JV PROFESSIONAL
TEXTILESOLUTIONS

IRREGULAR STAINLESS STEEL FILTRATION POWDER

GRADED METAL SAND ENGINEERED FOR SYNTHETIC FIBRE SPIN PACKS

Controlled particle-size fractions for application-specific packed-bed filtration

DESIGNED TO SUPPORT: High dirt-holding capacity, stable pressure development and protection of spinneret capillaries.

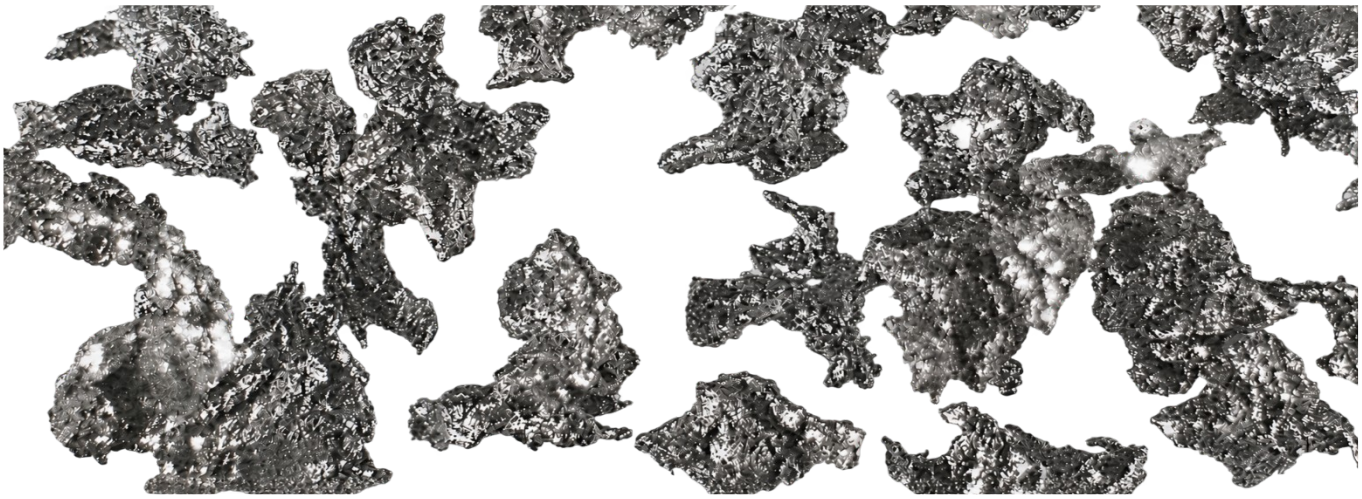
APPLICATIONS: PET | rPET | PA6 | PA66 | PP | OTHER THERMOPLASTICS

CONTROLLED FRACTIONS: Coarse, medium and fine fractions can be combined to tune bed architecture, void volume and retention duty.

TECHNICAL SELECTION SUPPORT: Grade and blend recommendations are based on the actual polymer, pack geometry, throughput and allowable pressure profile.

DEPTH FILTRATION BEFORE THE SPINNERET

Protect the spinneret through the full depth of the filter bed



Irregular
particles create distributed, tortuous flow paths that increase contact with contamination before the melt reaches the capillaries.

Representative irregular particle morphology

Why irregular powder is used in spin packs

Polymer melts may contain hard solids from raw materials or equipment together with deformable gels. If they reach the spinneret, contaminants can restrict capillaries and contribute to filament breaks, pressure instability and quality variation.

CAPTURE AND DIRT HOLDING: Textured particle surfaces provide a large contact area and a three-dimensional retention path.

PRESSURE MANAGEMENT: A graded bed distributes contamination through the media. Pressure rise depends on the layer sequence, bed depth and contamination loading.

PROCESS COMPATIBILITY: Alloy grade and particle blend must suit the polymer chemistry, melt temperature, preheating conditions and allowable differential pressure.

Product form: graded loose powder for a particulate filter bed - not a bonded or sintered porous disc, candle or element.

