

# Inert Bed Supports

## Description

Evonik provides high-quality, low-cost inert ceramic and alumina support media worldwide. The quality of the Durocel inert supports are maintained utilizing high-quality raw materials, world class manufacturing techniques and modern quality control testing. Durocel inert supports offer our customers reliable, economical and value-added inert supports.

### Durocel 222

A silicon oxide/aluminum oxide composite ceramic, vitrified to provide a highly inert material that affords excellent resistance to thermal and mechanical shock. Durocel 222 is ideal for use in a wide variety of adsorption and catalytic applications. The product is available in sizes ranging from 1/16" (1.5mm) to 2" (50mm).

### Durocel 235

A highly inert tabular aluminum oxide, fired at high temperature, resulting in a material of low porosity in which the potential for shrinkage has been removed. Resulting physical characteristics yield excellent resistance to thermal and mechanical shock and abrasion. High chemical purity and mechanical integrity result in one of the most inert support media available. Durocel 235 is ideal for use in applications and catalytic processes demanding the highest level of protection against unwanted chemical reactivity and contamination and also ideal in those applications sensitive to silica. The product is available in sizes ranging from 1/16" (1.5mm) to 3" (75mm).

## Product Properties

Property	DUROCEL	
	222	235
<b>Composition (wt%)</b>		
Al <sub>2</sub> O <sub>3</sub>	25-35	99+
SiO <sub>2</sub>	60-70	0.10
Fe <sub>2</sub> O <sub>3</sub>	-	0.10
Fe <sub>2</sub> O <sub>3</sub> + TiO <sub>2</sub>	3.0	-
CaO + MgO	2.0	-
Na <sub>2</sub> O	-	0.40
Na <sub>2</sub> O + K <sub>2</sub> O	5.0	-
Leachable Iron	0.05	-
Bulk (Packing) Density - lbs/ft <sup>3</sup> (kg/m <sup>3</sup> )	85-88 (1362-1410)	126-133 (2018-2130)
External Void Fraction - vol%	~40	~40
<b>Crush Strength (point load-minimum)</b>		
1/8" sphere - lbs (kg)	80 (36)	176 (80)
1/4" sphere - lbs (kg)	150 (68)	440 (200)
1/2" sphere - lbs (kg)	640 (290)	1323 (600)
3/4" sphere - lbs (kg)	1170 (530)	2645 (1200)
1.0" sphere - lbs (kg)	1760 (800)	3307 (1500)
Moh's Hardness	7-8	-
Apparent Porosity - vol%	1.0	1.0
Water Adsorption Capacity - wt%	0.40	0.40
Max Operating Temp. -°F (°C)	2200 (1200)	3270 (1800)

Evonik conducts routine quality control testing on all of the inert supports produced. Besides compositional and physical property analysis, Evonik also conducts Thermal Shock, Rapid Depressurization and Impact Test on all of our inert support to make sure that they can withstand the most severe operating conditions like hydrocracking.

## Stress Tests

**Thermal Shock (Rapid Quench) Test Description:** The Thermal Shock (Rapid Quench) Test is performed by heating 50 spheres of a given size to 925°F (500°C) for 30 minutes in an oven. After the 30 minute heating period, the spheres are removed and dropped into a 5-gallon container of water at ~75°F (~24°C). Once cooled, the spheres are visually inspected for signs of physical failure; including fracture, cracking, chipping and spalling. Any indication of these defects on a sphere constitutes failure. Survival rate is calculated as the percentage of spheres showing no visual signs of the described defects after testing is completed.

**Rapid Depressurization Test Procedure:** The Rapid Depressurization Test is performed by heating approximately 0.5 gallons (2 liters) of spheres in an autoclave to 850°F (455°C) and pressurized under hydrogen to 1500 psi (106 kg/cm<sup>2</sup>) for at least one hour. The pressure is then reduced in less than one second from the specified pressure to 0 psig. Depressurization time is measured with the assistance of a pressure transmitter. Once depressurized and cooled, the spheres are visually inspected for signs of physical failure; including fracture, cracking, chipping and spalling. Any indication of these defects on a sphere constitutes failure. Survival rate is calculated as the percentage of spheres showing no visual signs of the described defects after testing is completed. A minimum of 99% of the test sample must remain intact to constitute a “pass” result.

**Impact Test Procedure:** The Impact Test is conducted with the same spheres that were used in the Thermal Shock (Rapid Quench) Test, both before and after the quench procedure. A randomly selected sample of 50 spheres is dropped, one at a time, onto a steel plate at least 3/8” (10mm) thick from the height of 20 feet (6 meters). The spheres must withstand the impact test without fracture or spalling. Survival rate is calculated as the percentage of spheres showing no visual signs of mechanical stress after testing is completed.

## Warehouse Locations

- Lafayette LA, USA
- Luxembourg
- Medicine Hat AB, Canada
- Singapore

## Packaging & Labeling

### Standard

- 1000 kg supersack, 25 kg poly bag, steel drum

### Customization

- Supply the exact quantity filled in supersacks required for the reactor bed support layers
- Coded labels (color, etc.) for easy bed support layer identification



### Disclaimer

This information and all further technical advice are based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

### EVONIK OPERATIONS GMBH Business Line Catalysts

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