

## **ANNEALING**

The heating and cooling of steel to remove stresses, alter physical, mechanical and metallurgical properties, increase corrosion resistance, or to thermally treat steel prior to age hardening.

## **BRIGHT ANNEALING**

Annealing carried out in a controlled, furnace atmosphere so that surface oxidation is reduced to a minimum and the surface remains relatively bright.

## **AS-WELDED**

Tubular products not subject to thermal treatment after welding.

## **BUTT WELDING**

Joining two edges or ends by placing one against the other and welding them.

## **COLD DRAWN**

Refers to tubing drawn in the cold state through a hardened steel or carbonyl die, either with or without a mandrel on the inside. The purpose of cold drawing is to reduce the O.D. or wall, or both, to produce smooth surface finishes, obtain closer tolerances and to promote weld area recrystallization during subsequent annealing.

## **CONCENTRICITY**

The center of the inside diameter (of a tubular product) is consistent with the center of the outside diameter.

## **FULL-FINISHED**

Refers to tubular products in which the weld has been processed to produce uniform strength and dimensions, and subsequently annealed to obtain proper corrosion resistance.

## **FUSION WELDING**

A term which refers to the union of metals by fusion, using acetylene blow-pipe, electric current or the thermit reaction.

## **PASSIVATING**

Exposure of stainless steel to a dilute solution of nitric or other oxidizing acid to remove free iron from the surfaces and improve corrosion resistance.

## **PICKLE**

Chemical or electrochemical removal of surface oxides.

## **PIPE SPECIFICATIONS**

### **A-312, SA-312**

These specifications cover both welded and seamless pipe. The SA-312 is to the ASME (boiler) Code and A-312 is to ASTM specifications. All of the welded material for these specifications (up through 6 inch) is full finished, annealed and pickled, and has no filler metal added. The specification for 8, 10, and 12 inch pipe would be A-312 as welded, annealed and pickled. Both SA-312 and A-312 specifications required annealing at 1900°F, minimum.

### **A 376**

This is a seamless only specification.

### **A 358-CLASS II**

This specification designates that the material is intended for high temperature service, must be double welded but need not be x-rayed. Class I material designation requires that the welds must be x-rayed for soundness of weld. This specification is not normally called out for material below 8 inch. This also requires that filler material be added, a direct contradiction to the A-312 specification.

## **QUENCHING**

A process of rapid cooling from an elevated temperature by contact with liquids, gases, or solids

## **RESISTANCE WELDING**

A welding process in which the work pieces are heated by passage of an electric current through the contact.

## **STRESS RELIEVING**

A process of reducing residual stresses in a metal object by heating the object to a suitable temperature and holding for a sufficient time. This treatment may be applied to relieve stresses induced by casting, quenching, normalizing, machining, cold working or welding.

## **TUBING SPECIFICATIONS**

### **A-269**

This is a catch-all specification which covers both welded and seamless tubing. It requires only an average wall tolerance (10% variance), basic chemical properties and does not require any cold working in the weld area or any cold drawing.

### **A-249**

This is a minimum wall welded condenser tube specification meant for use in condenser, feed water tubes and evaporators. This wall size nominal gauge is the minimum allowable. Cold work in the weld area and/or cold drawing of some sort is required to meet the minimum wall requirements.

### **A-213**

This is a seamless minimum wall condenser tube specification.

## **WELD BEAD**

The buildup portion of a fusion weld, formed either from the filler metal or from the melting of the parent metal.