

## W 1.2738

### W 1.2738: a 300 HB/32 HRC prehardened mold steel

#### Material properties

300HB (32 HRC) prehardened grade designed for plastic mold industry, for medium size moulds and tools with good machinability. Consistent texturing and polishing improved by **very low sulphur content**.

#### For which tools

Plastic injection mould cores and cavities.

#### For which plastics

Thermoplastics (PE, PP, PS), thermosetting plastics, transparent melts.

## PROPERTIES

### STANDARD

- > DIN EN 4957      40 CrMnNiMo 8 - 6 - 4
- > Werkstoff        W1.2738
- > AISI                ≈ P20 + Ni

### CHEMICAL ANALYSIS - WEIGHT%

Typical Industeel analysis

| C   | S     | P    | Si  | Mn  | Ni  | Cr  | Mo  |
|-----|-------|------|-----|-----|-----|-----|-----|
| 0.4 | 0.005 | .012 | 0.3 | 1.5 | 1.0 | 1.9 | 0.2 |

### MECHANICAL PROPERTIES

W1.2738 is delivered **quenched and tempered to 290 - 330 HB (30 - 35 HRC)**.

| Hardness | Rp 0.2 Yield Strength |     | Rm Tensile strength |     | Elongation | Reduction of area | KCV 20°C | Elastic modulus |       |
|----------|-----------------------|-----|---------------------|-----|------------|-------------------|----------|-----------------|-------|
| HB       | MPa                   | ksi | MPa                 | ksi | %          | Z%                | J        | GPa             | ksi   |
| 300      | 826                   | 120 | 993                 | 144 | 17         | 49                | 25       | 205             | 29733 |

Typical values

### PHYSICAL PROPERTIES

| Thermal conductivity W.m-1.K-1 |  | Thermal expansion Coefficient (10-6.K-1) |          |          |          | Specific heat J/<br>kg.°C |
|--------------------------------|--|--|----------|----------|----------|---------------------------|
| 20°C                           |  | 20-100°C                                 | 20-200°C | 20-300°C | 20-400°C |                           |
| 29                             |  | 11.5                                     | 11.9     | 12.6     | 12.6     | 470                       |

Typical values

## METALLURGICAL PROPERTIES

### Internal soundness:

All plates are ultrasonically tested. The acceptance standards of ASTM A578.96 – S9 are guaranteed.

### Cleanliness:

The content of non metallic inclusions is reduced to an extremely low level. This ensures a good polishability and chemical etching ability. Non metallic inclusions content is assessed in accordance with ASTM E45 Method A (“Worst field”).

| A (Sulfides) |       | B (alumina) |       | C (silicate) |       | D (Globular oxides) |       |
|--------------|-------|-------------|-------|--------------|-------|---------------------|-------|
| Thin         | Heavy | Thin        | Heavy | Thin         | Heavy | Thin                | Heavy |
| 1.0          | 1.0   | 2.0         | 1.0   | 1.0          | 0.5   | 1.5                 | 1.0   |

