

**Table 4.1.3 A: Formaldehyde Uses in the US**

Major Use Category	Product Category	Uses/Applications
<b>Resins</b>	Urea-formaldehyde resin  (23% of US consumption of 37% formaldehyde)	Wood Adhesive (particleboard, medium-density fiberboard, hardwood plywood and waferboard: Internal, non-structural applications)
		Glass fiber roofing mats
		Molding compounds: Ball milling
		Molding compounds: electrical switches, circuit breakers and other
		Cross-linking agent for surface coating including flame retardants
		Other: Low-pressure laminates, wet strength additives and coatings for paper products, textile treating, cross-linking agents for surface coating
	Phenol-Formaldehyde resin (17%)	Wood adhesives (plywood, oriented strand board (OSB), hardboard, molded wood, particleboard); Structural applications; wet strength
		Insulation (phenolic foam insulation, binders for insulation)
		Decorative and Industrial (circuit board and personal computers) laminates
		Foundry mold binders
		Molding compounds
		Other: clutch facings, disk brake pads, automatic transmission components and brake linings, protective coatings (food containers), rubber processing additives, and abrasives for metal finishings
	Polyacetal resin (13%)	High performance plastic parts for automobiles, industrial machinery, plumbing, appliances, tools, and consumer goods such as ski bindings, knife handles
	Melamine-formaldehyde resin  (3%)	Adhesive in decorative laminates, OSB, plywood, mdf, particleboard
		Thermoset surface coatings
Molding compounds such as dinnerware (medical products, household fixtures), tire cord and ceiling tiles		
Paper and textile treating (wallpaper, wrinkle resistant clothing)		
Coating resins (7%)	Pentaerythritol (5%) is used to make alkyd resins in solvent-based paints and finishes; Trimethylolpropane and trimethylolethane impart UV and chemical resistance to coating resins; Polyhydric Alcohols (Polyols) are alkyd resins for use in automobile paint, house paints, artists' oil paints and synthetic lubricant markets	
<b>Disinfectant/ Sterilant/ Preservative</b>	Paraformaldehyde	EPA registered disinfectant, "Steri-dri" sanitizer and fungicide for barber and beauty and for households, ships, bedding, clothing, nonfood/non/feed transporting trucks

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	Formalin	Microbiologically active against bacteria, fungi, bacterial spores, many viruses: 8% solution with isopropanol: bacteriacidal, tuberculocidal and sporicidal 6-8% solution: sterilant 1-8%: low to high level disinfectant
		Embalming fluid
		Tissue fixation/Pathology
		Antimicrobial used in cosmetics, metal working fluids, latex paint and low VOC paint; secondary oil recovery
Derivative Chemicals	1,4-Butanediol (10%)	Used to make tetrahydrofuran (THF); urethane elastomers (spandex); gamma-butyrolactone which is used to make n-methyl pyrrolidone
	Methylene diisocyanate (MDI) (9%)	Rigid and flexible urethane foams (foam boards, furniture and bedding foam);
		Wood adhesive/binders in OSB and as a formaldehyde substitute in particleboard
		Eastomers (automotive bumpers, door panels; flexible tubing and cable jacketing; gaskets)
	Hexmethylenetetramine (3%)	Thermosetting catalyst for Novolac/phenolic resins (principal use) Manufacture of RDX explosive (cyclonite) Rubber vulcanization accelerators Unisolated intermediate in the manufacture of nitrilotriacetic acid
	Aminopolycarboxylic acids (EDTA and NTA), salts (3%)	Chelating agents in industrial and household cleaners and wastewater treatment
		EDTA is also a penetration enhancer in many cosmetic products
	Fertilizers	Controlled-release urea-formaldehyde concentrates for lawn chemicals
	Herbicides (2%)	Paraquat is made from pyridine chemicals
Textile chemicals	Wrinkle resistance (UF, MF, glyoxal-UF resins); fire retardants	