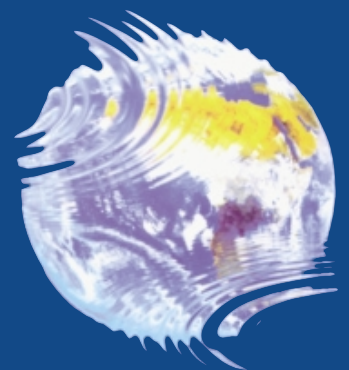


FLOCRYLTM
NMA



SNF FLOERGER[®]

Introduction

FLOCRYL™ NMA is supplied as a 48% solution in water. Its reactivity is due to the presence in the molecule of both an unsaturated vinyl group and a hydroxymethyl group which can be reacted separately and/or independently simply by varying the reaction conditions.

Reactivity

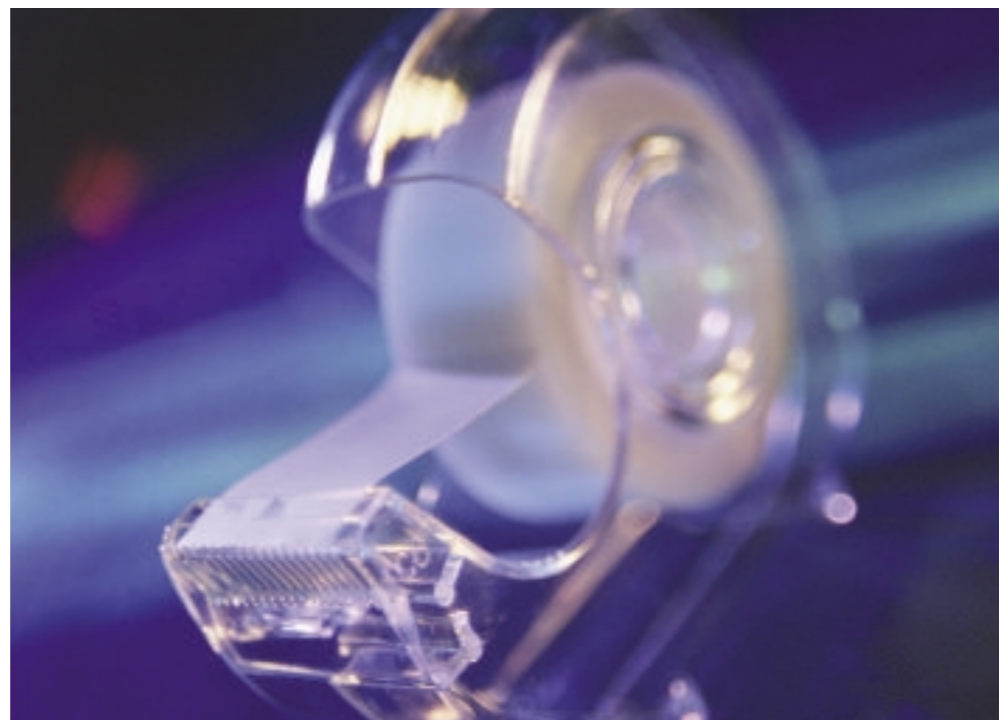
Reaction of the vinyl group

FLOCRYL™ NMA can be used in the preparation of a wide range of polymers and copolymers. The main is free radical polymerisation with other vinyl monomers such as acrylonitrile, acrylamide, acrylic and methacrylic esters, vinyl chloride, and styrene which leaves the hydroxymethyl group available. Additionally, the double bond in **FLOCRYL™ NMA** can be reacted with both halogens and alcohols under alkaline conditions and with thiol in the presence of alcoholate.

Reaction of the hydroxymethyl group

The hydroxymethyl group has a tendency to undergo condensation or substitution reactions.

FLOCRYL™ NMA containing polymers can be crosslinked either with themselves or with other reactive monomers, by heating and/or by the presence of an acid catalyst.



Uses

FLOCRYL™ NMA is an ideal raw material for a wide variety of applications. It is especially suitable for the preparation of latex binders and of cross-linkable emulsion polymers used in :

- Adhesives
- Antistatic agents
- Chromatographic materials
- Catalysts
- Impregnation of non-woven fabrics
- Inks
- Paints
- Paper coatings
- Pasting agents
- Plastics
- Rubbers
- Soil grouting systems
- Textile finishes
- Thermoplastics resins



When properly copolymerised, N-methylolacrylamide forms lattices which have low viscosity and excellent shelf stability. When the films, formed from these lattices, are cured, they develop excellent water resistance, organic solvent resistance, adhesion at high humidity and flexibility.

