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Non-NP-type polymerizable surfactant for emulsion polymerization

## **HITENOL<sup>®</sup> KH Series**

In recent years, one issue has been calling a biggest attention in every mass media, that certain chemical substances, when taken into human/animal body, are alleged to give undesired effects such as disrupting normal hormone functions (hormone-disrupting effects) and interfering reproduction functions: So-called "endocrine issue". The "List of 67 items", announced by Environment Agency, Government of Japan (current Ministry of the Environment) in May, 1998, includes nonylphenol (NP), a common material as a raw material for surfactant, claiming that it is suspected to have an endocrine-disrupting effects. So far, it is perceived that its effects on wild animals and human bodies are extremely low, judging by the correlation between environmental concentration and effect-revealing concentration, residual tendency in the environment, bioaccumulation, and ecotoxicology etc.

However, it is also true that, due to risk aversion, demand for a substitution for the NP-type surfactants has been arising, and accordingly we have been developing and selling a variety of eco-friendly surfactants. We have a lot of important customers who have long been using our **HITENOL Series** as polymerizable surfactants for emulsion polymerization, so for these customers we have newly developed **HITENOL KH Series**, a series of non-NP-type polymerizable surfactants.

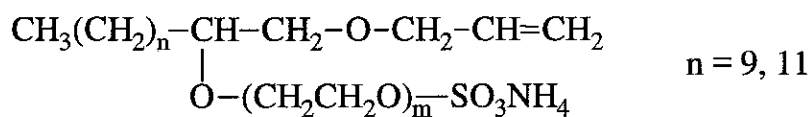
### <Characteristics>

- Non-NP-type, eco-friendly polymerizable surfactant.
- Makes highly water-resistant polymer films.
- The polymer stability is equivalent to traditional surfactants.
- Makes emulsion with less foaming and quicker defoaming.

### <Composition>

**HITENOL KH Series** is an anionic polymerizable surfactant, the structure of which is based on sodium polyoxyethylene alkylether sulfuric ester, into the hydrophobic groups of which radical-polymerizable allyls are introduced.

<Structural formula>



Patent No. 2596441

<Properties>

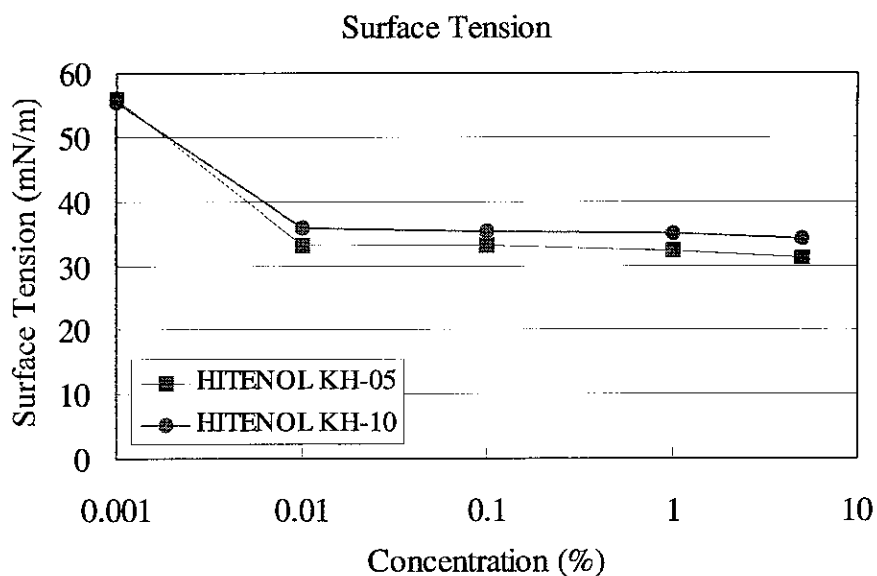
	HITENOL KH-05	HITENOL KH-10
Appearance	Yellowish-brown viscous liquid	Yellowish-brown viscous liquid
Effective matter	97.0% min.	97.0% min.
Volatile matter	3.0 max.	3.0 max.
pH	6.5 - 8.5 (1% aq.soln.)	6.5 - 8.5 (1% aq.soln.)

