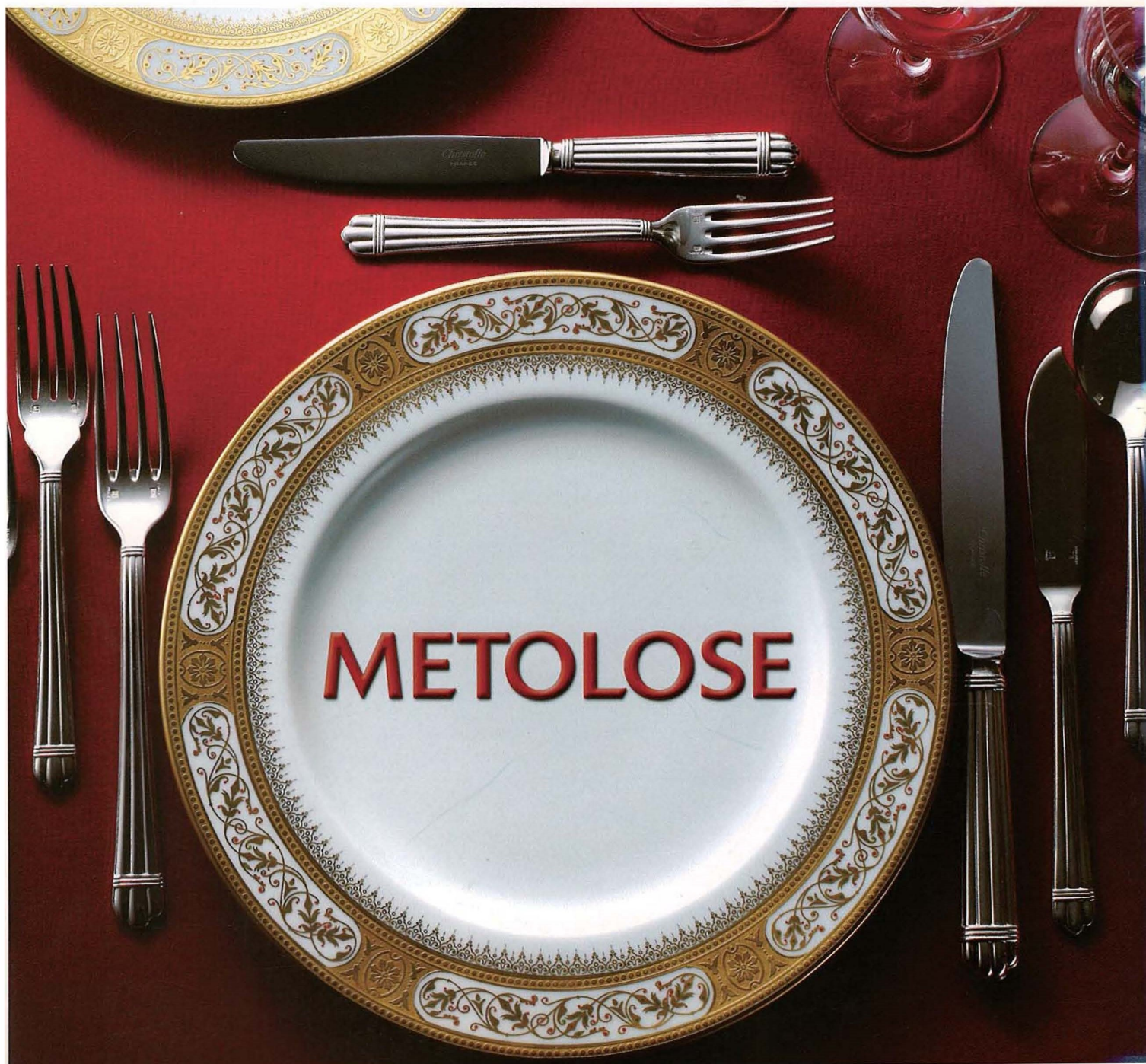


ShinEtsu

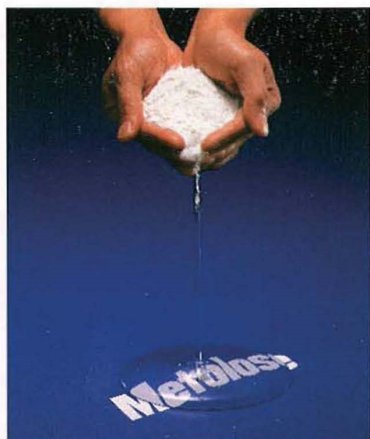
METOLOSE®

Food grade cellulose derivatives

Versatile Food Stabilizer



What is METOLOSE? - Versatile Food Stabilizer

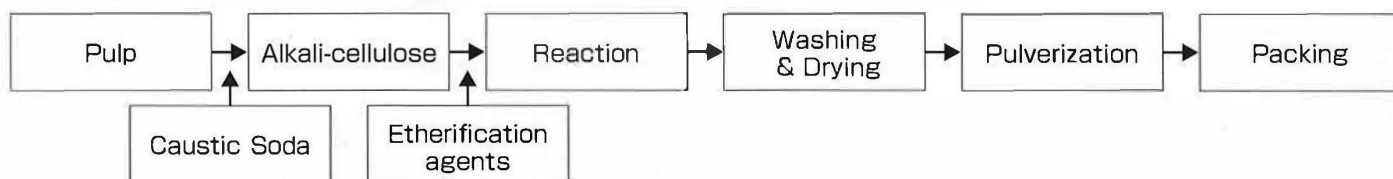


METOLOSE food grade is a range of low to high viscosity food quality methylcellulose and hydroxypropyl methylcellulose products.

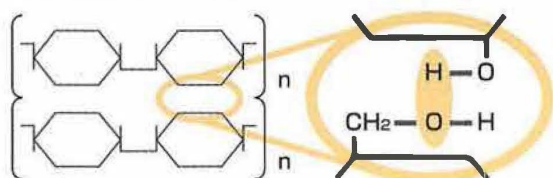
• General Properties

- Nonionic water soluble cellulose ethers
- Derived from pulp, vegetable origin
- Thickening-viscosity
- Reversible thermal gelation
- Film forming
- Compatibility with other gums, starch and sugars
- Stable in various pH

• Production flow diagram

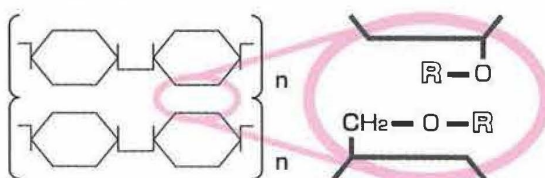


Cellulose(Pulp)



Strong intermolecular hydrogen bondings

METOLOSE



R : -CH₃ (MeO)
: -CH₂CHOHCH₃ (HPO)

• Chemical types and grades

	MCE	SFE	SE	NE
	Methylcellulose	Hydroxypropyl Methylcellulose		
E No.	E 461	E464		
21 CFR	§ 182.1480	§ 172.874		
Substitution	MeO = 27.5 - 31.5%	MeO = 27.0 - 30.0% HPO = 4.0 - 7.5%	MeO = 28.0 - 30.0% HPO = 7.0 - 12.0%	MeO = 19.0 - 24.0% HPO = 4.0 - 12.0%
Character	Firm thermal gel. Good shape retention and water retention.	Semi-firm thermal gel. Better compatibility with others.	Clear solution. Good film forming property. Softer texture.	Good compatibility with others. Soluble at higher temperature.