Specifications and Physical Properties

CAS Registry Number : 924-42-5

If the methods of analysis used to obtain these datas are of interest to you, a technical representative from our analytical department can discuss them with you.

Product description

Appearance	Clear to slightly yellowish solution
Molecular weight (g.mol ⁻¹)	101.10
Active content (%)	48.0
Refractive index (%)	1.412
Heat of polymerisation (Kcal/mole)	20.0
Specific gravity at 25°C	1.08
Cristallization point (°C)	-10

Notes : N-methylolacrylamide is soluble in polar solvents (alcohols) and not soluble in non-polar solvents (hydrocarbon, chloroform, ...).

Product range

		FLOCRYL™ NMA 48	FLOCRYL™ NMA 2820
NMA content	%	40.0 – 44.0	26.0 – 30.0
Acrylamide content	%	0 - 5.0	18.0 – 22.0
Formaldehyde content	%	2.0 maxi	0.2 maxi
pH		6.0 – 7.0	6.0 – 7.0
Color	apha	50 maxi	50 maxi

Stability

FLOCRYL™ NMA is a reactive monomer. As with other such monomers, it must be stabilized to prevent polymerisation during shipping and storage. FLOCRYL™ NMA can be safely handled if inhibited with cupric ions and oxygen, and if temperature, pH, and contamination are controlled. Air is usually an adequate source of oxygen.

Oxygen

Dissolved oxygen is necessary to inhibit polymerisation of FLOCRYL™ NMA. The dissolved oxygen level together with the air present is quite adequate stabilization during storage. Controlled intermittent air flow or continuous sparging at 0.09 Nm³/hr per m³ of N-methylolacrylamide (0.2 SCFM per thousand gallons) is sufficient for inhibition purposes.

Temperature

FLOCRYL™ NMA should be controlled to between 0°C (32°F) and 30°C (86°F). At temperatures below -10°C (14°F), N-methylolacrylamide will crystallize and separate from the solution. Warming the product to 0°C (32°F) will re-dissolve the crystals. In storage tanks, railcars and tank trucks, introduce tempered water (maximum temperature 40°C (104°F)) into the heating coils. Packaged material should be moved to a warm environment until crystals are redissolved. Do not apply steam to heating coils or direct heat to packaged material. Hot spots must be avoided. An air sparge should be employed, and agitation will increase the rate of dissolution. At temperatures above 50°C (120°F), polymerisation could be initiated over time. Storage tanks should include temperature monitoring and an independent temperature alarm system for early detection of polymerisation.

