

## TECHNICAL DATA SHEET

# KY-MF-1

### Introduction

KY-MF-1 polymer is a lightly cross-linked acrylate copolymer. It is a novel, liquid, acrylic rheology modifier designed to suspend, stabilize, thicken, and enhance the appearance of surfactant-based personal cleansing products and soap-based cleansing systems.

It is a cost-effective and easy-to-use product that provides numerous benefits.

### CTFA Name

Acrylates copolymer

### CAS No.

25212-88-8

### Properties

- Provides excellent suspending and stabilizing properties in a variety of surfactant-based cleansing products; even low viscosity formulations. Insoluble and difficult to stabilize ingredients such as silicones can be easily co-emulsified and stabilized.
- Imparts effective thickening and desirable flow characteristics to shampoos, body washes and other cleansing formulations.

- Permits the formulation of high clarity shampoos, body washes and other cleansing products.
- Compatible with virtually all commercial nonionic, anionic and amphoteric surfactants as well as with a wide array of popular additives and conditioning agents, such as cationic polymers.
- Functions synergistically with salts and surfactants providing options for achieving various suspending, stabilizing and thickening requirements.
- Builds high clarity products with yield value. It suspends hydrating capsules and exfoliates in pourable clear gel products and can be used to cream.
- Acrylates copolymer is a high-molecular polymer which improves the quality of washing in detergents by attracting soil or particles of the dirt and combining. KY-MF-1 is a strongly suspending agent and it can make those conjugation chains to suspend and prevent dirt from re-adhering.

### Use

- Clear shampoos, bath gels and cleansers.
- Pearlescent shampoos and washes.
- Conditioning products with high molecular weight silicones.
- Low pH facial and body curbs.
- Economy personal washes and gels.
- Soap-based cleansing systems.
- As an anti-Soil Redeption agent in detergents

## Product Data Sheet

- **Appearance:** white emulsion
- **Odor:** minor characteristic odor
- **pH(10%aq):** 5.0 - 6.0
- **Solid content(%):** 30 ± 2
- **Density(25°C,g/ml):** 1.03-1.07
- **Viscosity(25°C, cps):** 5-20
- **Viscosity(25°C)(1% neutralize to pH=7):cps** < 100
- **Acrylamide content(ppm):** ≤1
- **Germs(cfu/g):** ≤100
- **Mould(cfu/g):** ≤100

## Toxic Substances Standard

Pb	≤40 mg/kg
As	≤10 mg/kg
Hg	≤1 mg/kg
CH <sub>3</sub> OH	≤2000 mg/kg

## Benefits

### ● Easy-to-use form

KY-MF-1 is supplied as a low viscosity liquid, which is easily and quickly incorporated.

### ● Suspension and stabilization

KY-MF-1 was developed to function with surfactants and surfactant blends to provide significant suspending and stabilizing properties to formulations, insoluble and difficult-to-stabilize ingredients, such as

silicones, Can be co-emulsified and stabilized. Excellent suspension and stabilization properties are present even on low viscosity formulations.

### ● Thickening and flow control

KY-MF-1 thickens shampoo, body wash and other cleansing formulation to their ideal viscosity and provides highly desirable flow characteristics, although it has lower viscosity in water, KY-MF-1 works better synergistically with surfactants and salts to provide options for achieving various suspending, stabilizing, and thickening requirements.

Follow is the example of viscosity:

Formulation:	% (w/w)
SLES 70	10.0
Cocamide DEA	1.7
Cocamodopropyl Betaine	5.8
KY-MF-1/Other Acrylates copolymer	7.0
Use KOH to adjust pH = 7.0	

Viscosity of the above formula with:

KY-MF-1	8600cps
Other Acrylates copolymer	800cps

### ● Clear formulation

KY-MF-1 enables the formulation of highly transparent shampoo and body washes at pH = 7. Compare with SF-1, KY-MF-1 can add a little more salts for clear formulations.

### ● Excellent compatibility

KY-MF-1 is compatible with virtually all commercial nonionic, anionic and amphoteric.

surfactants as well as a wide array of popular additives and conditional agents, such as cationic polymer.

### ● Synergistic Thickening with Salt

KY-MF-1 works synergistic with low level

of salt to increase suspension and viscosity when the polymer is formulated with surfactants.

#### ● Storage Period

As we known, the storage period of SF -1 is only 9 months; this period is too short for transportation and storage, if overtime. The suspension ability decrease rapidly, but its appearance and specification will not change, for this, we can test it in lab, we put KY-MF-1 and SF -1 in 48°C oven, after one month, get out to use in formulation to check its suspension ability.