<Basic properties>

1. Surface tension

Wilhelmy Method (25°C)

	Surface tension (mN/m)				
	0.001%	0.01%	0.1%	1.0%	5.0%
HITENOL KH-05	55.8	33.0	33.0	32.3	31.1
HITENOL KH-10	55.3	35.9	35.2	35.1	34.2

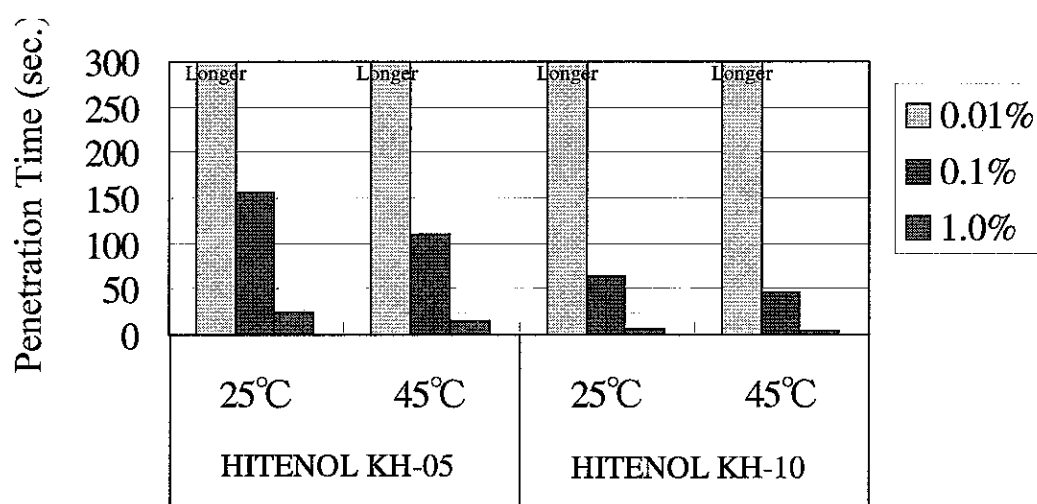


## 2. Penetration

Canvas Disc Method

	Temperature (°C)	Time spent for penetration (sec.)		
		0.01%	0.1%	1.0%
<b>HITENOL KH-05</b>	25	>300	156	24
	45	>300	111	15
<b>HITENOL KH-10</b>	25	>300	65	6
	45	>300	46	4

