UHMWPE (ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE) PRODUCT CATALOGUE

Base resin: virgin UHMWPE, molecular weight 3.5–9.0×10^6 g/mol. Data are typical values measured at 23 °C, 50 % RH unless stated otherwise. UHMWPE absorbs <0.01 % moisture; mechanical values are given for dry-as-machined condition.

VIRGIN UHMWPE — TYPICAL REFERENCE PROPERTIES

Density (ISO 1183): 0.93–0.94 g/cm^3.

Yield stress (ISO 527): 21–23 MPa.

Tensile strength at break: ≥40 MPa.

Elongation at break: ≥300 %.

Flexural modulus (ISO 178): 0.8 GPa.

Compressive stress at 10 % strain: 18 MPa.

Charpy impact, unnotched: no break (ISO 179).

Notched Izod impact (ASTM D256): no break.

Shore D hardness (ISO 868): 63–65.

Melting point (DSC): 133–135 °C.

Vicat softening point B/50: 80 °C.

Heat deflection temperature (0.45 MPa): 70 °C.

Continuous service temperature: -200 °C to +80 °C. Short-term peak: 90 °C.

Thermal conductivity (ISO 22007): 0.41 W/(m·K).

Coefficient of linear thermal expansion (23–60 °C): 20×10^{-5} /K.

Flammability (UL94): HB at 3.0 mm.

Surface resistivity (IEC 60093): $>10^{14}$ Ω.

Water absorption, 24 h at 23 °C: <0.01 %.

---

1. UHMWPE ROD

Extruded and compression-moulded stock. Available in virgin, anti-static, and food-grade formulations.

Diameter:

Extruded: 10, 12, 15, 20, 25, 30, 40, 50, 60, 80, 100, 120, 150, 200 mm.

Moulded: 180, 200, 250, 300 mm.

Standard length: 1000 mm, 2000 mm, 3000 mm. Moulded rod: 1000 mm, 2000 mm.

Density (virgin): 0.93 g/cm³.

Tensile yield strength (virgin): ≥21 MPa.

Elongation at break: ≥250 %.

Diameter tolerance: ISO h9 (extruded). Moulded: +1.0/-0 mm.

Straightness deviation: ≤0.5 mm per 1000 mm.

Continuous service temperature: -200 °C to +80 °C.

Applications:

Machined bushings, rollers, and bearings in aqueous and low-load dry applications.

Gear blanks for light-duty spur and helical gears.

Insulating spacers and standoffs in low-temperature equipment.

Shaft sleeves for food-grade mixers and conveyors.

Characteristics:

Abrasion resistance by sand-slurry test: <20 % of mass loss compared to PA66 (same test conditions).

Dynamic friction coefficient against polished steel: 0.06–0.10 (dry). No stick-slip.

Creep under 10 MPa compressive load at 23 °C for 1000 h: <2.5 % strain.

Rod surface Ra <1.6 µm; core free of voids above 0.5 mm.

Natural colour: translucent-white. Black grade (anti-static) and blue grade (metal-detectable food grade) available.

---

2. UHMWPE SHEET

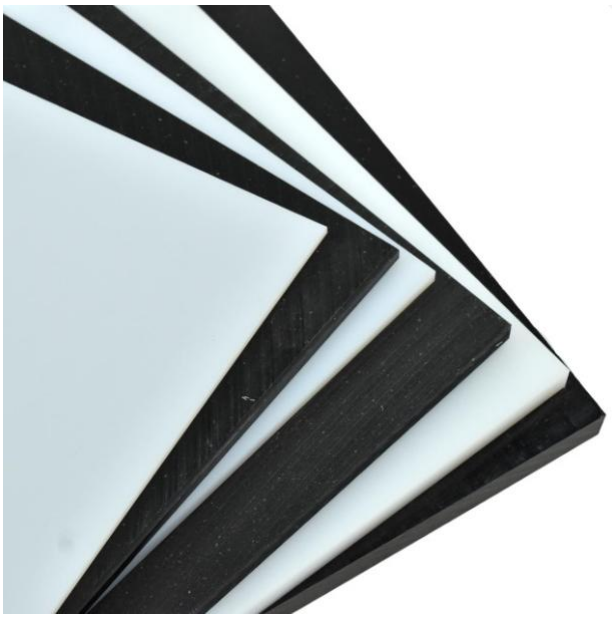
Extruded and compression-moulded plate. Thickness range from thin-gauge liner stock to thick structural slabs.

Thickness:

Extruded: 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 8.0, 10, 12, 15, 20, 25, 30, 40, 50 mm.

Moulded: 20, 25, 30, 40, 50, 60, 80, 100, 120 mm.

Standard sheet size: 1000×2000 mm, 1220×2440 mm, 1500×3000 mm. Custom up to 2000×4000 mm.



Density (virgin): 0.93 g/cm³.

Tensile yield strength (virgin): 21 MPa.

Elongation at break: ≥300 %.

Shore D hardness: 63.

Continuous service temperature: -200 °C to +80 °C.

