Helping manufacturers across the globe achieve sustainable leaner manufacturing processes

Mild & Carbon Steel

Low Carbon Steel

High Carbon Steel

CUT TO LENGTH WIRE & COIL

Fast Turnaround Processing

Low Width Thickness Ratio 3:1 unique to the industry (normal minimum is 8:1)

Over 75 years Experience

WIDE STOCK RANGE

bsi. ISO 9001 Quality Management

FM 02114

Mild & Carbon Steel

Plain Carbon Steel Strip is used in a very wide range of applications because it is particularly adaptable to low cost techniques of metal forming such as presswork. These materials combine ease of fabrication with adequate strength and excellent finishing characteristics to provide good surface finish on the final article.

The Knight Group range of Carbon Steels can be broadly split into two categories:

Low Carbon Mild Steels
High Carbon Spring Steels

Spring steels are available in the annealed condition for hardening after forming, or in the hardened and tempered condition.

Low Carbon Steel

The hardness or temper of cold rolled mild steel strip is determined by its analysis, the amount of cold rolling or by a final annealing process. These are selected to achieve the optimum mechanical properties for the forming operation whether it be deep drawing, forming or flat blanking.

"Skin passed" is a very light rolling reduction after the annealing process to prevent the formation of deformation bands called stretcher strains, which can ruin surface appearance of the formed article.

Mild steels cannot be hardened except by cold working because their carbon content is too low for significant heat treatment reaction to take place, however they can be case hardened to give a harder surface.

High Carbon Steel

Bright rolled Carbon Steels are often used in the annealed condition for forming of components, which are then batch heat treated to increase their hardness and spring characteristics.
To maintain a good surface condition heat treatment should be carried out in a controlled atmosphere furnace at the appropriate temperature for the grade (see table) and oil quenched to achieve maximum hardness.

Tempering must then be carried out to reduce the strength/hardness of the material but considerably improve its toughness and ductility. Temperatures in the range of 300 - 450°C should be used to achieve the required final hardness. Alternatively, austempering is frequently carried out by quenching into a molten salt bath @ 350 - 450°C.
Our Sales and Technical staff will give additional heat treatment advice for your particular application, upon request.

Hardened & tempered spring steel has been heat treated in strip form at the Mill, prior to being supplied to the customer. Many applications do not require severe bending and forming and it is often beneficial to use hardened & tempered strip in these cases.
The main benefits are:
No risk of distortion
Uniformity of surface finish
Constant mechanical properties
These factors often mean reduced processing costs and a higher quality product.

Stress Relieving

After severe deformation hardened & tempered spring steel requires a low temperature (250 - 300°C) stress relieving operation to "set" the components into shape. This will impart a coloured oxide finish ranging from Bronze to Blue which slightly improves corrosion resistance.

MILD & CARBON STEEL STOCK RANGE				
TYPE	COIL STOCK RANGE		WIRE STOCK RANGE	
	Thickness (mm)	Width (mm)	Round	Shaped
LOW CARBON STEEL				
Annealed	0.01 - 3.0	3 - 1220	0.1 – 10.00 mm dia	Upto 45 mm2 area
All Other Tempers	0.01 - 2.0	3 - 1000		
HIGH CARBON STEEL				
Annealed	0.05 - 3.0	3 - 650	0.1 – 10.00 mm dia	Upto 45 mm2 area
Cold Worked	0.05 - 1.6	3 - 450		
Hardened & Tempered	0.1 - 3.0	3- 450		
Other specifications can be made available upon request, please contact us with your requirements				

SURFACE APPEARANCES AND FINISHES			
Symbol	Characteristics	Applications	Surface finish
MA	Bright, metallic clean surface, pitting, small defects and scratches are permitted.	All thicknesses and treatment conditions.	FRR, RM, RL 2)
MB	Bright, metallic clean surface; pitting, grooves and scratches are permitted as long as the uniform smooth appearance is not substantially impaired when viewed with the naked eye.	Thicknesses =< 2.0mm in all conditions except A (annealed)	RM, RL 2)
MC	Bright, metallic clean surface; pitting, grooves and scratches are permitted as long as the uniform appearance of the mirror surface is not impaired.	Thicknesses =<1.0mm in all conditions except A (annealed).	SRN 2)
RR = rough, RM = matt, RL = smooth, RN = mirror 2) These code letters need not be given in the designation.			

