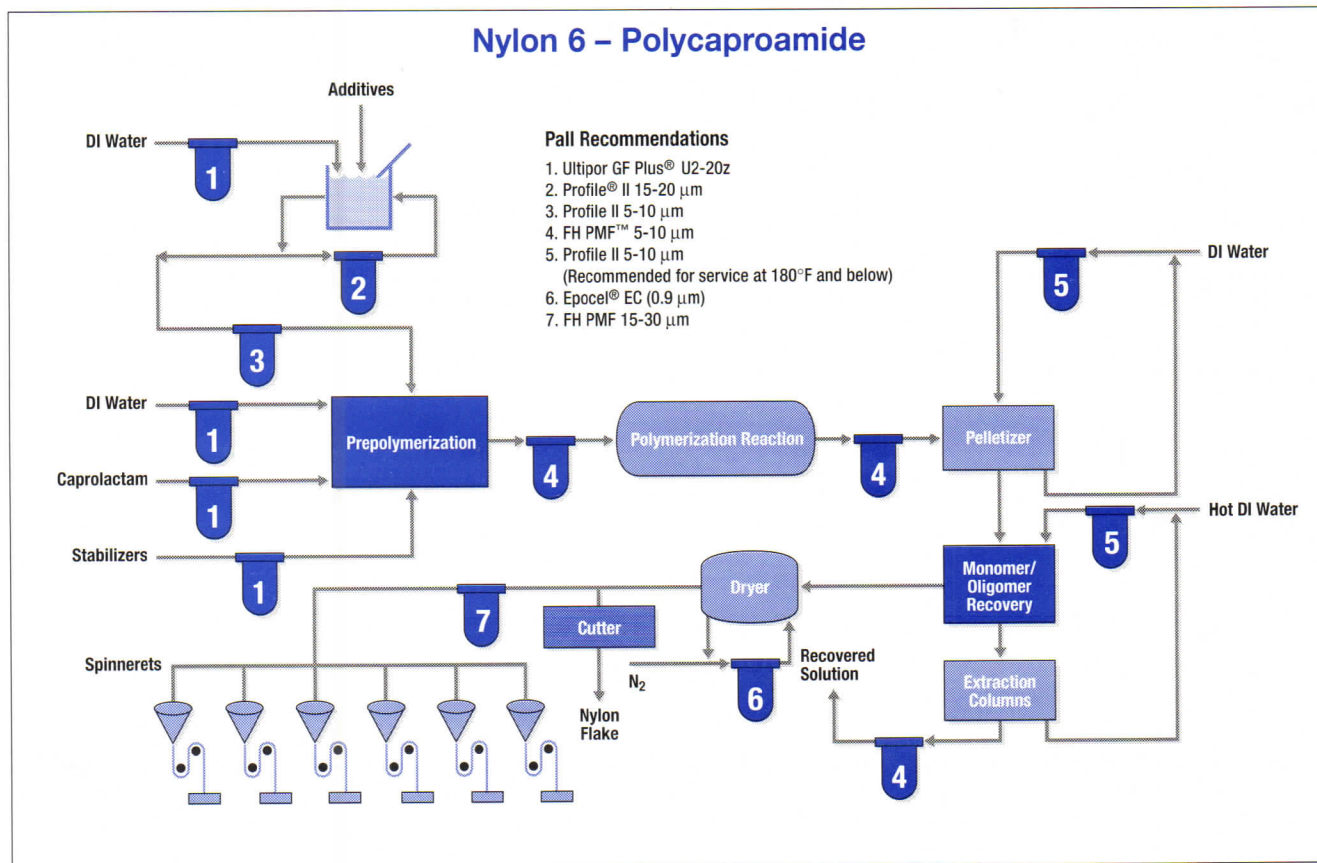


Nylon 6 – Polycaproamide Production



Production Process

Nylon 6 fibers for use in woven fabric, carpet, tire cord, and fishing line are produced by extruding molten polymer through spinnerets and stretching the fibers to their final thickness and weight. Because producing quality end products is important to the manufacturer, the need for fine filtration is essential.

The polymer melt must be homogeneous, gel free, and without oversized additive agglomerates to achieve high quality fiber and yields. Filtration of the process feedstreams, additive slurries, and the polymer melt itself are necessary to help eliminate fiber breaks and enhance fiber strength and uniformity. Through balanced filtration, fiber quality is improved, along with higher production rates with less process downtime.


Pall Recommendations



Caprolactam - Ultipor GF Plus®, grade U2-20Z, cartridges are recommended for this feedstream, reducing the level of contamination prior to prepolymerization. **1**


DI Water Feed and Stabilizers – Ultipor GF Plus, grade U2-20Z, cartridges are recommended to remove harmful minerals and contaminants, thereby promoting efficient polymerization. **1**

Additive Slurry in Water – The make-up water should be filtered with Ultipor GF Plus, grade U2-20Z, cartridge before mixing with the additive. Profile® II cartridges, rated 10-20 µm absolute, are recommended to filter the slurry recycle stream to remove agglomerates and maintain a well dispersed slurry. Profile II cartridges, rated 5-10 µm absolute, are recommended for the polishing filter. Filtration of the additive slurry stops the passage of large particles which can reduce the tensile strength and quality of the finished fiber. **1 2 3**

For the Oligomer or Pre-Polymer Stream – After the mixing of feedstreams and prior to polymerization, PMF™ filters are recommended to remove intrinsic process contamination, thus assuring unimpeded efficient polymerization. In addition, PMF filters should be utilized because of conditions, i.e., high temperature, pressure and fluid viscosity. **4**

Final Nylon 6 Polymer Transfer Line Filter – Depending on the denier fiber being produced, PMF elements, 15-30 µm, are recommended. These elements ensure superior, quality nylon fiber and allow high draw-off rates at the spinnerets with near "zero breaks." 

Extraction and Recovery of Monomers and Oligomers – Monomers and oligomers are recovered using hot water. As with the DI water feed, Profile II, 5-10 µm, cartridges are recommended to remove harmful minerals and contaminants, thereby promoting an efficient reaction. The recovered solution is filtered using 5-10 µm, PMF filters to remove any particulate matter picked up during processing.  

Nitrogen Gas – Epocel® cartridges, grade EC (0.9 µm absolute), are recommended to filter the nitrogen used to dry the nylon 6 chips. This eliminates the possible introduction of contaminants to the chips during drying. 

Spinneret Screen Packs – These are commonly used to remove oversized particles and gels which might plug the spinneret die. Where the flow versus pressure drop permits, PMF media in the 15-30 µm range is recommended. This prevents the clogging of the spinnerets and fiber breaks.



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