APPLICATION SCOPE

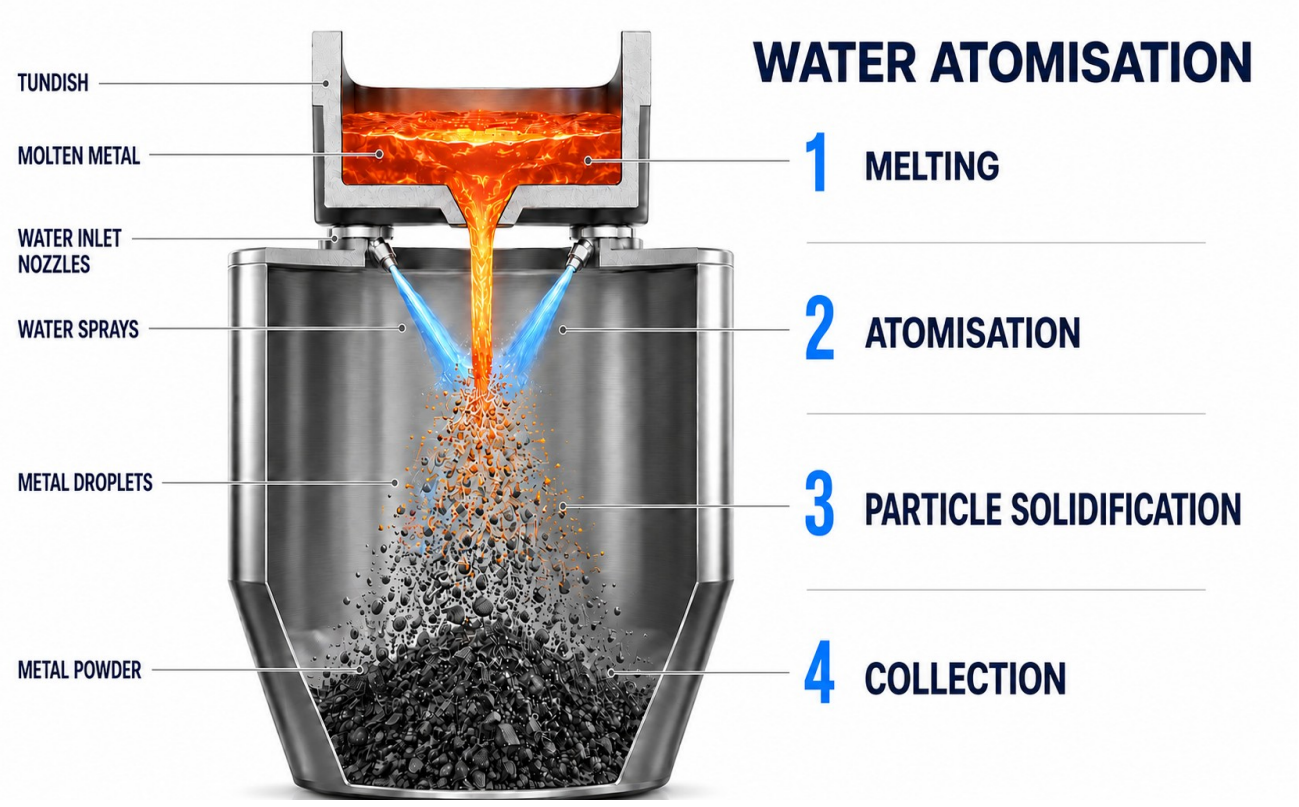
Suitable for validated packed-bed spin-pack duties in PET, rPET, PA6, PA66, polypropylene and other thermoplastic polymer processes.

- POY and FDY filament spinning
- BCF, IDY (industrial yarn) and staple-fibre extrusion
- Virgin and recycled polymer streams subject to process review

CONTROLLED PRODUCTION

Water atomisation creates the irregular morphology required for depth filtration

High-velocity water jets disintegrate a controlled molten-metal stream; the droplets cool, solidify, dry and are classified into defined size fractions.



