

<ADDRESS>

ADEKA CORPORATION
7-2-35, HIGASHI OGU, ARAKAWA-KU TOKYO 116-8554 JAPAN
SALES TEL +81-3-4455-2833 FAX +81-3-3809-8232
R&D TEL +81-3-3892-2512 FAX +81-3-3892-2887

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Thickener / Viscosity Modifying Agent

ADEKANOL UH-752

The ADEKANOL UH series is used as thickener for synthetic resin emulsions in a wide range of applications, mainly water born emulsion paints and emulsion adhesives. The newly developed viscosity modifier ADEKANOL UH-752 is the latest addition to the series.

ADEKANOL UH-752 is a liquid thickener featuring high water-resistance and excellent thickening performance and provides high thixotropic effects. UH-752 successfully overcomes the known problem of viscous instability by temperature change. With the use of UH-752, paint formulations need not be changed for summer or winter. In contrast to cellulose derivatives requiring the use of dilution tanks, UH-752 can be directly mixed into compounds or added at a later stage, e.g. during actual paint production.

I. Typical Properties

| | UH-752 |
|-------------------|-----------------------------------|
| Appearance | Transparent/opaque viscous liquid |
| Active Ingredient | 28% |
| Ionicity | Nonionic |
| Viscosity (25 °C) | 10000 mPa·s |

II. Characteristics

- * Highly water-resistant
- * Excellent thickening effect to provide thixotropic property
- * Changes in compound viscosity due to temperature fluctuations are minimized. Hence, product's viscosity remains stable regardless of season and application temperature.
- * The nonionic UH-752 can be applied with any other type of thickeners and compounds with various pH-values for optimal viscosity rates and properties.

III. Instructions in Use

- * UH-752 is mixed as it is or after dilution by a solvent.

When used with ADEKANOL UH-420 to modify viscosity, premixing these two products is recommended for easier homogenisation before adding them to a compound.

IV. Comparison of changes of thickening effect and viscosity in various dosing levels

1. Evaluation Tests Using Resin Emulsion

Test Procedure:

After mixing the designated amount of the thickeners to a resin emulsion, the compound is stirred until it becomes homogeneous. The compound is then left to stand overnight at 25 °C and its viscosity then measured by B8M viscometer at different rotating speeds (60, 30, 12 and 6 rpm). The measurement results are entered in a full logarithmic graph and a gradient of the resulting line gradient is determined as Value TI.

Sample Compound

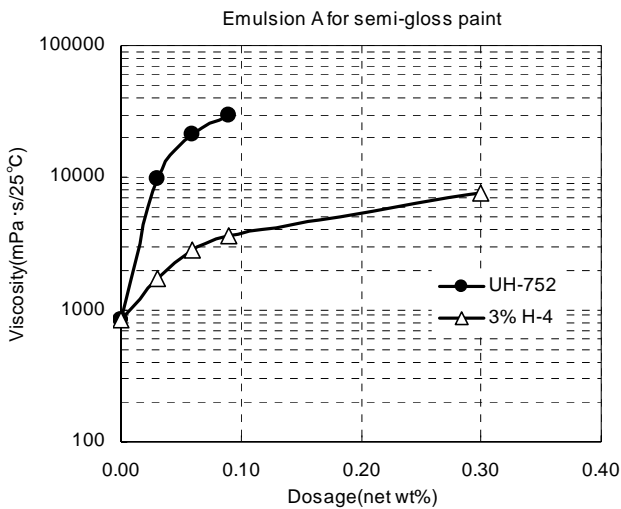
| | |
|---|-------------------|
| Resin Emulsion | 100 |
| Antifoaming agent (ADEKANAT B-940) | 0.2 |
| Thickener | Designated amount |

Sample Resin Emulsions:

