MISSION

Chemanol's mission since inception, is evolved around manufacturing and supplying premier grade Methanol based petrochemical products conforming to the highest international standards; utilizing in-Kingdom resources and remain to be major supplier to cater to the clientele spread around globally, at most competitive prices. Chemanol is committed to clean environment and holds tremendous value for Human life and its safety.

VISION

Chemanol foresees itself to be a major player in meeting the demands of Methanol based specialty products of its valued clients spread around the globe.

While doing so, the company shall remain committed to environment, safety, competitiveness, efficiency and innovativeness.

Chemanol shall continue to explore synergies and global partnerships to maximize the value for its stakeholders through continuous improvement and development and strategic alliances.
Methanol chemicals company (Chemanol) is a joint stock company, developed, promoted and financed by a group of leading industrialists from the Gulf Co-operation Council (GCC) countries. The company represents a true manifestation of the objectives of the Saudi Ministry of Commerce & Industry and the GCC which jointly encourage:

- Industrial co-operation between its citizens.
- Import substitution by installation of petrochemical units to manufacture value added downstream products utilizing the Kingdom’s natural hydrocarbon resources.
- Implementation of export oriented projects utilizing the vast industrial infrastructure made available by the Government of the Kingdom of Saudi Arabia.

Chemanol is a grass root, second generation petrochemical complex located in Madinat Al Jubal Al Sinaiyah (Jubail Industrial City), Kingdom of Saudi Arabia, manufacturing Methanol, Formaldehyde and its derivative products, Superplasticizers and Amino Resins.

Since its inception in 1989, CHEMANOL has earned the reputation of a world class, dependable and quality conscious manufacturer possessing a very sophisticated marketing and logistical support system to which our many GCC and overseas customers can testify.
Aqueous Formaldehyde Solutions (AF – 37 / Formalin)

Urea Formaldehyde Concentrate (UF – 85)

Hexa Methylene Tetramine (HMT / Hexamine)

Paraformaldehyde – Prills / Powder

Melamine Formaldehyde Spray Dried Powder Resins (MELFORES 101 P / MELFORES 103 P)

Urea Formaldehyde Spray Dried Powder Resins (UFORES 201 P / UFORES 301 P)

One shot and MUF Resins

Sulphonated Melamine Formaldehyde Liquid (MELFORES 701 L) Super plasticizers

Sulphonated Naphthalene Formaldehyde Liquid (NAFORES 801 L) Super plasticizers

Sulphonated Naphthalene Formaldehyde Powder (NAFORES 801 P) Super plasticizers

CHEMANOL possesses the requisite technical expertise and the capability of offering tailor made product specifications Formulations to meet our customer’s requirements. Our products conform to the strictest international standards.

OUR TECHNOLOGY

Our manufacturing facilities employ the latest state of the art technologies is from the internationally reputed companies with proven track records. The formaldehyde units are based on the modern Excess Air (Iron Oxide) Process whereas the continuous Liquid Phase Ammoniation Process has been used in the HMT plant.

CHEMANOL plants are specifically designed for steady, sustained operation, equipped with distributed digital control based electronic instrumentation which greatly enhances the speed and precision of operational controls resulting in complete reliability. The Utility, Urea handling and Products Dispatch units are also controlled automatically by PLC based instrumentation. The entire manufacturing facility is fully automated to ensure environmentally clean, safe and efficient operations around the clock consistently producing top quality products.

PROJECTS UNDER EXECUTION

CHEMANOL is currently building the following plants

• Methanol / Carbon Monoxide
• Methyl Amines
• Dimethyl Formamide – DMF
• Pentaerythritol
• Sodium Formate
• Acetaldehyde
• Formaldehyde (expansion Units)
Aqueous Formaldehyde Solution

UN No. 2209
IMCO Class: 8
Packing Group: 3

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Formula</th>
<th>Composition By WT.% (Stabilized with Methanol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>HCHO</td>
<td>37.0 ± 0.5</td>
</tr>
<tr>
<td>Methanol</td>
<td>CH₃OH</td>
<td>7.0 ± 0.5</td>
</tr>
<tr>
<td>Formic Acid</td>
<td>HCOOH</td>
<td>0.05 (max)</td>
</tr>
<tr>
<td>Water</td>
<td>H₂O</td>
<td>By balance</td>
</tr>
</tbody>
</table>

AF-37 with varying methanol concentration (0.4 – 12 wt.%) and AF-37 special grade, stabilised with benzoguanamine / other additives can be produced and supplied. The plants possess inherent technical flexibility to produce any AF grade up to 55% concentration in accordance with specific client requirements.

PHYSICAL PROPERTIES

- State: Clear aqueous solution
- Colour: (APHA scale) 5 – 10 max
- Odour: pungent
- Specific gravity: 1.08 (@ 25°C)
- Flash Point: (closed cup) 72°C (37% formaldehyde, 7% methanol) 64°C (37% formaldehyde, 10% methanol)
- pH: 2.8 – 3.0

MAJOR APPLICATION AREAS

- Lamination Industry
- Intermediate chemical for oil field formulations
- Raw material for insulation / fiberglass industry
- Fungitour for poultry farms
- Basic chemical for synthetic resins / moulding compounds / powdered & liquid resins, etc
- Organic dyestuff
- Explosives
- Soil disinfection chemicals
- Pharmaceuticals
- Inorganic synthesis
- Leather and Fur industries
- Metal-working industries
- Paper processing
- Rubber industry
- Textile industry
- Water treatment industry
- Sugar industry
- Photographic chemicals
- Foundry moulds
- Embalming fluids
- Pesticides

FORMALIN / AF-37

PACKING

- 30 litre HDPE canisters / polycans (32.50 kgs. nett.), 220 litre HDPE drums (225 kgs. nett.), IBC’s, 20,000 – 25,000 litre IMO-1 type isothermal tank containers (20 – 25 MT)

HANDLING

- Use of approved respiratory systems, goggles, gloves & suitable clothing is recommended.

