

Since the eighties ARKEMA manufactures sodium methylmercaptide (SMM). SMM is used as thiomethylation agent in a variety of applications. It represents the alternative for methylmercaptan, in cases where transport or storage of methylmercaptan are restricted. In thiomethylation reactions by organic substitution the methylthiolate ion is one of the reactants. In such cases SMM can be used directly. In organic addition reactions the SMM should be to acidified in order to obtain the free methylmercaptan prior to the thiomethylation reaction.

ARKEMA offers four grades of SMM : aqueous solutions of 21, 27 or 33% and a 21% methanolic solution.

Your choice of the preference will depend on the situation at your production site. This brochure combines the many years of experience of ARKEMA Production, Logistic, Application and Research employees, and aims to help you making that choice.

# SMM (Sodium methylmer)

## Physical and chemical properties

### SMM commercial grades

Formula:  $\text{CH}_3\text{SNa}$   
CAS No: 5188-07-8  
EINECS: 225-969-9  
TSCA 5188-07-8

Item	SMM-21 (aqueous)	SMM-27 (aqueous)	SMM-33 (aqueous)	SMM-21 (methanolic)
	Commercial	commercial	commercial	development
SMM [wt%]	20.7 - 21.3	26.5 - 27.5	32.3 - 34.0	min. 21.0
NaOH [wt%]	max. 1.0	max. 1.5	max. 1.5	max. 0.8
Water [wt%]				max. 10%

### Packaging

SMM-21 (aqueous)	SMM-27 (aqueous)	SMM-33 (aqueous)	SMM-21 (methanolic)
Heated isocontainers  200 L metal drum with PE inner drum, 210 kg net	Heated isocontainers	Heated isocontainers	200 L metal drum with PE inner drum, 180 kg net

Remark: SMM-33 and 27 are not available in drums.

Version 2 / SEPTEMBER 2003

Les valeurs mentionnées dans ce document sont le résultat d'essais conformes aux usages en matière d'études : elles sont données à titre indicatif afin de permettre à notre clientèle le meilleur emploi de nos produits et doivent être considérées comme des valeurs moyennes fournies sans engagement de notre part.

*The values given in this document have been obtained in laboratory tests conforming to standard procedures ; they should be regarded as mean values given as an indication to customers of the best ways of using our products. They do not imply any undertaking on our part.*

*This document does not replace the safety data sheets.*



# SMM (Sodium methylmer)

## Physical and chemical properties

### Physical properties

property	SMM-21 (aqueous)	SMM-27 (aqueous)	SMM-33 (aqueous)	SMM-21 (methanolic)
Crystallisation temperature	0 °C	21 °C	35 – 40 °C	
Relative density	1.10 (20°C)	1.13 (25°C)	1.203 (20 °C, solid) 1.181 (50 °C) 1.171 (60 °C)	0.946 (20 °C)
Viscosity	6.02 cP (20°C)		4.0 cSt (50 °C) 3.45 cSt (55 °C) 3.0 cSt (60 °C)	6.32 cP (20 °C)
Decomposition temperature		210°C	210 °C	200 °C
Decomposition enthalpy			-200 J/g	-450 J/g
Dissolution enthalpy			-170 J/g	
Auto-ignition temperature				422 °C
Flash point (ASTM D 93)	27°C	38°C	50 °C	14°C
pH	11	14	14	12.4
Boiling point		76°C	85 °C	64.7 °C

### Stability

SMM is a stable product. DSC tests show decomposition only at temperatures above 200°C. SMM does not contain stabilisers.

However SMM readily oxidises when in contact with air, yielding Dimethyldisulfide ( $\text{CH}_3\text{SSCH}_3$ ), which results in turbidity or, even under not too extreme circumstances, in an oil layer on top of the aqueous SMM phase. For this reason, SMM in containers is blanketed under nitrogen.

Also sampling and manipulation for QC purposes may easily lead to air oxidation, and as a consequence, erroneous analytical results.

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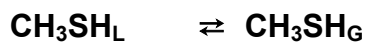
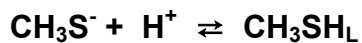
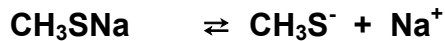


