

Manufacture of WELDED WIRE FABRIC:

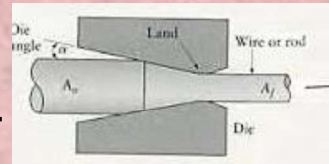
PROCESS

2) RAW MATERIALS PROCUREMENT & WIRE PRODUCTION-

Depending upon Design the reinforcement wires/bars may be a) Cold Drawn Plain Wires (IS:432-II) or b) Cold Rolled Ribbed / Deformed Wires or c) Hot Rolled TMT Bars.

While a few modern installations can process (c) i.e TMT bars, Almost all of Indian WWR manufacture happens with (a) or (b) . These require initial Raw Material MS Wire Rods of SAE-1008/1010/1015 or 1018 grades (with %C between 0.8 to 0.18%) . Prime Quality Wire Rods are sourced in India from M/s Tata Steels ; M/s RINL –Vishakapatnam Steel Plant ; M/s JSW ; M/s SAIL ; with initial diameters in range of 6.50mm to 14mm dia and received along with MTC of Physical & Chemical properties. After Mechanical De-scaling, Cold-working of Approx 30-45% Cross-sectional Area reduction is imparted over multiple passes via either

Cold Drawing Plain Round (Pulling through Tungsten Carbide Round Dies)



or

Cold Rolling Ribbed / Deformed (Pulling through Triplex sets of Tungsten Carbide Rolls)



to increase the Yield Strength from approx . 360 Mpa to about 540 MPa.

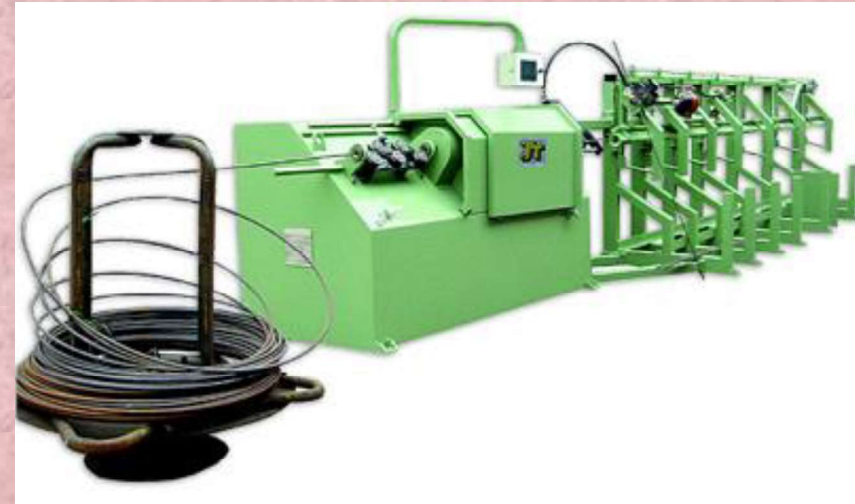
Tensile Tests on finished wire are performed in-house or from attached 3rd Party Labs to check UTS, 0.2% Proof Strength & Elongation at regular intervals of generally 1 sample/10MT.

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3) WIRE STRAIGHTENING & CUTTING :

Either both Long Wires & Cross Wires or only Cross Wires (with Long wires upto 8mm dia pulled off Continuous Coils) are Straightened & Cut to Exact lengths +/- 2mm as per Final Mesh Sheet Length & Width and for quantities as required for each production batch. Straightening & Cutting machine line generally employ combination of 5 or 7 Roll straightening along with Rotary Arbor (Spinner) to achieve very good straightness (within 5mm offset in 3000mm) suitable for further process during Multi-spot welding transport. There is no change in Physical / Chemical properties of the Wire in this operation.



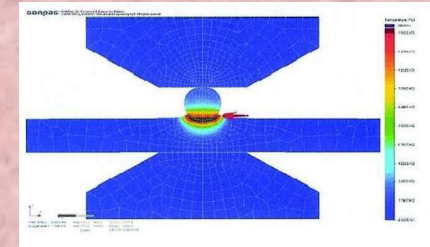
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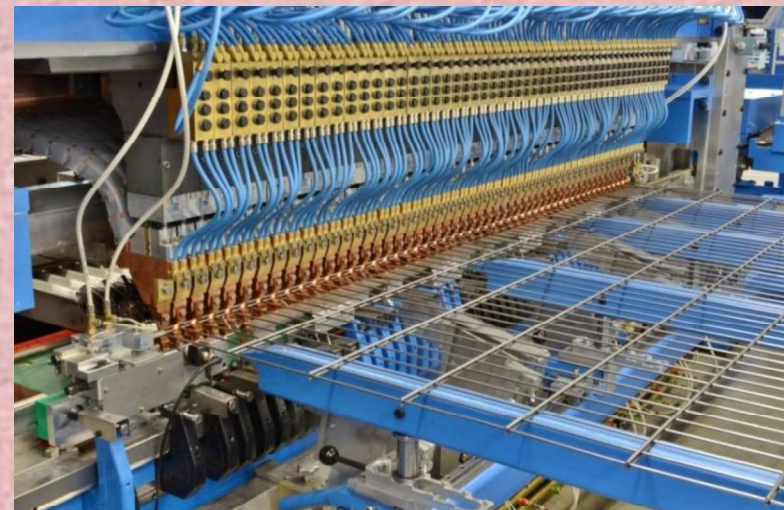
4) MULTI-SPOT WELDING & PITCH CONTROL :