Water atomisation process - representative production sequence

Process Sequence

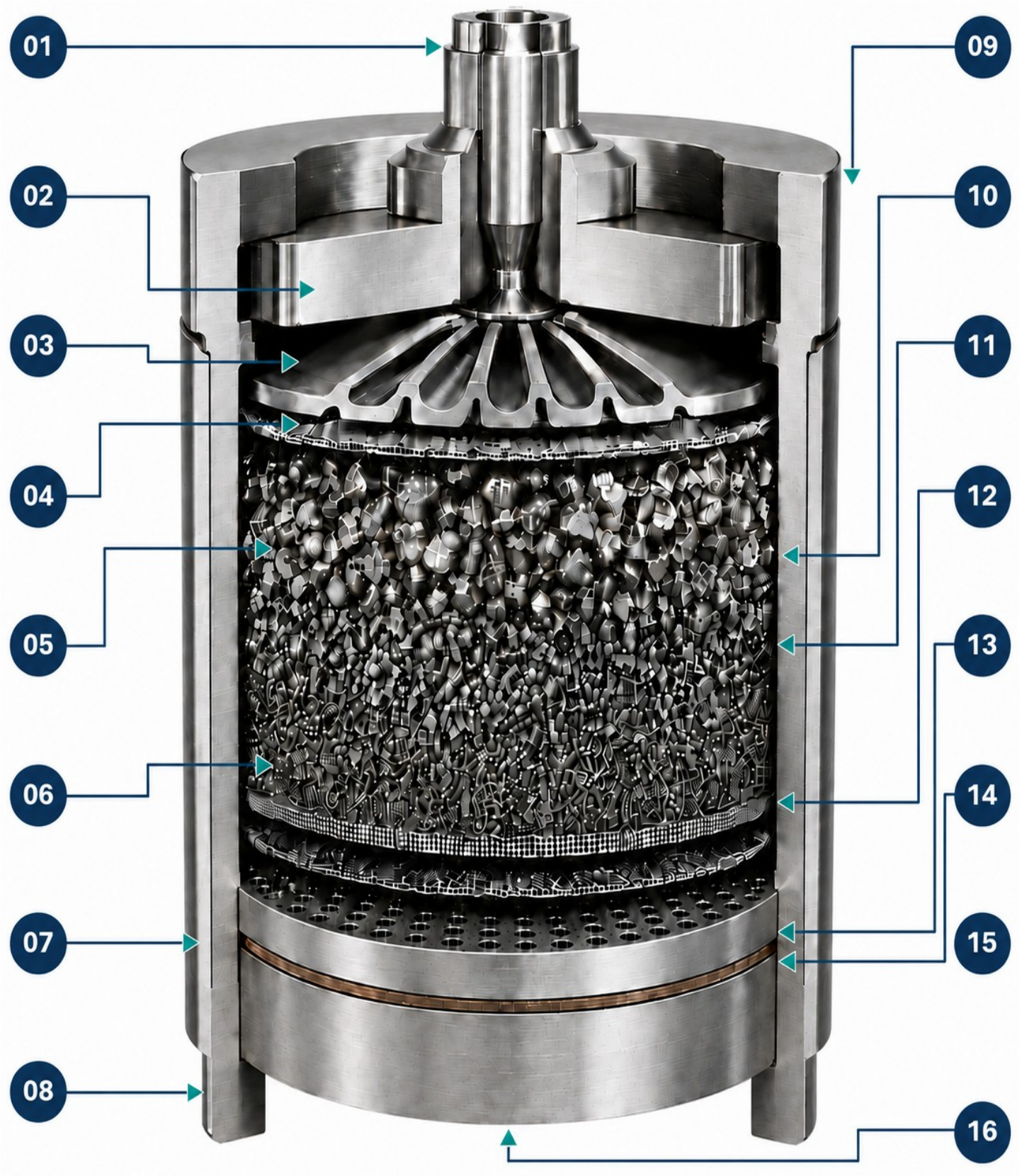
1. **MELTING:** A controlled molten-metal stream leaves the tundish.
2. **ATOMISATION:** High-velocity water jets divide the stream into droplets.

3. **SOLIDIFICATION:** Rapid heat extraction solidifies the droplets during descent.

4. **CLASSIFICATION:** Powder is collected, dried, sieved and graded to specification.

OUTPUT: Irregular water-atomised stainless steel powder in controlled size fractions, supplied against the approved product specification.