Labeled Viscosity / cP*

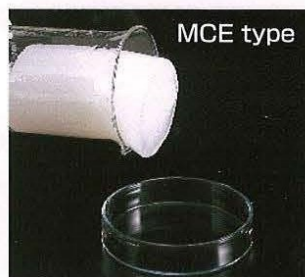
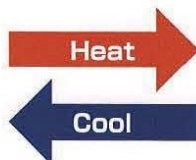
Specification / cP*

4	MCE - 4				3.2 - 4.8
6					4.8 - 7.2
15	MCE - 15		SE - 15		12 - 18
25	MCE - 25				20 - 30
50		SFE - 50	SE - 50		40 - 60
100	MCE - 100			NE - 100	80 - 120
400	MCE - 400	SFE - 400			300 - 560
1500	MCE - 1500				1125 - 2100
4000	MCE - 4000	SFE - 4000	SE - 4000	NE - 4000	3000 - 5600
25000		SFE - 25000			18750 - 35000

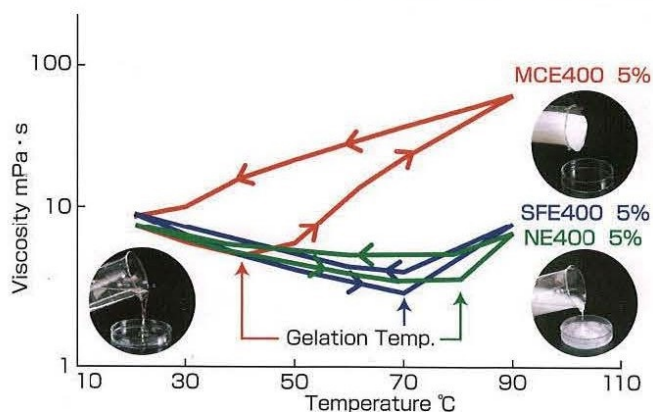
*2% aqueous viscosity at 20°C

What can **only** METOLOSE do? - Reversible thermal ge

• What is reversible thermal gelation?



• Gelation of 5.0% aqueous solution of METOLOSE



METOLOSE THERMAL GELATION

Shown by:

-Certain non-ionic cellulosic's solution

Temperature increased:

-Viscosity decreases apparently

At certain temperature on heating:

-Viscosity is generally seen to increase rapidly

On cooling:

-Viscosity decreases and return to original state

Heating/Cooling cycle can be repeated many times without damaging the products

• Gel temp. & Gel type affected by :

- Substitution type

	MCE	SFE	SE	NE
Gel Type	Firm	Semi-Firm	Soft	Weak & sticky
Gel Temp. (°C)	50 - 55	61 - 65	58 - 63	75

- Concentration - Higher concentration gives stronger gel strength and lower gel temp.

- Viscosity grades - Higher viscosity grade gives stronger gel strength and lower gel temp.

- Presence of additives

• General benefits of METOLOSE thermal gelation

- Controls moisture movement during cooking
- Maintains shape at high temperature
- Reduces oil uptake
- Thickens and binds foodstuffs
- Modifies the texture



Ex.) Benefits for fried foods

- Works as barrier and reduces oil uptake.
- Maintains the product shape due to the firm thermal gel.
- Improves life of cooking oil by preventing drips from seeping out.
- Improves better adhesion to thicken the batter



Ex.) Benefits for gluten free breads

- Binds all ingredients together
- Gives viscosity to dough and entraps gas cells
- Keeps a high volume during baking or heating
- Prevents from hard and gummy texture.



Ex.) Benefits for fillings

- Gives viscosity to filling for better handling.
- Stabilizes ingredients and provides rich texture.
- Works as an anti-boil out agent to prevent filling from flowing out of pies.



• Other benefits of METOLOSE

Stabilize emulsion

METOLOSE aqueous solution has excellent surface activity. It helps to provide smooth texture and maintain stable suspension not only in cooled condition but also in heated condition.



Stabilize foam

METOLOSE improves air entrainment and stabilizes the gas cells. This foam stability is maintained even under free/thaw repeated conditions and warm conditions.



Film forming agents

METOSE film is easily prepared by casting a METOLOSE solution and drying it. This property is suitable for edible strips and film coated tablets and pellets.



Lubricity

METOLOSE contributes lubricity to ease mixing, grinding and extrusion process. It is also good to provide spreadability and improve decollating process.

