



Clear Chill Cast Iron Rolls (TNB)

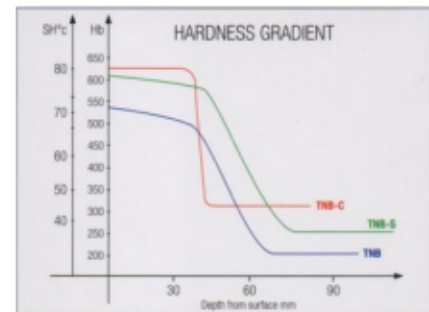
TYPE ArMo	HARDNESS		CHEMICAL ANALYSIS						MECHANICAL PROPERTIES		
	HB	ShC	C	Si	Mn	Cr	Ni	Mo	TENSILE STRENGTH (N/mm ²)	BENDING STRENGTH (N/mm ²)	MODULUS OF ELASTICITY (KN/mm ²)
TNB	450 + 555	64 + 74	3.30 + 3.70	0.40 + 1.00	0.20 + 0.70	≤ 0.60	≤ 0.60	0.15 + 0.30	~ 200	~ 300	~ 170
TNB-S	555 + 640	74 + 81	3.50 + 3.90	0.40 + 1.00	0.60 + 1.00	0.50 + 1.10	1.50 + 3.00	0.20 + 0.50	~ 250	~ 350	~ 170

Specifications

The structure of clear chill cast iron rolls is made up of a non-continuous network of carbides in a pearlitic or bainitic/martensitic matrix. Thanks to their high carbide ratio these rolls have an excellent wear resistance, whereas their resistance to thermal fatigue is reduced by the absence of free graphite. Rolls may be supplied as monobloc or as compound. For high hardness the use of compound rolls which can guarantee optimal properties in the working layer and in the core is recommended.

Applications

Clear chill cast iron rolls are used for intermediate, pre-finishing and finishing stands of open and continuous mills for rod and wire-rod and pre-finishing and finishing stands for narrow strips. They are also used as guide rollers.



Nodular Cast Iron Rolls (ArMo)

TYPE ArMo	HARDNESS		CHEMICAL ANALYSIS						MECHANICAL PROPERTIES		
	HB	ShC	C	Si	Mn	Cr	Ni	Mo	TENSILE STRENGTH (N/mm ²)	BENDING STRENGTH (N/mm ²)	MODULUS OF ELASTICITY (KN/mm ²)
Ferritic - Pearlitic	300 + 400	45 + 58	2.90 + 3.50	1.30 + 2.00	0.30 + 0.70	≤ 0.30	1.70 + 3.20	0.20 + 0.50	~ 700	~ 1300	~ 180
Pearlitic	400 + 550	58 + 74	3.10 + 3.60	0.90 + 1.70	0.30 + 1.00	0.10 + 0.80	1.70 + 3.20	0.20 + 0.50	~ 500	~ 800	~ 180
Acicular	400 + 555	58 + 74	3.10 + 3.60	0.80 + 2.00	0.40 + 1.00	≤ 0.30	2.00 + 4.00	0.40 + 0.90	~ 600	~ 950	~ 180

Specifications

After being treated with Magnesium the graphite contained in spheroidal cast iron precipitates in the form of spheroids. Spheroidal cast iron has mechanical properties similar to cast steel whereas its wear resistance is typical of alloys cast iron. Materials are subdivided on the basis of their matrix type as follows: ArMoT with a ferritic/pearlitic matrix, ArMoD with a pearlitic matrix, ArMoD-A with an acicular matrix. Mechanical properties, wear resistance and resistance to thermal fatigue depend on carbide and graphite ratio and on the type of matrix.

Applications

ArMo rolls are used mainly in wire, rod, light, medium and heavy section mills. Particularly ArMoT type are used for roughing stands where high thermal stresses can take place; the ArMoD type for roughing and preparing stands and the ArMoD-A type for pre-finishing and finishing.



