

HOT WORK CREEP RESISTANCE STEELS:

This group includes the types of structural steel used to fabricate parts affected by creep caused by the combined action of temperature – stress – time, intended for use in heating systems such as thermo-electrical power stations, oil refineries etc, and in any case for parts that do not operate in corrosive and/or oxidizing environment. The steels of this group can be supplied in normalized, annealed, machinable annealed, hardened, tempered conditions. To avoid fast downgrading of mechanical properties in service, the tempering temperature must, in any case, be at least 50 °C higher than the maximum service temperature. The medium hardenability and high toughness A193-B7 type is recommended for hot work up to 500-525 °C especially for “bolts and nuts and tie-rods” intended for power plants and oil refineries. The A193-B16 Cr-Mo-V type is used for hot work bolts with high creep strength properties. The A182-F11 type is suitable for the parts of pressurized steam systems, steam ducts up to temperatures of 525 °C and 550 °C respectively; the A182-F22 type has good creep strength up to a temperature of 600 °C and is suitable for the construction of pipes, joints, fittings and various forged parts of pressurized steam systems; also, its relatively good corrosion strength means that it is increasingly widely used in the petrochemical industry. The A182-F5 and A182-F9 steels are characterized by good strength up to a temperature of 600 °C for the first and 650 °C for the second, resistance to corrosion and intergranular corrosion caused by hydrocarbons and hydrogen. They are also characterized by a good creep strength. They are used in the oil industry for the fabrication of bolts, fittings, flanges, etc. The tables indicate the mechanical properties at room temperature and, for the various temperature levels, the approximate average values of the hot creep properties specified below:

ó 1 = unit load that produces a permanent deformation of 1% after 10,000 and 100,000 hours respectively.

ó r = unit load that produces breakage after 10,000 and 100,000 hours respectively.