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## **ZIRCONIUM ALLOYS**

**Zirconium alloys have 95.5% to 99.2% Zirconium with a maximum Hafnium content of 4.5%. These alloys feature excellent resistance to corrosion. Zr702 is commercially pure Zirconium and Zr705 is alloyed Zirconium with Niobium to increase tensile and yield strength.**

**The main features of Zirconium tubes are:**

- 1.High heat transfer efficiency**
- 2.Very low thermal expansion**
- 3.High resistance to erosion under tension**
- 4.High resistance to localized corrosion (pitting and crevice)**
- 5.Very good resistance in most organic acids**
- 6.Exceptional corrosion resistance in mineral acids**
- 7.Good corrosion resistance in strongly alkaline mediums**
- 8.Low thermal neutron absorption**

# Applications of Zirconium Tubes

## Nuclear Applications

The best use of Zirconium alloys tubes is for structural material for nuclear reactors due to the low thermal neutron absorption. Because zirconium has a lower absorption of neutrons than most metals it is the material of choice to improve reactor efficiency. However, in this application the low hafnium grade should be used for reactors. The alloys most used are: Zr-702 and Zr-704, having excellent corrosion resistance to high steam temperatures and good yield stress.

## Chemical Processes

Used for structural material in the chemical processing industry including excellent corrosion resistance in most organic and inorganic acids, chloride solutions and alkaline mediums. In certain applications it can extend its life beyond the rest of the plant's life. Therefore, maintenance costs are low, and downtime is minimized. It is non-toxic and biocompatible. Used in heat exchangers, evaporators, tanks, packaging, reactors, pumps, valves and pipe.

## Heat exchangers, coolers and condensers

Zirconium and zirconium alloy tube are increasingly used due to its cost effectiveness over other materials thanks to its longer life, low maintenance and downtime, and improved process efficiency. Due to its excellent heat transfer properties and durability Zirconium is replacing many graphite heat exchangers. Since zirconium alloys have an inherent corrosion resistance due to its inert oxide layer it can be used to great advantage in condensers.

## Piping

Used in urea, acetic acid, formic, nitric, and methyl methacrylate production systems.

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