PuroMill™
Industrial milling media

FREQUENTLY ASKED QUESTIONS

PuroMill™ Industrial is a novel polymeric milling media that helps to improve the characteristics of industrial materials through the creation of nanoparticles with greatly reduced contamination.

Using the Media

What is PuroMill?

PuroMill is an advanced technology used for reducing the particle size of chemical compounds to the nano scale. PuroMill media is composed of highly crosslinked copolymer beads that establish many benefits in the development of industrial materials.

What type of industrial products can PuroMill be used for?

PuroMill can be used in any industrial milling application that conventional ceramic media is used for, including inkjet pigments, coatings, electronics and nano-additives. Since PuroMill is an organic copolymer, it is particularly suitable for aqueous formulations, although organic formulations may be applicable depending upon solvent selection.

What type of media mills, nanoparticle media mills or ball mills can PuroMill be used in?

PuroMill is a low-density milling media and is recommended for use in high-energy mills with agitation speeds ranging from about 5 m/sec. to over 20 m/sec. PuroMill is compatible with all mill designs, including horizontal and vertical mills. In specialty applications such as inkjet pigments, very small (e.g., 50 µm) PuroMill media can be used in rotor-stator equipment with tip-speeds over 35 m/sec.

Is PuroMill suitable for both dry milling and wet milling?

Generally, PuroMill is recommended for wet milling applications using agitated media mills. In some cases, dry milling may be feasible.

Purolite®

Performance & Characteristics

Will using PuroMill in my process allow scalability?

Yes. PuroMill has demonstrated to scale very well from the smallest lab-scale media mills to the largest production-scale mills. Scaling is generally related to maintaining a consistent energy density within the agitated media bed during mill scale-up.

Will using PuroMill in my process allow consistent reproducibility?

Yes. PuroMill technology is produced under tight specification parameters and strict ISO guidelines. The beads have a very specific particle size range and allow consistent batch-to-batch reproducibility.

Does PuroMill contain impurities?

PuroMill is highly purified during manufacturing to ensure potential contaminants (both particulates and volatiles, such as monomers or solvents) are reduced to lowest attainable levels. We recommend that customers evaluate all final products prepared using PuroMill to ensure trace impurities are within acceptable limits.

Can PuroMill be used with viscous suspensions?

Yes. Despite its lower density, PuroMill can be used effectively for processing viscous suspensions by maximizing media mill agitation speeds to promote effective media separation during milling.

Will PuroMill cause excessive wear to milling equipment?

No. In fact, unlike ceramic media, PuroMill can be used in conventional stainless steel equipment or other acceptable alloys without measurable wear to milling equipment surfaces (e.g., agitator or chamber).

PuroMill is a low-density media. Doesn't that make it more susceptible to hydraulic packing?

No. As with any milling media, the operational parameters of nanoparticle milling (e.g., flow rate, RPM, media load, product viscosity, etc.) need to be established and optimized experimentally. PuroMill can be used at maximum media loads and RPMs without hydraulic packing, provided product flow rate and viscosity are optimized.

How does the low density of PuroMill affect comminution time when compared to YTZ or other media?

PuroMill can achieve comparable particle size reduction efficiency to YTZ media by operating the nanoparticle media mill with a higher media load and agitation speed.

In what other ways does PuroMill differ from YTZ or other media?

PuroMill does not undergo hydrothermal degradation, often associated with YTZ media and YTZ ceramic mill components.

About the technology

How does PuroMill polymeric media produce effective particle nanonization?

Puromill is composed of optimized, monodisperse copolymer beads that have exceptional wear resistance and provide excellent milling efficiency. Similar to conventional media, the mechanism of particle size reduction with PuroMill is based upon shear and impact forces resulting from media collisions during high-energy agitation within a media mill. Unlike denser ceramic media, PuroMill can withstand higher media load and agitation speed without unacceptable media attrition, resulting in maximum stress intensity and stress frequency during milling.

How is the uniform particle size of PuroMill media achieved?

PuroMill milling media is produced using Purolite's proprietary copolymer synthesis and purification technologies that enable production of consistent, monodisperse media bead distributions.

What percent capacity of the empty mill volume should be filled with PuroMill for most effective operation?

PuroMill is generally used in mills at higher media loads than conventional ceramic media. Media loads of 90% to 99% are recommended to maximize milling efficiency.

What agitator speeds are recommended with PuroMill?

PuroMill can be used in media mills at much higher RPM or "tip-speeds" than conventional ceramic media, without excessive media attrition or heat generation. Tip-speeds of 15 – 20 m/sec. are generally recommended.

Is PuroMill media reusable?

Yes. Due to its excellent wear resistance, PuroMill can be used multiple times, depending upon the application.

Can PuroMill be cleaned and sterilized?

Yes. PuroMill media has been developed to withstand moist heat sterilization techniques, such as autoclaving or SIP (e.g., 121°C for 20 min.). Also, PuroMill can be cleaned by flushing with water or with the use of common CIP detergents to enable media reuse.

Will anything cause PuroMill media to degrade prematurely?

Yes. Consideration should be given for the use of PuroMill with certain organic solvents and extreme operating temperatures.

The Basics

How is PuroMill sold?

PuroMill is sold by weight and a variety of packaging options are available, ranging from 1 kg to 50 kg quantities. Given the low bulk density (0.61 kg/L) of PuroMill, customers should consider the required amount to charge the media mill on a volumetric basis.

What is the shelf life of PuroMill media?

PuroMill Industrial-grade does not have a stated expiry and should be evaluated by the customer for extended use.

What grades of PuroMill are available?

PuroMill is offered as either an Industrial-grade media or a Pharmaceutical-grade media. The manufacturing of PuroMill Industrial-grade is governed by a quality system conforming to ISO 9001:2008 requirements.

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