STORAGE

- Storable under controlled temperature conditions depending on the specific product grade.
Urea Formaldehyde Concentrate

UF-85

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Formula</th>
<th>Composition By Wt. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>HCHO</td>
<td>60.0 ± 0.5</td>
</tr>
<tr>
<td>Urea</td>
<td>NH₂CONH₂</td>
<td>25.0 ± 0.5</td>
</tr>
<tr>
<td>Methanol</td>
<td>CH₃OH</td>
<td>0.21 (max)</td>
</tr>
<tr>
<td>Formic acid</td>
<td>HCOOH</td>
<td>0.01 (max)</td>
</tr>
<tr>
<td>Water</td>
<td>H₂O</td>
<td>By balance</td>
</tr>
<tr>
<td>Chlorides</td>
<td>Cl</td>
<td>0.001 (max)</td>
</tr>
<tr>
<td>Iron</td>
<td>Fe</td>
<td>0.0001 (max)</td>
</tr>
<tr>
<td>Heavy metals as</td>
<td>Pb</td>
<td>N.T</td>
</tr>
</tbody>
</table>

**PHYSICAL PROPERTIES**

- State: Clear viscous liquid
- Colour (APHA scale): 30 max.
- Odour: Pungent
- Specific gravity: 1.325 at 25°C
- Viscosity: 300 – 500 cps at 25°C
- Flash point (closed cup): 79°C approx.
- pH: 7 - 8

**MAJOR APPLICATION AREAS**

- Conditioning / anticaking agent for urea fertilizer
- Spray coating agent for urea fertilizer
- Slow release fertilizer
- Manufacturing of
  - UF liquid resins
  - UF powdered resins
  - UF molding compounds

**PACKING**

- 220 litre HDPE drums (270 kgs. nett.), IBCs.
- 20,000 - 25,000 litre IMO-1 type isothermal tank Containers (20 - 25 MT)

**STORAGE**

To be stored above 0°C to avoid excessive viscosity and gel precipitation and below 40°C to avoid polycondensation. pH of stored UF-85 needs to be maintained above 6.5 pH units.
Hexamethylene Tetramine

UN No. 1328
IMCO Class: 4.1 (Inflammable solid)
Packing group: 3
Empirical formula: \((\text{CH}_2\text{)}_6\text{N}_4\)
Molecular weight: 140.22

**SPECIFICATION**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Composition By Wt. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Stabilized</td>
</tr>
<tr>
<td></td>
<td>Unstabilised</td>
</tr>
<tr>
<td>Purity:</td>
<td>98.2 min</td>
</tr>
<tr>
<td></td>
<td>99.5 min</td>
</tr>
<tr>
<td>Ash content *</td>
<td>0.10 max</td>
</tr>
<tr>
<td></td>
<td>0.05 max</td>
</tr>
<tr>
<td>Moisture</td>
<td>0.3 max</td>
</tr>
<tr>
<td></td>
<td>0.3 max</td>
</tr>
<tr>
<td>Free Ammonia</td>
<td>0.01 max</td>
</tr>
<tr>
<td></td>
<td>0.01 max</td>
</tr>
<tr>
<td>Chlorides</td>
<td>0.001 max</td>
</tr>
<tr>
<td></td>
<td>0.001 max</td>
</tr>
<tr>
<td>Sulphates</td>
<td>0.005 max</td>
</tr>
<tr>
<td></td>
<td>0.005 max</td>
</tr>
<tr>
<td>Heavy Metals</td>
<td>N.T.</td>
</tr>
</tbody>
</table>

* Depending on required degree of stabilization

**PHYSICAL PROPERTIES**

- Form: Crystalline small rhombic crystals
- Colour: White
- Odour: Slight odour of amine
- Specific gravity: 1.33 at 20°C
- pH of 10% aqueous solution: 8 - 9
- Bulk density: 700 - 800 gms per litre
- Vapor pressure: 0.0035 mbar at 20°C
- Solubility in water: 20°C – 874 g/ltr.  60°C – 844 g/ltr.
- Melting point: 280°C (subl)
- Flash point: 250°C
- Ignition temperature: 390°C

**MAJOR APPLICATION AREAS**

- Rubber industry
- Explosive industry
- Fuel industry
- Synthetic resin industry
- Pharmaceuticals industry
- Photographic industry
- Organic synthesis industry
- Metal industry
- Lubricant industry
- Fertilizer industry

**PACKING**

Polypropylene woven bags with loose inner polyethylene liner:
25 kgs. nett., 500kgs. nett., 1000 kgs. nett.