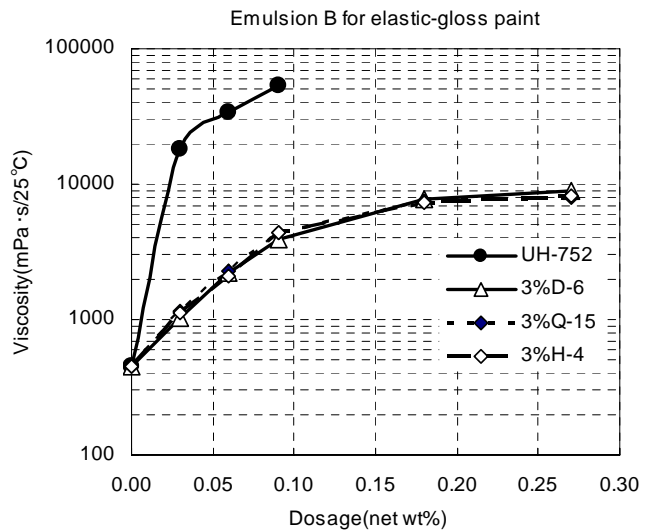
- Emulsion A for gloss paint (See graph 1)
- Emulsion B for elastic paint (See graph 2)

Thickeners Tested:

- ADECANOL UH-752
- H-4 (commercially available HEC)
- D-6 (commercially available HEC)
- Q-15 (commercially available HEC)



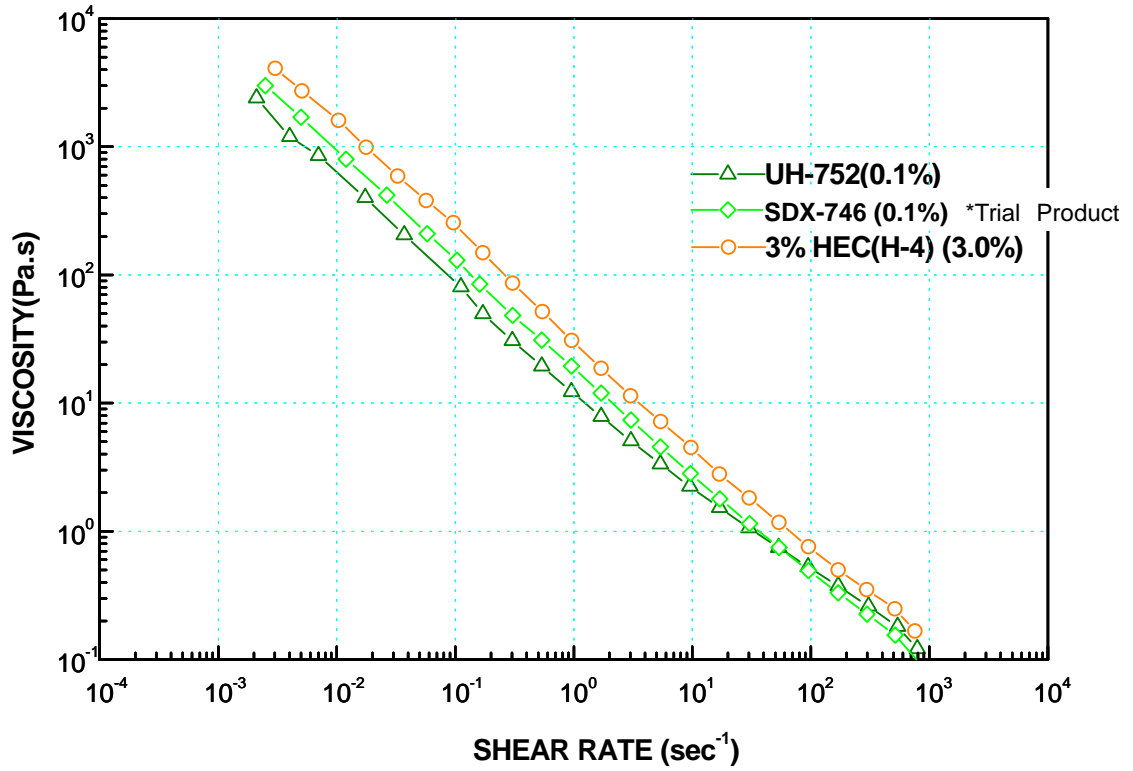
| TI | Dosage(wt%) | | | | |
|--------|-------------|------|------|------|------|
| | 0 | 0.03 | 0.06 | 0.09 | 0.3 |
| UH-752 | 0.59 | 0.76 | 0.84 | 0.86 | ---- |
| 3% H-4 | 0.59 | ---- | 0.68 | 0.72 | 0.72 |