Cold Rolled Low Carbon (Mild) Steel

COLD ROLLED LOW CARBON (MILD) STEEL PROPERTIES

DESIGNATION		FORMER BRITISH STANDARD GRADE	TEMPER	Key Features	Applications
NAME	NUMBER				
1.0873	DCO6	-	Skin passed	Extra deep drawing quality, non-ageing.	Very Deep Drawn Components, Automotive & Electrical Parts
1.0312	DCO5	CS1	Annealed & Skin Passed	Extra deep drawing quality, non-ageing.	
1.0338	DCO4	CS2		Deep drawing quality, non-ageing	Deep Drawn and Stretch Formed
1.0347	DCO3	CS3		Drawing quality, non-ageing	Shallow Drawn and Stretch Formed
1.033	DCO1	CS4		Forming and Bending.	Press Formed and Bent Components
1.033	DCO1	CS4	Temper Rolled C290/ C340/ C390/ C440	Forming and Bending.	Press Formed and Bent Components
			Hard Rolled C490/ C590/ C690	Blanking.	Flat Components, Shims, Washers

COLD ROLLED LOW CARBON (MILD) STEEL CHARACTERISTICS

DESIGNATION		FORMER BRITISH STANDARD GRADE	TYPICAL CHEMICAL COMPOSITION %					MECHANICAL PROPERTIES						
NAME	NUMBER		C	P	S	Mn	Ti	Period Guaranteed	Delivery Condition	Symbol	Re N/mm2	Rm N/mm2	Elongation % min A80	Hardness HV
DC01	1.033	CS4	0.12	0.045	0.045	0.6	-	3 months	Annealed	A	-	270-390	28	105 max
									Skin passed	LC	280 max	270-410	28	115 max
									Work hardened	C290	200-380	290-430	18	95-125
									C340	250 min	340-490	-	105-155	-
									C390	310 min	390-540	-	117-172	-
									C440	360 min	440-590	-	135-185	-
									C490	420 min	490-640	-	155-200	-
									C590	520 min	590-740	-	185-225	-
									C690	630 min	690 min	-	215 min	-
DC03	1.0347	CS3, CS2	0.1	0.035	0.035	0.45	-	6 months	Annealed	A	-	270-370	34	100 max
									Skin passed	LC	240 max	270-370	34	110 max
									Work hardened	C290	210-355	290-390	22	95-117
									C340	240 min	340-440	-	105-130	-
									C390	330 min	390-490	-	117-155	-
									C440	380 min	440-540	-	135-172	-
									C490	440 min	490-590	-	155-185	-
									C590	540 min	590 min	-	185 min	-
DC04	1.0338	-	0.08	0.030	0.030	0.4	-	6 months	Annealed	A	-	270-350	38	95 max
									Skin passed	LC	210 max	270-350	38	105 max
									Work hardened	C290	220-325	290-350	24	95-117
										C340	240 min	340-440	-	105-130
										C390	350 min	390-490	-	117-155
										C440	400 min	440-540	-	135-172
										C490	460 min	490-590	-	155-185
										C590	560 min	590 min	-	185-215
DC05	1.0312	-	0.06	0.025	0.025	0.35	-	6 months	Skin passed	LC	180 max	270-330	40	100 max
DC06	1.0873	-	0.02	0.020	0.020	0.25	0.30	6 months	Skin passed	LC	80 max	270-350	38	-

Cold Rolled High Carbon Spring Steel

COLD ROLLED HIGH CARBON SPRING STEEL CHARACTERISTICS

DESIGNATION		TEMPER	Key Features	Applications
NAME	NUMBER			
C55S C60S C67S C75S C85S C90S C100S C125S 48Si7 56Si7 51CrV4 80CrV2 75Ni8 125Cr2 102Cr6	1.1204 1.1211 1.1231 1.1248 1.1269 1.1217 1.1274 1.1224 1.5021 1.5026 1.8159 1.2235 1.5634 1.2002 1.2067	Annealed & Skin Passed	Press forming and blanking, hardenable	Springs and Hight Strength Parts. E.g. Circlips & Automotive Clutch Plates Wear Resistant Parts, Knives, Saw Blades
		Hardened & Tempered	Flat or very simply formed shapes High fatigue and wear resistance	Flat Springs, Circlips, Automotive Clutch Plates High Performance Springs, Machine Knife Blades, Doctor Blades