**HANDLING**

Use of approved respiratory systems, goggles, gloves & suitable clothing is recommended

**STORAGE**

Hexamine is sensitive to moisture. It is therefore preferable to store it in an atmosphere at relative humidity below 60%.
Paraformaldehyde

UN No. 2213
IMCO Class 4.1 – flammable solids
Packing Group: 3
Empirical formula: HO – (CH20)n – H

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Composition By Wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde content</td>
<td>91 – 97%</td>
</tr>
<tr>
<td>Ash content</td>
<td>100 ppm max</td>
</tr>
<tr>
<td>Acidity (As Formic Acid)</td>
<td>0.03% max</td>
</tr>
</tbody>
</table>

**PHYSICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Form</th>
<th>Free flowing granules, Prills / fine powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>White</td>
</tr>
<tr>
<td>Odour</td>
<td>Pungent smell</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>750 – 850 kg/m³</td>
</tr>
<tr>
<td>pH of 10% aqueous solution</td>
<td>3 – 7</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Sparingly Soluble</td>
</tr>
<tr>
<td>Melting point</td>
<td>120°C – 170°C</td>
</tr>
<tr>
<td>Flash point</td>
<td>Above 71°C (160°F) by Tag closed cup tester Above 93°C (199°F) by open cup tester</td>
</tr>
</tbody>
</table>

**MAJOR APPLICATION AREAS**

- Resin manufacture (Phenolic / Amino Resins)
- Anticaking agent for Urea
- Manufacture of surface coating Resins.
- Adhesives
- Ion Exchange Resins
- Friction Dust industry
- Formaldehyde substitute / formaldehyde donor.
- Disinfectants, insecticides and pesticides industry.
- Manufacture of dyestuffs & special plasticizers.

**PACKING**

Polypropylene woven bags with loose inner polyethylene liner: 25 kgs. nett., 500 kgs. nett., 1000 kgs net.

**HANDLING**

Use of approved respiratory systems, goggles, gloves & suitable clothing is recommended.
Urea Formaldehyde Powder Resin

Ufores 201 P is a powder Urea Formaldehyde resin, which must be dissolved in water prior to use. When used with the hardener, it provides an excellent adhesive for plywood gluing.

**SPECIFICATIONS (TYPICAL)**

<table>
<thead>
<tr>
<th>Appearance</th>
<th>White free flowing powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity (2 parts resin + 1 Part water) 25°C, cps</td>
<td>2500 – 6000</td>
</tr>
<tr>
<td>Viscosity (1 part resin + 1 Part water) 25°C, cps</td>
<td>180 ± 40</td>
</tr>
<tr>
<td>pH of 50% solution</td>
<td>8 – 9</td>
</tr>
</tbody>
</table>

**DISSOLVING THE RESIN**

Prior to use, the resin is mixed with water to convert into solution. A mechanical stirrer may be used for this purpose. With high speed mixer all the water may be placed first and then resin may be added, while mixer is running.

If low speed mixer is used, it is better to make a homogenous mix of the resin with about ½ of water, and rest of the water may be added later.

The temperature of the water may be 20 – 30°C, because with lower water temperature, mixing is time consuming. Reconstitution can be carried out in simple mixing equipment as follows:

1. Take all the water in the mixer. The water temperature should not be below 20°C
2. Add required amount of Ufores 201 P and mix until a homogenous solution is obtained
3. Once a homogenous solution has been obtained, other additives and hardener are added.

**CHOICE OF REACTIVITY**

The choice of reactivity would normally depend upon the local conditions. The reactivity of the glue can be adjusted over a wide range by varying the composition and amount of hardener. The reactivity of the glue is expressed in terms of gelation time at 100°C.

**A. TYPICAL GLUE FORMULATIONS**

- **Ufores 201 P** 100 parts by weight
- **Water** 50 parts by weight
- **Flour** 10 parts by weight
- **Hardener AA1387** 5 parts by weight
- **Water** As required to adjust the viscosity (1200 ± 100 cps)

The pot life of the glue mix at 30°C is about 8 hours and gel time at 100°C would be about 2 minutes. The above formulation would meet with the requirements of S. 6566 for MR grade

**B. TYPICAL GLUE FORMULATIONS**

- **Ufores 201 P** 100 parts by weight
- **Water** 50 parts by weight
- **Flour** 50 parts by weight
- **Hardener AU8020** 5 parts by weight
- **Water** As required to adjust the viscosity (1200 ± 100 cps)
The gel time of the above glue mix at 100°C would be 40 seconds. Pot life can be adjusted to the desired level by addition of retarders like Ammonia or Hexamine.

The glue mix would meet with the requirements of B.S. 6566 for interior grade.

PRESSING CONDITIONS

The pressing time would depend upon the press temperature, glue mix reactivity, wood density, veneer thickness and moisture content of the veneers. The temperature for good glue setting normally varies between 90 – 120°C. Pressure would depend upon the wood quality, being higher for hard wood species as compared to soft wood.

GLUE CONSUMPTION

The glue is spread to one surface. The veneer surface should be clean and free from dust and other contamination. The consumption of glue generally would be 140 -200 gms per square meter.

CLEANING

The equipment can be cleaned with warm water and this should be done before the glue has completely cured.

HANDLING

Like any formaldehyde product, Ufores 201 P contains free formaldehyde. This may cause dermatitis, when it comes into contact with skin of sensitive persons. Skin contact with powder or liquid resin should be avoided. Hands should be thoroughly washed with soap and hot water at the end of the working day and before meals. A dust mask should be worn, while emptying the bags.