| TI | Dosage(wt%) | | | | |
|---------|-------------|------|------|------|------|
| | 0 | 0.03 | 0.06 | 0.09 | 0.3 |
| UH-752 | 0.61 | 0.74 | 0.78 | 0.87 | ---- |
| 3% D-6 | 0.61 | 0.66 | 0.68 | 0.73 | 0.71 |
| 3% Q-15 | 0.61 | 0.67 | 0.68 | 0.72 | 0.71 |
| 3% H-4 | 0.61 | 0.67 | 0.68 | 0.73 | 0.70 |



Comparison of Viscosity among UH-752, SDX-746, HEC



2. Evaluations Test using Paint Compounds

Test Procedures:

The above procedures for emulsion tests are also applied to the test using white pigments, which have been compounded following in-house formulation.

Compositions of White Pigments

Pigment Paste Composition

| | | |
|---------------------|---------|------------------------------|
| Tap water | 9.99 | |
| Sodium triphosphate | 0.50 | 10% water solution |
| Dispersant | 0.50 | ADEKACOL W-193 |
| Titanium oxide | 28.67 | TCR-10 (Tohkem Products Co.) |
| Antifoaming agent | 0.40 | ADEKANAT B-1015 |
| Total | (40.06) | |

(Resin Emulsion Liquid)

| | | |
|----------------------------|--------|--|
| Emulsion for gloss coating | 53.25 | |
| Pigment paste | 40.06 | |
| Texanol | 2.60 | CS-12 (Chisso Petrochemical Corporation) |
| Propylene glycol | 3.80 | Adeka-propylene glycol |
| Aqueous ammonia | 1.10 | 28% water solution |
| Antifoaming agent | 1.19 | ADEKANAT B-1015 |
| (Total) | 100.00 | |

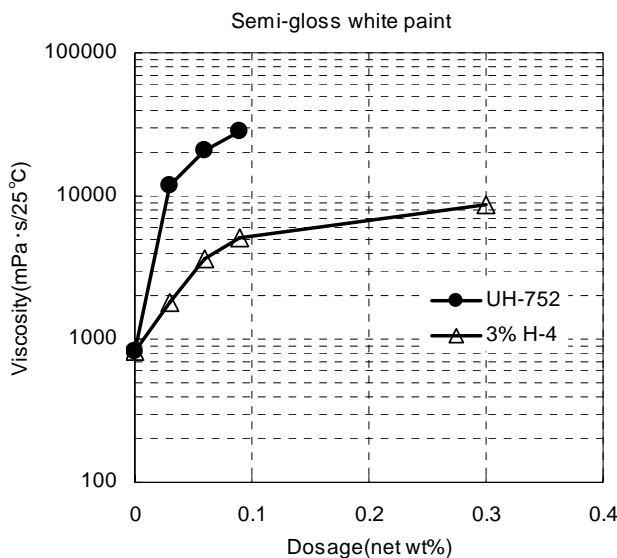
Sample Compound:

White Pigment compounded following an in-house formulation 100

Thickener Designated amount

Thickener Tested:

ADEKANOL UH-752
H-4 (commercially available HEC)



| TI | Dosage(wt%) | | | | |
|--------|-------------|------|------|------|-----|
| | 0 | 0.03 | 0.06 | 0.09 | 0.3 |
| UH-752 | 0.30 | 0.78 | 0.86 | 0.82 | --- |
| 3% H-4 | 0.30 | --- | 0.69 | 0.77 | 0.8 |



V. Water-Resistance Test of Paint Film

Test Procedures:

A given amount of thickener is mixed into a resin emulsion for stone-slab paints and the compound is stirred until it becomes homogeneous. It is then applied on a glass plate using a 10-ml applicator and subsequently dried. After soaking in warm water at 30 °C for 22 hours, the whiteness (WB) of the generated paint films is measured.

Sample Compound:

| | |
|--|-------------------|
| Resin Emulsion C for Stone-Slab Coating Paints | 100 |
| Thickener | Designated amount |

Bodifying Agents Tested:

ADEKANOL UH-752
 H-4 (commercially available HEC)

