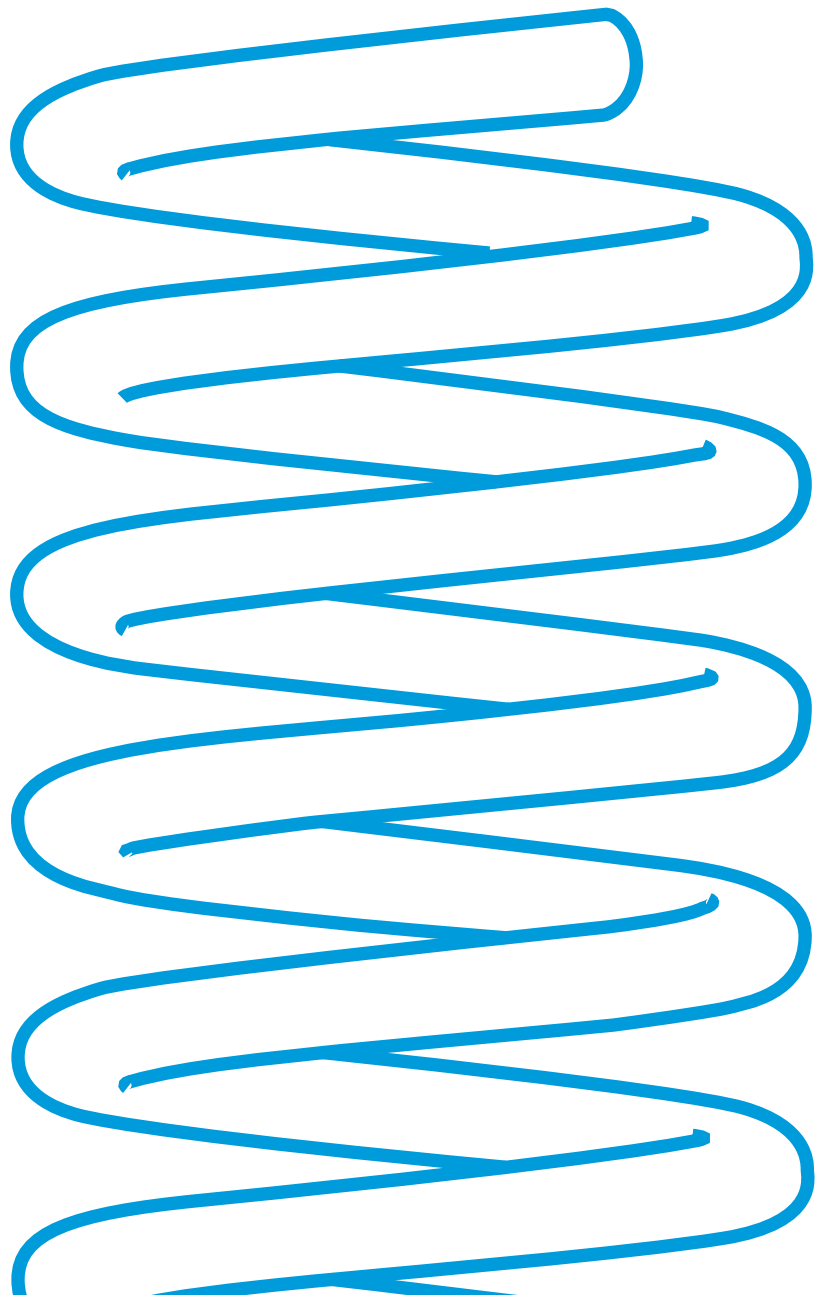


## High carbon wire rod

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# High performance

## Corus

**is a leading supplier of high carbon wire rod to the worldwide market and has the knowledge and expertise to produce wire rod for the most demanding applications.**

Corus produces top quality wire rod from high purity raw materials at its fully integrated site in Scunthorpe.

The company is continually investing in plant and technology to ensure it consistently meets the stringent quality requirements expected in high carbon steels. This quality guarantee enables its customers to satisfy the ever-increasing demands of the many end-users of high performance wire rod.

