REF: TT/ DEC.09/WK2

SILICONES FOR TEXTILES-EFFECT OF MODIFICATIONS

Properties of conventional aminomethyl polysiloxanes can be altered/ improved to the desired level through structural modifications of the functional group using organic reagents. Non-yellowing characteristics of the polymer can be improved through such structural modifications by controlling the concentration of oxidising groups on the polymer chain. However, a corresponding compromise on softness of treated fabrics, is inevitable due to the structural changes. Further, the compatibility of the polymer with different bath additives can be achieved through a judicious choice of the modified groups. Such modified fluids can be used along with other classes of fabric softeners for better combination of finish effects on fabrics and choice of treatment process.

Hydrophilicity/ hydrophobicity of the polymer also can be altered through such modifications although to a limited extent, as compared to polyether modified siloxanes. Such structural modifications also improve the emulsifiability of modified amino polysiloxanes.

EMULSIFICATION

Emulsions are aqueous dispersion of two or more immiscible liquids. One liquid is dispersed into another with external aids called surfactants or emulsifiers. They are classified as water-in-oil or oil-in-water depending on which liquid is dispersed into the external medium. In case of oil-in-water emulsion, oil is the dispersed phase whereas water is the continuous phase. For e.g, milk. In water-in-oil emulsions, water is dispersed into small particles and oil is the continuous medium. For e.g., butter.

OIL-IN-WATER	WATER-IN-OIL
Thin (e.g., Milk)	Thick (e.g., Butter)
Dilutable with water	Dilutable with oil
Water soluble dye tints the emulsion	Oil soluble dye tints the emulsion
High electrical conductivity	Low electrical conductivity

Normally, only oil-in-water silicone emulsions are used for textile applications due to their easier compatibility with various aqueous baths. Uniformly dispersed oil particles, due to their greater surface area, have a high tendency to spread and form even coatings on textile surfaces through both exhaustion and padding applications.

CLASSIFICATIONS

Emulsions are again classified depending on the particle size of the dispersed phase as micro emulsions, semi micro emulsions and macro emulsions. Macro emulsions have a typical particle diameter 0.1-1.0 microns. Being longer than the wavelength of light, these particles block the passage of light and hence have a milky white appearance. In micro emulsions, typical particle diameter is less than one quarter of the wavelength of light, i.e, 0.01 microns to 0.05 microns. The dispersed particles do not impede light, and hence the emulsions appear clear and transparent. Semi micro emulsions have a particle size in the range of 0.05 to 0.1 micron and appear bluish and translucent.

PARAMETERS	MICRO EMULSION	MACRO EMULSION	SEMI MICRO EMULSION
Appearance	Clear transparent to straw	Milky opaque	Bluish, translucent
Physical State	Liquid to semi-solid	Liquid to semi-solid	Liquid to semi-solid
Stability	Best	Moderate	Good
Effect in application	Inner penetration	Surface deposition	Both
Handle type expected	Limpy feel, inner softness	Body feel, smooth surface	Surface and inner smoothness
Durability	Best	Moderate	Good
Particle diameter range	0.01-0.05 micron	0.1-1.0 micron	0.05-0.1 micron