NanoFract

MATERIAL DATA SHEET 01 · MICRO & NANO GRINDING

What we make from your material.

Documented grinding results from 16 material classes – from polymers and minerals to fibrous natural materials. Without cryogenic milling.

3.0 µm
finest documented volume-weighted d50 (post-consumer PVC)

311
documented individual measurements on 175 polymer samples from 56 internal measurement and test reports

16
material classes with documented results, 2022–2026

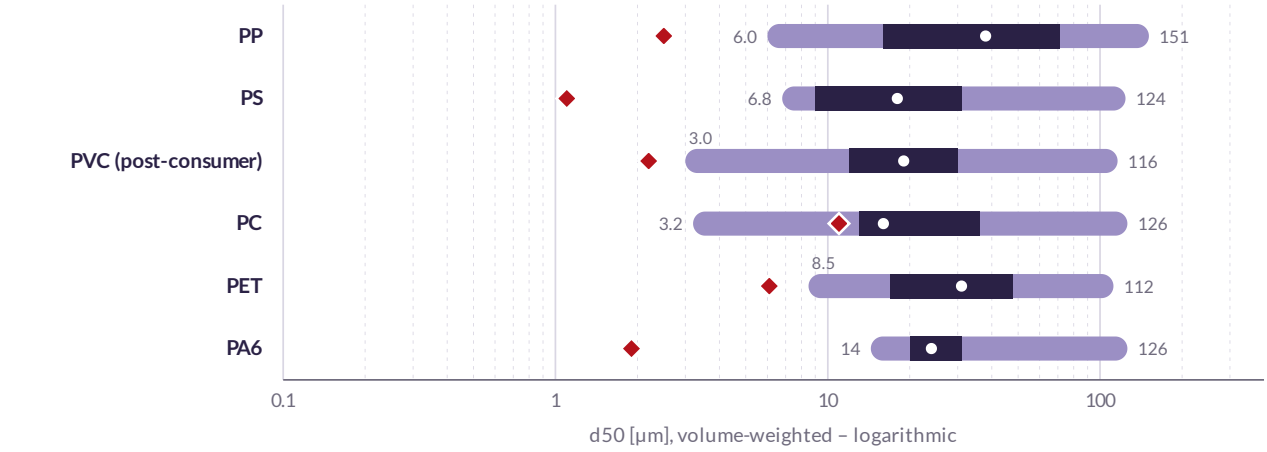
0 l
liquid nitrogen in the process – all results achieved without cryogenic milling

All values come from documented measurements of completed customer and research projects (2022–2026) and have been checked for distribution type and data origin. d50 figures are rounded indicative values and not guaranteed properties; the binding specification results from the respective trial grind and its measurement report (d10/d50/d90, distribution type stated).

POLYMERS

Seven polymers, documented from around 1 µm to 150 µm

The overview summarises the documented particle size measurements from completed customer and research projects. The basis is laser diffraction measurements on real grinding batches.



POLYMER	VOLUME-WEIGHTED D50 [MM]	MIDDLE 50 % OF SAMPLES	FINEST FRACTION (NUMBER-WEIGHTED)	SAMPLES
Polypropylene (PP)	6.0 – 151	16 – 71	2.5 µm	32
Polystyrene (PS)	6.8 – 124	9 – 31	1.1 µm	16
PVC (post-consumer)	3.0 – 116	12 – 30	2.2 µm	37
Polycarbonate (PC)	3.2 – 126	13 – 36	11.0 µm	31
PET	8.5 – 112	17 – 48	6.1 µm	28
Polyamide 6 (PA6)	14.4 – 126	20 – 31	1.9 µm	31
HDPE *	41 – 101 *	–	–	2 series

Volume-weighted indicative values, rounded, from completed projects; 175 samples, several measurement runs per sample. * For HDPE only two measurement series without a stated distribution type are available so far; they are not directly comparable with the other values and are not shown in the chart.