Ongoing development initiatives ensure that Corus continues to improve its service and the quality of products it supplies. The company aims to constantly provide solutions for new and more challenging applications.

A team of experienced metallurgists provides customers with technical support, helping them to select the most appropriate materials for their requirements. The team also works on developing and improving products to meet customers' needs.

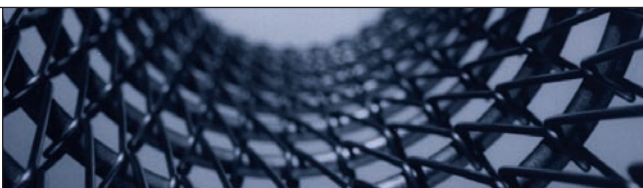
This technical team is backed up by a wealth of experience and knowledge in Research and Development, which ensures that customers always receive the best possible support.

All Corus's manufacturing works are quality assured to BS EN ISO 9001 and undergo bi-annual audits by LRQA, a nationally accredited independent approval body.

Corus steel is used in springs for bedding and seating, agricultural implements, music wire, cable armouring and rope wire for some of the world's largest bridges and sports stadia.

To offer customers greater choice, wire rod can be ordered not only by chemical composition, but also by tensile strength. The second method is usually preferred by customers who will be direct drawing the rods to meet guaranteed mechanical properties in the finished wire, without any intermediate heat treatment. Corus can supply grades that meet British, European and international standards, as well as individual customer specifications.

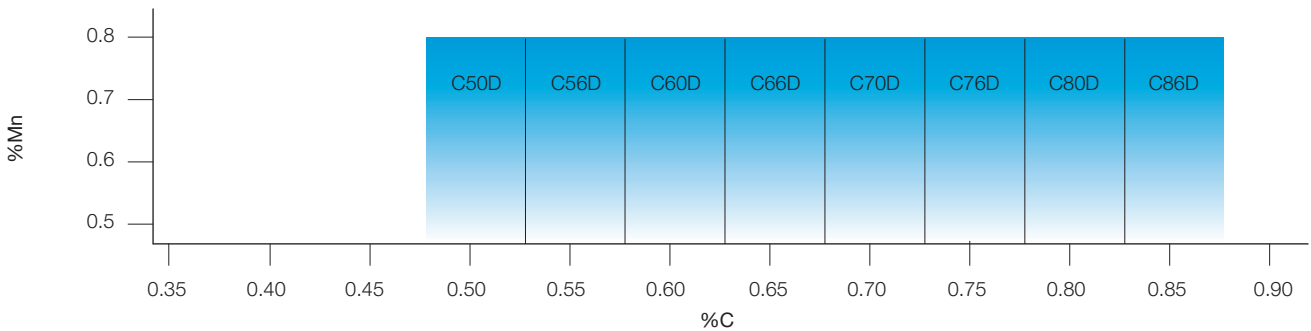
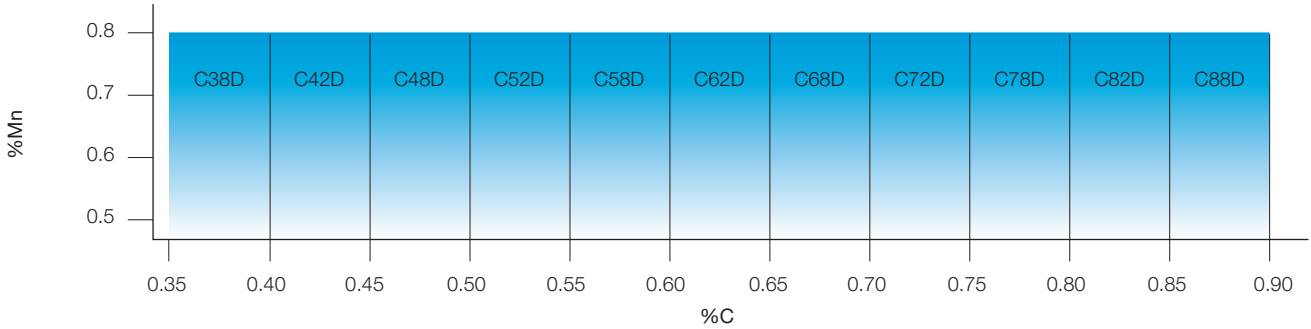
UK customers are encouraged to order steel as specified in PD 6635: 1999, a BSi published document derived from EN 10016: Parts 1-4.



