   | -            |
| WE150CF <sup>1</sup> | 12.5                                         | 925                                  | 1,000                                                | 151                          | SA, AB              |     |          |    | ●    | -  | ✓   | -   | -            |

**Key:**  
SA: Contains slip agent  
AB: Antiblock

● Main application  
● Secondary application  
✓ tested  
<sup>1</sup> WD170CF and WE150CF are not  
Bormed™ branded  
- test not performed

All figures are typical values -  
data should not be used for  
specification work



# Sterilisation

## Steam Sterilisation

Sterilisation by steam may be used on the majority of the Bormed PE and PP grades. For Polypropylene, due to its high melting point, 121°C sterilisation may be applied. For HDPE grades, this is usually valid as well. For the LDPE grades, lower sterilisation temperatures need to be applied.

Depending on the final product design and manufacturing process of the application, the optimum product needs to be determined. The dimensional stability (deformation) always needs to be checked – internal and/or external tensions can deform the product during sterilisation, e.g. relaxation of moulded-in stress.

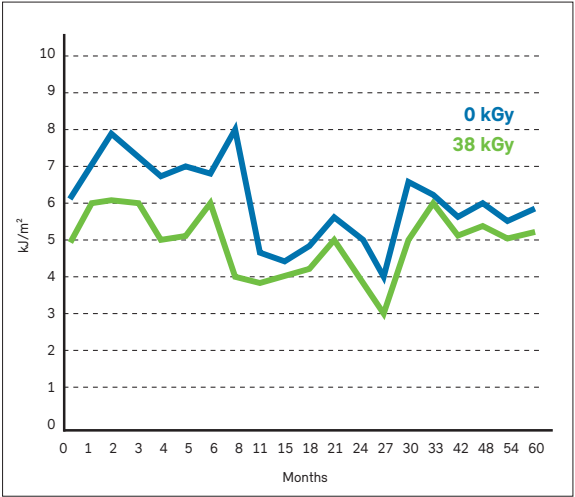
## EtO Sterilisation

May be used with all Bormed grades.

## Radiation Sterilisation

Gamma or E-Beam sterilisation is used in an increasing number of applications. Some polymers, especially PP, are sensitive to degradation (formation of radicals) due to the high energy used. Effects like brittleness or yellowing may develop over a after few weeks or months (see graph).

Bormed HD810MO & RF830MO are, respectively, a homopolymer and a random copolymer which have been appropriately additivated to mitigate the effects of irradiation. All Bormed PE grades may be used with radiation sterilisation, however performance should be checked using the final article.



Charpy notched 23°C - Bormed HD810MO

Facts

Polypropylene MFR  
[230°C/2.16 kg] g/10 min = ISO 1133

Polyethylene MFR  
[190°C/2.16 kg] g/10 min = ISO 1133

EBM= Extrusion Blow Moulding  
IBM= Injection Blow Moulding  
ISBM= Injection Stretch Blow Moulding  
IM= Injection Moulding

Food contact regulations and certificate on pharmaceutical use  
If required, contact your Borealis or Borouge representative for a certificate.

For Technical Data Sheets, Safety Data Sheets and Product Liability Statements please visit us at [www.borealisgroup.com](http://www.borealisgroup.com) and [www.borouge.com](http://www.borouge.com) or contact your Borealis or Borouge representative.

All Bormed grades are produced and sold under dedicated Healthcare directives including enhanced change control, increased security of supply, proactive notifications. A healthcare policy and risk assessment process applies.

For any information related to Healthcare, please contact us [www.borealisgroup.com](http://www.borealisgroup.com), [www.borealisbecausewecare.com](http://www.borealisbecausewecare.com)

Notes

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