ars METAL
STRIP & WIRE SOLUTION

Cold rolled precision strip
HIGH CARBON STEEL
Annealed - quenched & tempered

FT1/ANGL/QUAL/March 2009

AVAILABLE STOCK

GRADE		MATERIAL CONDITION NFEN 10132		SURFACE ASPECT NFEN 10132	Available thickness
BS	NF EN 10132				
CS 50	**C45E / 1.1191**	annealed and skin passed SKP	+LC	**MB finishes bright annealed**	0,2 to 4,0
CS 70	**C67S / 1.1231**	annealed and skin passed SKP	+LC		
CS 70	**C75S / 1.1248**	annealed and skin passed SKP	+LC		0,2 to 4,0
		quenched and tempered	+QT	**white bright polished**	0,2 to 1,5

Thickness tolerances according to EN 10140 / 96 – Surface finishes according to EN 10139/97 -

C45E : steel for quenching and tempering (NF EN 10132-3) - C67S and C75S : steal for spring and general purposes (NF EN 10132-4)

CHEMICAL COMPOSITION: NF EN 10132-3 ET -4

GRADE	C	Si	Mn	P	S	Cr	Mo	Ni
C45E	0.42 to 0.50	0.40 max	0.50 to 0.80	0.035 max	0.035 max	0.40 max	0.10 max	0.40 max
C67S	0.65 to 0.73	0.15 to 0.35	0.60 to 0.90	0.025 max	0.025 max	0.40 max	0.10 max	0.40 max
C75S	0.70 to 0.80	0.15 to 0.35	0.60 to 0.90	0.025 max	0.025 max	0.40 max	0.10 max	0.40 max

MECANICAL PROPERTIES IN SOFT ANNEALED CONDITION : NF EN 10132-3 AND -4

GRADE	Yield strength YS 0.2 (N/mm²)	Tensile strength TS (N/mm²)	Elongation E80 min. (%)	Hardness HV
C45E	455 max	570 max	18 min	180 max
C67S	510 max	640 max	16 min	200 max
C75S	510 max	640 max	15 min	200 max

The customer can define either tensile strenght or hardness. If none is required, tensile strength TS will be applied.

MECANICAL PROPERTIES IN QUENCHED CONDITION FOR GENERAL ENGINEERING PURPOSES

	Thickness (mm)	Quenched and tempered condition			
TS (N/mm²)	0.04 to 0.09	-	1620 to 1765	-	1915 to 2060
	0.10 to 0.19	-	1570 to 1715	-	1865 to 2010
	0.20 to 0.29	1375 to 1520	1520 to 1670	1670 to 1815	1815 to 1960
	0.30 to 0.49	1220 to 1375	1330 to 1485	1510 to 1660	1620 to 1780
HR 30 N	0.50 to 0.69	58 to 61	61 to 64	64 to 67	66 to 69
HR 45 N	0.70 to 0.89	42 to 45	45 to 48	48 to 51	51 to 54
	0.90 to 0.99	41 to 44	44 to 47	47 to 50	50 to 53
HRC	1.00 to 1.09	36 to 39	39 to 42	42 to 45	45 to 48
	1.10 to 1.39	35 to 38	38 to 41	41 to 44	44 to 47
	1.40 to 1.69	34 to 37	37 to 40	40 to 43	43 to 46
	1.70 to 2.09	33 to 36	36 to 39	39 to 42	42 to 45
	2.10 to 2.50	32 to 35	35 to 38	38 to 41	41 to 44

The mechanical properties (hardness or tensile strenght) must be specified with the order.

Temperature before oil quenching

Grade	temperature°C
C45E	885 – 900
C67S	835 – 855
C75S	825 – 850

Temperature values for information only.

Hardness after oil quenching and tempering

Grade	Hardness HRC			
	300°	400°	500°	600°
C45E	48	40	35	24
C67S	52	44	37	26
C75S	55	46	39	28

Tempering period: 15 mn (HRC hardness for information only)

Hardness conversion:

Tensile strength TS (Mpa)	Hardness (HV)	Hardness (HRB)	Tensile strength TS (Mpa)	Hardness (HV)	Hardness (HR 30N)	Hardness (HR 45N)	Hardness (HRC)
330	100	55	**1020**	320	54	34	32.2
390	115	64.6	**1090**	340	55	37	34.4
440	130	71	**1120**	350	56	38	35.5
510	155	80.5	**1160**	360	57	39	36.6
580	180	87.3	**1220**	380	58	42	38.8
630	195	91.7	**1290**	400	60	44	40.8
690	215	94.6	**1360**	420	62	47	42.7
740	225	97	**1430**	440	64	49	44.5
810	245	100	**1500**	460	65	51	46.5
880	265	103	**1570**	480	66	53	48.0
960	300	-	**1650**	500	68	54	49.5

Conversion table for information only.

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