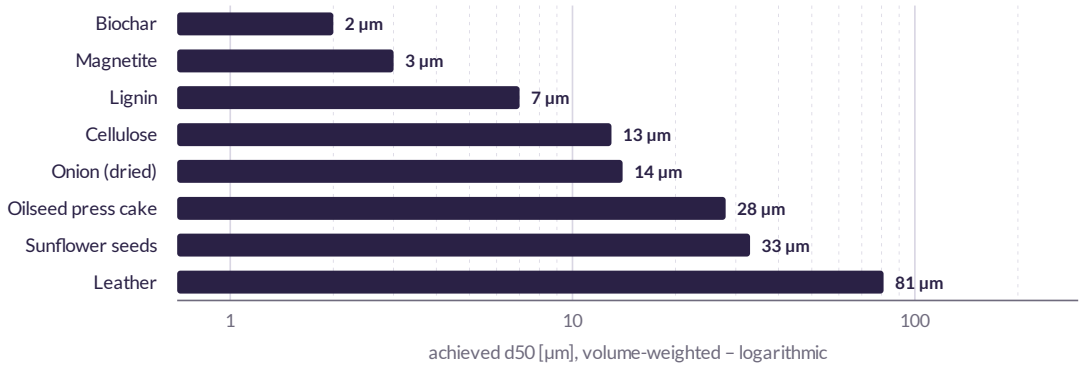
Why we state two distribution types

Number-weighted and volume-weighted distributions give clearly different d50 values for the same sample. We state both separately: the volume-weighted distribution as the process figure, the number-weighted one as evidence of the finest fraction actually produced. Figures without this distinction are not technically comparable.

FURTHER MATERIALS

Soft, fibrous and tough materials

Soft, fibrous, temperature-sensitive, tough: many of our projects begin where a defined target fraction has not yet been achieved. The following results come from completed customer and development projects.



MATERIAL	ACHIEVED D50	FIELD OF APPLICATION / BACKGROUND
Biochar	2 µm	Modified thermal conductivity; cement and construction material systems
Magnetite	3 µm	EMC shielding, filler compounds, polymer filler, high-density applications
Lignin	7 µm	Fine grinding of a lignocellulosic residue into a filler
Cellulose	13 µm	Natural fibre material as filler and carrier material
Onion (dried)	14 µm	Development project: fine grinding of processing residues from onion processing **
Oilseed press cake	28 µm	Development project: fine grinding of a residual stream from oilseed processing **
Sunflower seeds	33 µm	Development project for the food and feed industry **
Leather	81 µm	Fibrous, tough-elastic material
Carbon nanotubes (CNT)	–	Special case without a d50 figure: the aim is not size reduction but disentangling the agglomerates without substantially shortening the tube length. The process route is a trade secret.

Achieved d50 values are volume-weighted indicative values from one completed project each; they describe the result achieved there, not a generally achievable fineness. ** Development and sample projects for the food and feed sector: NanoFract supplies proof of feasibility, samples and a measurement report. Manufacturing and placing on the market of food and feed take place at the customer within the scope of its food or feed law authorisation.

PROCESS & QUALITY

How these results come about

Our own process – without cryogenic milling

The basis is a rotating fluidised-bed process developed by us. It works without liquid nitrogen and is designed individually for each material. The specific process route – plant design, process parameters and material-specific experience – is treated as a trade secret. What counts for you is the result: a defined fraction, documented per batch in the measurement report.

No liquid nitrogen

Our process works without cryogenic cooling. There are no running costs for liquid nitrogen, and the material is not exposed to cryogenic embrittlement.

Gentle on the material

No grinding media abrasion enters the product – relevant wherever the particle itself is the object under test.

538 kWh/t

Documented specific energy input from a completed reference project. The value depends on material and target size; for larger plants we expect a lower specific consumption.

Reproducible process window

For each material we define a dedicated process window and document it internally. The aim is repeatability across batches; the evidence is the batch-related measurement report.

Measurement and evidence

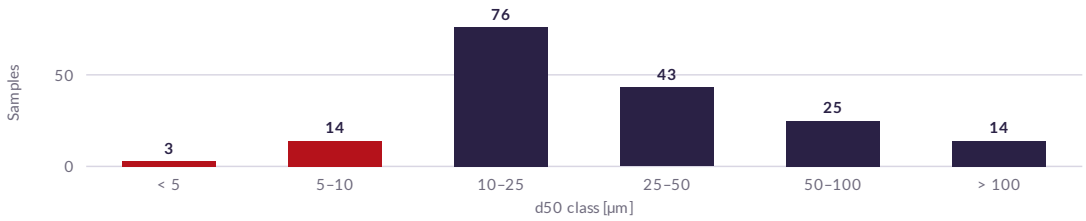
- Particle size analysis by laser diffraction (Mastersizer), distribution type stated per batch
- Fractionation by centrifugation and sieving for narrow target ranges
- Raman spectroscopy to confirm material identity on request
- Batch-related measurement reports, raw data on request

From trial grind to series

- **Feasibility trial** – trial grind on your material with measurement report
- **Process development** – process window for your target specification
- **Small series** – first quantities for your validation
- **Repeat programme** – recurring supply to an approved specification
- **Customer plant** – transfer of the process to a mill at your site under a know-how agreement

Fineness distribution of the documented polymer samples

Distribution of volume-weighted d50 values across all 175 polymer samples (excluding HDPE). The majority of our batches lie in the 10–50 µm range.



Send us your material.

We grind a sample and deliver a measurement report. If it works, we talk quantities. If it does not, we tell you why.

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