Product Data Sheet

# AMBERLYST™ 15WET Polymeric Catalyst

Industrial-grade, Strongly Acidic Catalyst

## Description

AMBERLYST™ 15WET Polymeric Catalyst is a strongly acidic, sulfonic acid, macroporous polymeric catalyst based on crosslinked styrene-divinylbenzene copolymers. Its continuous open pore structure and excellent physical, thermal, and chemical stability make it the resin of choice in many applications. It also possesses a greater resistance to oxidants such as chlorine, oxygen, and chromates than most other polymeric resins.

AMBERLYST™ 15WET is used in a wide variety of organic reactions. It has the optimal balance of surface area, acid capacity, activity, and pore diameter to make it the catalyst of choice for etherification (MTBE, ETBE, TAME), esterification, and hydration reactions.

AMBERLYST™ 15WET can be used for processes where cationic impurities or bases have to be removed or recovered from a process liquor. Both the cationic impurities and bases are removed by ionic interactions with its acidic groups. Its excellent resistance against oxidation makes it an exceptional resin in many applications.

AMBERLYST™ 15WET can be used directly in aqueous systems or in organic media after conditioning with a water-miscible solvent.

## Applications

- Etherification (MTBE, ETBE, TAME)
- Olefin hydration (TBA)
- Esterification (acetates, acrylates, fatty acid esters)



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## Typical Properties

| | |
|---|---|
| **Physical Properties** | |
| Copolymer | Styrene-divinylbenzene |
| Matrix | Macroporous |
| Type | Strong acid cation |
| Functional Group | Sulfonic acid |
| Physical Form | Amber, opaque, spherical beads |
| **Nitrogen BET** | |
| Surface Area | 53 $m^2/g$ |
| Total Pore Volume | 0.40 cc/g |
| Average Pore Diameter | 300 Å |
| **Chemical Properties** | |
| Ionic Form as Shipped | $H^+$ |
| Concentration of Acid Sites ‡ | ≥ 4.70 eq/kg |
| | ≥ 1.80 eq/L |
| Water Retention Capacity | 52 – 57% |
| **Particle Size** § | |
| Particle Diameter | 600 – 850 µm |
| Uniformity Coefficient | ≤ 1.70 |
| < 355 µm | ≤ 1.0% |
| > 1180 µm | ≤ 5.0% |
| **Shrinkage** (in solvent) | |
| Methanol | 5% |
| MTBE | 9% |
| Hexane | 22% |
| Dry | 37% |
| **Density** | |
| Shipping Weight | 770 g/L |

‡ Dry Weight Capacity ≥ 4.70 eq/kg; Total Exchange Capacity (on a water-wet basis) ≥ 1.80 eq/L
§ For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 177-01775).



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## Suggested Operating Conditions

| | | |
|---|---|---|
| Maximum Operating Temperature | 120°C (250°F) | |
| Bed Depth, min. | 1000 mm (3.3 ft) | |
| Pressure Drop, max. | 1 bar (15 psig) across the bed | |
| Flowrates | | |
| Operating | 1 – 40 BV*/h (0.125 – 5 gpm/ft$^3$) | |
| Linear Hourly Space Velocity (LHSV) | 0.5 – 5 h$^{-1}$ | |
| Backwash | See Figure 1 | |
| Regeneration | 4 – 8 BV/h (0.5 – 1.0 gpm/ft$^3$) | |
| Slow Rinse | Regeneration flowrate for 2 BV (15 gal/ft$^3$) | |
| Fast Rinse | Operating flowrate for 2 – 4 BV (15 – 30 gal/ft$^3$) | |
| Contact Time | | |
| Regeneration | ≥ 30 minutes | |
| Total Rinse Requirement | 3 – 5 BV | |
| Regenerant | HCl | $H_2SO_4$ |
| Concentration | 4 – 10% | 1 – 5% |
| Level | 40 – 100 kg/m$^3$ (2.5 – 6.25 lb/ft$^3$) | 40 – 200 kg/m$^3$ (2.5 – 12.5 lb/ft$^3$) |

* 1 BV (Bed Volume) = 1 m$^3$ solution per m$^3$ resin or 7.5 gal per ft$^3$ resin

## Hydraulic Characteristics

Estimated bed expansion of AMBERLYST™ 15WET Polymeric Catalyst as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLYST™ 15WET as a function of service flowrate and temperature is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean water and a well-classified bed.

**Figure 1: Backwash Expansion**

Temperature = 10 – 90°C (50 – 194°F)

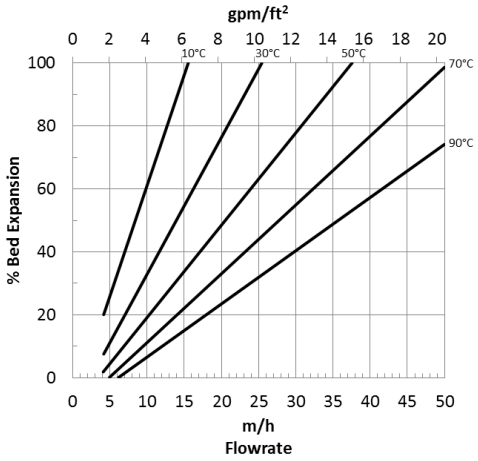
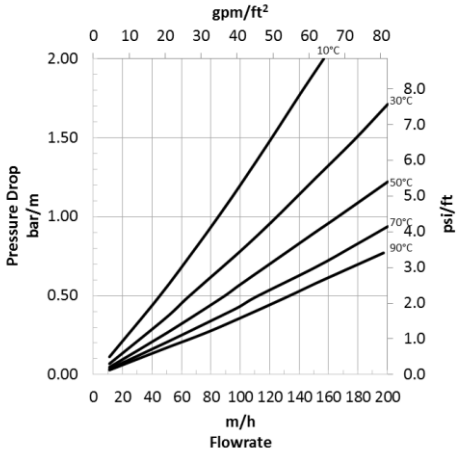



**Figure 2: Pressure Drop**

Temperature = 10 – 90°C (50 – 194°F)



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DuPont has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with DuPont products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

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Please be aware of the following:

- **WARNING:** Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

**Have a question? Contact us at:**

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