Binding

METOLOSE binding property improves product integrity, strength, and flexibility.



Recommendation List

Application	Characteristics needed	Recommended grades	Dosage level (%)
Reformed products - potato, meat, cheese, etc.	binds, controls moisture movement maintains product shape	NE-100 SFE-400	0.2 - 0.4
Vegetarian products	binds, controls moisture movement maintains product shape	MCE-4000 SFE-400	1.0 - 1.6
Processed products - savory and sweet pies and pasties	binds, controls moisture movement maintains product shape	SFE-4000 MCE-4000 SFE-400	0.4 - 0.6
Batters & crumb coatings	thickens & improves coating adhesion reduces oil uptake	MCE-4000 NE-100	0.3 - 0.5
Doughnuts	reduces oil uptake	MCE-4000	0.2 - 0.4
Gluten free products	uniforms texture improves volume	SFE-4000 MCE-4000	1.0 - 1.5
Non dairy cream	improves overrun, uniform texture stabilizes whipped product	SE-50 SFE-50	0.4 - 1.0
Bakery mixes	improves texture, retains moisture & improves shelf life	SFE-400 SFE-50	0.2 - 0.4
Ice cream (powder mix)	improves texture	SFE-50	0.4 - 1.0
Dairy toppings	improves overrun & freeze/thaw stability	MCE-15	0.2 - 0.4

METOLOSE General Information

Description		White and slightly off-white, free flowing powder
Loss on drying	FCC grade	5.0% maximum
	EU grade	10.0% maximum
Sulphated ash		1.5% maximum

Other METOLOSE properties also follow the each (FCC/EU) regulations.

• How to use METOLOSE

To make METOLOSE aqueous solution, put METOLOSE powder into hot water (over 80C°) while stirring well for uniform dispersion. Cool the mixture with continuous stirring until the solution becomes clear.

Or blend METOLOSE powder with other dry ingredients prior to putting into the hydration process. The mixture is recommended to be cooled sufficiently.

• Package

General grades

Package : Three outside layers of kraft paper and internal layer of polyethylene film

Net weight : 20kg

Low viscosity grades

Package : Double - layers polyethylene bag in fiber drum

Net weight : 20kg or 25kg depending on grade

Manufacturer:

Shin-Etsu Chemical Co., Ltd. has been manufacturing cellulose derivatives for over 40 years.

We are committed to continuous quality improvement. Our products have to perform as predicted the first time and every time.

Our manufacturing process is strictly controlled to ensure that all specifications, both internal and customer's special requirements are met.

Our process and quality control system are accredited to the international standard ISO9001,

and our environmental management is accredited to ISO 14001



Customer Service:

We welcome the opportunity to form close, confidential and long-term working partnerships with our customers at all levels.

Contact our distributor for further information.

Warranty

To the best of our knowledge, this information is considered accurate and reliable as of the date appeared below and is presented in good faith. As (i) use conditions of this information and applicable regulations may differ from one location or country to another and may change with time and (ii) the application of this product may differ from one user to another recipient of this information is responsible determining whether the information in this document is appropriate for recipient's use. Since Shin-Etsu cannot control over how this information is used, all liability is disclaimed and Shin-Etsu assumes no obligation or liability therefore. No warranty, expressly or implied, is given nor is free from any patent owned by Shin-Etsu and/or others to be inferred

Supplied by :

ShinEtsu

Shin-Etsu Chemical Co., Ltd.

Head office : 6-1 Ohtemachi 2-Chome Chiyoda-ku Tokyo, 100-0004, Japan

Tel : +81-3-3246-5261

Mail to : metolose@shinetsu.jp

Visit our website : <http://www.metolose.jp/e>

Chinese Distributor: Dalian Diligence Trade Co., Ltd.

Room No.1801, Tianxing Roosevelt Center, No.677 Yellow River Road, Shahekou Dist., Dalian, China.

Tel: 0411-8452-1177 Fax: 0411-8452-1199/2288

<http://www.dalian-diligence.com>