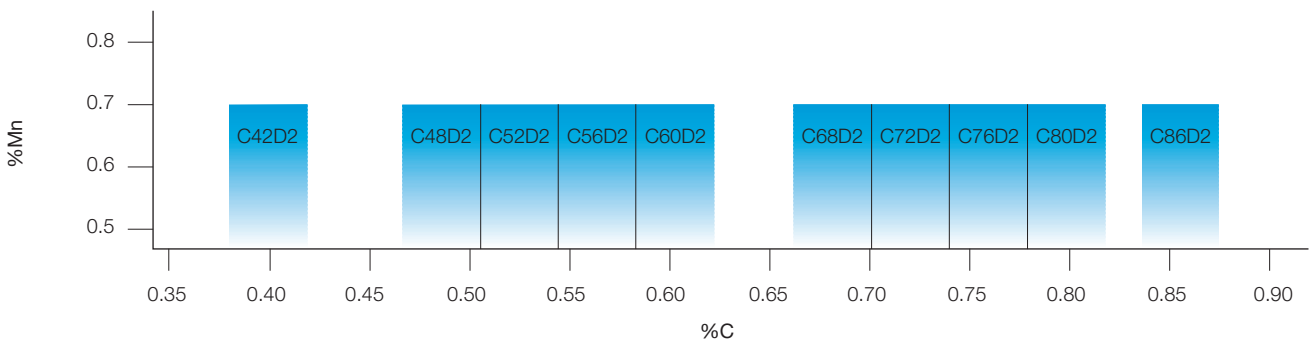
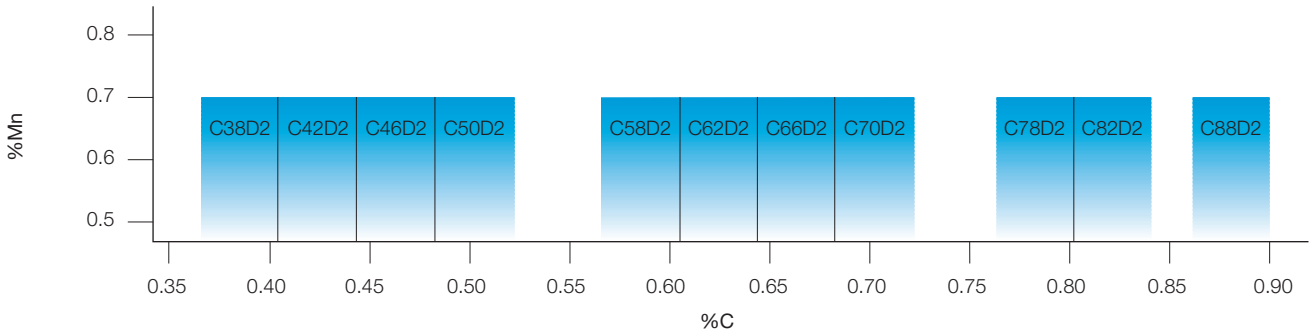
# Ordering to chemical composition

Wire rod can be supplied to meet the requirements of EN 10016: Parts 1-4.

General purpose rods



Rod for special applications



## Steel grades

**Corus supplies a diverse range of high carbon steel grades to satisfy an equally diverse range of high performance applications.**

### Ordering to mechanical properties

Corus selects the appropriate chemical composition that will deliver the mechanical properties required by the customer.