The Main Operation of Mesh Welding happens on a Multi-Spot Welding Line comprising of the Long & Cross Wire Pitch Control & Transport Mechanisms and the Multiple Resistance Welding Guns .

Spot Welding is fusing (no foreign filler metal) of the Cross Wire into the Long Wire between Copper Electrodes by Passing Heavy Current at Low Voltage (Approx. 11000 Amps for 12 to 12mm dia Welding at about 6- 10 Volts) under Heavy Force (Approx. 8kN for 12-12dia) for a short duration (Approx 20 cycles or 0.4 sec for 12-12 dia) . Most Indian Manufacturers use Transformers at Mains Frequency (50Hz) with timing & Phase Angle Current control by Synchronous Thyristor (Fast acting Semi-conductor switches) Controllers .



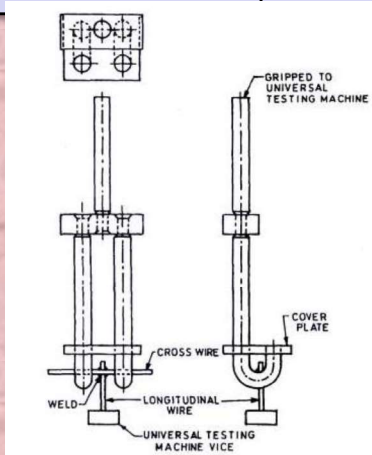
Pitch Control of Long Wires is generally set fixed for one batch and needs resetting for each batch of Long Wire pitch sets. Some New Installations have Robotic type Moving Electrode guns controlled by PLC for quick change over of Long Wire Pitch sets. Pitch Control of Cross Wires is by a Setting Adjustable Mechanical Cam Motion or By Online Variable Stepper/Servo Motor driven Motion.



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PROCESS - 5) SPECIFICATIONS & GENERAL QUALITY CONTROL :

Specification No:	Country	Specification Title	Parameter	Value
IS:1566 & IS:432(Pt.II)	Indian	Hard-drawn Steel Wire Fabric for Concrete Reinforcement & Hard-drawn steel wire for concrete reinforcement: Part 2	UTS	570 Mpa Min.
			Yield – 0.2% Proof Strength	480 Mpa Min.
			Elongation on 8 Times Dia GL	7.5% Min.
			Weld Shear Strength	Min 25% of UTS
BS:4483 & BS:4482	British	Steel fabric for the reinforcement of concrete & Steel wire for the reinforcement of concrete products	UTS	1.05 times Yield Strength
			Yield – 0.2% Proof Strength	500 Mpa
			Total Elongation at Peak force on 5D GL	2.5%
			Weld Shear Strength	Min. 25% of Yield Strength of Thicker Dia
ASTM A185 & A82	USA	Steel Welded Wire Fabric Plain For Reinforcement & Steel Wire, Plain, for Concrete Reinforcement - Grade 60 & Grade 80 (80000 Psi)	UTS Grade 80 / Grade 60	620 MPa Min / 515 Mpa
			Yield – 0.35% Proof Strength	550Mpa Min / 450 Mpa
			Reduction in Area (after Failure)	30% Min
			Weld Shear Strength	241 Mpa in Thicker Dia



Weld Shear Test

QC / Testing Protocol (Tested In-house / External Approved Lab) :

a) Chemical Properties : % C/P/S/Mn/Si – As per Raw Material Supplier's TC & Confirmed every 50MT/ Purchase Batch lot.

b) Physical Properties :

1) UTS, Yield ,% Elongation , Re-bend Test– Tested every 10MT / Manufacture Batch lot upon Wire Production

2) UTS, Yield ,% Elongation – Tested every 6000 sqm/ 10MT / Mesh Welding Batch lot.

c) Weld Shear Test : Every 6000 sqm / 10 MT / Mesh Welding Batch.