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Super clean handling of octabins for power cable insulation compounds

BOREALIS
SHAPING the FUTURE with PLASTICS

About Borealis

Borealis is a leading provider of innovative, value creating plastics solutions. With more than 40 years of experience in the polyethylene (PE) and polypropylene (PP) business, we focus on pipe systems, energy and communications cables, automotive and advanced packaging markets. We are strong in Europe and growing in the Middle East and Asia-Pacific through Borouge, our joint venture with the Abu Dhabi National Oil Company (ADNOC). Our technology shapes plastic products that make an essential contribution to the society in which we live. We are committed to lead the way in 'Shaping the Future with Plastics'.

With EUR 5 billion revenue in sales and 4,500 employees, Borealis is headquartered in Vienna, Austria with innovation centres, customer service centres, and main production sites in Europe and the Middle East. Borealis has representative offices and operations in Asia, North and South America.

At its heart, the company's four values of Responsible, Respect, Exceed and Nimblicity™, define its way of doing business. For Borealis, success is achieving value creation through innovation.

Borstar® is Borealis' proprietary technology supporting differentiated PE and PP products. Borstar is a registered trademark of Borealis A/S.

Learn more about us at
www.borealisgroup.com

Picture 1: Polyolefins, Stenungsund plant, Sweden

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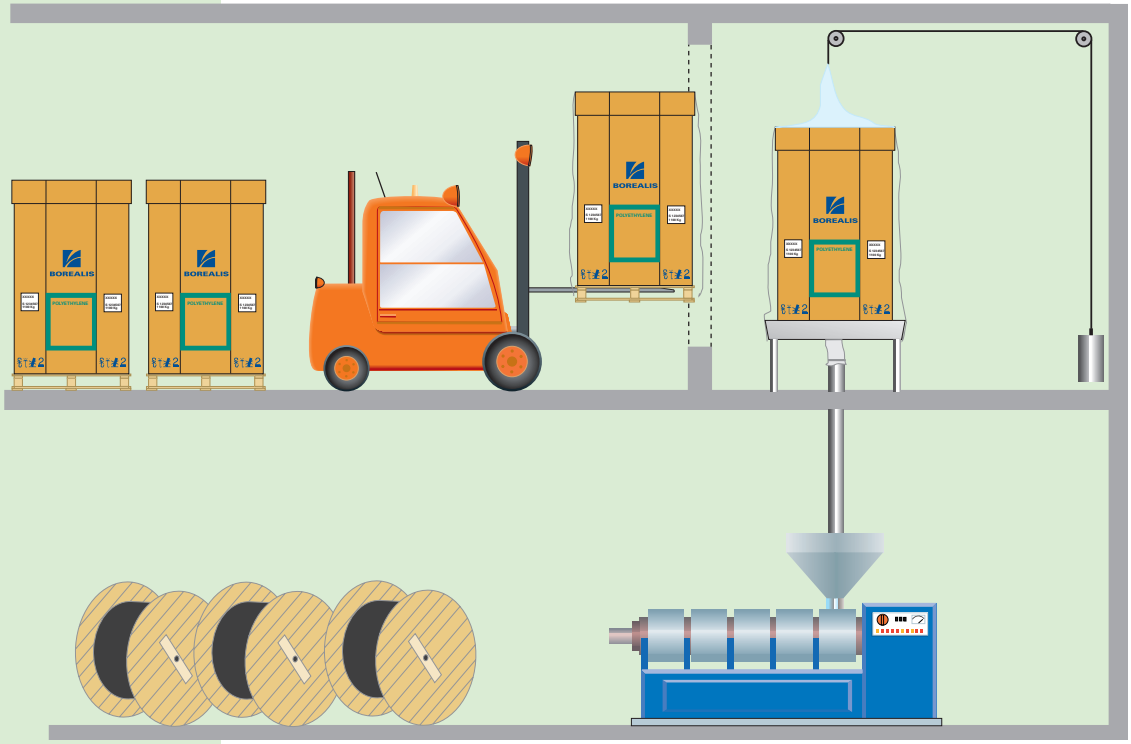
Picture 2: Unloading of octabin

Introduction

One of the most important quality criteria for XLPE insulation, when it is used in manufacturing grades from Medium to Extra High Voltage cable, is cleanliness.

