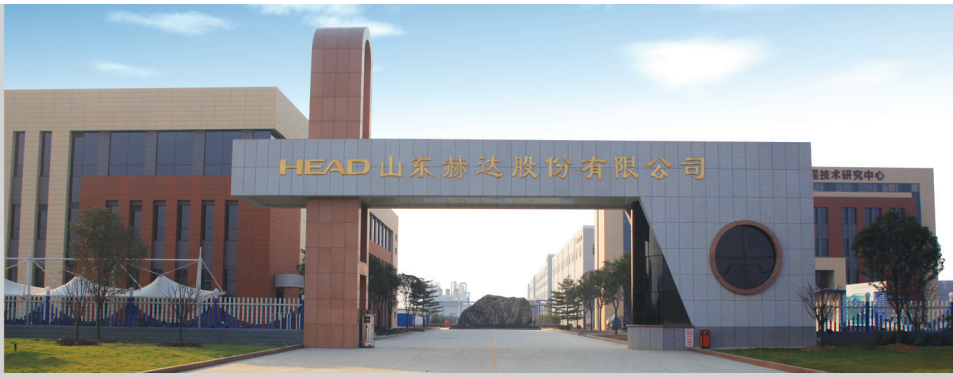
SHANDONG HEAD CO.,LTD.


# PHARMACEUTICAL EXCIPIENTS

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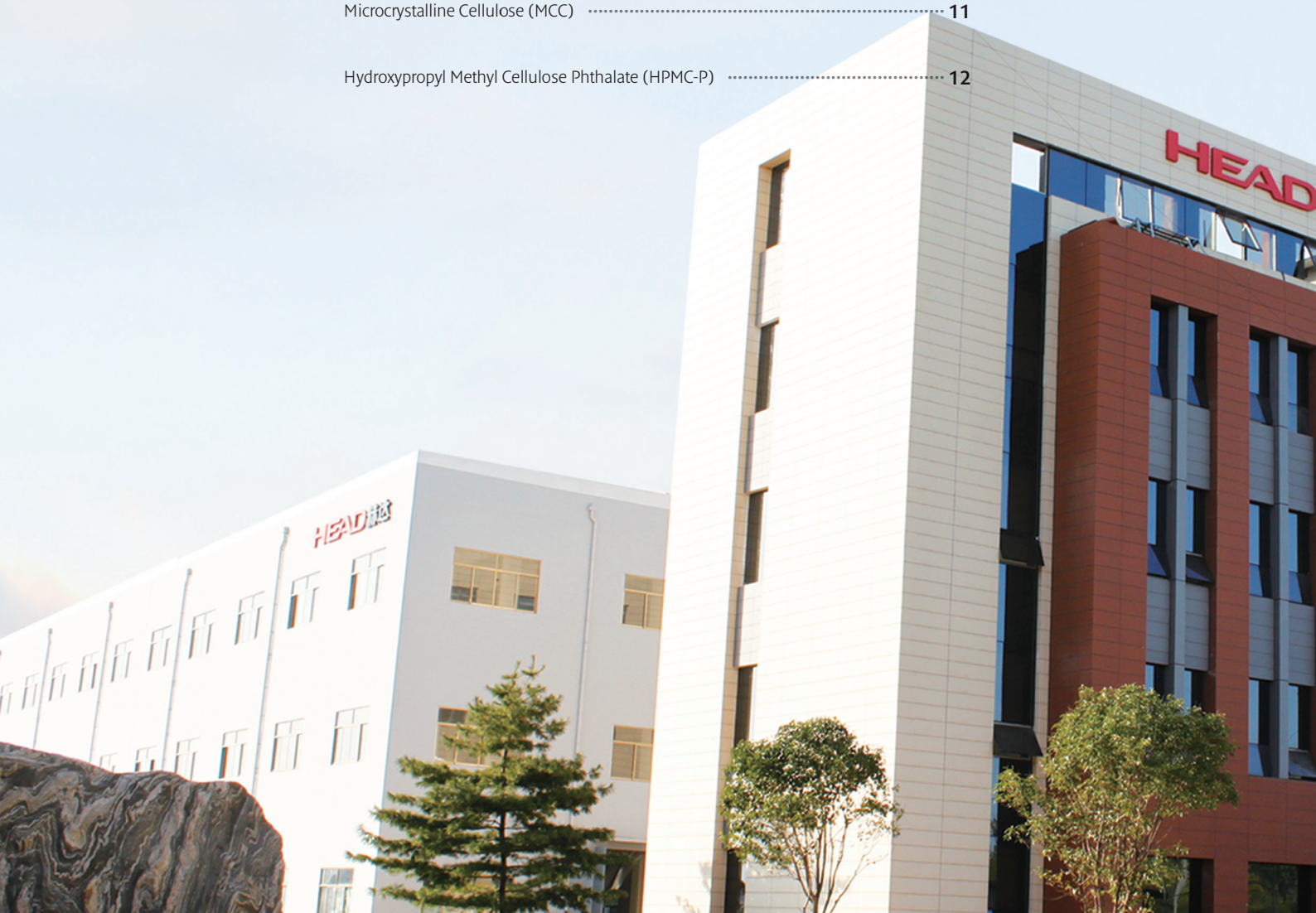


