



# **TECHNICAL SPECIFICATION**

## **HRC FOR RE-ROLLING**

### **NON-AUTOMOTIVE**

## 1. HR PRODUCT

Hot Rolled Coil, not pickled, not oiled with as rolled hot mill edge in thicknesses 1.80 – 3.0mm and width 800 – 1540mm

## 2. DSP END USE

Cold full hard (CFH), cold rolled annealed and temper (CFIN) and hot dipped galvanized (HDG)

## 3. DSP PROCESSES

Start with hydrochloric pickling of the HRC followed by cold reduction (up to 85%) through a single stand reversing mill after which the CFH is utilized for...

- Batch annealing then tempering to produce cold rolled annealed and tempered (CFIN)
- Continuous Hot dip galvanizing (HDG)

## 4. SPECIFICATION

**SAE1006** - Aluminium Killed, Continuous Casting with following **MAXIMUM** chemistry (%) is required

C	Mn	P	S	Si	Al	N	V
0.06	0.45	0.02	0.03	0.03	0.02 - 0.08	0.006	0.008
Nb	Ti	B	Cu	Ni	Mo	Sn	
0.005	0.005	0.005	0.05	0.04	0.02	0.02	

Ratios: Cu+Ni+Cr+Mo – 0.12% max

Al/ N – 4.0 max

IIW standard CE= C+ Mn/6 +(Cr+Mo+V)/5+(Cu+Ni)/15

Typical expected mechanical value

	HRB	0.2% YIELD (Ra) MPa	TENSILE (Rn) MPa	ELONG (EI) %
Typical	50	280	360	32 min
Max / Min	70 max	350 max	420 max	22 min

## 5. OTHER HRC SPECIFICATIONS UTILIZED

STEEL GRADES	FINAL QUALITY
SAE1006 / 1008	DX51 / SPCC / SPCH
EN 10025 S275JR	S280GD
EN 10025 S355JR	S350GD / S450GD (reduction)
EN10149 S420MC / S460MC	S450GD pic-galv
EN 10111 DD13	DX52

## 6. HR SLAB REQUIREMENTS

The supplier must exclude from the rolling process the “slabs of events”, such as heads (first slab), tails (last slab), tundish change, submerged shroud exchange slabs, casting without submerged or ladle shroud, cleaning of submerged shroud, slabs from low level of steel in the tundish, mould turbulence, casting with submerged shroud cracked, casting without argon sealing on the ladle or on the submerged shroud and

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casting without automatic level control in the mould, and also slabs split in the width (longitudinally cut by torch).

## 7. INTERNAL STRUCTURE OF THE HRC

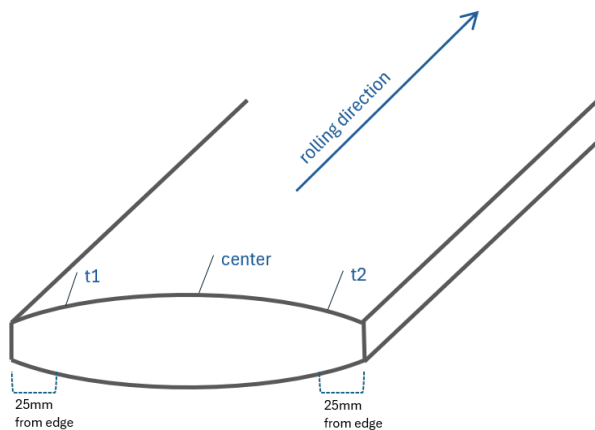
Grain size: ASTM E112 N<sup>07</sup> or finer - equiaxial

## 8. DIMENSIONAL AND WEIGHT TOLERANCES

- Thickness tolerance: 75% of the EN10051 (table 2) latest edition or 75% of ASTM 568 (table A1.1) latest edition. The tolerance is to be spread equally below and above the nominal HRC order gauge.
- Width Tolerance: -0 / +15mm (coils with negative tolerance is not to be shipped)
- Inside Diameter (ID): 810 (+/-30mm) or 760 mm (+/-30mm). Shipment of alternative ID's subjected to DSP written consent.
- Coil size: Outer diameter (OD) maximum 1960 **OR** maximum coils mass 28 metric ton. Coils exceeding maximum 1960 OD **OR** maximum 28 metric ton must be cut back prior shipment.
- Flatness: Excluding the first and last 15m of an individual coil, out of flatness cannot exceed 40mm. If specifically requested in the order, a restricted flatness tolerance – 25mm max - can be agreed. The material with higher values of out-of-flat will be evaluated on case-by-case basis to verify the impact of such defect on and final use, for such cases the subsequent processing must be guaranteed.