COLD ROLLED HIGH CARBON SPRING STEEL CHARACTERISTICS

DESIGNATION		TYPICAL CHEMICAL COMPOSITION %									Hardness for Delivery Condition (reference values)	
NAME	NUMBER	C	Si	Mn	P max	S max	Cr	Mo max	V max	Ni	Annealed (+A) or annealed and skin passed (+LC) Rockwell 'B' scale	Quenched and Tempered (+QT) Rockwell 'C' scale
C55S	1.1204	0.52-0.60	0.15-0.35	0.60-0.90	0.025	0.025	0.40 max	0.1	-	0.40 max	90 max	34 - 50.5
C60S	1.1211	0.57-0.65	0.15-0.35	0.60-0.90	0.025	0.025	0.40 max	0.1	-	0.40 max	91 max	35 - 51.5
C67S	1.1231	0.65-0.73	0.15-0.35	0.60-0.90	0.025	0.025	0.40 max	0.1	-	0.40 max	92 max	38.5 - 54
C75S	1.1248	0.70-0.80	0.15-0.35	0.60-0.90	0.025	0.025	0.40 max	0.1	-	0.40 max	93 max	38.5 - 54
C85S	1.1269	0.80-0.90	0.15-0.35	0.40-0.70	0.025	0.025	0.40 max	0.1	-	0.40 max	94 max	38.5 - 55
C90S	1.1217	0.85-0.95	0.15-0.35	0.40-0.70	0.025	0.025	0.40 max	0.1	-	0.40 max	94 max	38.5 - 55
C100S	1.1274	0.95-1.05	0.15-0.35	0.30-0.60	0.025	0.025	0.40 max	0.1	-	0.40 max	95 max	38.5 - 57
C125S	1.1224	1.20-1.30	0.15-0.35	0.30-0.60	0.025	0.025	0.40 max	0.1	-	0.40 max	97 max	38.5 - 57
48Si7	1.5021	0.45-0.52	1.60-2.00	0.50-0.80	0.025	0.025	0.40 max	0.1	-	0.40 max	95 max	38.5 - 50.5
56Si7	1.5026	0.52-0.60	1.60-2.00	0.60-0.90	0.025	0.025	0.40 max	0.1	-	0.40 max	96 max	38.5 - 50.5
51CrV4	1.8159	0.47-0.55	0.40 max	0.70-1.10	0.025	0.025	0.90-1.20	0.1	0.10-0.25	0.40 max	94 max	38.5 - 52.5
80CrV2	1.2235	0.75-0.85	0.15-0.35	0.30-0.50	0.025	0.025	0.40-0.60	0.1	0.15-0.25	0.40 max	95 max	38.5 - 52.5
75Ni8	1.5634	0.72-0.78	0.15-0.35	0.30-0.50	0.025	0.025	< 0.15	0.1	-	1.80-2.10	93 max	38.5 - 52.5
125Cr2	1.2002	1.20-1.30	0.15-0.35	0.25-0.40	0.025	0.025	0.40-0.60	0.1	-	0.40 max	97 max	42 - 57
102Cr6	1.2067	0.95-1.10	0.15-0.35	0.20-0.40	0.025	0.025	1.35-1.60	0.1	-	0.40 max	97 max	42 - 57

The information contained herein is given in good faith and is based on our present knowledge and experience. However, no liability will be accepted by The Knight Group and its subsidiaries in respect of any action taken by any third party in reliance thereon. Any advice given by the Company to any third party is given for that party's assistance only and without any liability on the part of the Company. The contents of this brochure are subject to change and the most recent edition of all Knight Group documentation can be found on our website or by written request.

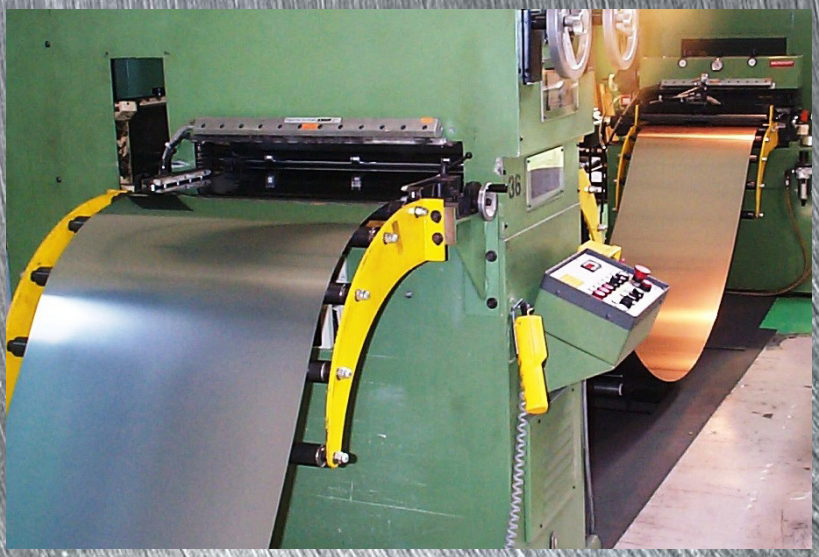
Any contract between the Company and a customer will be subject to the Company's Conditions of Sale. The extent of the Company's liabilities to any customer is clearly set out in those Conditions; a copy of which is available by request and can also be found on our website www.knight-group.co.uk.