Shandong Head Co., Ltd. is an independent producer of cellulose ethers and derivatives, founded in 1992, focused on serving customers in several industries with top quality products. The company's two production sites and headquarters are located in Zibo, China, currently employing over 600 people. Through several distribution channels, our products have been exported to over 60 countries around the world.

With a combined surface area of 290.000 ㎡ and an annual capacity of 37.000MT, the company is amongst the largest of its kind in Asia, with 5.000MT dedicated to producing pharmaceutical excipients. Both production sites have obtained certifications for ISO9001, 14001 and OHSA18001, produce according to GMP and comply with kosher and halal requirements.

Years of research and development have led to the patented "One step" production method, resulting in a closed-environment production process. In combination with strict internal quality standards this ensures that all products have optimum stability and high purity.

In 2014 Shandong Head Europe B.V. was created.  Located in Houten, the Netherlands, the European office is responsible for regional customer service, as well as coordinating the sales and distribution.

It is the company's aim to continuously invest in new technologies that will limit the impact on the environment and contribute to a sustainable world for future generations.

# HPMC HYDROXYPROPYL METHYL CELLULOSE

CAS No.: **9004-65-3**

## Brief introduction

Hypromellose or HPMC is a multi-purpose pharmaceutical excipient. In the production of tablets, it is used as a film coating or adhesive agent. It can also significantly increase the dissolution rate as well as enhance the water-retention properties of a tablet. The product can be used as a suspension, ophthalmic preparation, sustained-release reinforcing material and in floating tablets. Combined with other synthetic polymers and colloidal drugs, HPMC can prevent water and alcohol from separating from transparent gels and improve water retention properties. It is also the main raw material used in the production vegetable capsules.

## Technical specification

Complies with USP, EP and CP.

| Item | Grade | | |
|---|---|---|---|
| | 60HD (2910) | 65HD (2906) | 75HD (2208) |
| Methoxy (WT%) | 28.0-30.0 | 27.0-30.0 | 19.0-24.0 |
| Hydroxypropoxy (WT%) | 7.0-12.0 | 4.0-7.5 | 4.0-12.0 |
| Gelation temperature (℃ ) | 58.0-64.0 | 62.0-68.0 | 70.0-90.0 |
| Viscosity (mPa.s) (2% solu., 20℃ ) | 3, 5, 6, 15, 50, 4000 | 50, 4000 | 100, 4000, 15000, 100000 |
| Loss on drying (%) | ≤5.0 | | |
| Residue on ignition (%) | ≤1.5 | | |
| pH | 4.0-8.0 | | |
| Heavy metals (ppm) | ≤20 | | |
| Arsenic (ppm) | ≤2.0 | | |