For suspension ability of:

KY-MF-1	No change
SF -1	Decrease

#### ● Enhanced Pearlization

KY-MF-1 has the remarkable ability to enhance the visual impact mica and other pearlizing additive used surfactant-based systems, the stability of the visual impact is also dramatically improved.

#### ● Higher pH

KY-MF-1 has higher pH = 5, it is more safety for use of worker and equipments, without effect to other performance.

### Product Chemistry

KY-MF-1 is an alkali swellable acrylic emulsion polymer, as supplied, the majority of the polymer's carboxyl functionality is in the protonated form, the polymer molecules are coiled and impart little suspension and viscosity to the liquid, upon neutralization, the molecule ionize, expand due to charge repulsion of the anionic carboxylated and provide suspending and thickening properties to the aqueous system in which they reside,

The mechanism is known as "hydrodynamic" thickening, in hydrodynamic theory system, it is the physical packing of polymer molecules (and possibly other formula ingredients) that is responsible for the development of suspending ability and viscosity. This "space filling" mechanism is distinctly different from the associative thickening mechanism attributed to hydrophobically modify polymeric rheology modifiers.

### Performance properties

KY-MF-1 was designed to be used in surfactant containing systems; it is in the presence of surfactants that polymer displays its most valuable performance attributes:

- ✓ Synergistic suspending, stabilizing, and thickening with surfactant and salts.
- ✓ Low pH suspending, stabilizing, and thickening.
- ✓ High clarity.
- ✓ Enhancement of pearlization.

#### ● Viscosity in surfactants

For the difference with SF-1, in the water, KY-MF-1 has lower viscosity, but in surfactant it displays better synergistic properties, in same formula, it has better viscosity, more surfactant, salt, and polymer itself rapidly increase viscosity, if the pH increase, the viscosity also increase:

#### Example:

Name	% (w/w)
Water	93
SF -1	7

Use KOH adjusts pH = 7.5, viscosity only 3500Cp, but another example:

Name	% (w/w)
Water	89
SLES 70%	4

KY-MF-1

7

Use KOH adjust pH = 7.5, the viscosity achieve 8500cps.

**• suspending in surfactants;**

The suspending ability of KY-MF-1 is very significant in surfactant-based formulation, many type of insoluble ingredients are easily suspended and stabilized including:

- ✓ Gelatin-based and other beads and capsules
- ✓ Polyethylene
- ✓ Pumice
- ✓ Loofah
- ✓ Walnut shell

Compare with SF -1, KY-MF-1 use same quantity of MF-1 and adjust same viscosity, we get the same suspending ability for all kind of insoluble ingredients,

Another important problem, the pH would effect its suspending ability, if pH increase, its suspending decrease, when pH = 6.2, we can get the best suspending ability, we suggest that the pH should be lower than  $pH \leq 8.0$  for suspension.

**• pH: “Back-Acid” Thickening**

The KY-MF-1 is not necessary to use this process.

**• Addition**

The follow general guidelines should be observed:

- 1). Add primary anionic and nonionic surfactant, for example: Sodium Lauryl Sulfate, Soidum Lauryl Ether Sulfates.
- 2). Add remaining surfactants, for example: Amphoterics.
- 3) Add conditioning and ancillary ingredients, for example: silicones, cationics, EDTA.
- 4) If desired, add pearlizing agent, for

example: mica, EGDS, EGMS.

- 5) Add KY-MF-1 (first mix with water  $KY-MF-1 \div water = 1 \div 1$ )
- 6). Neutralize pH = 6.5 to 7.5 with TEA or KOH or citric acid.
- 7) Add fragrance, dyes and preservatives.
- 8) If desired, add sodium chloride or CAB-35 to further increase viscosity.

We suggest adding KY-MF-1 in the last, before neutralize, fragrance, dyes, preservatives, and viscosity adjusted.

**Safety Information**

Test	Classification
✓ Acute Oral Toxicity	Non-Toxic
✓ Acute Dermal Toxicity	Non-Toxic
✓ Primary Eye irritation	Slight Irritant

**Storage Warranty Period**

The warranty period is 24 months from date of delivery from KIYU of stored in the original unopened container at 25°C.

**Package**

200kg/plastic barrel  
50kg/plastic barrel

**Remarks:**

In this TDS of KY-MF-1,we use another famous brand of SF -1,For some reasons,we only use SF -1 instead of its brand name.