Since we first started producing these types of compounds in the 1960's, Borealis has consistently improved cleanliness to a level where cables with voltage ratings up to 400 kV are possible. This has contributed to improvement in the life-time of XLPE-insulated MV cables.



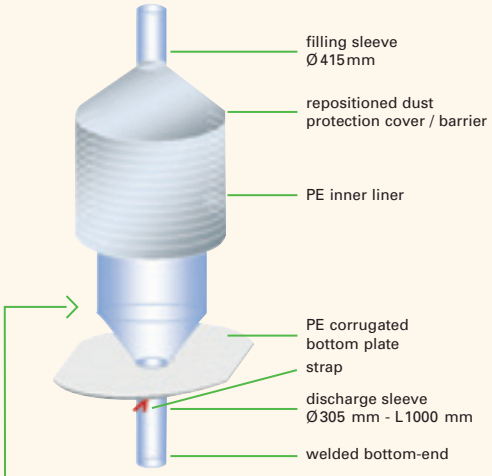
''Super clean'' quality is achieved by special manufacturing of compounds in completely closed systems.

Power cable XLPE compounds from Borealis can be supplied in 25 MT Cleantainers™ octabins ranging from 500 kg to 1200 kg.

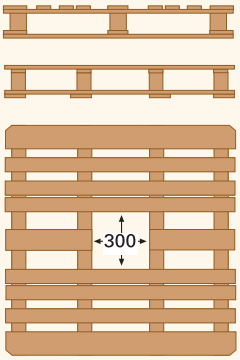
Once packed in their final package, cleanliness is ensured by a completely closed compartment. The weakest link in the chain from Borealis to the cable producer's extruder is unloading of the packaging. Based on the general philosophy of keeping the material in closed systems, the octabin package is specially designed to minimise the risk of external contaminants entering the polymer.

Unloading of octabins

General



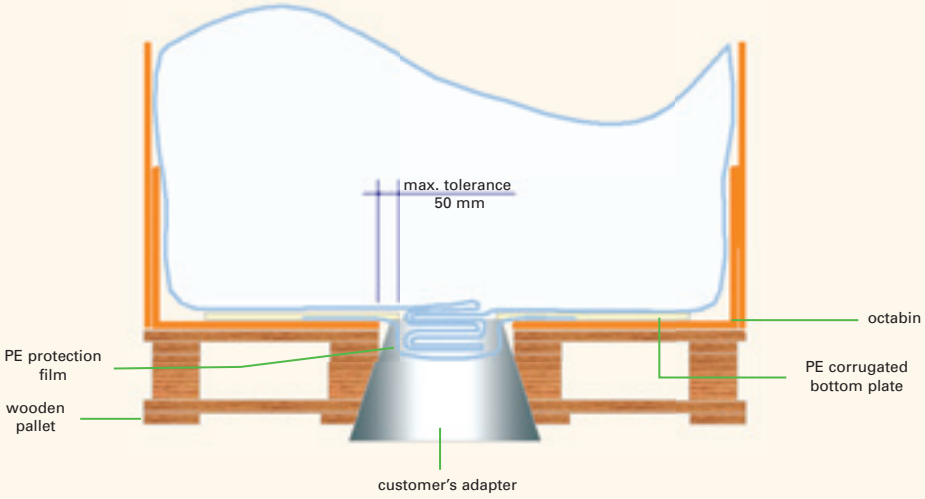
Octabins can be unloaded from the top by means of a vacuum system and a probe inserted into the spout.



