



WORK ROLLS – FOR OPTIMUM LIFE

Cold Rolling Mill Rolls are used for cold rolling, ferrous and non-ferrous metals in Cold Rolling Mills. They have hardened roll body and their sensitivity to temperature and over heating is extremely high. They should be used carefully. First of all rolls should be cleaned, by removing all dust and rust preventive. Then hardness of the roll should be checked along & across the roll which should be within 2 HRC (max.) in a single roll. Between a pair, hardness difference should be within 1 HRC.

While rolling, microcracks appear on the roll surface which are mostly due to work hardening or due to faults which occur because of slipping of the strip which is being rolled, doubling up or folds in the strip or due to electric faults causing sudden stoppage of mill. All such defects may lead to sudden local overheating of the hardened surface of the roll body which results into spalling in due course of time. Sufficient quantity of coolant should be used to avoid over heating of Work Rolls.

While regrinding rolls, sufficient material should be removed to clear work hardened



layer and minor cracks from the surface. Then roll should be tested with Die penetration test / ultrasonic test / 3% solution of nitric acid in alcohol, called as "Nital".

The surface of the roll should be thoroughly cleaned with alcohol. Clean and dry surface should be subjected to 3% solution of nitric acid into alcohol. Within seconds areas of overheating can be seen clearly as dark spots appear. Such rolls should be again reground before use to remove over heated area.

Stress relieving is recommended after 2/3 regrindings. Rolls should be kept at 140° C for 4 hours. After stress relieving hardness should return to original limits.

Once Roll is taken out of Mill, its hot, it should be naturally cooled before regrinding and similarly roll gets hot while regrinding - should be cooled for nearly 12 hours before putting in service again.

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Dee Tee stands for total quality movement



Coolant plays very important role in life of roll. Sufficient soluble oil should be used. A thumb rule says soluble oil @ 4 litres / H.P. of mill should be used.

It is advisable to run the mill without load for 15 minutes while new rolls are put in the mill to heat up the rolls to avoid sudden thermal shocks. Initial reduction on mill should not be more than 25%.

While using a pair of Work Rolls, difference in diameters should not be more than twenty microns for 4 Hi Mill rolls.

Barrel run out of a roll w.r.t. bearing seat after choke assembly should be within 15 microns when checked in guide. Check the run out after cleaning centres.

MANUFACTURING NORMS FOR 4-HI MILL ROLLS

1. Barrel diameter matching of pair of Work Rolls is important and it should be within 20 microns.
2. Barrel should be within ± 0.5 mm on O.D. but both the barrel diameters should be matched within 20 microns.
3. Length tolerance of the rolls should be as per IS-2102 medium grade.

315 to 1000 mm	± 1 mm
1000 to 2000 mm	± 1.5 mm
above 2000 mm	± 2.5 mm
4. Straightness of leveller rolls should be within 0.1 mm/ 1000 mm of length.

HARDNESS

In case of barrel, maximum variation within a single roll should not be more than 2 HRC. In case of Journal, hardness is not uniform throughout because of journal softening in salt bath. Due to temperature gradient, hardness towards barrel is slightly more.

In case of Leveller Rolls, though straightness has to be accurate. It should be within 0.1mm/1000 mm.

For manufacturing good quality rolls, raw material is checked for Ultrasonic defects, Chemical composition, Micro & Macro. Raw material checked visually also for forging defects on surface. Finally rolls are checked by following three methods before despatch.

1. Magnetic particle testing.
2. Ultrasonic testing.
3. Die penetrant test.

From O.D. sufficient forging layer is removed for removing forging defects. Minimum 5% material should be removed from O.D.

