

# klucel™ MS hydroxypropylcellulose in marine coatings

who helps marine primers sail ahead of the rest?  
we do.

Ashland launches **Klucel™ MS**, a new grade of hydroxypropyl cellulose as a thickener and anti-sagging agent **for inorganic zinc rich primers**. This brand new HPC technology enables a major improvement in dissolution speed in polar organic solvents, including methanol, isopropyl alcohol and xylene. Furthermore, the thickening efficiency has significantly improved compared to conventional HPCs.

Zinc-rich primers are used to protect steel surfaces from corrosion, principally through cathodic galvanic protection. Inorganic zinc rich primers typically use a silicate binder to promote zinc adhesion to the surface. Inorganic zinc-rich primers often contain higher zinc levels versus organic zinc primers. The combination of higher zinc levels and reactive silicate binders may provide superior corrosion resistance compared to their organic counterparts.

Klucel™ MS HPC is suitable for permanent and temporary coatings sprayed onto ship panels prior to welding:

- permanent inorganic zinc rich primers
- temporary inorganic zinc 'shop' primers (B part)

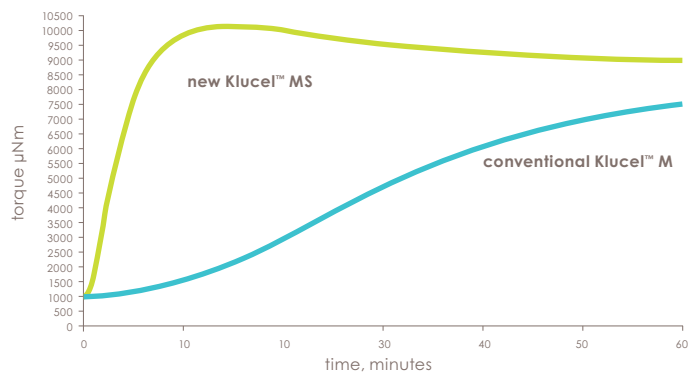


fig 1: Klucel™ MS HPC for rapid viscosity build-up in polar organic solvent

## benefits

Klucel™ MS hydroxypropyl cellulose is a non-ionic water-soluble cellulose ether with a versatile combination of properties:

- designed for **rapid dissolution** in organic solvents (fig 1)
- provides **highest thickening efficiency** against chemistries commonly used as thickeners and anti-sagging agents for solvent based zinc-rich primers (fig. 2 and 3)
- soluble in water and multiple polar organic solvents used to control viscosity and **gives smooth and clear solutions** (fig 4)

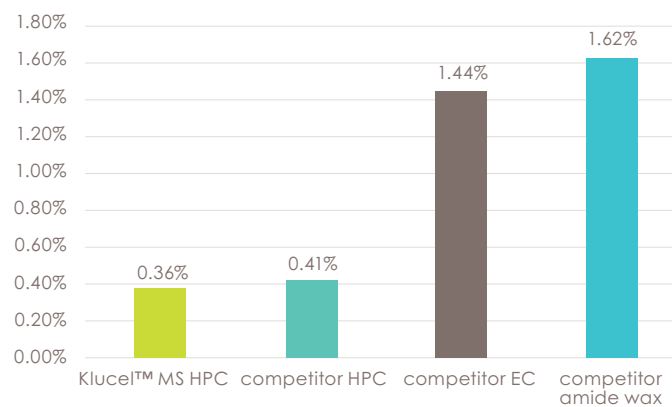


fig 2: Klucel™ MS HPC for high thickening efficiency (Stormer viscosity, 100KU)

fig 3: estimated low cost-in-use for 1 mt zinc dust formulation

product	dosage <sup>1</sup>	solvent separation <sup>2</sup>	settling <sup>2</sup>	estimated cost-in-use <sup>3</sup>	relative dosage difference
klucel™ MS HPC	0.36%	no	no	\$108.00	100%
competitor HPC	0.41%	no	no	\$118.90	114%
competitor EC	1.44%	no	yes	\$244.80	400%
competitor amide wax	1.62%	yes	no	\$162.00	450%

<sup>1</sup> to achieve 100KU

<sup>2</sup> visual observation after overnight storage at room temperature

<sup>3</sup> per mT using market pricing

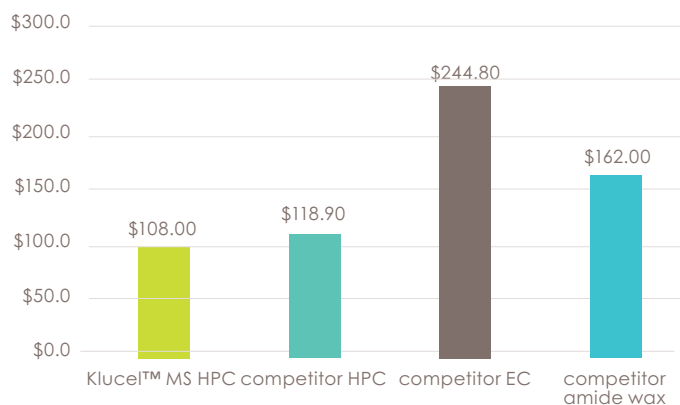
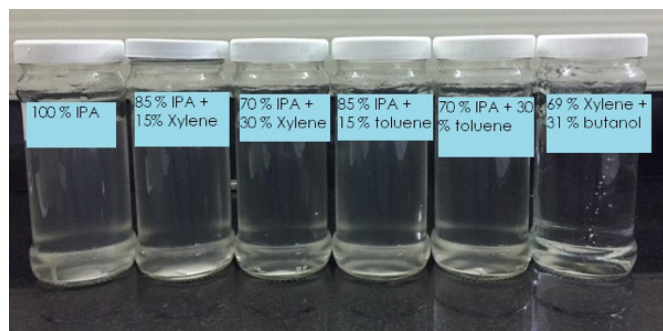


fig 4: 2% w/w Klucel™ MS HPC giving smooth and clear solutions in multiple polar organic solvents



## packaging information

Material is packed in fiber drums of 100 lbs/45.36 kgs.

## typical product properties of Klucel™ MS hydroxypropyl cellulose:

viscosity (2% visc., water, LV 25°C 4@12rpm)	4,000 – 7,000 cps
appearance	off-white powder
moisture content, as packed, %, max	6.0
moles of substitution	3.0 – 4.4
pH of 2% solution	4 – 10

## guide formulation

Below you will find a guide formulation of a typical inorganic zinc rich primer containing Klucel™ MS hydroxypropyl cellulose:

components	at 0.5WT% of zinc powder	
IPA+Xylene (70:30)	23.92	
zinc dust powder	72.82	grinding
Klucel™ MS HPC	0.36	
IPA+Xylene (70:30) – used in post addition stage	3.9	post-addition
<b>total</b>	<b>100</b>	

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