

CREUSABRO^â M

A wear resistant steel

CREUSABRO M is a high Manganese, fully austenitic, quench annealed, non magnetic, work-hardening steel with an exceptionally high level of wear resistance when subjected to work-hardening by shock or high impact pressure in service.

The main characteristics is a superior wear resistance :
Severe wear on the surface has a work-hardening effect on the austenitic structure of this steel. This, when combined with the level of carbon in accordance with the international standards, leads to an increase in hardness from 200BHN (in as delivered plates) up to an in-service hardness of at least 600BHN.
This work-hardening capability renews itself through out in-service life. The underlayers not work-hardened maintain an excellent resistance to shock and a very high ductility.

STANDARD

AFNOR.....Z120M12
EURONORM.....X120Mn12
WERKSTOFF Nbr.....W1.3401
OTHER STANDARD....."HADFIELD"
ASTM.....A128Grade B2

CHEMICAL ANALYSIS

Typical values (% Weight)

C	Si	Mn	S
1.15	0.40	13	≤0.002

PROCESSING*

The grade is processed by usual methods taking into account its special properties : specifically its aptitude for work-hardening, high coefficient of expansion, and low thermal conductivity.

▪ Cutting

Thermal cutting : possible using oxy-acetylene with iron powder addition or improved using plasma or laser cutting which result in a cleaner quality of cut.

* ask for detailed brochure

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WELDING

Mechanical cutting :

Shearing can be easily achieved with sufficiently powerful machines and freshly sharpened blades. When crossed cutting is necessary, intermediate local grinding is required on edges (already work-hardened).

▪ **Machining**

By standard methods allowing for work-hardening : the edges of the tool should bite beyond the work-hardened zones, necessitating a rigid machine.

- **Drilling** using supercarburized cobalt alloy high speed steel bits of HSSCO type (AFNOR grade 2-9-1-8, AISI grade M42), with reinforced shape, 130° point angle, long twist, low cutting speed (2-3m/min.), high feed, lubrication using soluble oils.

The depth of the hole to be drilled should not exceed 3 times the bit diameter. (Other solutions : 3 nibbed bits with carbide reinforcement, concrete drill bits, hot drilling).

- **Milling** using supercarburized high speed steel tools of HSSCO type (AISI grade M42) or carbide tipped tools (ISO grade K10) and high feed (as for drilling) to bite beyond work-hardened zones.

Punching is possible on sufficiently powerful equipment and with tools in good condition (avoid denting shocks).

▪ **Forming**

Bending and rolling are easy : to be performed cold only (at workshop temperature). Avoid forming directly on zones previously work-hardened, (e.g. sheared edges), carry out grinding of these areas.

Using standard procedures taking into account : high coefficient of expansion, low thermal conductivity, risk of carbide precipitation above 300°C (572°F).

Weld metal :

- **Heterogeneous welds** (most common practice) :

For manual arc welding typical deposits recommended are 18Cr8Ni6Mn or 20Cr10Ni3Mo (class A5.4E307 or 5.4E308Mo per AWS).

For semi-automatic welding under gas the same type of deposit is used in

- solid wire – class A5.2ER 307 or A5.9ER 308 Mo per AWS
- coated wire – class A5.22^E 307T or A5.22^E 308 Mo T per AWS

- **Homogeneous welds** : (work-hardenable deposit)

Typical deposit 13Mn3NiMo (class A5.13^E FeMn per AWS) for manual welding. For semi-automatic welding coated wire of similar composition, with or without protective gas.

General recommendations :

Welding is performed with low heat-input $E < 20 \text{KJ/cm}$, interpass temperature limited to $\cong 100^\circ\text{C}$ (212°F) with water cooling, if necessary between each pass. Any distortion can be hammered out.

N.B. NEVER PREHEAT

DIMENSIONAL PROGRAMME

Our thickness range is one of the widest available on the world market : 3 to about 120mm (0.125"-(") and sizes up to 2500 (96") x 8000mm (315").

Standard dimensions :

- 1500 X 3000 (60" X 118")
- 2000 X 6000 (79" X 236")
- 2500 X 8000 (96" X 315")

Other dimensions on request.

NOTE :

1. This technical data and information represents our best knowledge at the time of printing. However, it may be subject to some slight variations due to our ongoing research programme on abrasion resistant grades.

We therefore suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here is only for the purpose of description, and may only be considered as guarantees when our company has given written formal approval.

Further information may be obtained from the following address.

2. Creusabro Mn : Application range.

Creusabro Mn has been developed specifically for its abrasion resistance. Customer's usage of CREUSABRO Mn for any other purposes, not directly resulting from its abrasion resistance, is his own prerogative but won't, in any way, engage USINOR INDUSTRIEL's responsibility. In addition to the recommendations given in this document, Customer will have to follow the Industry standard quality rules for any processing operation performed on this material.

For all information : **USINOR INDUSTRIEL**

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