STORAGE

The powder resin should be stored in the original bags in a cool place protected from the heat. Care should be taken that powder does not absorb moisture and water. The bags, which have been opened, should be carefully closed before storage. When stored in original bags at 20°C, shelf life would not be less than one year.
Ufores 301 P is a powder Urea Formaldehyde resin, which is used in the manufacturing of MDF, Particleboard and other cellulosic products.

**SPECIFICATIONS (TYPICAL)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White free flowing powder</td>
</tr>
<tr>
<td>Volatiles at 105°C 1 hr. (%)</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>Viscosity of 60% solution at 25°C (cps)</td>
<td>300 – 600</td>
</tr>
<tr>
<td>Viscosity of 50% solution at 25°C (cps)</td>
<td>100 – 200</td>
</tr>
<tr>
<td>pH of 50% solution</td>
<td>8 – 9</td>
</tr>
<tr>
<td>Solubility</td>
<td>Easily soluble in water</td>
</tr>
</tbody>
</table>

**DISSOLVING THE RESIN**

The resin is mixed with water to convert into solution. A mechanical stirrer may be needed for this purpose. With low speed mixer, it is better to make homogenous mix of the resin with about ½ the amount of water, the rest may be added later under agitation.

With high speed mixer all the water may be placed in the mixer and then powder resin may be added. The temperature of water may be 20 – 30°C, because with lower temperature mixing is time consuming.

**REACTIVITY**

The choice of reactivity would normally depend on the local conditions. Important parameters are platen temperature, moisture content of the mat, pressing cycle etc. The reactivity of the glue can be adjusted over a wide range by varying the composition and amount of hardener system. The reactivity of the glue is expressed in terms of gelation time at 100°C. A commonly used method for determining the reactivity is to measure gel time of resin at 100°C with addition of Ammonium Salt such as Ammonium Chloride or Ammonium Sulphate.

**GLUE MIX PREPARATION (TYPICAL)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount (parts by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ufores 301 P</td>
<td>100</td>
</tr>
<tr>
<td>Water</td>
<td>82</td>
</tr>
<tr>
<td>Urea</td>
<td>10 – 15</td>
</tr>
<tr>
<td>Hardner AU 7030</td>
<td>3</td>
</tr>
<tr>
<td>Wax Emulsion</td>
<td>0.5 – 1 parts wax (solid basis) on dry chips weight</td>
</tr>
<tr>
<td>Gel time at 30°C</td>
<td>165 minutes</td>
</tr>
<tr>
<td>Gel time at 100°C</td>
<td>55 seconds</td>
</tr>
</tbody>
</table>

For outer layers of three layered particleboard, the amount of hardener may be reduced or its addition totally avoided. The risk of pre-curing can be reduced by retarding the reactivity of glue by addition of Ammonia or Hexamine.

**PARAFFIN EMULSION**

Wax emulsion is generally used at a dosage level of 0.5 – 1% solids on dry wood weight, separately or in combination with resin solution. This is needed to reduce the thickness swelling of the finished board.
RESIN CONSUMPTION
The quantity of resin to be used is expressed as weight of solid resin calculated on dry chips or fiber. The normal consumption of resin generally varies between 9 – 12%. The consumption of resin would depend on the quality of feed stock also. The important parameters being the porosity, bark and dust content.

PRESSING CONDITIONS
For pressing boards, using Ufores 301P the press temperature varies between 150 – 200°C. The pressing time would depend on pressing temperature, glue reactivity and moisture content. The usual pressing time may be 12 -18 seconds of board thickness.

CLEANING
The equipment can be cleaned with warm water and this should be done before the glue is fully set. Once the glue has hardened, it is insoluble and must be scraped off.

HANDLING
Ufores contains free formaldehyde, which may cause dermatitis, when it comes into contact with skin of sensitive persons. Skin contact with solid or liquid resin should be avoided. Hands should be thoroughly washed with soap and hot water at the end of working day and before meals. A dust mask should be worn while emptying the bags.

STORAGE
The powder resin should be stored in the original bags in a cool place protected from heat. When stored at high temperature, the storage stability will impair considerably. Care should be taken that powder does not absorb moisture and water. The bags, which have been opened, should be carefully closed before storage. When stored in original bags at 20°C, shelf life would be not less than one year.
Melamine Formaldehyde Powder Resin

Melfores 101 P is an unmodified melamine formaldehyde powder resin suitable for impregnation of base / decorative papers and overlay in the manufacture of high pressure decorative laminates, low pressure melamine surfaced wood boards / panels etc. It is soluble in water; clear to slightly hazy solution.

Melfores 101 P can also be used in the modification of Urea glues by physical blending for achieving overall improved properties of the wood boards, especially for enhanced moisture resistance. This is more common in case of plywood gluing. Generally, Melfores 101 P content does not exceed 25% by weight in such mixtures. The powder resin is first dissolved in water and the solution is then blended with Urea glue.

