

# Steels for hot stamping

## Data sheet

### Product characteristics

Usibor® 1500 and 22MnB5, which have very high mechanical strength after hot stamping, are two steels in the range of products developed to meet vehicle weight reduction requirements. Usibor® 1500 and 22MnB5 are intended for use in automobile structural and safety components. These steels are designed to be heat treated and then die-quenched during the hot stamping process. The mechanical properties of the final part make significant weight savings possible (up to 50 percent compared to standard high yield strength steel). The very high yield strength of these steels after heat treatment and hot stamping make them suitable for anti intrusion and safety cage components, including bumper beams, door beams, B-pillars, A-pillars, roof rails, cross-bows and traverse and longitudinal members.

The manufacturing process of these steels, and the thermo-mechanical treatment they undergo during hot rolling, result in good structural uniformity and quenchantability, ensuring good response to heat treatment and hot stamping.

The main advantages to Usibor® 1500 and 22MnB5 are:

- Separation of forming and service properties
- High hot formability allowing relatively complex geometries
- Absence of part springback

ArcelorMittal was the first steelmaker to offer the automotive industry a coated Press Hardened Steel: Usibor® 1500.

Usibor® 1500 has an aluminum-silicon pre-coating and was developed to protect the metal

from oxidation (scale) and decarburization during hot stamping. The pre-coating is applied to the coils in a continuous process, similar to zinc coatings. Usibor®1500 hot stamped parts do not require corrosion protection prior to assembly. The additional advantages of Usibor®1500 (above and beyond those of 22MnB5) are:

- Elimination of the shot-blasting step required for conventional uncoated hot forming steels (no scale)
- Very good final part geometric tolerance (no shot-blasting, hence no deformation)
- Excellent final part corrosion resistance
- No decarburization
- Simplified process and cost savings (no shot-blasting, no inert atmosphere in ovens)

### Applications

Because of their high mechanical strength after hot stamping, Usibor®1500 and 22MnB5 are particularly well suited for the entire range of structural parts in a vehicle's Body in White (BIW) and especially for safety parts.

Most of the current applications are intrusion-resistant passenger and engine compartment components:



## Chemistry - Typical

	C	Mn	Si	Other
22MnB5/modified	0.24	1.20	0.20	Cr, Mo, Ti, B

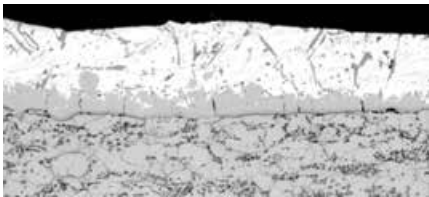
## Chemistry - Max

	C	Mn	Si	Other
Usibor®1500	0.25	1.40	0.35	Cr, Ti, B
Ductibor®1000	0.10	1.80	0.50	Nb, Ti, B

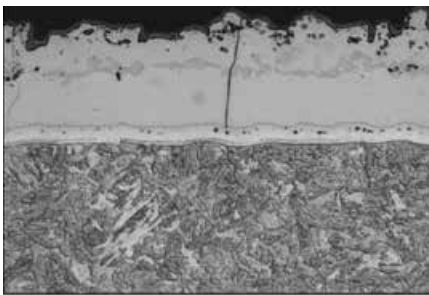
## Mechanical properties - Typical

	Yield strength (MPa)	Ultimate tensile strength (MPa)	Total elongation (%)
As delivered – before hot stamping (information only)			
Usibor®1500	400	600	≥10
22MnB5/modified	400	600	≥10
Ductibor®1000	500	800	≥12
After hot stamping according to best practices (information only)			
Usibor®1500	1100	1500	6
22MnB5	1100	1500	6
Ductibor®1000	850	1050	6

## Metallography

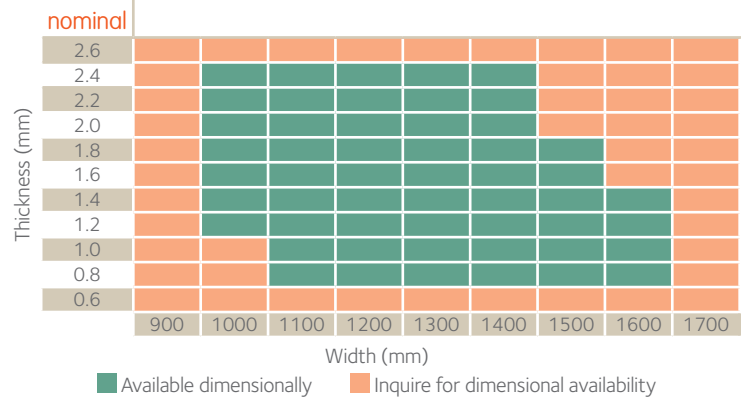


Prior to heat treatment – Ferrite Pearlite as delivered coating

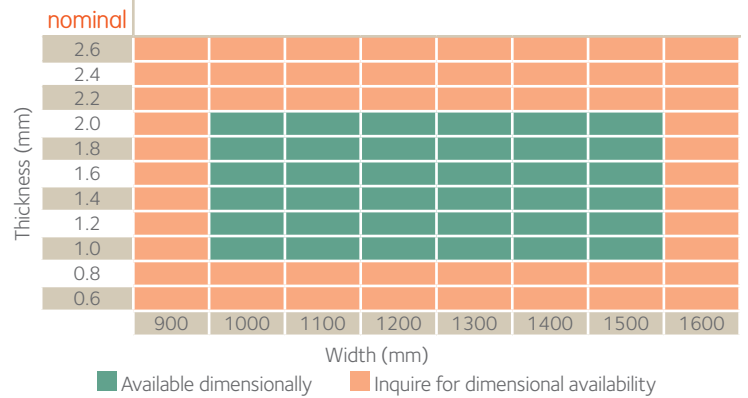


After heat treatment – 100% MARTINSITE® with alloyed coating

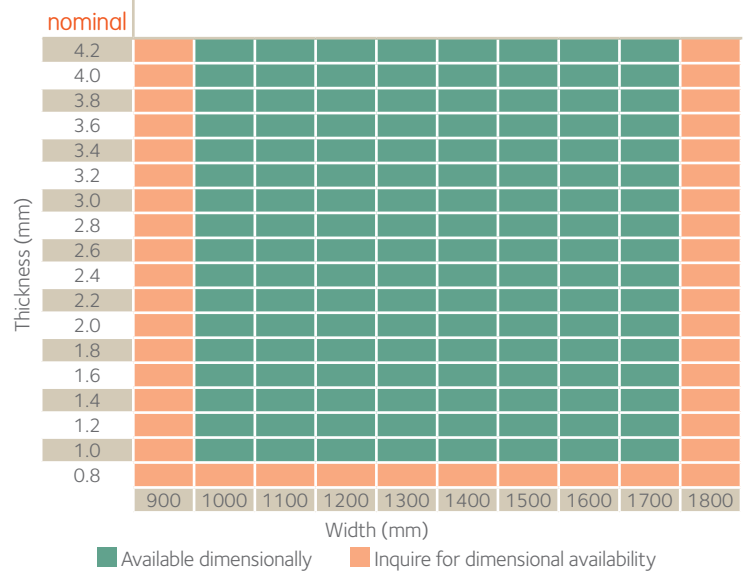
## Size availability – Usibor® 1500



## Size availability – Ductibor® 1000



## Size availability – 22MnB5



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September 2016