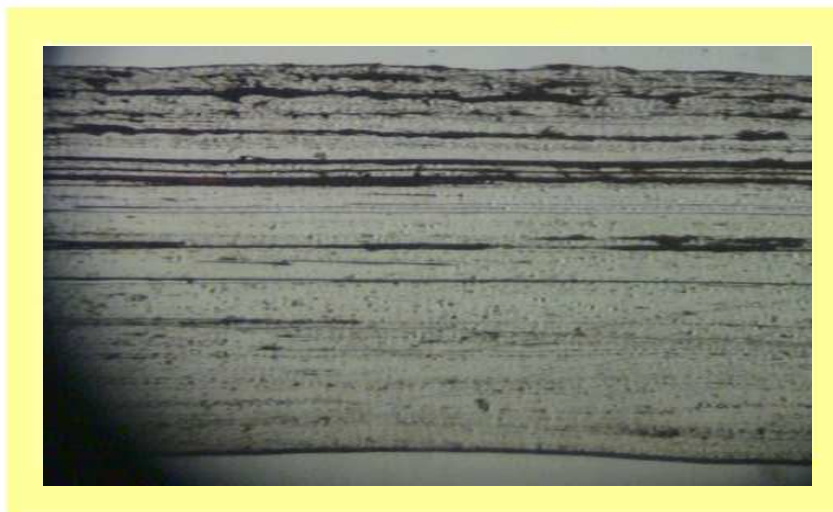


## 1. High Density Polyethylene containers using QUORAL® BR technology.

The BP Polymers trademark QUORAL® covers a whole range of different barrier resins. BR is the abbreviation for "barrier resin" which describes the concept of a barrier resin additive introduced via the Master batch in a single-hopper/mixer processing technique. This BR is used to create discontinuous barrier layers in an high density polyethylene (HDPE) extrusion process, whether in an accumulator or continuous extrusion machine.

Numerous overlapping layers - or platelets - of polyamide are distributed over the entire wall of the container by means of special extruder tooling and careful monitoring of the extrusion process. These overlapping polyamide layers reduce the permeability of the container wall by extending the path taken by any molecule migrating (permeating) through it. The barrier layers formed are mono-structures in that they are integrated into the HDPE matrix creating one solid polymer structure.



*Section of a HDPE container wall with Quoral barrier layer*

QUORAL® BR consists of a modified polyamide 6 designed to work with HDPE. Since it is packaged as a granular material, the concentration of QUORAL® BR can be varied and its barrier properties thus adjusted to meet specific requirements. The finished container retains the excellent physical properties of the HDPE resin with no negative impact on label adhesion or colorants chosen.

With favorable processing conditions and the appropriate concentration of QUORAL® BR its barrier properties can be up to 100 times more effective in the containment of hydrocarbons than pure HDPE. And, as a secondary benefit, it reduces water vapor and oxygen transmission rates vs. untreated HDPE. Finally, there is no shelf life issue as the barrier does not degrade since it is structural.

**Barrier Plastics, sister company to BP Polymers, manufactures HDPE barrier containers under the brand name BARITAINER®.**

## 2. Fields of application for BARITAINER® packaging.

BARITAINER® packaging can be used for products containing solvents, such as household and industrial chemicals, cleaning agents and adhesives, as well as flavors and fragrances in the food and cosmetics industries. It can also safely package additives in the automotive sector, photo chemicals, and agrochemicals. BARITAINER® packaging is therefore an attractive and environmentally sound alternative to glass and metal containers. They can also replace co-extruded and fluorinated containers as well as other single-layer barrier resins such as Borex and PVC. Because BARITAINER® products are made primarily of HDPE, they have all the material advantages of that polymer and can be manufactured in a variety of complex shapes and sizes.

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### 3. Environment/end-of-life disposal.

QUORAL<sup>®</sup> BR is a safe, nontoxic and noncorrosive polymer. This means that it is not only safe for the user but it is also recyclable without any need for special handling for end of life disposal. QUORAL<sup>®</sup> BR is compatible with food products.

### 4. Properties and special features of UN BARITAINER<sup>®</sup> packaging:

- Highly effective barrier effect
- Can be completely emptied
- Rugged and impact resistant
- UN certification for hazardous substances
- Resistant to chemicals and acids (see chemical compatibility chart)
- Not hazardous to health (compatible with food products)
- Corrosion resistant
- Resistant to high and low temperatures
- Stackable – suitable for palletizing
- Blow-molded handle in top of container
- Grip recess in bottom of container
- Ideal surface for brand advertising: silk-screen printing or labeling options

### 5. Identification

All our BARITAINER<sup>®</sup> products, UN and non-UN, are marked with the BARITAINER<sup>®</sup> logo embossed in the wall (see photo at right). In addition, there are other identification markings such as the UN No., part code, manufacturer's designation and the time (production date) when appropriate. The brand marking also serves as our seal of quality for this special barrier container.



Only containers marked in this way are genuine BARITAINER<sup>®</sup> products from Barrier Plastics located in the US.

### 6. Developments

QUORAL BR<sup>®</sup> technology can be used for all Barrier Plastics containers both UN and non-UN. Barrier Plastics continues to launch multiple product lines of various designs and styles for both custom and standard applications. Please contact Barrier Plastics to learn more as to how our technology fits your packaging requirements.