Processing

Your Material Your Way

The Knight Group are industry leaders in the supply and processing of strip, coil and wire, consistently exceeding expectations of quality, service and performance. With a number of accreditations, including BS EN ISO 9001 and BS EN AS 9120, we are the supplier of choice for global manufacturers where quality, reliability and lean manufacturing at the heart of their priorities. Most manufacturers are facing increasing demands for goods to be delivered with tighter time frames and even tighter margins. By selecting the processing to meet your specific needs, your material can be prepared and delivered to the exact size, length and finish you need, saving valuable production time and costs. Our processing is offered at a comprehensive price and with a flexibility to select only the services you need and want, giving you maximum versatility and minimum cost.

We have invested heavily in our bespoke machinery and training our established team of operators, so that we can offer a truly comprehensive range of processing to complement our extensive range of stocked material.



8 Cut To Length Lines
5 Edge Finishing Lines
27 Recoiling Lines
26 Slitting Lines
4 Traverse Winding Lines

Low Width Thickness Ratio 3:1 unique to the industry (normal minimum is 8:1)

Ability to offer Ultrafine Width Tolerances down to +/- 0.025mm (0.001”)

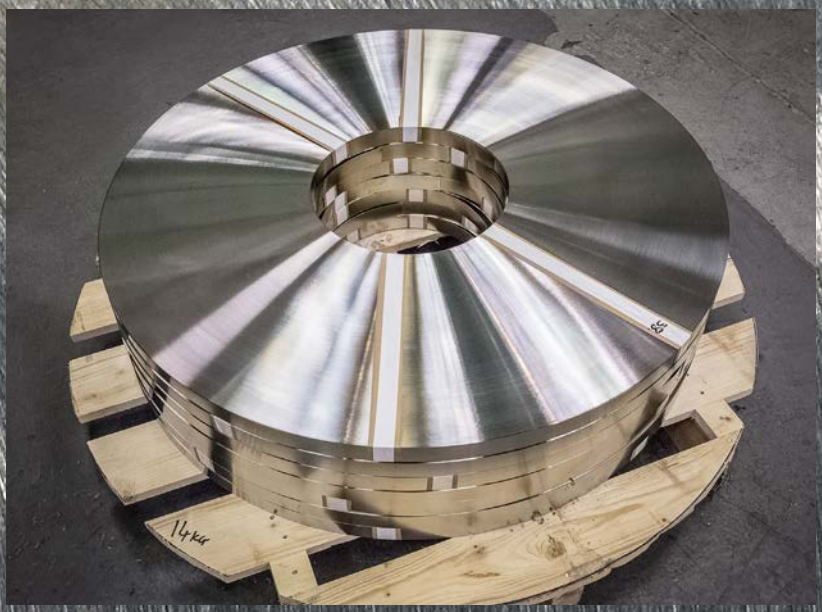
Thicknesses -0.013mm to 6.5mm (0.0005” to 0.26”)

Widths - 0.64mm to 1100mm (0.025” to 43”)

Bespoke Packaging

If you need bespoke material sizes and processing, then you probably want bespoke packaging as well. Thanks to our in house packaging design team, we can offer bespoke packaging solutions to protect your materials in transit. Whatever processing and finishing options you have chosen, your products will packaged to arrive safely and ready to use

You can choose to have strip material as pancake coils, traverse wound coil, flat blanks and sheets. Wire can be supplied as cut lengths, coils, formers or spools to suit your needs.



Choose From Our Trusted Partners Or Your Preferred Carrier

We firmly believe that all of our customers should be able to have your material, your way. Thanks to our global network of freight providers, you can choose from air, land or sea freight so you can have your material where you want, when you want.

There is also the option to arrange your own collection from our site in Birmingham, which can be organised through our sales team.

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