Applications:

Cut-to-size wear plates for chutes, hoppers, silos, and truck beds.

Sliding-table tops and assembly-bench covers.

Die-cutting pads and anvil covers.

Insulating covers for cryogenic pipe supports.

Liners for ship-loading conveyors and bulk-handling buckets.

Characteristics:

Water absorption <0.01 %; zero swelling in humid or wet conditions.

Flatness tolerance: ±0.5 mm over 1000 mm for extruded sheet. Moulded plate: ±1.0 mm over 1000 mm.

Thickness tolerance: ±0.20 mm (extruded ≤10 mm), +1.0/-0.5 mm (moulded ≥30 mm).

Impact resistance: no crack at -50 °C in falling-weight test (20 kg, 1.5 m).

Available with one-side textured surface for adhesive bonding (peel-ply finish on request).

Black anti-static and blue food-grade grades stocked in common thicknesses.

3. UHMWPE TUBE

Extruded thin-wall and moulded thick-wall tube. Used for lining and fluid handling in non-pressure service.

Outer diameter (OD): 20, 25, 30, 40, 50, 63, 75, 90, 110, 125, 140, 160, 200, 250, 300, 400, 500, 600 mm.

Wall thickness (WT):

Extruded (OD ≤200 mm): 3.0, 5.0, 6.0, 8.0, 10.0 mm.

Moulded (OD >200 mm): 10, 12, 15, 20, 25, 30 mm.

Density (virgin): 0.93 g/cm^3.

Hoop tensile strength (virgin): 25 MPa.

Continuous service temperature: -200 °C to +80 °C.

Burst pressure example (virgin, OD 63 mm × WT 5 mm): >2.0 MPa at 23 °C.

Applications:

Liner sleeves for pneumatic conveying pipes handling abrasive powders.

Flow pipes for slurry, grain, and powder transfer.

Protective casings over electrical cables in mining equipment.

Low-friction sleeves for rodless cylinders.

Characteristics:

Dynamic friction against coal slurry: μ = 0.08–0.12.

OD tolerance extruded: ±0.3 mm (OD ≤110 mm). Moulded: +1.0/-0 mm.

Wall thickness variation within a tube length: <10 %.

Black anti-static grade available for explosive-atmosphere conveying (ATEX dust zone 22).

Tube can be flanged by hot-forming; flange face Ra <3.2 µm after facing.

---

4. CUSTOM UHMWPE MACHINED PARTS

Fully finished components machined from rod, sheet, or moulded blanks. Design optimized for wear, impact, and chemical resistance.

Machining capability

Maximum part size (from sheet): 2000×4000 mm; (from rod): Ø300×3000 mm.

Minimum wall thickness after machining: 2.0 mm (virgin).

Tolerances:

Linear dimension: ±0.10 mm (≤300 mm), ±0.20 mm (300–1000 mm), ±0.50 mm (>1000 mm).

Bore: H9 standard; H8 achievable.

Flatness: 0.1 mm per 300 mm.

Surface finish Ra: 0.8–1.6 µm on sealing faces; 1.6–3.2 µm on general faces.

Threads: metric M6–M36, UN 1/4″ to 1½″. External threads cut, internal tapped.

Typical machined parts:

Sprockets, star wheels, and timing pulleys for food conveyors.

Bearing blocks and thrust washers in marine and off-shore cranes.

Scraper blades, doctor blades, and wiper strips.

Valve seats and poppets for abrasive slurry service.

Insulating pads and cryogenic spacers.

Applications:

Bulk material handling: chain-guide profiles, roller-track inserts.

Food processing: cutting-board plates, dough-handling guides.

Marine: fender pads, rubbing strips, dock-bumper inserts.

Cryogenics: LNG pipe-support blocks, cold-box spacers.

Characteristics:

Stress-relief annealing at 80 °C for 4 h reduces machining-induced distortion by >60 %.

No coolant required during machining; dry-cut with carbide tool at 400–800 surface m/min.

Machined edges free of melt-beads when correct feed rate is applied; burr height <0.05 mm.

No toxic emission, no BPA, no phthalates.

---

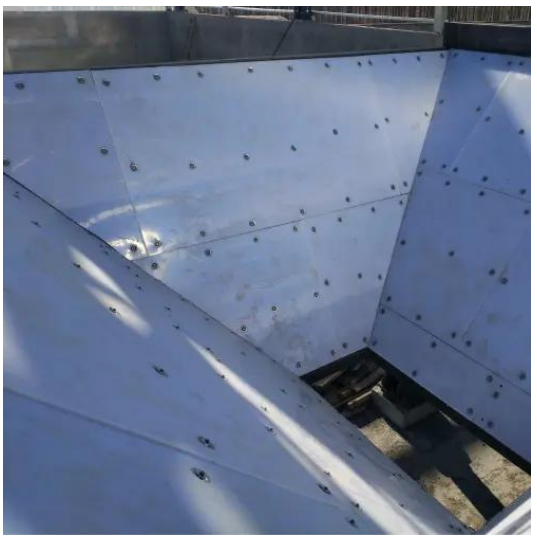
5. UHMW LINERS

Cut-to-size or custom-fabricated lining panels for impact and abrasion protection. Assembled by mechanical fastening or welding.