### Elements other than carbon will conform to the following limits

Si 0.10 - 0.30%

Mn 0.50 - 0.80%

S 0.030% max

P 0.030% max

V up to 0.10% maximum in micro-alloyed steels

Steel grade	Ultimate tensile* strength, $R_m$ (N/mm <sup>2</sup> )
T700	650/750
T750	700/800
T800	750/850
T850	800/900
T900	850/950
T950	900/1000
T1000	950/1050
T1050	1000/1100
T1100	1050/1150
T1150	1100/1200

### Micro-alloyed steels

Corus grade	Ultimate tensile* strength, $R_m$ (N/mm <sup>2</sup> )	
	Rod diameter (mm)	
	≤ 9.5	> 9.5
M85	> 1200	> 1150
M90	> 1250	> 1200

\*The specified properties apply to a mean value of at least 5 samples taken from each cast or batch.



## High quality products

**Corus manufactures steel under strictly controlled conditions to ensure only the highest quality wire rod is supplied to customers.**

### Composition and internal quality

Raw materials are carefully chosen to ensure close control is maintained over any residual elements during steelmaking. This provides steel of a consistent quality for customers. Chart 1 below shows the typical distribution of residual elements in Corus's wire rod supply.

Low levels of dissolved nitrogen, which are a characteristic of the basic oxygen steelmaking process, reduce the potential for both dynamic and static strain ageing effects, see chart 2 below.

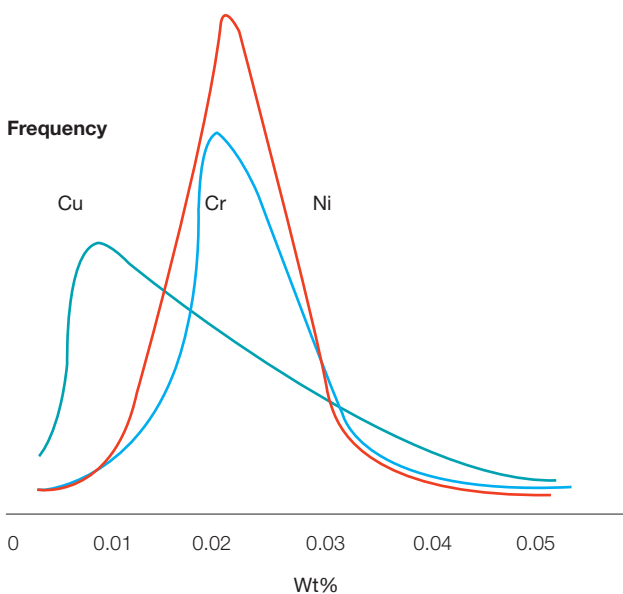


Chart 1

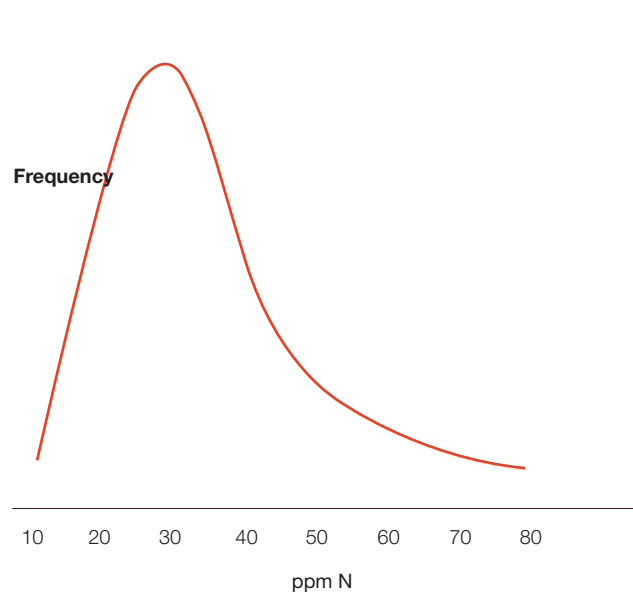


Chart 2



## High quality products

High levels of cleanness are maintained by using efficient shrouding systems during continuous casting. The benefits of this are realised in improved surface quality, die wear and superior drawability of Corus rods.

Consistency in the chemical composition of the steel is achieved through strict controls during steelmaking. This ensures customers achieve consistent performance during wire drawing and heat treatment. Corus's advanced casting technology ensures that segregation is maintained at exceptionally low levels to meet the most stringent requirements. This minimises the risk of fractures during wire drawing and subsequent operations.