Indefinite Chill Cast Iron Rolls (AS)

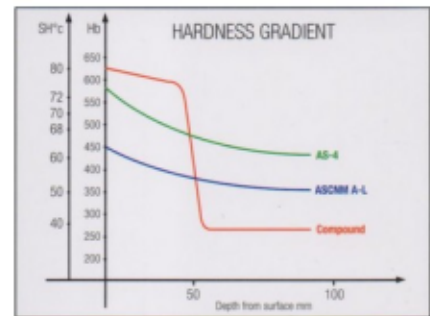
TYPE ArMo	HARDNESS		CHEMICAL ANALYSIS						MECHANICAL PROPERTIES		
	HB	ShC	C	Si	Mn	Cr	Ni	Mo	TENSILE STRENGTH (N/mm ²)	BENDING STRENGTH (N/mm ²)	MODULUS OF ELASTICITY (KN/mm ²)
ASCNM	350 + 460	50 + 65	2.90 + 3.30	0.70 + 1.50	0.70 + 1.00	0.60 + 1.30	1.00 + 2.60	0.20 + 0.50	~ 300	~ 500	~ 180
AS-4	460 + 640	65 + 82	3.20 + 3.60	0.50 + 1.10	0.40 + 1.00	0.70 + 1.50	1.80 + 4.20	0.20 + 0.50	~ 350	~ 600	~ 180

Specifications

The presence of free graphite flakes in the working layer distinguishes indefinite chill cast iron rolls from clear chill cast iron rolls. Free graphite improves the elastic properties of the material, reduces the effect of specific rolling loads and favours heat exchange by increasing the resistance to thermal fatigue. The structure is also made up of cementite which increases wear resistance, in a pearlitic or bainitic/martensitic matrix. Rolls may be supplied as monobloc or as compound. When high hardness in the working layer and highly resistant core metal material to high rolling pressure is required the use of compound (double pored) rolls is recommended.

Applications

Indefinite chill cast iron rolls are used above all as pre-finishing and finishing for rods, flats, light and medium sections.



Hypereutectoid Steel Rolls (IPE), Graphitic Steel Rolls (GSB), High Chrome (HCr)

TYPE ArMo	HARDNESS		CHEMICAL ANALYSIS						MECHANICAL PROPERTIES		
	HB	ShC	C	Si	Mn	Cr	Ni	Mo	TENSILE STRENGTH (N/mm ²)	BENDING STRENGTH (N/mm ²)	MODULUS OF ELASTICITY (KN/mm ²)
IPE	250 + 400	33 + 52	1.80 + 2.10	0.20 + 0.60	0.50 + 1.10	0.50 + 1.20	0.70 + 1.50	0.20 + 0.40	~ 750	~ 1600	~ 210
GSB	310 + 400	40 + 52	1.80 + 2.10	0.80 + 1.70	0.50 + 1.10	0.50 + 1.50	0.80 + 1.70	0.20 + 0.50	~ 750	~ 1400	~ 200
HCr	450 + 550	64 + 73	2.20 + 2.60	0.30 + 0.60	0.50 + 0.80	13.00 + 15.00	0.30 + 0.60	0.40 + 0.80	~ 550	~ 900	~ 230

Specifications

Steel base rolls have a carbon ratio ranging between 1,50 and 2,10% and are Cr-Ni-Mo alloyed. Chemical analysis and specific heat treatments give the material the high mechanical properties typical of steel and the wear resistance distinctive of cast iron. Hardness is constant in the whole working layer. The structure is made up of pearlitic matrix and of small carbides. Graphitic steel rolls have a better thermal conductivity thanks to the presence of graphite nodules.

Applications

Steel base rolls are used for roughings, preparings, pre-finishing and finishings, for light, medium and heavy sections where high mechanical properties are required, in severe rolling conditions. Graphitic steel rolls are suitable above all for high thermal stresses.