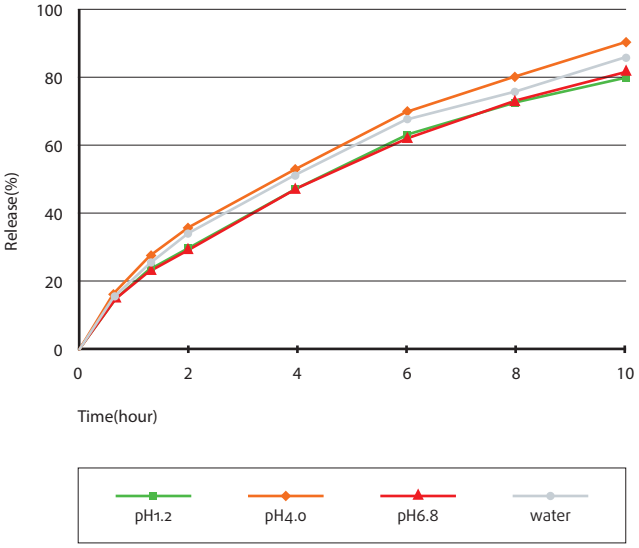

## Application suggestions

| Specification | Reference dosage | Advantages | Applications |
|---|---|---|---|
| 60HD3<br>60HD5<br>60HD6<br>60HD15 | 0.5-5% | Used for organic solvent coatings, excellent film forming properties, good barrier, increases compressive strength, reduction of debris | Coatings |
| | 1-5% | Mixed with ethyl cellulose used as a coating to form a solid, adhesive film, masking of odour | Coatings |
| 60HD5<br>60HD6<br>60HD15 | 3-20% | Controlled release coating, mixed with ethyl cellulose to regulate proliferation | Control release agent |
| 60HD15<br>60HD50 | 2-6% | Low concentration, high hardness, low friability and good disintegration properties | Granulation, Tablet, Binder |
| 60HD15<br>60HD4000 | 1-2% | Positive effect on suspended particles and good anti microbial properties | Antacid |
| 60HD50<br>60HD4000 | 0.1-0.5% | High clarity solutions, low concentrations increase and thickening and lubrication performance | Eyedrops |
| 60HD4000 | 1-2% | For suspended solids | Suspending agent |
| 60HD4000<br>75HD4000 | 1-5% | Positive effect of colloidal and emulsifying properties of liquid drug preparations | Emulsions, gels and ointments |

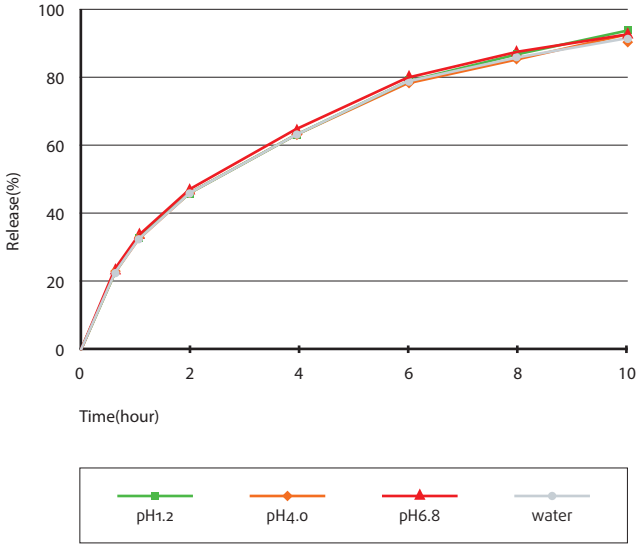
# HPMC CONTROLLED RELEASE GRADE

CAS No.: **9004-65-3**

Itopride HCl Sustained release dissolution test




Metformin HCl Sustained release dissolution test




## Application suggestions

| Specification | Reference usage | Advantages | Applications |
|---|---|---|---|
| 75HD100CR<br>75HD4000CR<br>75HD15000CR<br>75HD100000CR | 5-75% | Sustained release matrix tablets;<br>75HDCR specification has the fastest rate of hydration | Control release agent |

# HPMC CAPSULE GRADE

CAS NO.:9004-65-3

## Our Advantage

Our products are manufactured in accordance with the requirements of customers, assuring an excellent and consistent performance.

## Advantages of HPMC Capsule

·Low moisture content, suitable for filling medicines and functional food that is hygroscopic and sensitive to moisture
·Widely applicable, no cross linking risk, no reciprocity, highly stable
·Consistent medicine release

## Technical specification

| Item | Specification<br>60HD |
|---|---|
| (WT%) Methoxy | 28.0-30.0 |
| (WT%) Hydroxypropoxy | 7.0-12.0 |
| (℃) Gelation temperature | 58.0-64.0 |
| (mPa.s) Viscosity (2% solu., 20℃) | 3, 4, 5 |

# MC METHYL CELLULOSE

CAS No.: **9004-67-5**

## Brief introduction

This product is physically inert and is widely used as a thickener, protective colloid, auxiliary emulsifier, pigment, adhesive and film-forming agent of pharmaceutical tablets, food and cosmetics. It is used in applications such as eye drops, drug stabilizer, oral laxative, mouthwash and corneal wetting fluid for contact lenses. It is also used as a sustained-release, hydrophilic reinforcing material, micro-porous film or in multilayer coating formulations.