### Surface quality

Corus wire rod is rolled from high quality billets, which undergo in-line inspection for internal and surface quality. The surface integrity is maintained through to the finished wire rod by rolling under controlled conditions, ensuring that the quality of the rod meets the requirements of the end application.

Corus can supply surface discontinuity depths to a range of limiting values, as specified in EN 10016 and PD 6635.

A variety of techniques is employed to assess surface quality on samples taken from the coil ends. In

addition, an eddy current surface inspection system provides in-line monitoring of surface quality along the whole length of the coil.

Wire rod is supplied to decarburisation limits specified in EN 10016: Part 4, with tighter limits available on request. A continuous improvement programme aims to optimise reheating practices to keep pace with market demands for lower decarburisation levels.

### Limit values for the depth of surface discontinuities

#### EN 10016: Part 2

Class <sup>1</sup>	Nominal diameter $d_N$ (mm)	Maximum permissible depth of surface discontinuity (mm)
B	$5 \leq d_N \leq 12$	0.20
	$12 < d_N \leq 13.5$	0.25

#### EN 10016: Part 4

D	$5 \leq d_N \leq 12$	0.15
	$12 < d_N \leq 13.5$	0.20
E	*tighter than class D, by arrangement	

<sup>1</sup>Class according to EN 10221

#### PD 6635

Class	Maximum surface discontinuity depth (% of nominal rod diameter) measured radially
II	3.0
III	2.0
IV	1.5
V	1.0

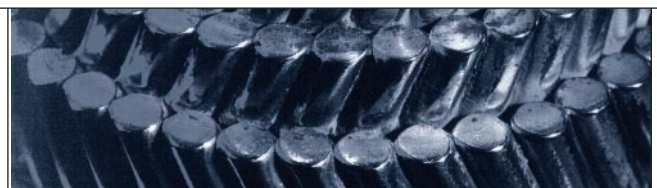
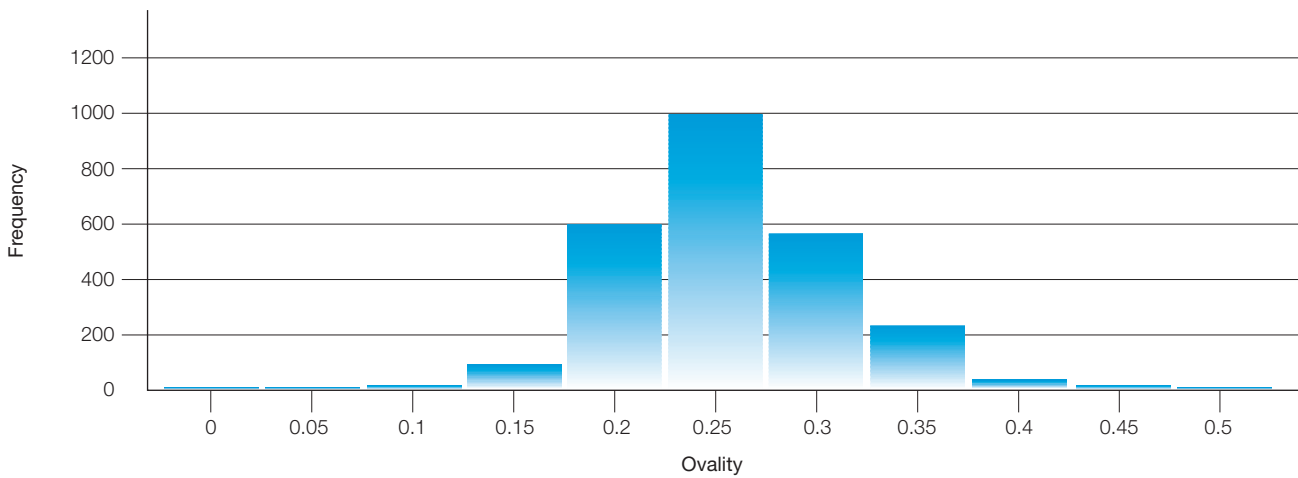


## High quality products

### Dimensional control

To provide wire drawing customers with a consistent feedstock, continuous Orbis Gauge monitoring gives close control of rod tolerance and ovality. Corus's size

control exceeds the requirement of EN 10016: Part 1. The chart below shows the typical distribution of ovality in 9.0mm wire rod.