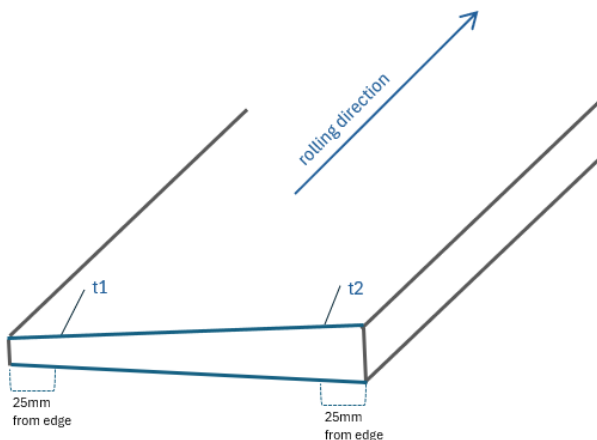
## 9. STRIP PROFILE

- Crown Tolerance: (30 to 90 µm) aim 60 µm maximum measured 25 mm from mill edge



$$\text{Crown: centre} - (t1 + t2) / 2.0$$

- Wedge tolerance: (50 µm maximum) aim 20 µm maximum measured 25mm from mill edge

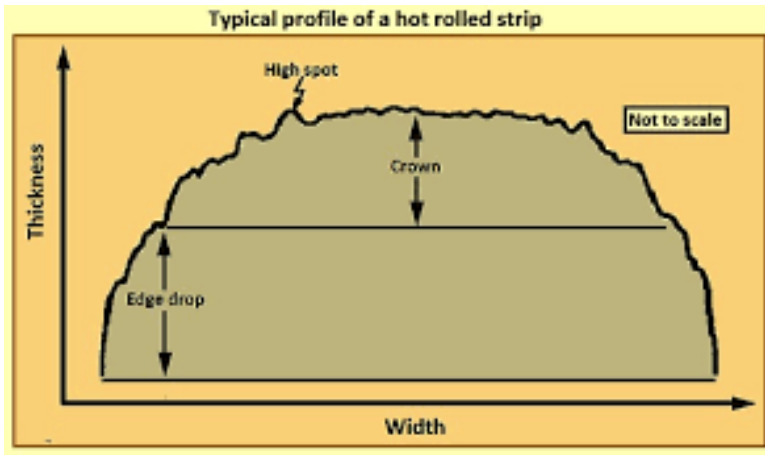


$$\text{Wedge} = t1 - t2$$

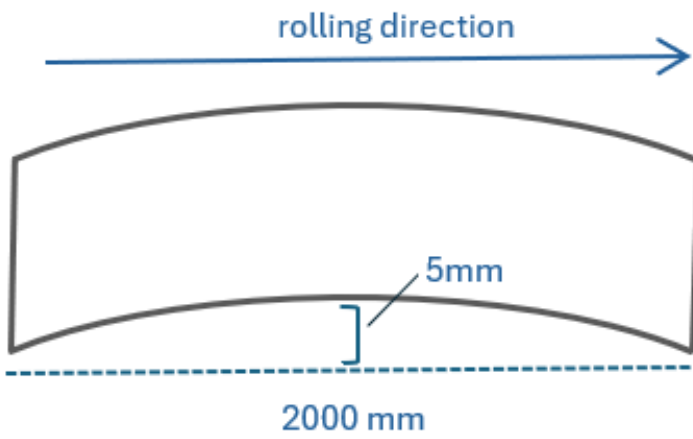
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c. Peak (High-Spot): 10  $\mu\text{m}$  maximum



d. Camber: 5 mm maximum by each 2 meters length



## 10. SURFACE QUALITY

Oxide layers of various colours acceptable, flaky or an oxide layer that is not adhering the hot roll surface is not to be shipped. Oxide should be easily removed in the pickle process using hydrochloric acid.

After pickling the presence of imperfections like small imprints or light surface defects is tolerated, the defect should be light in appearance, should not be felt when touched and should be removed through cold reduction process. Light coil break, light roll marks, light scratches that will not prejudice the end use is permitted.