TYPICAL POLYMER MELT SPIN PACK ASSEMBLY



Component names and engineering functions

NO.	COMPONENT	FUNCTION
1	**POLYMER MELT INLET**	Receives metered polymer melt under pressure.
2	**PACK HEAD / TOP COVER**	Closes the pack and applies axial compression to the internal stack.
3	**ALUMINIUM CRUSH SEAL**	Prevents high-pressure melt leakage at the upper pack interface.
4	**FLOW-DISTRIBUTION PLATE**	Spreads the central inlet flow uniformly across the filter-bed area.
5	**UPPER RETAINING SCREEN**	Contains and stabilises the loose metal-powder bed.
6	**COARSE METAL-POWDER LAYER**	Provides first-stage depth filtration and high dirt-loading capacity.
7	**MEDIUM METAL-POWDER LAYER**	Captures progressively smaller solids and deformable gels.
8	**FINE METAL-POWDER LAYER**	Provides final granular filtration and controlled melt shear.
9	**FINE RETAINING SCREEN**	Prevents fine metal-powder migration into downstream hardware.
10	**COARSE SUPPORT SCREENS**	Support the fine screen against differential pressure.
11	**BREAKER / SUPPORT PLATE**	Carries the packed bed and redistributes melt before the spinneret.
12	**SPINNERET GASKET**	Seals the breaker-plate-to-spinneret interface.
13	**SPINNERET PLATE**	Divides the melt into twelve uniform vertical capillary streams.
14	**SPINNERET HOLDER / CLAMP**	Retains the lower assembly and maintains axial seating.
15	**PACK BODY / PRESSURE HOUSING**	Contains the complete pressurised filter stack.
16	**EXTRUDED FILAMENTS**	Uniform filaments exit the spinneret

ARRANGEMENT RESULT: The graded bed progressively captures solids and gels while distributing melt to the spinneret. In a balanced pack, the outlets produce parallel filaments with more consistent flow and reduced capillary contamination risk.

IMPORTANT DESIGN POINTS

- Melt flows through the metal sand bed from coarse to medium to fine. This graded arrangement delays blockage and progressively increases filtration resistance.
- Retaining mesh is required above and below the loose sand, with supporting screens and a breaker plate beneath it.
- Modern packs typically include the inlet cover, sealing ring, flow guide, filter layers, distribution/breaker plate, spinneret and pressure housing.
- Two or three powder grades are commonly used. Their particle sizes, quantities and bed depths must be selected for the polymer, viscosity, melt cleanliness, temperature and throughput.

This is a representative configuration; individual Barmag, Neumag, TMT and other OEM packs may combine or reposition some screens and distribution plates.

EFFECT ON FILAMENT QUALITY

A correctly engineered **coarse-to-medium-to-fine metal-sand bed** provides progressive depth filtration and controlled melt-flow resistance.

It removes gels and contaminants, protects spinneret capillaries and supports uniform melt distribution across the spinneret.

Key filament-quality benefits include:

- Improved yarn and filament linear-density uniformity
- Lower Decitex / Denier variation and Uster CV%
- More consistent tenacity and elongation
- Uniform molecular orientation, shrinkage and dye uptake
- Fewer gels, slubs, broken filaments and spin breaks
- Reduced fuzz, loops and downstream processing defects
- More stable pack pressure and extended operating life

Average linear density and tensile properties remain primarily controlled by polymer quality, pump delivery, temperature, quenching, spinning speed and draw ratio.

Metal-sand grades, quantities and bed depths must therefore be matched to the polymer and process.

Insufficient filtration allows contaminants and spinneret blockage, while excessive filtration resistance can cause high pressure, melt heating, polymer degradation and reduced pack life.

ALLOY SELECTION

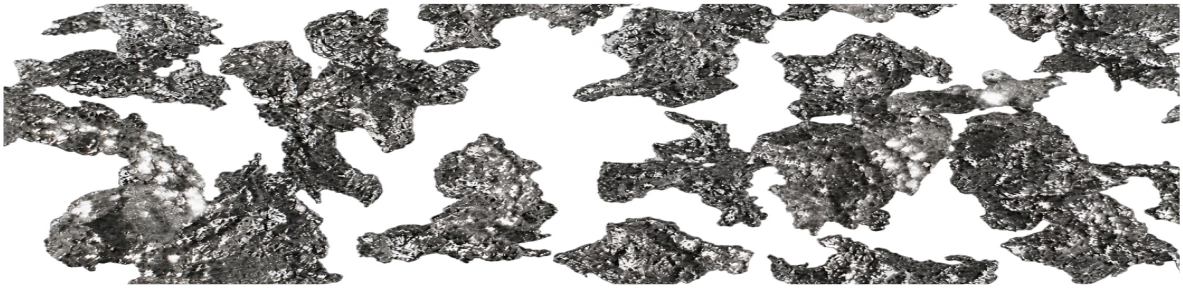
Select the grade around polymer chemistry, temperature and pressure duty

Final approval requires a process review and confirmation against the current product specification and batch certificate of analysis.