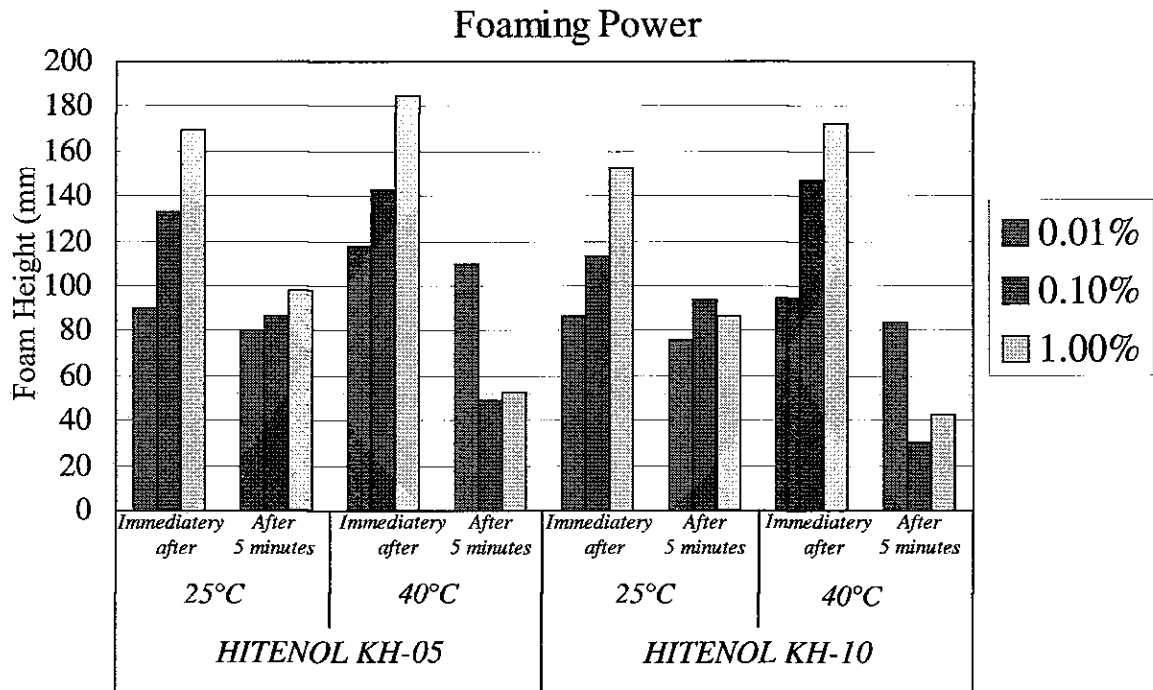
### Penetration Power



## 3. Foaming

Ross-Miles Method

	Temperature (°C)	Time passed	Foam height (mm)		
			0.01%	0.1%	1.0%
<b>HITENOL KH-05</b>	25	Just foamed	90	133	170
		5 min.	80	87	98
	45	Just foamed	118	143	185
		5 min.	110	49	53
<b>HITENOL KH-10</b>	25	Just foamed	87	113	153
		5 min.	76	94	87
	45	Just foamed	95	147	172
		5 min.	84	30	43

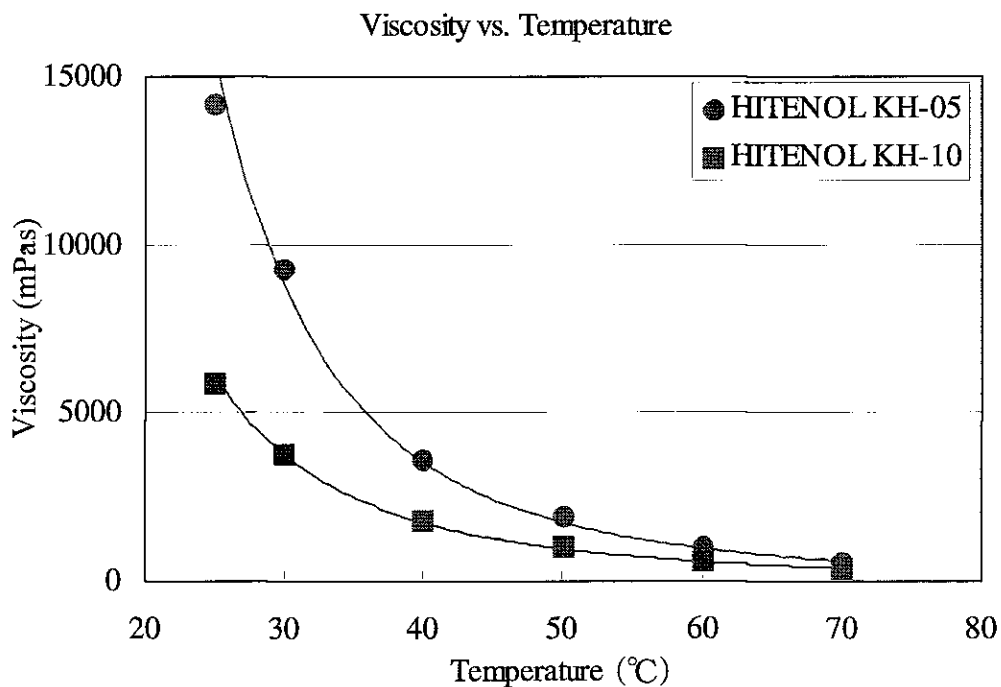


#### 4. Temperature - Viscosity

(mPa·s)

	Temperature (°C)					
	25	30	40	50	60	70
<b>HITENOL KH-05</b>	14200	9240	3600	1930	1030	520
<b>HITENOL KH-10</b>	5870	3760	1790	1040	580	360

\* Measured by B-type viscometer



## 5. Specific gravity

	Specific gravity (25°C)
<b>HITENOL KH-05</b>	1.077
<b>HITENOL KH-10</b>	1.092

## 6. COD

	COD <sub>Mn</sub> (mg/l)
<b>HITENOL KH-05</b>	319
<b>HITENOL KH-10</b>	323

\* The samples are dissolved at 0.1% and then measured

\* Measurement by: JIS K 0102 17

### <Packaging>

	Packaging	
	Canned	Drummed
<b>HITENOL KH-05</b>	18kg	200kg
<b>HITENOL KH-10</b>	18kg	200kg

### Handling and storage instructions

Read the MSDS (Material Safety Data Sheet) issued by DKS carefully before use, and strictly follow the written instructions.

### Notes

1. The contents given in this brochure are based on DKS' experimental data carefully obtained in DKS' laboratories, however, they do not guarantee actual usage results.
2. The data are subject to revision from time to time.