The hot roll strip shall be free from injurious defects such as abrasion, scabs, holes, roll marks and pinch marks, slivers, laminations, seams and scratches. Surface shall be free of rolled-in and other severe forms of scale: rolled in scale, pit scale (salt and pepper), scab are not accepted.

## 11. INTERNAL STRUCTURAL DEFECTS

Defects such as laminations or high inclusion level detrimental to cold rolling or to final use, is not to be shipped.

## 12. EDGE

HRC will be delivered with mill edges that is free from tears, folds and saw edge. Edge defects should not penetrate the width more than +5mm. DSP written confirmation is to be obtained for coils that is supplied with a cut edge prior shipment.

## 13. COILING QUALITY

Telescopicity: 50mm max

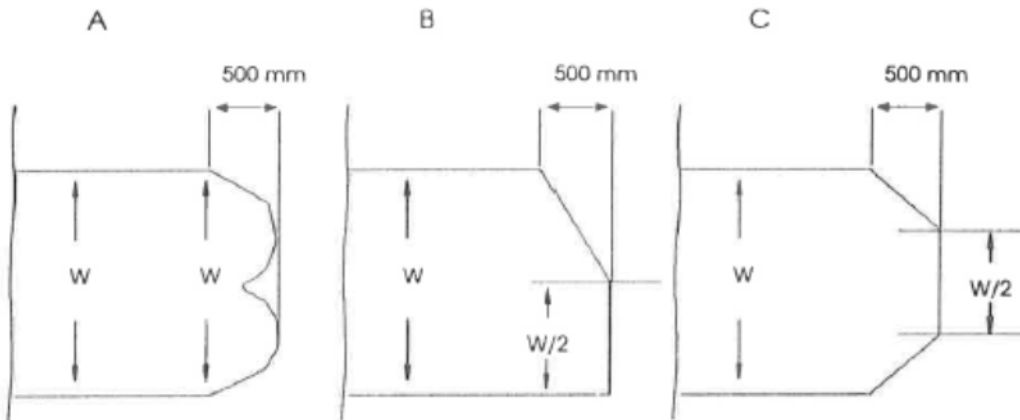
Loose and protruding wraps not acceptable

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## 14. COIL ENDS

The irregular shape of the HRC Tail cannot exceed 0.5m length. Tongue max 900mm can be tolerated if exceptional



## 15. ROLLING TEMPERATURES (Typical)

Finishing:  $880 \pm 10^\circ \text{C}$

Coiling:  $650 \pm 10^\circ \text{C}$

## 16. PACKING

Coils must be shipped in horizontal axis. Each coil with 6 steel bands through eye of the coil spaced evenly and 2 straps around the circumference of the coil.

## 17. IDENTIFICATION TAG

Position: 4 labels - one on each end of the ID and 2 on opposite side of the OD

Minimum information

- Coil identification number (as on pack list and test certificate)
- Coil weight (gross and net)
- Heat number
- Specification
- Dimensions (thickness and width)

## 18. QUALITY MILL CERTIFICATE

With the following information:

- Customer
- Product
- Sales order number
- Specification
- Dimensions (thickness and width)
- Edge condition (mill edge / cut edge)
- Coil number identification
- Coil weight (net)
- Heat number
- Chemical composition (all specified elements)

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- Mechanical results
- Quality Mill Certificate number and date issued
- Cast and poured

Product must be certified to be free from radioactivity

## **17. TECHNICAL INFORMATION**

Below technical information to be made available in excel electronic format prior arrival of the vessel in Saldanha.

1. Supplying mill sales contract number to DITH
2. DITH purchase contract with supplying mill
3. Thickness, width, weight (nett & gross)
4. Coil nr and position on the production program (casting, rolling)
5. Steel grade, cast analysis, cast number, heat number
6. Mechanical values if available
7. On request, diagrams of thickness, width, crown, roughing temperature, finishing rolling temperature, coiling temperature, cooling pattern, results of the surface inspection and of other tests executed on the coil

## **18. CONTROLS BEFORE COLD PROCESSING**

HRC will be subject to the following checks before the cold processing begins:

1. Visual examination
2. Dimensional and weight control
3. Coil ID check
4. Mechanical properties (only for specific cases)

The supplier of the HRC REMAINS responsible for the non-conformities discovered by the end user or by the final customer that are due to hidden defects (that cannot be found by normal controls and normal tests performed prior and during the cold processing).