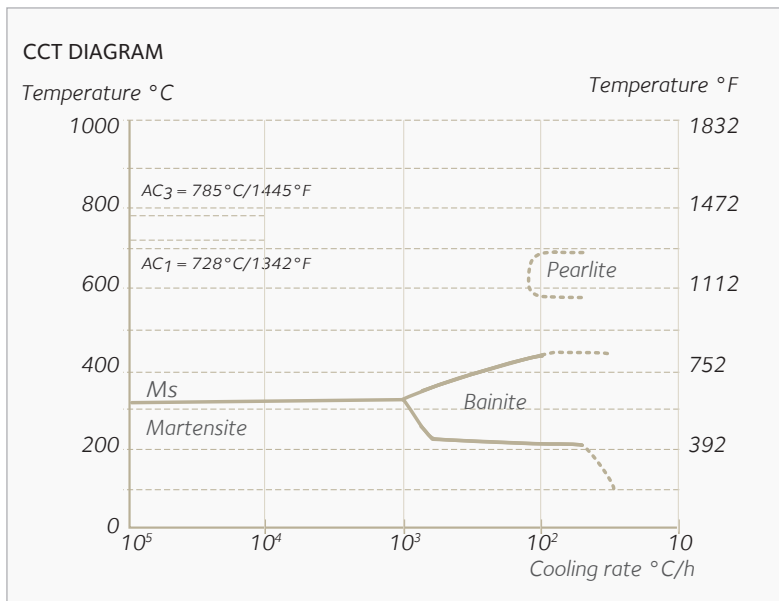
Guaranteed levels

### Metallurgical transformation points

| AC <sub>1</sub> °C (°F) | AC <sub>3</sub> °C (°F) | M <sub>s</sub> °C (°F) | V <sub>1</sub> °C (°F) | V <sub>2</sub> °C (°F) |
|-------------------------|-------------------------|------------------------|------------------------|------------------------|
| 728 (1342)              | 785 (1445)              | 310 (590)              | 1000 (1832)            | 100 (212)              |

### Homogeneity

Owing to its high nickel content, W1.2738 has an excellent hardenability resulting in good uniformity of hardness and microstructure through the thickness.



## PLATE PROCESSING

### HEAT TREATMENTS

For particular applications where mechanical properties higher than 300 HB are required, hardening can be performed in the following way:

- Heating at about 850 °C (1560 °F) with a sufficient holding time 1 hour/25 mm (1h/inch)
- Oil or air quenching depending on thickness (see CCT diagram in order to prevent any pearlitic constituent)

Tempering temperature controls mechanical characteristics. Generally, follow these instructions:

- uniform heating at the selected tempering temperature
- holding time: one hour per inch of total thickness
- double tempering with intermediate cooling to room temperature

In case of complicated parts, holding time should be determined considering the thicker section of the part.

For any further information on heat treatments, please contact us.

## PLATE PROCESSING

### SURFACE TREATMENT

Quality of surface treatment depends largely on the surface roughness and characteristics after polishing. Homogeneity of hardness, microstructure and good cleanliness ensure a good behavior for chromium plating, nickel plating or nitriding.

After hard chromium plating, the steel should be tempered for about 4 hours at 180°C (356°F) in order to avoid hydrogen embrittlement.

### POLISHING

W1.2738 has a good polishability in quenched and tempered condition. After grinding, polishing shall be performed with aluminium oxide or diamond paste.

It is necessary to avoid overpolishing (high pressure or polishing time) which may create defects (orange peel, waves...).

### WELDING

GTAW is the recommended process to ensure a clean weld without any sulphides, porosities or oxides which affect properties of the weld.

Pre - and postheating treatment must be achieved to ensure crack free welds.

For more information about welding procedure, please contact us.

### MACHINING

W1.2738 grade shows good performances in drilling and in milling using carbide tools.

Cutting conditions (cutting speed, feed rate, etc...) depend on the tool. Cutting conditions of W1.2311 can be applied on W1.2738 grade.

### ELECTRICAL DISCHARGE MACHINING (EDM)

This method of machining can be used on W1.2738 grade.

After machining, a rehardened surface layer - the "white layer" - generally appears by grinding and polishing. This layer should be completely removed.



## DELIVERY CONDITIONS

### DIMENSIONAL PROGRAM

| Thickness                 | Width                      | Length            |
|---------------------------|----------------------------|-------------------|
| 7 - 120 mm (.27" - 5")    | 1000 - 2500 mm (39" - 98") | up to 6 m (20 ft) |
| 120 - 700 mm (5' - 27.5") | 1000 - 2100 mm (39" - 79") |                   |

For specific dimensions, please contact our sales department.

## YOUR CONTACTS

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Technical data and information are to the best of our knowledge at the time of printing. However, they may be subject to some slight variations due to our ongoing research programme on steels. Therefore, we 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 are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company. Further information may be obtained from the address opposite.