Picture 3: Octabin basic design

Product handling such as pneumatic conveying always increases the risk of contaminants and dust entering systems. Due to wear and tear of the conveying system, supervision and maintenance are needed. The other method of unloading is to use the bottom emptying hose of the polyethylene inner liner. The material can then be fed to the extruder gravimetrically. This method is recommended because of its simplicity and the minimum external equipment needed.

The design features of the octabin enables the package to be easily enclosed in a compartment consisting of a protecting polyethylene liner and a dust-tight pallet tray. This method completely eliminates the risk of external contaminants being introduced from the package itself.



Pallet size PRS8:
1140 x 1140 x 151 mm

Height of package:
1950 mm max. (including pallet of 151 mm)

Dead weight:
Approx. 40 kg

Volume:
Approx. 1.8 m³

Liner:
High strength cardboard package with a polyethylene liner and special cover / barrier.

Material weight:
In a range from 500 to 1200 kg

Handling instruction:
To be stored indoors in dry atmosphere. Can be stacked one on one, provided that the PE stretch-wrapping is not removed.

Unloading procedure:
The octabin can be unloaded from the top or the bottom. This package is specially designed to facilitate super clean bottom unloading.

Super clean bottom unloading

Basic considerations

Provided that the package is prepared as described below, the only potential contaminants will be those coming from the surrounding air or from dust from the floor, walls, ceilings, or the operator. Particles bigger than 1–2 micron will settle, while smaller particles will remain airborne.

For production of High Voltage and Extra High Voltage cables, it is common practice to unload the XLPE package in a clean room operating under defined clean room specifications. The most well-known standard is Federal Standard 209.

To maintain standards, regular cleaning of the unloading clean room is needed. It is recommended that the clean room is frequently cleaned with a stationary vacuum cleaner with external exhaust and, at regular intervals, by water spraying. It is also recommended that the operator unloading the package wears protective clothing that do not release fibres.

Octabin design details

The new octabin is designed with the following features for clean handling:

- Bottom plate of corrugated polyethylene.
- Polyethylene film for protection of the emptying hose.
- Dust protection cover/barrier which has been repositioned can easily be deployed enclosing the whole package to create a super clean environment.

1. Platform

The package should be placed on a platform preferably of stainless steel, as shown in Picture 4. The platform has to be specially designed by the cable maker according to the needs of his plant layout.

The platform can be made as a single unit with wheels placed on rails leading into the clean unloading area, or as a unit designed to be handled by a forklift or a traverse crane. The tray should be cleaned with a vacuum cleaner between each operation.

Picture 4: Platform

The design of the platform described here includes a stainless steel adapter (Picture 5) which can be inserted from the bottom into the outlet frame of the pallet.

This procedure facilitates easy placement of the package in the tray by means of a forklift truck, preferably equipped with a side shift system.

Picture 5: Adapter

2. Dust protection

A polyethylene liner used as dust protection is fitted on top of the inner liner, inside the package. This dust protection liner should be manually pulled from the top over the octabin and the platform. This should be done before the package is transported into the clean area where the unloading will take place. Strapping the dust protection liner around the circumference of the platform ensures that the whole package is enclosed.

3. Inner liner

During unloading of the XLPE compound, the inner liner of the package will fall down inside the octabin and potentially interfere with the flow of the material. To avoid this, and to ensure that the package is completely unloaded, the top of the inner liner should be fixed in its top position during unloading. This can be done by placing a strap around the top of the inner liner linked to a balance weight. See Step 6.