PHYSICAL PROPERTIES OF MELFORES 101 P (TYPICAL)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White free flowing powder</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>&lt; 3.0 %</td>
</tr>
<tr>
<td>Storage life of powder resin when stored in original packing below 20°C</td>
<td>&gt; 6 months</td>
</tr>
<tr>
<td>Solution density / 25°C</td>
<td>1.23g / cm³</td>
</tr>
<tr>
<td>(55 pbw powder and 45 pbw water) Solution storage life</td>
<td>5 days (depends on temperature)</td>
</tr>
<tr>
<td>(55:45 at 25°C) pH of solution</td>
<td>9.3 – 10.5</td>
</tr>
<tr>
<td>Water tolerance / 25°C</td>
<td>Dilutable up to 30% solid without precipitation</td>
</tr>
</tbody>
</table>

PREPARATION OF IMPREGNATING RESIN SOLUTION

Generally, aqueous solutions of 40 – 60% concentration by weight of Melfores 101 P are used, however, actual percentage depends on the characteristics of the paper and the resin pick-up required for the application.

The requisite quantity of water is taken in a mixing vessel fitted with a propeller agitator. The required amount of Melfores 101 P is added in lots with the agitator running and the stirring is continued until the powder resin completely dissolved to give a uniform clear to slightly hazy solution. The dissolving process can be expedited by using warm water (40 – 50°C). Addition of a small amount of industrial methylated spirit or isopropyl alcohol in the mix (up to a maximum of 15% replacement of the water) improves the solubility of powder resin, faster wetting out and reduced effect on the wet strength of the paper, and lower drying time.

STORAGE LIFE OF THE RESIN SOLUTION

The usable life of the impregnating resin solution is about 5 days, depending on the temperature and dilution. If the solutions stored for longer periods, it may flocculate which can normally be redissolved by warming to about 70 – 75°C. However, it should be cooled immediately to the working temperature, under stirring, to avoid further polymerization of the resin.

It is strongly recommended, however, to process and consume fresh resin solution daily.
GUIDANCE FOR IMPREGNATION AND DRYING OF PAPERS

The resin solutions based on Melfores 101 P are conveniently used in all types of impregnating / coating machines. The following typical parameters may be considered as a guide to process different types of papers for use in the manufacture of laminates.

<table>
<thead>
<tr>
<th>Material</th>
<th>Paper</th>
<th>Resin Solution (Concentration)</th>
<th>Impregnated and Dried Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Resin Content</td>
<td>Volatiles Content</td>
</tr>
<tr>
<td>Print Sheet</td>
<td>80 – 140 gsm</td>
<td>40 – 50%</td>
<td>35 – 40%</td>
</tr>
<tr>
<td>Decorative base sheet</td>
<td>120 – 160 gsm</td>
<td>55 – 60%</td>
<td>55 – 60%</td>
</tr>
<tr>
<td>Overlay</td>
<td>25 – 40 gsm</td>
<td>50%</td>
<td>60 – 70%</td>
</tr>
</tbody>
</table>

*As percentage of impregnated paper stock

Drying and further polymerization of the impregnated papers may be carried out at about 90 – 145°C (or higher) in a vertical or horizontal type of drying tunnels and the drying time much depends on a number of factors such as the type and length of the drying tunnel, paper throughput speed, resin pick-up, temperature, volatile content, resin flow required on the impregnated and dried stock etc. It is not practical to recommend optimum drying schedules with accuracy, but are best standardized by trials under actual manufacturing conditions.

The impregnated and dried paper sheets are to be stored under controlled conditions, generally below 25°C and 40% relative humidity. If exposed to higher percentage of relative humidity, there will be considerable pick up in the volatile content due to moisture ingress, which in turn will affect the flow properties, surface finish, etc.

CURING / PRESSING CONDITIONS

Generally, curing is carried out at press temperatures of 135 – 155°C and at pressure range 800 – 1000 PSI but it is also possible to cure under low pressure laminating applications such as the surfacing of the wood boards / panels. For achieving better surface finish and the overall improved dimensional stability of the finished products, it is recommended to cool the laminated sheets, after curing, to about 45°C while still under pressure.

POST - FORMING IMPREGNATED STOCKS

Melfores 101 P solution can be modified by incorporating water soluble plasticizers / flexibilizers at site for use in the impregnation of paper stocks suitable for manufacture of post forming laminates. Generally, such additives content do not exceed 15% by weight. However, the degree of modification depends on the application requirement.

PACKING

Melfores 101 P is packed in multi-wall paper bags with inner polyethylene liner. Generally 25 kgs. nett. Higher capacity packing can be considered, if necessary.

STORAGE

Melfores 101 P should be stored in original bags in a dry place and kept as cool as possible (below 20°C) when stored at higher temperatures, the storage stability will impair remarkably. It is very sensitive to moisture and hence the bags should be kept well closed to avoid lumps formation.
SOLUTION PREPARATION

Distilled or deionised water is recommended for the preparation of resin solution. The dissolution would be easier, if the water temperature is maintained between 25°C – 30°C. At lower temperature the dissolution would be time consuming and if dissolved in water at higher temperature the usable life of the resin solution would be shortened. If the temperature of the resin solution is above 35°C it is advisable to cool it to about 25°C to have optimum pot life.

Following procedure may be adopted for preparing the solution.

a. The requisite quantity of water is taken in a mixing vessel fitted with an agitator.
b. Melfores 103 P is added under agitation.
c. Stirring is continued till the powder resin completely dissolves and clear solution is formed.
d. The resin solution is filtered through a fine mesh to remove any suspended matter.