## Technical specification

Complies with USP, EP and CP.

| Item | Grade |
|---|---|
| | 55HD |
| Methoxy (WT%) | 27.5-31.5 |
| Gelation temperature (℃ ) | 50.0-55.0 |
| Viscosity (mPa.s) (2% solu., 20℃ ) | 15, 20, 50, 100, 400, 4000 |
| Loss on drying (%) | ≤5.0 |
| Residue on ignition (%) | ≤1.0 |
| pH | 4.0-8.0 |
| Heavy metals (ppm) | ≤20 |
| Arsenic (ppm) | ≤2.0 |

# EC ETHYL CELLULOSE

CAS No.: **9004-57-3**

## Brief introduction

Because ethyl cellulose is insoluble in water but is soluble in many organic solvents, it is used as adhesive agent in tablets and granules. It can increase the hardness and reduce the friability of a tablet. Additionally, common applications are as a film-forming agent to improve the appearance of a tablet, isolating taste and avoiding disintegration of water-sensitive drugs. By preventing water absorption, tablets can be stored for a longer period of time. It can also be used as reinforcement material for the sustained release tablets.

## Technical specification

Complies with USP, EP and CP.

| Item | K grade | N grade |
|---|---|---|
| Ethoxy (WT%) | 45.5-46.8 | 47.5-49.5 |
| Viscosity (mPa.s) (5% solu., 20℃ ) | 4, 5, 7, 10, 20, 50, 70, 100, 150, 200, 300 | |
| Loss on drying (%) | ≤3.0 | |
| Chloride (%) | <0.1 | |
| Residue on ignition (%) | ≤0.4 | |
| Heavy metals (ppm) | ≤20 | |
| Arsenic (ppm) | ≤3 | |

## Application suggestions

| Specification | Reference usage | Applications |
|---|---|---|
| HDN-7<br>HDN-10<br>HDN-20 | 3-20% | Sustained-release coating, to provide a good diffusion membrane and to adjust the mix of water-soluble HPMC proliferation rate |
| HDN-20<br>HDN-50<br>HDN-100 | 10-20% | Microcapsules |
| HDN-7<br>HDN-10<br>HDN-20 | 1-5% | Floating layer tablets, used as an organic solvent to form a solid coating with good adhesive film, often mixed with HPMC |
| HDN-10<br>HDN-20 | 2-6% | Tablet granulation binder, used as a solvent for water-sensitive drug granulation, good dissolution properties. |

## Organic solvent method of solubility and dissolution

EC can be dissolved in various organic solvents, such as ethanol, isopropyl alcohol, other alcohols, ketones, aromatic and so on. Common solvent (volume ratio):

1) Toluene:Ethanol = 4:1
2) Ethanol
3) Acetone:Isopropanol = 65:35
4) Toluene:Isopropanol = 4:1
5) Methyl Acetate:Methanol = 85:15

The viscosity of an aromatic compound is lowered when the alcohol percentage is increased. With an alcohol percentage of 30-35%, the viscosity is at its lowest. Method of dissolution: while stirring, add the EC slowly into the container with the selected solvent until a solution is formed.

# CMC SODIUM CARBOXY METHYL CELLULOSE

CAS No.: **9004-32-4**

## Brief introduction

Sodium carboxy methyl cellulose is suitable for use as a thickener and stabilizer for drug pastes. It can be used as a dispersant for ointments, and as a disintegrator for tablets. It can also be used to create an oil emulsion for injection purposes.

## Technical specification

Complies with USP, EP and CP.

| Headcel® | Headcel | Degree of Substitution | Purity | Total plate count | Heavy Metals |
|---|---|---|---|---|---|
| 500HF | 300-600 cps( Brookfield ,1%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 1000HF | 500-1500 cps ( Brookfield ,1%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 2000HF | 1500-2500 cps ( Brookfield ,1%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 3000HF | 2500-3500 cps ( Brookfield ,1%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 4000HF | 3500-4500 cps ( Brookfield ,1%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 5000HF | 4500-5500 cps ( Brookfield ,1%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 500MF | 100-500 cps ( Brookfield ,2%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 1000MF | 500-1500 cps ( Brookfield ,2%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |
| 2000MF | 1500-3000 cps ( Brookfield ,2%, 25℃ ) | 0.7-0.95 | ≥ 99.5% | ≤1000 cfu/g | ≤20 |

# L-HPC LOW-SUBSTITUTED HYDROXYPROPYL CELLULOSE

CAS No.: **9004-64-2**

## Brief introduction

This product is mainly used as tablet disintegration accelerator. It should be applied to tablets with poor disintegration properties. By accelerating the disintegration and increasing the fineness of a dispersion after disintegration, it improves the bioavailability of the API. For drugs that can't be easily moulded, the product can help to mould and increase the hardness of the tablet. It is suitable for use in both wet and dry granulation. It can also be added as an adhesive in starch paste.