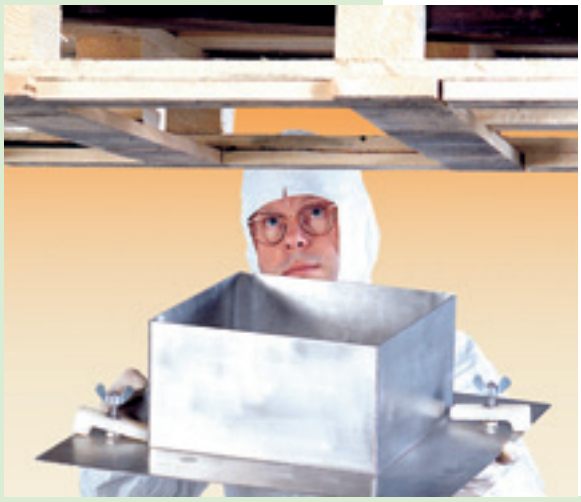
4. Unloading hose

The emptying hose is placed in the centre of the bottom of the package. The hose is an integral part of the inner liner. The hose is protected during transport by a polyethylene film fixed to the bottom plate. The bottom of the package is a polyethylene corrugated plate specially selected to eliminate the risk of contamination when the protective film is removed. The film should be removed, using a knife, before the package is moved into the clean area.

5. Connection

The hose should be opened by cutting with a knife to the desired length. The hose is then connected to the filling pipe of the downstream system. The material will start to flow when the hose strap is removed.

Unloading procedures



Step 1
Lift the octabin and insert the adapter in the bottom outlet frame of the pallet.

Step 2
Place the package on the tray.

Step 3
Remove the lid and pull the dust protecting liner over the octabin.

Step 4
Strap the dust protection liner around the bottom tray.

Step 5

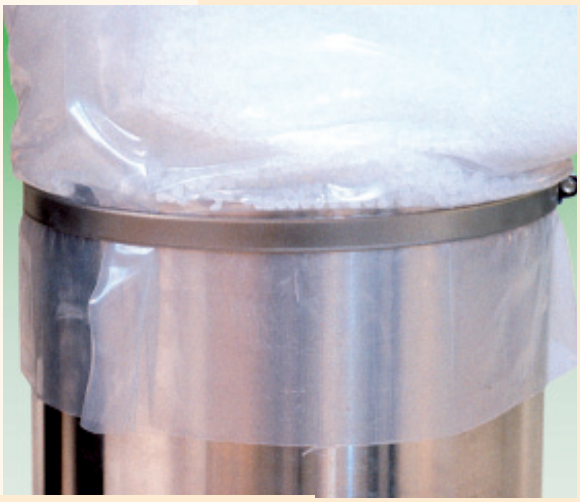
When placed in unloading position, connect the top of the liner to the balance weight system.

Step 6

Remove the hose protection. The covered octabin is now prepared for transfer to the unloading position in the clean room.

Step 7

Pull out the hose and cut to the desired length.



Step 8

Connect the hose to the filling pipe and open the strap for unloading.

Borealis Wire & Cable

Built on experience and successes over more than 40 years, Borealis has grown to become one of the world's leading suppliers of polyolefin plastics for the global Wire & Cable industry. Through the introduction of advanced polymer technologies such as Supercure™, SuperCopo™, SuperTR™, Supersmooth™, Casico™, Visico™, Ambicat™ and Borstar®, Borealis has pioneered developments of insulation systems and sheathing solutions for both energy and communication cables that have contributed to today's industry standards.

Borealis believes that customer-driven innovation is the only way to achieve and sustain progress and we work closely with customers and end users to develop solutions that will meet or exceed their expectations in quality, consistency and processibility, for today's applications and those of the future. In response to customers' needs these include cutting edge solutions for extruded High Voltage and EHV power cables and XLPE materials for Low and Medium Voltage energy cables, together with cost efficient HFFR solutions and advanced insulations for communication cables.

Customers' needs are at the centre of our research programmes and resource deployment, and through ongoing investment in upgrades and new plant programmes, we continue to set new records for output efficiency, product reliability and economy, in addition to product innovation.

Responsiveness is the foundation of successful customer partnerships and Borealis Wire & Cable ensures this through its strategically located production sites in Sweden, Austria, Belgium, Finland, USA and Abu Dhabi, an Innovation Centre in Stenungsund, Sweden with an affiliate in Rockport, New Jersey, USA, as well as a well dispersed sales and agent network around the World.

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