Reconstitution can be carried out in a simple mixing equipment. The mixing vessel may be of stainless steel or plastic material.

Melfores 103 P is a powder Melamine formaldehyde resin used for glazing of amino moulded articles. The same resin can be used for the impregnation of overlay paper also. Melfores 103 P is used in powder form for glazing application, while it needs to be reconstituted into solution by dissolving in water for impregnation of paper.

When used as a glazing compound it imparts very high gloss to the surface of the molded article. The moulded articles treated with Melfores 103 P display improved resistance towards water, staining, cigarette burns and abrasion.

TYPICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White free flowing powder</td>
</tr>
<tr>
<td>Volatiles at 105°C 1 hr (%)</td>
<td>&lt; 4</td>
</tr>
<tr>
<td>Storage life (25°C)</td>
<td>Not less than six months</td>
</tr>
</tbody>
</table>

PROPERTIES OF 50% SOLUTION

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear transparent liquid</td>
</tr>
<tr>
<td>Density at 25°C</td>
<td>1.22 approx</td>
</tr>
<tr>
<td>Viscosity at 25°C (CPS)</td>
<td>25 – 40</td>
</tr>
<tr>
<td>pH at 25°C</td>
<td>7.5 – 8.5</td>
</tr>
<tr>
<td>Stability at 25°C</td>
<td>24 Hours.</td>
</tr>
</tbody>
</table>

IMPREGNATION

Melfores 103 P is converted into solution by dissolving in water for impregnation application. Generally a solution of 50% concentration by weight of Melfores 103 P is used. Actual concentration would depend on the characteristics of the paper and the resin pick up required.

IMPREGNATION OF PAPER

Impregnation of paper may be carried out by any of the conventional methods.

DRYING

Drying of impregnated paper is normally carried out at 80°C – 100°C. The residence time in the drying tunnel would depend on the resin pick up by the paper, temperature, type and length of the tunnel. The resin pick up by paper may vary between 50% – 60%. The dried paper should be stored in a cool and dry place because heat and humidity would affect the quality of the paper adversely.
Melamine Formaldehyde Powder Resin

PRESSING
The products based on amino resins are moulded in a hydraulic press under influence of heat and pressure. The platen temperature of the press would vary according to the type of moulding powder. It may be between 140°C – 170°C

1. The moulding powder is put into the mould cavity and the press is closed. It is opened after a predetermined time. The pressing time depends on the press temperature, thickness of the article and the curing characteristics of the moulding powder.

2. The impregnated paper is placed on the semi-cured article and the press is closed again giving sufficient time for the paper to cure. The time is again established practically depending on the local conditions.

3. The press is opened and Melfores 103 P is distributed over the hardened surface of the article and the press is closed for the last time, in the cycle. The curing time for glazing compound depends on the temperature of the press. Normally Melfores 103 P would require 20 – 50 seconds for curing.

HANDLING
It is advisable to wear a dust mask and hand gloves while emptying the bags. Hands should be thoroughly washed with soap and hot water at the end of the working day and before meals.

STORAGE
The powder resin should be stored in original bags in a cool place protected from heat and humidity. Do not keep the bags open or material exposed to atmosphere. Melfores 103 P being hygroscopic would pick up moisture, which would affect the quality and performance of the product adversely. The bags which have been opened should be carefully closed before storage. The recommended storage temperature is 20°C – 25°C

PACKING
Melfores 103 P is packed in multiwall paper bags with inner polyethylene liner containing 25 kgs. nett. in each bag.
Nafores 801 L is a highly effective water soluble for concrete. Chemically, Nafores 801 L is a Sulphonated Naphthalene Formaldehyde based poly-condensation product.

- Improved workability (by maintaining same water cement ratio).
- Higher early & ultimate compressive strength (by lowering water cement ratio) up to 30% water reduction can be achieved by using optimum dosage of Nafores 801 L.
- Flowing, self-leveling.
- Reduced cement.
- Strong plasticizing effect without any tendency to segregation.
- Very high strength.

**APPLICATION AREAS**

- Ready mix concrete.
- Pre-cast and pre-stressed concrete.
- In areas of congested reinforcement, where higher workability is of benefit.
- In reducing water contents for the sake of improving impermeability and durability.
- Marine concrete.
- Gunite concrete.
- Architectural concrete.
- Special concrete.
- Pumpable concrete.

**DOSSAGE**

Field trials should be conducted to determine optimum dose of Nafores 801 L. Generally, 0.2 – 2% of Nafores 801 L is used based on weight of cement.

**MIXING**

Nafores 801 L should be added to concrete at end of mixing cycle. Do not add Nafores 801 L to dry cement.

**COMPATIBILITY WITH OTHER ADMIXTURES**

Nafores 801 L can be used together with other concrete admixtures such as retarders, accelerators and air entrainers. It is compatible with most of the known brands, but we recommend to carry out compatibility test under local conditions before using. The different admixtures should not be premixed but added separately to concrete.

**CHLORIDE CONTENT**

Nafores 801 L is practically chloride free so it does not pose any corrosion hazards to steel reinforcement.

**SAFETY AND HANDLING PRECAUTIONS**

Nafores 801 L is an alkaline solution. It may cause irritation to eyes and skin on direct and prolonged contact. Hands should be thoroughly washed with soap and water before meals and at the end of the working day.