## High quality products

### Mechanical properties

In addition to the close controls maintained on the chemical composition of wire rod, the post-rolling cooling process plays a very important part in ensuring that the correct mechanical properties are achieved.

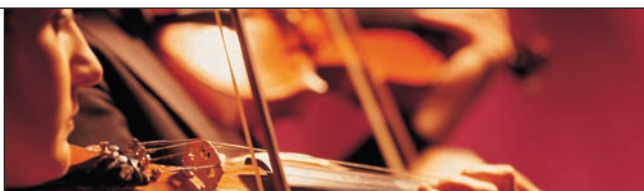
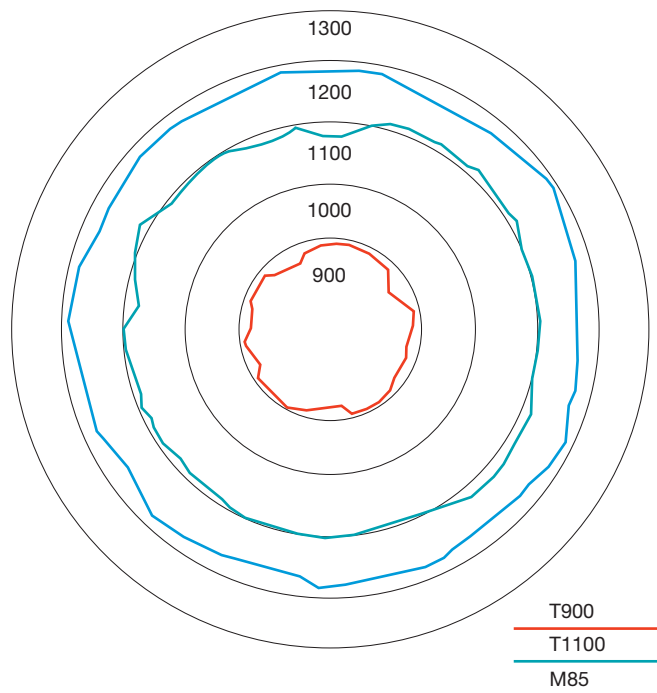
The Rod Mill incorporates a Stelmor™ controlled cooling system which, combined with Corus's own process technology, optimises the microstructure of its products. This improves both the absolute level and the consistency of mechanical properties and ensures good drawability and high drawing reductions.

Controls in the cooling process ensure products meet customers' requirements for consistent descalability, whether by chemical or mechanical processes.

### Round-ring tensile consistency

The need for round-ring consistency of mechanical properties is well recognised, particularly in the spring wire sector where wire fabricators are seeking to produce springs on automatic machines at ever faster speeds.

The radar chart below shows typical round-ring consistency of ultimate tensile strength. The standard deviation on ultimate tensile strength is typically less than one per cent of the absolute level.



## Delivery condition

# Corus takes every care to ensure wire rod is delivered to customers optimum condition.

Corus wire rod is delivered to customers throughout the world. A dedicated logistics team selects the most appropriate route and arranges all transportation to ensure the steel arrives at the customer's plant in optimum condition.

A world-class automatic warehouse at the rod mill is equipped with specially-designed handling equipment to minimise the risk of damage to the rod during storage and handling.

A range of protective packaging solutions are available to ensure coils reach their destination in prime condition.

### Product range

Rod diameter	<b>5.0-15mm in 0.5mm increments</b>
Coil weight	<b>1600-2200kg</b>
Coil dimensions	<b>Outside diameter 1250mm</b>
	<b>Inside diameter 850mm</b>

Care has been taken to ensure that this information is accurate, but Corus Group plc, including its subsidiaries, does not accept responsibility or liability for errors or information which is found to be misleading.  
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