Panel thickness: 6, 8, 10, 12, 15, 20, 25, 30, 40, 50 mm.

Standard panel size: 1000×2000 mm, 1220×2440 mm. Cut to dimension ±1 mm.

Density: 0.93 g/cm^3.



Static friction coefficient against coal (dry): 0.09–0.14.

Dynamic friction coefficient against wet sand: 0.06–0.09.

Abrasion index (Taber, CS-17 wheel, 1000 g, 5000 cycles): <10 mg mass loss.

Operating temperature: -200 °C to +80 °C.

Applications:

Hopper and bin liners in coal, grain, and fertiliser plants.

Chute and deflector-plate liners in cement and aggregate processing.

Dump-truck and trailer-body liners.

Underground mine-pass liners.

Characteristics:

No moisture absorption eliminates freeze-bonding in cold climates.

10 mm liner reduces impact sound level by 6–8 dB(A) compared to bare steel plate (measured 100 mm away).

Bolt-fixed liners: countersunk hole pattern 200×200 mm or 300×300 mm; pull-through force per M10 bolt >1500 N.

Weldable: hot-gas extrusion welding produces seam strength >80 % of parent sheet.

Black anti-static grade (surface resistivity 10^6–10^9 Ω) for ATEX-regulated coal-dust environments.

---

6. UHMW WEAR STRIPS & GUIDE RAILS

Extruded and machined profiles for sliding and guiding applications. Cross-sections produced to drawing.

Standard rectangular sections: 20×5, 30×8, 40×10, 50×12, 60×15, 80×20, 100×25, 120×30 mm.

Custom profiles: L-angle, T-section, U-channel, dovetail base.

Length: 1000 mm, 2000 mm, 3000 mm. Continuous lengths up to 6000 mm by arrangement.

Density: 0.93 g/cm^3.

Flexural modulus: 0.8 GPa.

Coefficient of friction against steel: 0.07–0.11.

Wear rate (Pin-on-disc, 1 MPa, 0.5 m/s, vs. S235 steel, dry): $<2\times10^{-6}$ mm^3/N·m.

Applications:

Chain-drive guide rails in bottling, canning, and packaging lines.

Slide-gate tracks and linear-motion rails in food-processing machinery.

Wear strips on telescopic booms and forklift masts.

Rubbing strips on marine pilings and lock gates.

Characteristics:

Dimensional tolerance on thickness and width: ±0.3 mm (extruded).

Drilled and countersunk mounting holes on standard pitch 100, 150, 200 mm.

80×20 mm strip, 2000 mm span, takes 2.5 kN central load with ≤5 mm deflection.

No lubrication required; friction remains stable from -50 °C to +60 °C.

Black anti-static grade strips prevent electrostatic dust attraction in packaging areas.

---

7. UHMWPE FOOD GRADE & ANTI-STATIC PARTS

Parts produced from raw materials that meet food-contact and electrostatic-discharge requirements. Both stock shapes and finished components available.

Food Grade (Virgin, Natural)

Complies with FDA 21 CFR 177.1520, EU 10/2011, and EC 1935/2004.

Colour: natural-white (translucent). Blue grade: metal-detectable and X-ray-visible.

No substances on the SVHC candidate list.

Extractables in 3 % acetic acid at 40 °C for 10 days: <5 mg/dm^2.

Service temperature in food contact: -50 °C to +80 °C.

Typical parts: scraper blades, dough rollers, star wheels, bushings, cutting boards, chain guides.

Surface finish on food-contact faces: Ra 0.8 µm; no crevices >0.3 mm.

Anti-static Grade (Black)

Surface resistivity: 10^6–10^9 Ω (IEC 60093). Volume resistivity: 10^5–10^8 Ω·cm.

Carbon-black filled, no surface coating; conductivity is permanent.

Mechanical properties vs. virgin: yield stress 19 MPa, elongation 200 %, Shore D 60.

Operating temperature: -200 °C to +80 °C.

Complies with ATEX directive 2014/34/EU for non-conductive parts in dust zone 22.

Typical parts: guide rails for electronic component assembly, conveyor rollers in explosive-atmosphere areas, liners for powder handling equipment, substrate carriers in PCB lines.

Characteristics common to both grades:

No odour, no extractable plasticizers.

Resistant to cleaning chemicals: 10 % H_2O_2, 5 % NaOH, 10 % H_3PO_4 at 60 °C — no weight change after 7-day immersion.

Blue food-grade parts detectable by standard metal detectors down to 3 mm sphere equivalent.

All parts can be steam-cleaned (max 90 °C, short duration); 200 cycles without surface cracking.

Post-machining washing in 80 °C deionised water reduces particle residue to <50 per cm^2 above 5 µm.