# SMM (Sodium methylmercaptan)

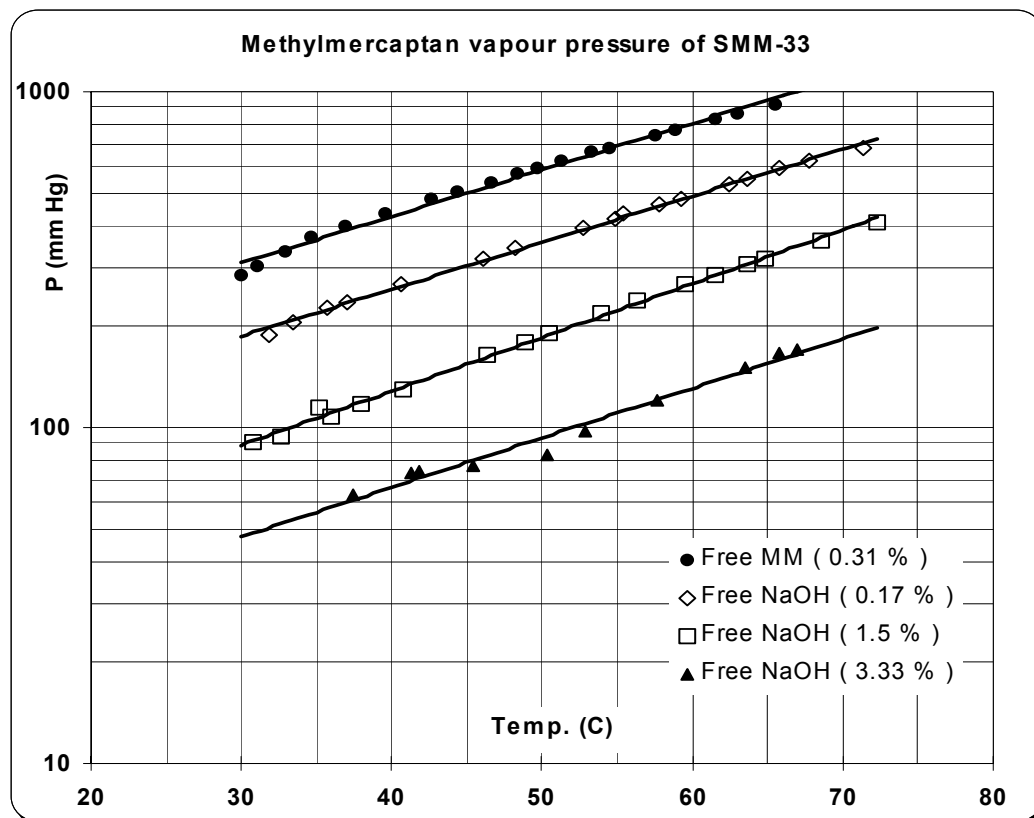
## Physical and chemical properties

### Vapour pressure

Methylmercaptan vapour is present above SMM, as a result of ionic and gas-vapour equilibria;



In order to reduce MM vapour pressure, a slight excess of NaOH is always present in SMM.



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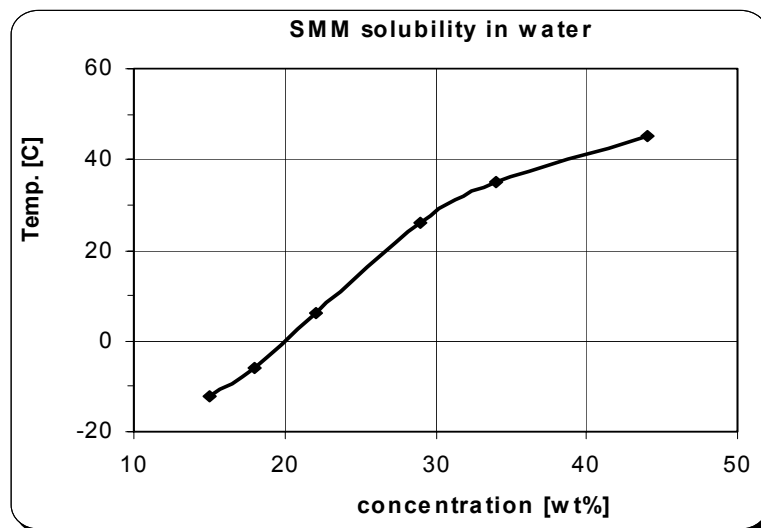


# SMM (Sodium methylmercaptide)

## Physical and chemical properties

### Solubility in water

The SMM crystallisation temperature varies a few degrees according to the free NaOH concentration. SMM crystallises as a hydrate  $\text{CH}_3\text{SNa} \cdot 4.5 \text{H}_2\text{O}$ , i.e. as 46%. Upon solidification due to cooling during transport and storage, SMM-33 is initially present as an homogeneous mixture of amorphous solid and mother liquid. Crystallisation is very slow. Only after a period of several months, phase separation takes place (separation of mother liquid top layer) as the result of crystallisation. In this case reheating without agitation of the container content will lead to an inhomogeneous product.



### Corrosion tests

A gravimetric test and stress corrosion cracking test of SMM-33 with a U-curved SS-316 Ti test piece, according ASTM G30, for 21 days at 75°C do not show any significant corrosion. Gravimetric test SMM-50% on SS-316 L, 7 days at 70 and 120°C showed no significant corrosion. SMM-50% on Carbon steel (7 days at 70°C) showed severe pitting and weight decrease; also discoloration of product.

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