## Technical specification

Complies with USP, EP and CP.

| Item | Grade |
|---|---|
| Hydroxypropoxy (WT%) | 5.0-16.0 |
| Loss on drying (%) | ≤5.0 |
| Chloride (WT%) | ≤0.36 |
| Residue on ignition (WT%) | ≤1.0 |
| Heavy metals (ppm) | ≤20 |
| Arsenic (ppm) | ≤3.0 |
| Iron (ppm) | ≤10 |

# MCC MICROCRYSTALLINE CELLULOSE

CAS No.: **9004-34-6**

## Brief introduction

This product can be used as a disintegrator, adhesive, flow-aid, anti-adhesive or capsule diluent. The dissolution of a drug in a tablet can be increased by adding this product. It can also be used as a food additive and as a stabilizer in the cosmetic industry.

| Reference usage | |
|---|---|
| Tablet binder / Thinner (Wet granulation) | 5-20% |
| Tablet binder / Thinner (Dry tabletting) | 5-20% |
| Tablet disintegrant | 5-15% |
| Tablet flow aid | 5-15% |
| Antiagglomerant | 5-20% |
| Capsule thinner | 10-30% |

## Technical specification

Complies with USP, EP and CP.

| Specification | Unit | Quality Index |
|---|---|---|
| Appearance | - | White or quasi-white powder |
| Odour | - | Odourless and tasteless |
| Content | % | 97.0-102.0 |
| pH | - | 5.0-7.5 |
| Insolubles in water | % | ≤0.2 |
| Chloride | % | ≤0.03 |
| Loss on drying | % | ≤5.0 |
| Residue on ignition | % | ≤0.2 |
| Heavy metals | ppm | ≤10 |
| Arsenic | % | ≤0.0002 |

| Specification | Pellet Diameter (μm) | Loss on drying (<%) | Bulk density (g/ml) | Application |
|---|---|---|---|---|
| PH-101 | 50 | 5% | 0.29 | Suitable for tablet manufacturing, especially wet granulation and globular granule production. |
| PH-102 | 90 | 5% | 0.31 | It offers better fluidity than PH101. Suitable for direct tableting and improving the fluidity of capsule filling. |

# HPMC-P HYDROXYPROPYL METHYL CELLULOSE PHTHALATE

CAS No.: **9050-31-1**

## Brief introduction

This product is an excellent enteric film-coating material. Other applications are as sustained-release material of tablets, capsule adhesive, microencapsulation substrate, implants, taste-masking agent, microspheres, oral membranes and solid dispersions. Its release rate is linked to the PH value.

## Technical specification

Complies with USP and EP.

| Item | Grade | |
|---|---|---|
| | HP55 | HP55S |
| Methoxy (WT%) | 18.0-22.0 | 18.0-22.0 |
| Hydroxypropoxy (WT%) | 5.0-9.0 | 5.0-9.0 |
| Phthaloyl group (WT%) | 27.0-35.0 | 27.0-35.0 |
| Viscosity (mPa.s) (10% solu., 20±0.1℃ ) | 32-48 | 136-204 |
| Loss on drying (%) | ≤5.0 | ≤5.0 |
| Residue on ignition (%) | ≤0.20 | ≤0.20 |
| Chloride (%) | ≤0.07 | ≤0.07 |
| Heavy metals (ppm) | ≤10 | ≤10 |

## Preparation of coating solution

1) Concentration of coating solution

| Item | Tablet | Granule |
|---|---|---|
| HP55 | 6-10% | 5-7% |
| HP55S | 5-8% | 4-6% |

2) Organic solvents for HP

Acetone: Water =9:1
Methylene chloride: Ethanol =1:1
Acetone: Ethanol = 1:1
Ethanol: Water = 8:2 (Solution temperature above 25℃ )
Methylene chloride: Ethanol: Water = 5:4:1

3) Dissolving method

Added to the container a certain amount of solvent, under stirring, slowly add HPMCP stir until fully formed viscosity.

4) HPMCP usage is generally 6-10% the amount of core chip.

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