pH

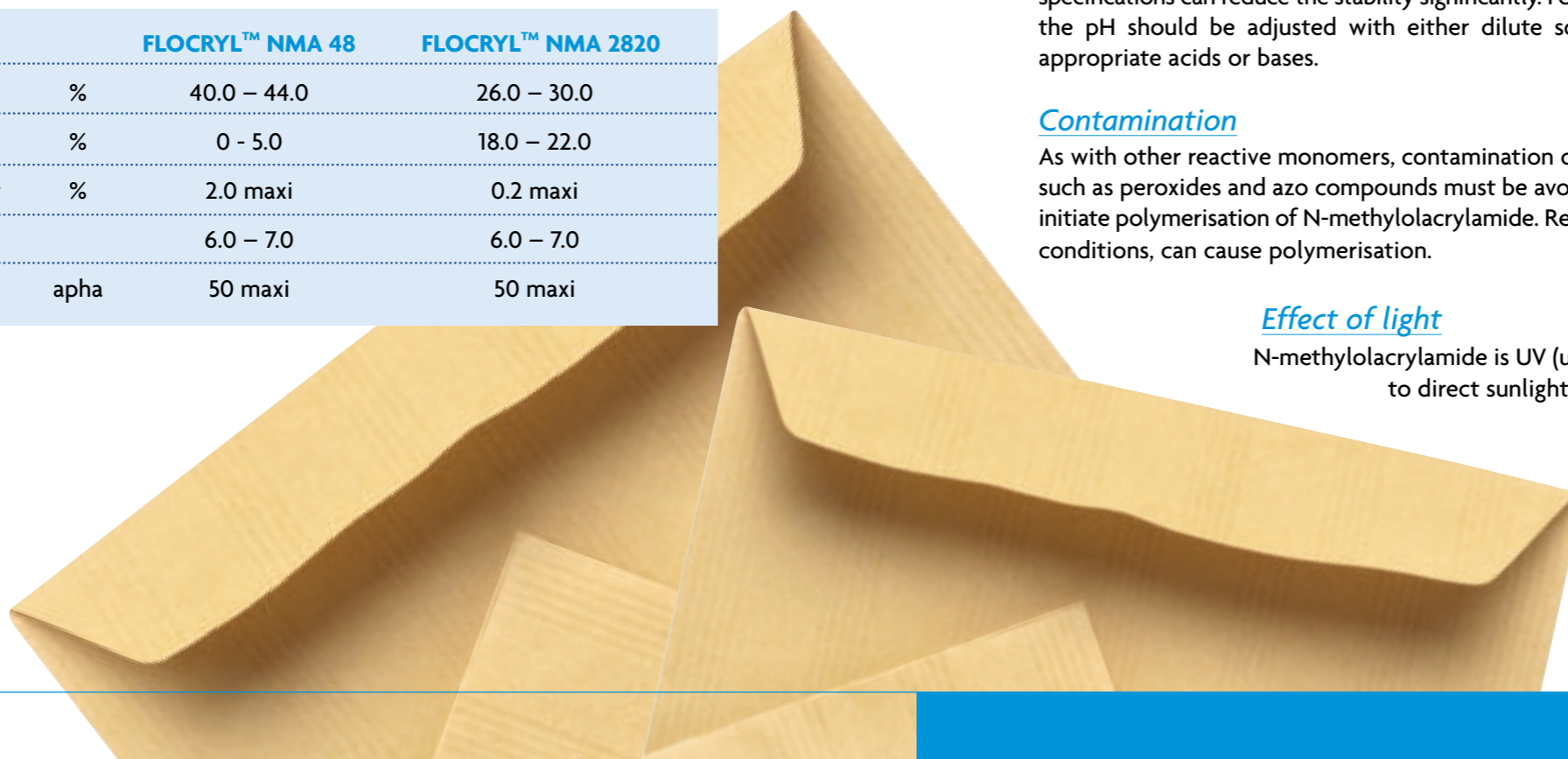
As supplied, FLOCRYL™ NMA has a pH of 6.0 to 7.0. Any modification of the pH, above or below these specifications can reduce the stability significantly. Periodic monitoring of pH is recommended and, if necessary, the pH should be adjusted with either dilute sodium hydroxide or dilute sulfuric acid, or any other appropriate acids or bases.

Contamination

As with other reactive monomers, contamination of N-methylolacrylamide solutions with known initiators such as peroxides and azo compounds must be avoided. Strong oxidizing agents such as persulfates can also initiate polymerisation of N-methylolacrylamide. Reducing agents such as sulfites and bisulfites under certain conditions, can cause polymerisation.

Effect of light

N-methylolacrylamide is UV (ultra violet) sensitive. Therefore, it should not be exposed to direct sunlight or polymerisation may occur.



FLOCRYL™ NMA

Operational notes

FLOCRYL™ NMA is a reactive monomer which can polymerise spontaneously with the possible generation of heat and pressure, in the presence of certain contaminants, or as a result of improper handling or storage. As with any toxic or reactive material, thorough training of all employees is imperative. Knowledge of the toxicological properties, strict provisions for safe handling procedures and appropriate storage and handling practices are necessary for ensuring the safe use of this monomer.

Storage

It is recommended that **FLOCRYL™ NMA** be used before six months after the date of manufacturing. Do not sparge or blanket **FLOCRYL™ NMA** with an inert gas. Shelf life may be reduced if these storage conditions are not observed.



Safety considerations

FLOCRYL™ NMA is a toxic monomer and requires proper handling. Serious damage to health can be caused through prolonged exposure by inhalation and contact with skin and if swallowed. Only properly informed, trained, and equipped staff should be involved in storage, loading, unloading, or process activities with N-methylolacrylamide monomer. Complete and up-to-date information on the toxicology of **FLOCRYL™ NMA** can be found in the Material Safety Data Sheet which is available from our Product Information & Regulatory Affairs Department.



Packaging

FLOCRYL™ NMA is supplied in 200 kg drums and 1 000 kg containers. Bulk shipments are available on request.