



HAH

HAH ELECTRIC-RESISTANCE
WELDED (ERW) STEEL PIPES

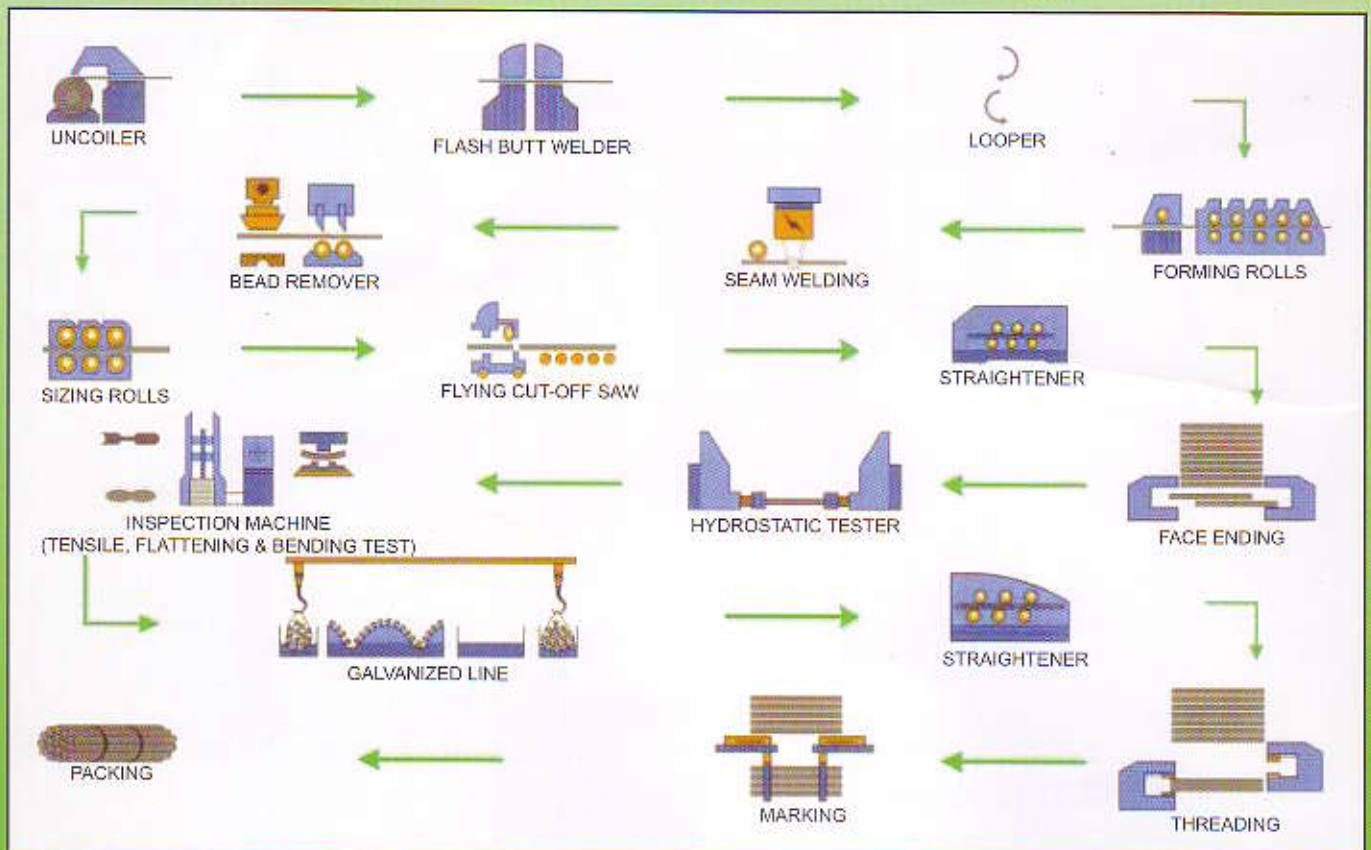
HAH Electric-Resistance Welded (ERW) Steel Pipes

HAH steel pipes are manufactured in compliance to international standards. Using advance machinery, equipments and testing facilities under the strict supervision of dedicated engineers, ensuring pipes produced has uniform strength throughout its length without any distortion. Strict adherence to standards and quality control ensure that the products are of superb quality and consistency.

A typical manufacturing process starts with the slitting of steel coils lengthwise in the pre-determined size. It will then be guided through forming machines to form round or square, conduit tubes/ pipes, welded to make various sizes of pipes and cut into desired lengths, usually 6 metres long. The ends of the pipes are then faced to remove the burs. The pipes will be tested at random in accordance with the specified international standard procedures.

At this stage, the finished pipes are called "Black Pipes". If galvanization is needed, the black pipes will have to go through the pickling process to clean before being forwarded to galvanizing plants to be coated with zinc. The end of the galvanized pipes may be threaded, marked, socketed one end and equipped with plastic caps on the other end. Galvanized pipes that are not threaded are called "Plain Ends" pipes. The finished products will later be packed in bare bundles and deliver to customers.

Manufacturing Process



Chemical Composition

The chemical composition of the steel, by ladle analysis, shall be as below:

C max.	Mn max.	P max.	S max.
0.20%	1.20%	0.045%	0.045%

Mechanical Properties

The mechanical properties at room temperature shall be as below:

Tensile Strength (N/mm ²)	:	320 to 460
Yield Strength (N/mm ²)	:	195 min.
Elongation on gauge length $L_0 = 5.65 \sqrt{S_0}$ (%)	:	20 min.

Tolerances on Dimensions & Mass

Outside Diameter (OD) : As shown in Tables on page 4.

Wall thickness (t) : Light tubes -8%
Medium and Heavy tubes -10%

Mass : Mean consignment mass for quantities of 150m and over of one size shall not deviate by more than $\pm 4\%$ from the mass consignment calculated from the respective mass given in Tables. No single tube shall deviate more than + 10%, - 8% from the respective mass given in Table (Page 4) as appropriate.

Hot-Dip Zinc Coating Test (if required)

After 4 successive one-minute immersions in the copper-sulphate solution, test samples shall not show any adherent red deposits of metallic copper.

Bend Test

Black tubes \leq DN50 shall be bent cold w/o showing any signs of fracture or failure, through 180°C, round a former having a radius at the bottom of the groove equal to **6X** the OD of the tube as given in Tables. Hot-dip-zinc coated tubes shall be bent cold w/o cracking of the steel, through 90°, round a former having a radius at the bottom of the groove equal to **8X** the OD.

Flattening Test > DN 50mm

A ring not less than 40mm in length taken from one end of each selected tube shall be flattened cold between parallel flat platens w/o showing either crack or flaw until the distance between the platens, measured under load, is $\leq 75\%$ of original OD of the tube and no cracks or flaws in the metal elsewhere than in the weld shall occur until the distance between the platens is < 60% of original OD. The weld shall be placed at 90° to the direction of flattening.

Leak Tightness Test

The test shall be either a hydraulic test at a pressure of 50 bar ($50 \times 10^5 \text{N/M}^2$), or alternatively, an eddy current test.

Bore Test for Hot-Dip Coated Tubes

Hot-dip zinc coated tubes \leq DN25 shall allow a specified diameter of rod 230mm in length passing through and shall have a free bore.

Nominal Pipe Size (DN)	Diameter of rod (mm)
15.00	9.50
20.00	14.30
25.00	20.60