Technical Data Sheet

Synthetic zeolite molecular sieve and carbon molecular sieve — typical specification

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1. Product description

Molecular sieves are crystalline aluminosilicates with pores of a uniform, molecular-sized diameter. Separation is by size and polarity: molecules small enough to enter the pore are adsorbed, larger ones are excluded. The pore opening is set by the exchangeable cation, which is what distinguishes 3A, 4A, 5A and the X types from one another. Carbon molecular sieve is different in kind — it is a carbonaceous adsorbent that separates oxygen from nitrogen by adsorption *rate* rather than by equilibrium capacity, which is why it is used in pressure-swing nitrogen generators.

Supplied as beads or pellets, activated, and sealed against moisture at the end of production.

2. Grades, pore opening and typical applications

Grade	Pore opening	Typical bulk density g/mL	Crush strength N/bead	Static water adsorption	Typical applications
3A	3 Å	0.60–0.65	≥ 40 (1.6–2.5 mm) ≥ 60 (3.0–5.0 mm)	≥ 20%	Drying of unsaturated hydrocarbons, cracked gas, ethylene and propylene, LPG, refrigerants; moisture adsorption in insulating glass
4A	4 Å	0.66–0.68	≥ 35–80	≥ 20.5%	General deep drying of gases and liquids, natural gas, refrigerants, static drying in sealed packaging
5A	5 Å	≥ 0.65	≥ 25–40	≥ 20.5%	Separation of normal from iso-paraffins; PSA oxygen and hydrogen purification; CO_2 removal
13X	10 Å	0.64–0.68	≥ 40 / ≥ 80	≥ 25%	Air separation feed gas clean-up (H_2O and CO_2); general gas and liquid drying
13X APG	10 Å	≥ 0.64	≥ 25–40	≥ 25%	Air separation pre-purification: water and CO_2 removed in a single bed
Li-LSX	X framework, Li exchanged	0.60–0.66	≥ 25	High N_2 capacity	VPSA and PSA oxygen generation; medical oxygen concentrators
CMS	Kinetic separation	0.63–0.70	≥ 40–70	Not applicable	PSA nitrogen generation, 95–99.999% N_2

3. Other typical properties

Property	Typical value	Test reference
Attrition / abrasion	≤ 0.20 wt%	Rotating drum or ball-mill attrition test
Loss on ignition	≤ 1.50 wt%	575 °C for 1 h
Moisture as packed	≤ 1.5 wt%	Loss on ignition at release
Size compliance	≥ 96% (beads) / ≥ 95% (pellets)	Sieve analysis, ISO / GB sieve set
Static water adsorption	See section 2	GB/T 6287, saturated NaCl at 25 °C / 75% RH
Appearance	Beige to light brown beads or pellets	Visual
Odour	Odourless	—
Water solubility	Insoluble	—

4. Forms and sizes

Beads: 1.6–2.5 mm, 3.0–5.0 mm (other ranges on request). **Pellets:** 1/16", 1/8". **Carbon molecular sieve:** granules 1.0–1.2, 1.3, 1.5, 2.0 and 2.4 mm. Low-binder and high-zeolite-content grades, and sizes matched to a product you are replacing, are available against agreement before production.

5. Regeneration

Regenerate with a dry purge gas at 200–350 °C, at 0.3–0.5 kg/cm^2, for 3–4 hours, until the bed outlet reaches 110–180 °C, then cool with dry gas. Confirm the window for your grade — over-firing damages the crystal structure and the capacity lost does not come back. Where the bed has adsorbed organic material, strip with steam before the thermal step. In pressure-swing service no heat is applied; the bed is regenerated by depressurisation and purge.

6. Packing, storage and shelf life

Option	Detail
Standard packing	25 kg net carton or paper-plastic composite bag with inner moisture-barrier liner
Alternatives	130–150 kg steel drum; 750–1,000 kg big bag; private label
Pallet	1,000 kg per pallet (40 × 25 kg), stretch-wrapped
Container	18,000–20,000 kg per 20 ft container
Marking	Grade, lot number, net weight, production date
Storage	Sealed, off the floor, in dry conditions. Activated sieve adsorbs moisture from ambient air within hours once the liner is opened
Shelf life	Indefinite while sealed and undamaged; confirm lot condition before loading a vessel

7. Quality control and documents

Static water adsorption, crushing strength, attrition, bulk density, size distribution, loss on ignition and moisture as packed are tested on every released lot. A sample of each lot is retained for 12 months. Documents issued: certificate of analysis (measured values of the shipped lot), technical data sheet, safety data sheet, packing list, commercial invoice and certificate of origin. Third-party pre-shipment inspection on request.

8. Important notes

The values in this document are typical values for guidance when shortlisting a grade. They are the ranges commonly published by molecular sieve producers, and they are not a specification of a particular lot. Every shipment is released against the measured values on its own certificate of analysis, and that COA governs. Where a buyer needs a guaranteed minimum rather than a typical value, agree it before production and it will appear on the COA.

Working capacity in a real bed is set by the regeneration temperature, the cycle time and how completely the bed is regenerated. It is always lower than the equilibrium capacity quoted on a data sheet, and it is the figure a design should use. Grade selection should be made from stream composition, pressure, temperature, flow, target outlet and cycle time — send those and we will recommend a grade and size the bed.

Supplier
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Legal entity name, business registration number and registered address are stated on the commercial invoice and certificate of origin issued with each shipment.