GRADE	POSITIONING	TYPICAL APPLICATION GUIDANCE
F-01	Economical Media	Cost-led PET POY / FDY applications where the approved specification meets the process duty.
S-03	Standard Media	Higher mechanical strength and lower oxidation sensitivity for more demanding PET filtration duties.
S-04	Higher Chromium Media	Higher initial-pressure and compaction-resistance duties, including validated PA filament applications.

Chemical composition limits (mass %)

GRADE	Iron Fe	Nickel Ni	CHROMIUM Cr	MANGANESE Mn	SILICON Si	MOLYBDENUM Mo	CARBON C
F-01	Balance	Max. 0.6	16 – 18	Max. 1.0	1.0 - 4.0	-	Max. 0.12
S-03	Balance	6 – 12	16 – 22	Max. 1.0	0.6 - 3.5	Max. 3.0	Max. 0.12
S-04	Balance	Max. 0.6	33 – 37	Max. 1.0	2 - 4	-	Max. 0.12



Morphology, alloy chemistry and particle integrity work together under rising pack pressure.

Grade selection considers polymer chemistry, pack-preheating conditions, melt temperature, differential pressure, oxidation sensitivity and resistance to compaction.

SELECTION CONTROL Validate initial pressure, pressure-rise rate, polymer colour, filament performance and pack life under the actual operating conditions.

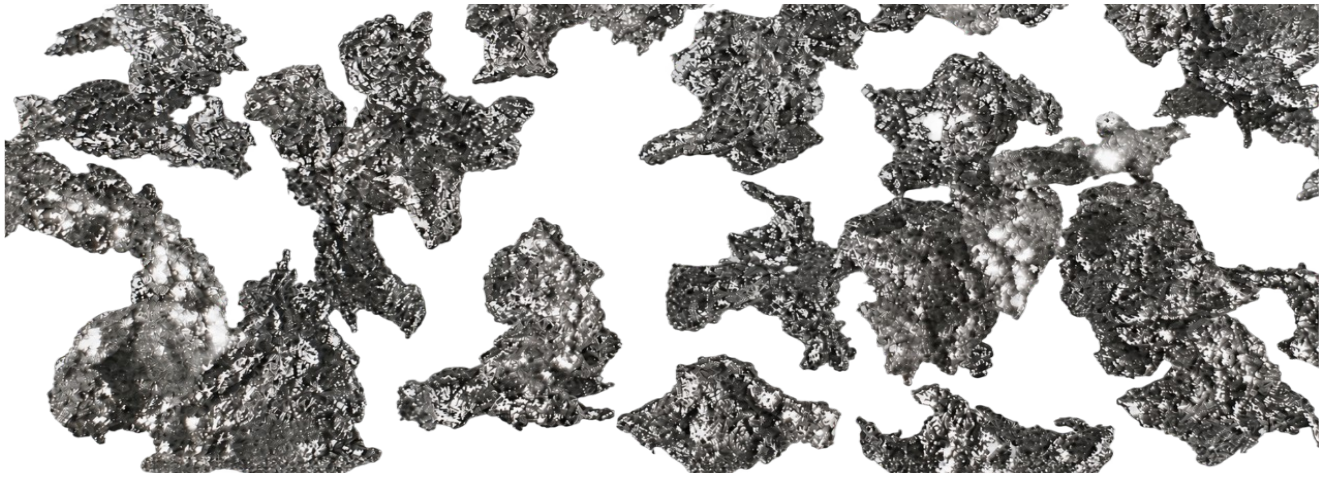
PARTICLE SIZE CONTROL

Build the packed bed from controlled coarse, medium and fine fractions

The final blend depends on the retention target, bed depth, melt viscosity, throughput and allowable pressure drop.

