

Technical Data Sheet (TDS)

1. Product Overview

- **Product Name:** Hydroxypropyl Methyl Cellulose (HPMC)
- **English Name:** Hydroxypropyl Methyl Cellulose
- **CAS Number:** 9004-65-3
- **Formula:** $(C_6H_{10}O_5)_n \cdot (C_3H_7O)_x \cdot (CH_3O)_y$
- **Viscosity Grade:** 20000 mPa·s (2% aq. solution, 20°C)
- **Molecular Weight:** Variable (10,000-1,000,000 Da)
- **Product Characteristics:** White odorless free-flowing powder, modified cellulose ether, hygroscopic, dispersible in cold water to form clear viscous solution. Non-toxic, non-combustible, biodegradable. Exhibits thermoreversible gelation (sol in cold water, gel in hot water >80°C). Excellent thickening, water retention, binding, emulsifying and film-forming properties. Customizable viscosity grade (5-200,000 mPa·s) and substituent content; food/pharmaceutical/industrial grades available. Stable in neutral and mild acidic/alkaline media; ideal additive for construction, pharmaceuticals, cosmetics, food and coatings.

2. Technical Specifications (20000 mPa·s Grade)

Item	Specification
Appearance	White to off-white free-flowing powder
Moisture Content	≤ 5.0%
Ash Content	≤ 1.0%
Viscosity (2% aq. solution, 20°C)	18000-22000 mPa·s
Methoxyl Content (-OCH ₃)	28.0-30.0%
Hydroxypropoxyl Content (-OCH ₂ CH(OH)CH ₃)	7.0-12.0%
pH Value (2% aq. solution, 25°C)	5.0-8.0
Heavy Metals (Pb)	≤ 5 ppm
Arsenic (As)	≤ 1 ppm
Loss on Ignition	≤ 5.0%
Solubility	Dispersible in cold water (clear solution)
Gelation Temperature (2% aq.)	80-90°C
Hygroscopy	Hygroscopic
Shelf Life (unopened)	24 months (≤30°C, dry)

3. Product Advantages

1. **Multi-Functional Properties:** Integrates thickening, water retention, binding, emulsifying, film-forming and suspending properties in one product; reduces need for multiple additives.
2. **Customizable Grades:** Viscosity grade (5-200,000 mPa·s) and substituent content customizable; food/pharmaceutical/industrial grades available for specific applications.
3. **Excellent Water Retention:** Superior water retention capacity; ideal for construction materials (mortar, concrete) to prevent rapid drying and improve workability.
4. **Thermoreversible Gelation:** Sol in cold water, gel in hot water (>80°C); reversible physical change; no chemical degradation; suitable for temperature-controlled formulations.
5. **Good Compatibility:** Stable in neutral and mild acidic/alkaline media (pH 5-8); compatible with most organic/inorganic additives, surfactants and polymers.
6. **Non-Toxic & Safe:** FDA GRAS (E464) for food grade; USP/EP/BP compliant for pharmaceutical grade; no toxic residues, no skin/eye irritation (except mild dust irritation).
7. **Biodegradable & Eco-Friendly:** Fully microbial biodegradable; no environmental accumulation; non-toxic to soil and aquatic organisms; meets global environmental standards (REACH, RoHS).
8. **Chemical Stability:** Long shelf life (24 months); no degradation under normal storage; resistant to microbial attack (no mold growth on dry powder).

4. Application Fields

- **Construction Industry:** Water retention agent, thickener and workability improver for mortar, tile adhesive, gypsum products, concrete and self-leveling materials; reduces cracking and improves adhesion.
- **Pharmaceuticals:** Binder for tablets/capsules, thickener for oral liquids/syrups, film-former for film-coated tablets, suspending agent for injections (pharmaceutical grade).
- **Food Industry (E464):** Thickener, emulsifier, stabilizer and film-former for beverages, dairy products, baked goods, sauces and frozen foods (food grade).
- **Cosmetics & Personal Care:** Thickener, emulsifier and film-former for creams, lotions, shampoos, hair gels and toothpaste; improves texture and stability.
- **Coatings & Paints:** Thickener, suspending agent and film-former for water-based coatings, latex paints and industrial coatings; prevents pigment sedimentation and improves film properties.
- **Adhesives & Sealants:** Thickener and tackifier for water-based adhesives, wood glue and sealants; improves viscosity and bonding strength.
- **Textile Industry:** Sizing agent, thickener for printing pastes and finishing agent; improves fabric strength and print clarity.
- **Other:** Suspending agent for pesticides, thickener for detergents, film-former for packaging materials.

5. Usage Methods

- **Dissolution Method:** Add powder to cold water ($\leq 25^{\circ}\text{C}$) with continuous stirring (not water to powder) to avoid agglomeration; stir until fully dispersed and dissolved (10-30 minutes); clear viscous solution forms. For faster dissolution, use high-shear mixer or pre-mix powder with inert solid (sugar, salt) before adding water.
- **Construction Mortar:** Add 0.1-0.5% (w/w) to dry mortar mix; mix evenly with cement/sand before adding water; improves water retention and workability.
- **Pharmaceutical Tablets:** Add 2-5% (w/w) as binder; dissolve in water to form binder solution; granulate with active pharmaceutical ingredients (API).
- **Food & Beverages:** Add 0.1-1.0% (w/w) as thickener/stabilizer; dissolve in cold water first; mix with food ingredients; avoid high temperature ($>80^{\circ}\text{C}$) for clear solutions.

6. Packaging & Storage

- **Packaging:** 1 kg PE bags (food/pharm grade), 25 kg HDPE moisture-proof bags/drums (industrial grade), 50 kg fiber drums, 1000 kg IBC totes (bulk industrial); food/pharm grade available in aluminum foil packaging.
- **Storage:** Cool, dry, well-ventilated warehouse ($\leq 30^{\circ}\text{C}$); store in sealed moisture-proof containers; avoid direct sunlight, high humidity and high temperature; keep away from strong acids, strong oxidizers and sharp objects (prevent bag/drum damage); separate different grades (food/pharm/industrial).

7. Safety & Protection

- Wear safety goggles, nitrile gloves and N95 dust mask for bulk powder handling; avoid dust inhalation and eye contact.
- Use dust collection system and local exhaust ventilation for bulk processing; use wet cleaning methods to prevent dust dispersion.
- Rinse eyes with plenty of water if contact occurs; consult a doctor if irritation persists.

8. Quality Assurance

- Manufactured under ISO 9001 (quality), ISO 14001 (environmental) and ISO 22000 (food safety) management systems; pharmaceutical grade complies with GMP.
- Each batch is strictly tested for viscosity, substituent content, purity and heavy metals; accompanied by a Certificate of Analysis (COA).
- Customizable viscosity grades (5-200,000 mPa·s) and substituent content (methoxyl/hydroxypropoxyl) available upon request.
- Provide technical support for formulation optimization (dissolution method, dosage adjustment, compatibility testing); on-site technical guidance for large-scale industrial applications.
- Quality control for all production processes; raw material inspection, in-process testing and final product testing to ensure consistent quality.