**PACKING AND STORAGE**

Nafores 801 L is supplied mainly in bulk by road tankers with payload of 25,000 kgs approx. It is recommended to store Nafores 801 L at around 25°C in closed original packing protected from direct sun light. When stored under recommended conditions the shelf life would be not less than 6 months.

**TYPICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear brown liquid</td>
</tr>
<tr>
<td>Specific gravity @ 25°C</td>
<td>1.19 – 1.24</td>
</tr>
<tr>
<td>pH @ 25°C</td>
<td>7 – 9</td>
</tr>
<tr>
<td>Solids content (% by mass)</td>
<td>43 ± 1%</td>
</tr>
<tr>
<td>Dilution in water</td>
<td>In any ratio (dilutes rapidly in hard or soft water)</td>
</tr>
<tr>
<td>Sodium Sulfate content (% by mass)</td>
<td>3 – 4</td>
</tr>
<tr>
<td>Chlorides (ppm)</td>
<td>250 max</td>
</tr>
<tr>
<td>Miscibility with water</td>
<td>Miscible in all proportions.</td>
</tr>
<tr>
<td>Shelf Life @ 25°C</td>
<td>6 months min.</td>
</tr>
</tbody>
</table>

**EFFECTS OF NAFORES 801 L ADDITION ON CONCRETE**

Nafores 801 L possesses a powerful water reducing and dispersing ability whereby high strength concrete can be produced. The exact percentage of Nafores 801 L in each cement composition will depend on the ultimate application requirement and may have to be arrived at by actual trials. However, incorporation of Nafores 801 L is used to achieve the following concrete characteristics.
Nafores 801 P is a sodium salt of polynaphthalene sulphonate acid, which is used as a highly effective water soluble superplasticizer for concrete.

### TYPICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical classification</td>
<td>Sodium salt of polynaphthalene sulphonate acid</td>
</tr>
<tr>
<td>Appearance and form</td>
<td>Beige to brownish free flowing powder</td>
</tr>
<tr>
<td>Solid content</td>
<td>93 ± 1%</td>
</tr>
<tr>
<td>pH of 10% solution</td>
<td>7 – 9</td>
</tr>
<tr>
<td>Bulk density g/cc</td>
<td>0.7 ± 0.02</td>
</tr>
<tr>
<td>Ionic nature</td>
<td>Anionic</td>
</tr>
<tr>
<td>Solubility</td>
<td>Soluble in water in all proportions</td>
</tr>
</tbody>
</table>

Nafores 801 P possesses a powerful water reducing and dispersing ability whereby high strength, flowing and self-leveling concrete can be produced. Nafores 801 P improves flow properties of concrete by dispersing cement particles and preventing floc formation.

The exact dosage of Nafores 801 P in each mix design would depend upon the ultimate application requirement and may have to be arrived at by actual site trials. However, incorporation of Nafores 801 P is used to achieve the following concrete characteristics.

- Improved workability (by maintaining same water cement ratio).
- Higher early and ultimate compressive strength by lowering water cement ratio.
- Up to 30% water reduction can be achieved by using optimum dosage of 801 P.
- Flowing and self-leveling concrete.
- Strong plasticizing effect without any tendency to segregation.
- Very high strength.

### APPLICATION AREAS

- Ready mix concrete.
- Pre-cast and pre-stressed concrete.
- Areas of congested reinforcement.
- To reduce water for the sake of improved impermeability and durability.
- Marine concrete.
- Pumped concrete.
- Special concrete slabs.

### DOSAGE

Field trials should be conducted to determine optimum dose for particular application. Generally 0.2 to 1% of Nafores 801 P is used based on weight of cement.

### MIXING

It is preferable to add the reconstituted solution of Nafores 801 P at the end of mixing cycle.

### COMPATIBILITY WITH OTHER ADMIXTURES

Nafores 801 P can be used together with other concrete admixtures such as retarders, accelerators and air entrainers. It is compatible with most of the known brands but we recommend to carryout compatibility test under local conditions before using. Different admixtures should not be premixed but added separately to concrete.
Melfores 701 L is an aqueous Sulphonated Melamine based synthetic polymer, which in concrete displays powerful dispersion effect on both cement and pozzolanas. It forms a lubricating layer between the particles and thus lowers the internal friction between the concrete components to yield better consistency, easy flowability, greater workability, fast and higher ultimate strength.

**TYPICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Colourless to slightly yellow, transparent to slightly milky liquid.</td>
</tr>
<tr>
<td><strong>Specific gravity @ 25°C</strong></td>
<td>1.255 – 1.265</td>
</tr>
<tr>
<td><strong>pH @ 25°C</strong></td>
<td>8 – 10</td>
</tr>
<tr>
<td><strong>Viscosity @ 25°C CPS</strong></td>
<td>30 – 60</td>
</tr>
<tr>
<td><strong>Solids content</strong></td>
<td>43 ± 1 %</td>
</tr>
<tr>
<td><strong>Sulfate content (%)</strong></td>
<td>1.75 max.</td>
</tr>
<tr>
<td><strong>Chlorides (ppm)</strong></td>
<td>&lt; 100</td>
</tr>
<tr>
<td><strong>Miscibility with water</strong></td>
<td>Miscible in all proportions</td>
</tr>
<tr>
<td><strong>Shelf Life @ 25°C</strong></td>
<td>6 months min.</td>
</tr>
</tbody>
</table>

**EFFECTS OF MELFORES 701 L ADDITION ON CONCRETE**

The exact percentage of Melfores 701 L in each cement composition will depend on the ultimate application requirement and may have to be arrived at by actual trials. However, incorporation of Melfores 701 L in concrete compositions will result in:

- Strong concrete plasticizing without any tendency to segregation.
- Improvement of pumpability.
- Faster early and ultimate strength.
- Reduced time for pouring.
- Less vibration.
- Close - textured fair - faced surfaces.
- Good workability.