PARTICLE SIZE RANGE (micron)	NOMINAL MESH	APPARENT DENSITY (g/cm^3)	TAP DENSITY (g/cm^3)	INDICATIVE POROSITY (%)
850 - 2000	10 / 20	1.45	1.95	75
500 - 850	20 / 30	1.55	2.10	73
350 - 500	30 / 40	1.60	2.10	71
250 - 350	40 / 60	1.65	2.60	67
180 - 250	60 / 80	1.80	2.70	65
125 - 180	80 / 120	2.10	3.00	60
90 - 125	120 / 170	2.30	3.10	58
45 - 90	170 / 325	2.40	3.20	56

Particle-size fractions are determined by dry sieving in accordance with ISO 4497:2020 - Metallic powders: determination of particle size by dry sieving



Irregular morphology supports useful void volume and multiple flow paths through the packed bed.

IMPORTANT: Apparent density, tap density and porosity values are indicative supplier data.

PLANT QUALIFICATION

Media performance is proven in the complete spin-pack and process

Particle strength, irregular morphology and controlled size fractions are designed to support stable filtration; actual results depend on the full pack architecture and operating conditions.

MEDIA CHARACTERISTIC	INTENDED OPERATING EFFECT
High Mechanical Strength And Particle Integrity	Resistance to deformation and compaction as pack pressure rises.
Irregular Surface With Comparatively Low Apparent Density	High contact area and useful void volume within the packed bed.
Controlled Coarse, Medium And Fine Fractions	Tunable bed architecture, retention duty and pressure profile.
F-01, S-03 And High-Chromium S-04 Options	Grade selection around polymer, thermal and oxidation duty.

Recommended trial measurements

- Initial pack pressure at stabilised throughput and melt temperature
- Pressure-rise rate during the agreed operating period

- Pack life against the existing approved media
- Filament breaks, yarn quality and spinneret cleanliness
- Polymer colour and any evidence of oxidation or degradation

QUALIFICATION PRINCIPLE: Agree the product specification, trial quantity, operating window, measurable success criteria and review point before routine commercial supply.

Qualification links the approved media specification to measurable plant performance

APPLICATION-SPECIFIC TECHNICAL SUPPORT

Define the application before selecting the grade and blend

Provide complete process, spin-pack and operating data so our technical team can propose a controlled trial specification.

INFORMATION REQUIRED FOR SELECTION

- Product and polymer: POY, FDY, BCF, industrial yarn, staple fibre or other extrusion duty
- Throughput per spin pack and operating melt temperature
- Spin-pack cavity dimensions, available bed depth and screen arrangement
- Spinneret diameter, capillary diameter and hole count
- Current particle-size blend, pack weight and loading method
- Initial pressure, maximum permitted pressure and typical pack life
- Target filtration improvement, yarn-quality issue or contamination type

INDIA - CHINA SUPPLY PARTNERSHIP

ESTABLISHED MANUFACTURING AND GLOBAL REACH

Established manufacturing capability in China since 2007 is supported by application expertise and commercial coordination in India. The stainless-steel metal sand is accepted by major polymer spinners in China and international markets, with Futai's wider filtration portfolio exported to more than 40 countries.

COMPETITIVE TECHNICAL PERFORMANCE

Controlled particle sizing, irregular morphology and alloy options position the media as a credible alternative to established European and US products. Comparable or potentially improved performance can be confirmed through customer-specific spin-pack trials under agreed operating conditions.

PLANNED SURAT STOCK PROGRAMME

Selected approved grades and particle-size ranges will be imported in consolidated quantities and stocked locally in Surat against agreed customer forecasts or blanket orders. Customers will be able to call off smaller quantities according to actual consumption instead of purchasing and storing a complete shipment.

RAPID LOCAL CALL-OFF SUPPLY

Local dispatch from Surat will provide the shortest practical delivery time and a faster response to urgent or unplanned requirements. It will also reduce exposure to international freight schedules, customs-clearance delays and costly emergency shipments.

CUSTOMER INVENTORY AND SUPPLY BENEFITS

The programme will reduce customer-held inventory, working-capital commitment and warehouse requirements. Scheduled call-offs and planned stock replenishment will support reliable material availability, purchasing flexibility and continuity of production.

JV PROFESSIONAL
TEXTILE SOLUTIONS

PRODUCT ENQUIRIES AND TECHNICAL SUPPORT

Contact JV Professional Textile Solutions

Provide pack drawing, current media specification and operating data to agree a technically controlled trial.

CONTACT US		
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Enquiry information

For faster selection, include the polymer, throughput per pack, melt temperature, pack drawing, bed depth, screen arrangement, current particle size blend, initial and terminal pressure, pack life and expected annual consumption.