

# Hot rolled HYPRESS®

## Corus Narrow Strip

### HYPRESS® steels are High Strength Low Alloy (HSLA) steels from Corus Narrow Strip which offer many benefits to the designer.

HYPRESS® is a series of high strength cold formable strip steels. In many applications, mild steel strip is being replaced by thinner sections of HYPRESS®, not only is weight saving achieved but substantial cost savings can be made. The guaranteed minimum yield strength allows designers to make fuller use of the HYPRESS® strength.

#### The cost saver

The cost of materials is a large proportion of every manufacturer's total expenditure. To reduce this cost by even a small percentage can lead to a tremendous overall saving. HYPRESS® provides such opportunities. The high strength of HYPRESS® allows the down gauging of steel requirements whilst maintaining or even increasing strength levels of the component. In weight terms, less steel is required. Further cost savings may also be achieved by reduced through costs in production and design optimisation.

#### The problem solver

In the automotive industry, vehicle designers are under continual pressure to keep unit weight down to a minimum to achieve a lower fuel consumption and greater payload. HYPRESS® provides the opportunity to reduce weight and increase strength, thus obtaining a greater load bearing capacity. Such benefits are equally valuable in other industries.

#### Chemical composition

HYPRESS® grades are low carbon steels with increased strength from the addition of micro-alloying elements such as niobium, vanadium and titanium. Strengthening in this way gives excellent cold formability. This can further be improved where required by:

- Reducing the amount of non-metallic inclusions present.
- Control of sulphur.
- Modifying the shape of inclusions by special additions.

The exact chemistry will depend on a particular application, but all HYPRESS® grades will be within the general composition shown below, but with tighter restriction on some elements where necessary.

**Table 1: Typical Composition**

Element	Weight %
Carbon	0.12 max
Manganese	1.20 max
Phosphorus	0.035 max
Sulphur	0.035 max
Titanium / Niobium / Vanadium	0.30 max

#### Design

Valuable weight savings can be achieved by exploiting high yield characteristics.

#### Weight saving

Increased yield strength means increased load carrying capacity before permanent deformation.

#### Mechanical properties

The higher yield strength of HYPRESS® up to four times that of mild steel can provide a solution to strength problems.

**Table 2: HYPRESS® mechanical properties**

Grade	Minimum Yield Strength (Re) Mpa	Minimum Tensile Strength (Rm) Mpa	Minimum Elongation % (50mm)
20	300	400	28
23	350	430	25
26	400	460	22
29	450	510	21
32	500	555	20
35	550	600	19
40	620	680	18

**Table 3: \*Nearest equivalent International Grades to HYPRESS® products**

Corus	European	National UK	France	Germany	America	America
<b>HYPRESS®</b>	EN 10149- 2:1996	BS 1449- 1:1991	NFA36- 231:1992	SEW 092: 1990	ASTM A 1011: 2003 HSLAS-F	SAE J1392: 1984
<b>20</b>	S315MC	HS40F30	E315D			045Y
<b>23</b>	S355MC	HS43F35	E355D	QStE340/380TM	Grade 50	050Y
<b>26</b>	S420MC	HS46F40	E420D	QStE420TM	Grade 60	060Y
<b>29</b>	S460MC	HS50F45		QStE460TM		
<b>32</b>	S500MC		E490D	QStE500TM	Grade 70	070Y
<b>35</b>	S550MC	HS60F55	E560D	QStE550TM	Grade 80	080Y
<b>40</b>	S600MC	HS68F62	E620D			

\* Note – The equivalent grades above may not be exact and should only be used as a guide. Not all equivalent grades have been used in this example, please enquire for suitability.

### Impact properties

In addition to high strength, HYPRESS® steels have room temperature impact properties at least as good as those of mild steel, and offer excellent sub zero properties.

### Metallurgy

HYPRESS® steels exploit the strengthening effects of grain refinement and precipitation hardening in order to retain maximum cold formability. As the mechanical properties of HYPRESS® are developed during thermal processing in the hot strip mill, it is recommended that HYPRESS® is not subject to hot forming operations as this may result in a reduction in mechanical properties.

### Product consistency

Careful standardised production methods ensure product consistency.

### Surface quality

HYPRESS® is monitored throughout all stages of production to maintain a consistently high standard of surface quality.

### Fatigue strength

Components made from HYPRESS® possess significantly higher fatigue strength in comparison with similar components made from mild steel.

### Weldability

HYPRESS® is weldable with all conventional arc welding processes. By virtue of their low carbon equivalent HYPRESS® has improved weldability over other steels of equivalent strength.

**Table 4: Size range**

Mill Edge		Sheared edge	
Width (mm)	Thickness (mm)	Width (mm)	Thickness (mm)
150 - 350	1.6 - 10.0	26 - 340	1.6 - 3.5
351 - 430	2.0 - 8.0	26 - 390	2.0 - 3.5
431 - 460	3.0 - 8.0	26 - 420	3.0 - 3.5
		50 - 450	3.5 - 8.0

- Conditions of supply: – Black or pickled & oiled  
– Mill or sheared edge.
- Cut lengths: from 800mm to 11,000mm.
- Coil dimensions: – Inside diameter 508mm  
– Outside diameter 1350mm max.
- Coil weight: up to 9.5kg/mm of strip width.
- Tolerances: width and thickness to EN10048: 1997.

### Technical support

Corus Narrow Strip has a comprehensive technical support team, available to advise on the use of HYPRESS® to achieve the maximum benefit. Technical Account Managers provide specialist advice and help with day-to-day problem solving. Works based metallurgists and the full resources of Corus Research and Development Laboratories are available to assist with longer-term developments.

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