**APPLICATION AREAS**

- Ready mix concrete.
- Precast and pre-stressed concrete.
- Water resistant concrete.
- Under water concrete.
- Frost resistant concrete.
- Flowing concrete.
- Pumpable concrete.
- Fair faced concrete.
- Diaphragm wall concrete.
- Lightweight aggregate concrete.
- Foundation, slabs, floors, ceiling, walls, columns, girders, beams, industrial floors and floor toppings.

**DOSSAGE**

Recommended dosage of 1 - 3 % on weight of cement depending on the application requirement would result in reduction of water content in the composition up to 30%.

**COMPATIBILITY WITH OTHER ADMIXTURES**

Melfores 701 L can be used together with other concrete admixtures such as retarders, accelerators and air entrainers. It is compatible with most of the known brands, but we recommend to carry out compatibility test under local conditions before using. The different admixtures should not be premixed but added separately to concrete.

**CHLORIDE CONTENT**

Melfores 701 L is practically chloride free and so it does not pose any corrosion hazards to steel reinforcement.

**SAFETY AND HANDLING PRECAUTIONS**

Melfores 701 L is an alkaline solution. It may cause irritation to eyes and skin on direct and prolonged contact. Hands should be thoroughly washed with soap and water before meals and at the end of the working day.

**PACKING AND STORAGE**

Melfores 701 L is supplied in 1200 kg reconditioned IBC or bulk in stainless steel tank containers. It is recommended to store Melfores 701 L at around 25°C in closed original packing protected from direct sun light. When stored under recommended conditions the shelf life would be not less than 6 months.
Pentaerythritol

UN No.: -
IMDG Code (Page No.): -
IMCG Class: -
CAS No.: 115-77-5
Empirical Formulae: C10H22O4
Molecular Weight: 186.15

SPECIFICATION

Mono Pentaerythritol % wt: 98 min
Hydroxyl No. mg KDN/gm: 1625-1650
Moisture Content % wt: 0.1 max
Ash content as Na ppm: 15 max

APPLICATIONS: PE-98

- Alkyd Resins
- PVC Stabilizers
- Polymers
- Lubricants
- Epoxies
- Plastics
- Resin Esters
- Synthetic Drying Oil

PACKAGING

In 25 Kg valve type paper bag.
In 250/500/1000 Kgs Polypropylene jumbo bags with antistatic provision.

SPECIAL PENTA ORGANICS SPO

We also manufacture a product named as Special Penta Organics (SPO) - a mixture of Pentaerythritol and other allied organics in liquid form.

APPLICATIONS: SPO

SPO finds its application in the manufacture of cost economic Alkyd resins and Resin esters.

PACKAGING

In 30 liters barrels / 220 liters HDPE barrels.
Sodium Formate a by product of Pentaerythritol process, is also manufactured in the same complex.
### Sodium Formate

- **Molecular Formulae**: HCONa
- **CAS No.**: 141-53-7
- **EINECS No**: 225-488-0
- **Molecular Weight**: 68.01

### SPECIFICATION

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purity</td>
<td>97% (min)</td>
</tr>
<tr>
<td>Moisture content</td>
<td>0.5 % (max)</td>
</tr>
<tr>
<td>Organic Impurities</td>
<td>3% (max)</td>
</tr>
<tr>
<td>Iron content</td>
<td>5.0 ppm</td>
</tr>
</tbody>
</table>

### PHYSICAL DATA

- **Appearance**: White Crystals
- **Melting Point**: 253°C
- **Relative Density, 20°C**: 1.92
- **Solubility in water, g/100ml at 20°C**: 50
- **Bulk density Kg/m³ at 20°C**: 1200-1400
- **Relative Molecular Mass**: 68.01

### APPLICATIONS: SF - 97

- In Dyeing Industries
- In leather tanning process
- In Electro plating process
- In Formic Acid manufacturing
- In Paper industries as Anti Oxidant

### PACKAGING

- In 25 Kgs Polypropylene bags.
- In 500 / 1000 Kgs Polypropylene Jumbo Bags.
CHEMANOL’s Policy is evolved around manufacturing and supplying premier grade Methanol Derivative Products for industrial and commercial applications.

CHEMANOL, since inception, is engaged in developing an integrated Petrochemical Complex that would use the locally available raw materials and transform them into specialty chemicals.

CHEMANOL’s prime objectives are focused at value addition, employment generation, development of local workforce, and providing feedstock to the local downstream industries.

CHEMANOL is striving at widening its customer base through exportation of standard and tailor made products conforming to the highest regulatory and International Standards.

CHEMANOL’s emphasis has always been on continual improvement in its efficiencies, quality, cost effectiveness, customer services aiming to maximize the value of shareholder’s investments.