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# Corus Construction and Industrial, Freecutting Steels

**Corus Construction & Industrial is a major supplier of freecutting semi finished products specially designed for efficient, accurate and high speed machining of large volume engineering components.**

## Specifications

Corus Construction & Industrial supplies freecutting steels to a wide range of compositions, to meet national and international specifications as well as your individual requirements.

## Standard Grades

| Country | Standards |
|---|---|
| Europe | EN 10087 (1998) – 11SMn(Pb)30<br>EN 10087 (1998) – 11SMn(Pb)37<br>EN 10087 (1998) – 15SMn13<br>EN 10087 (1998) – 38SMn(Pb)28<br>EN 10087 (1998) – 44SMn(Pb)28 |
| United Kingdom | BS970 Part 3 1991 – 230M07(Pb)<br>BS970 Part 3 1991 – 226M44<br>BS970 Part 3 1991 – 212A42 |
| United States | SAE/ASTM – C12(L)14<br>SAE/ASTM – C12(L)15<br>SAE/ASTM – C1117<br>SAE/ASTM – C1137<br>SAE/ASTM – C1144 |
| Germany | DIN 1651 (1988) – 9SMn(Pb)28<br>DIN 1651 (1988) – 9SMn(Pb)36<br>DIN 1651 (1988) – 35S(Pb)20<br>DIN 1651 (1988) – 45S(Pb)20 |
| France | NF A35 – 561(1992) – S250(Pb)<br>NF A35 – 561 (1992) – S300(Pb)<br>NF A35 – 561 (1992) – AD55(Pb)<br>NF A35 – 561 (1992) – AD60(Pb) |
| Italy | UNI 4838 (1980) – CF9SMn(Pb)28<br>UNI 4838 (1980) – CF9SMn(Pb)32<br>UNI 4838 (1980) – CF9SMn(Pb)36<br>UNI 4838 (1980) – CF10S20 |
| Spain | UNE 36021 (1980) – 11SMn(Pb)28<br>UNE 36021 (1980) – 12Mn(Pb)35<br>UNE 36021 (1980) – 35SMn(Pb)6 |

Quality and profitability during machining are assured by the use of feedstock designed to enhance machinability. Improved machining is a combination of ease of cutting, high production rates, consistent performance and smooth finished surface.

Controlled additions of sulphur give rise to manganese sulphide inclusions throughout the steel, producing short turnings during machining. Normal plain carbon steels are harder to machine as they produce much longer turnings. To achieve a good machining performance the manganese sulphide inclusions are formed globular in shape and evenly distributed throughout the steel. This can be achieved very effectively using our bloom cast and re-rolled

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product. Non-metallic inclusions such as aluminium and silicon oxides, which have an adverse affect on machinability, are kept to the lowest possible levels. This is achieved using advanced clean steelmaking practices and precise compositional control.

Sulphur additions on their own clearly influence machinability. Increasing the sulphur level progressively up to 0.4%, as shown in Figure 1, gives a marked improvement in machinability. The addition of further elements can further improve machinability through a number of mechanisms including self-lubrication. Here, a smooth layer is formed between the tool and the work piece during machining. Figure 2 illustrates the progressive effect of adding lead (Pb) to a steel with a given level of sulphur (S). During the repetitive manufacture of components, 50% more are produced per hour from a steel with a 0.3% lead addition. Tellurium (Te) and bismuth (Bi) are further elements that can be added to achieve even higher levels of machinability, as shown in Figure 3.

Figure 1

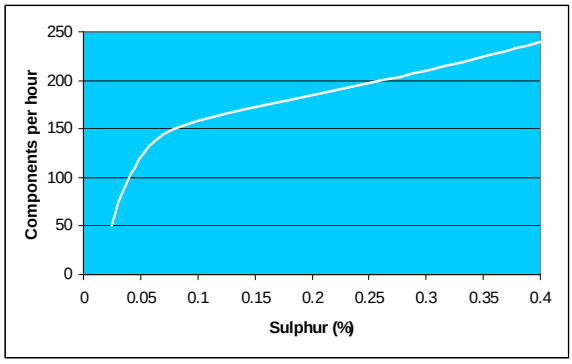



Figure 2

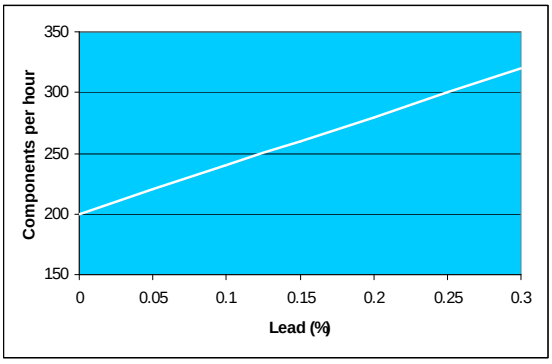
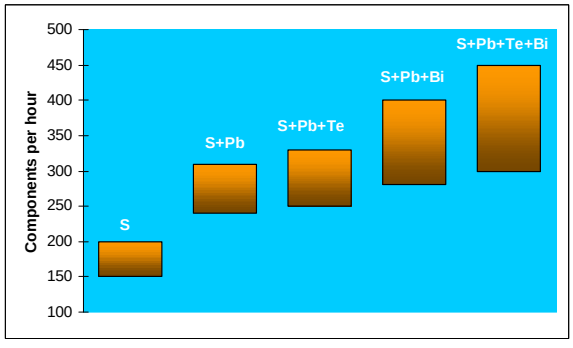



Figure 3




**The benefits of freecutting steels can be seen through:**

- High cutting speed and feed rates
- Long tool life
- Excellent surface quality
- Reliable and reproducible machining

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# Corus Construction and Industrial, Freecutting Steels

- Easy chip and swarf replacement
- Predictable tool replacement
- Easier scheduling and planning
- Reduced down time
- Decreased cutting forces contributing to cost reduction, improved product quality and enhanced profitability.