

Corrosion Resistant Alloy Fasteners for Applications in Pulp & Paper Plants

In modern fastening technology, the objective is to reduce friction between the nut and the bolt, or the mating parts. The ideal fastening condition is obtained when the nut is driven on to the bolt or the bolt into the mating part, without friction and up to the bolt's elastic limit. It is not necessary for the bolt shank to fit dead tight into the clearance hole if proper tension is placed on the fastener, since the fastener should rely on tension, rather than its fit, for holding power.

Some general rules for fastening techniques are:

- Use a large number of fasteners of small diameter, rather than fewer large diameter fasteners.
- Use fasteners with as near frictionless threads as possible. Fasteners threads must be clean of dirt. Machine screws, bolts and nuts should be adequately lubricated.
- Use a definite torque in driving the fastener to a certain percentage of the fastener elastic limit.

The pulp and paper industry experiences severe corrosion problems because of the nature of its operations. Acme Alloys provides its customers and process plants, not only consulting services to combat corrosion problems but also manufactures custom made parts/components in different corrosion resistant alloys to meet demanding application needs of pulp and paper industry. Few areas of applications in pulp and paper industry are discussed in this technical paper. For your specific corrosion problems, please do not hesitate to contact us.

For your fastener and fittings requirements in corrosion- resistant alloys
Get in touch with us !

We will make fasteners confirming to your specification, size and standard.

Call, write, fax or e-mail us for engineered casting solutions.

Barking

Hydraulic barking focuses high-pressure jet streams of water on the logs, encouraging steady corrosion of all components. Mechanical barking places high stress on critical areas and involves continuous maintenance and replacement. 18 Chromium-8 Nickel stainless steel i.e. type 304 or type 316 is recommended.

Mechanical Pulping

Logs are ground against a revolving abrasive stone. Type 304 (18Cr-8Ni) fasteners are recommended.

Sulphite Pulping

The entire sulphite processes is highly corrosive. Recommended stainless steel fastenings are of types 316, 317, 309 and Hastelloy-C. These alloys are especially valuable for target plates in the blow pit and for all the digester fittings. For magnesia-based pulping, type 316 and Hastelloy-C is recommended.

Semi-Chemical Pulping

The neutral sulphite, semi-chemical pulping employs a dilute acid solution in which type 309 fasteners offer superior performance. Type 316 is recommended.

Alkaline Pulping

Soda pulping and Kraft or Sulphate pulping is an alkaline process. Fasteners associated with the digester dump valve and digester body should be of type 316 or 18-8 stainless steel (type 304).

Digesters, Diffusers, Vacuum Washers, Bleach Liquor Evaporators, and Pulp Screens

The same type of stainless steel fastener recommended for the digester, 18-8 stainless steel (type 304) or type 316, should also be used for the blow tanks, diffusers, brown stock washers, knoter screens, and fire screens. Nearly fasteners, such as motor mountings, are also subject to corrosion, if not made of stainless steel.

Pulp Bleaching

When sodium chlorite or sodium peroxide is used in the bleaching process, type 316 fasteners should be specified. Type 316 and type 317 are suggested when hydrogen peroxide, zinc hydrosulphite, and calcium hypo chlorite are used in the bleaching process.

Stock Preparation

Types 316 and 18-8 stainless steel has proven to be superior fastener alloys. Stock chest fittings, agitators, beater bars, and pipe connections should also be fastened with these alloys.

Fourdrinier and Cylinder Paper Machines

Type 304, 316, 317 stainless steels and Nickel-base alloy called Monel are now used extensively for shower pipes, mid-feathers, slices, aprons, head box linings, saveall trays, and doctor blades. Fasteners of similar metal/alloys should be used, for all these applications.

Example of Wrought Alloys Used in Pulp & Paper Industry

AISI & Proprietary Grades

304, 304L, 309, 310, 316, 316 L, 317, 317 L, 321, 329, 347, 409, 410, 420, 430, 440, 904 L, 20Cb-3, E-brite, Monel, Nitronic-50, Alloy-20, Monit, Sea Cure, 254SMO, Duplex alloy 2205, Ferralium 255, Hastelloy-C, Hastelloy-C 276, Hastelloy-G, Incoloy 825, Inconel 625

Example of Cast Alloys used in Pulp & Paper Industry

ASTM /ACI Grades:

CA-15, CA-40, CB-30, CB-7Cu, CC-50, CE-30, CF-3, CF-3M, CF-8, CF-8M, CG-6MMN, CG-8M, CH-20, CK-20, CN-7M, CW-12M, CY-40, M-35, CZ-200

Note: There is a slight difference between wrought (rolled type) alloys and cast alloys in terms of composition, characteristics, behaviour, performance and service life. *Cast alloy chemical composition ranges are NOT the same as the wrought alloy composition ranges. For convenience, buyers often use wrought alloy designations for castings and frequently use them while specifying materials for castings.* Most of the wrought alloy compositions have EQUIVALENT and CORRESPONDING cast alloy composition, designations; used in alloy standards of different countries. Therefore, one must specify the desired alloy composition by casting type designation when ordering cast components. Use of *Alloy Casting Institute (ACI)* or *American Society for Testing Materials (ASTM)* standards & specifications; have been developed, as a consensus of consumers, producers and disinterested experts is often the most effective way to ensure understanding of the requirements.