

## S420M steel plates

Thermomechanical rolled weldable fine grain structural steel

### Product description

S420M – fine grain structural steel after thermomechanical rolling. This steel grade possesses good weldability features, high resistance to brittle cracking and good cold-forming properties. S420M steel plates meet requirements of EN 10025-4.

It is typically used for welded structures in shipbuilding and machine-building and for construction of bridges, steel structures and wind generators supports.

### Available dimensions

S420 steel plates of quality categories M and ML are available with thicknesses of 8-50 mm. Rolled product widths can be up to 3200 mm, lengths up to 12200 mm max. With plate thickness of 50 mm and width of 3200 mm, the maximum length is 7500 mm. The maximum plate weight is 9.5 tons. Plates are supplied with edges trimmed.

### Mechanical properties according to DSTU EN 10025-4

| Thickness (t), mm | Yield strength, min MPa | Tensile strength, MPa | Elongation, min % |
|-------------------|-------------------------|-----------------------|-------------------|
| ≤ 16              | 420                     | 520-680               | 19                |
| 16 < t ≤ 40       | 400                     | 520-680               | 19                |
| 40 < t ≤ 50       | 390                     | 500-660               | 19                |

| Steel grade | Impact energy KV, min J |    |     |     |     |     |     |
|-------------|-------------------------|----|-----|-----|-----|-----|-----|
|             | +20                     | 0  | -10 | -20 | -30 | -40 | -50 |
| S420M       | 55                      | 47 | 43  | 40  | -   | -   | -   |
| S420ML      | 63                      | 55 | 51  | 47  | 40  | 31  | 27  |

### Chemical composition

According to DSTU EN 10025-4 (max %)

| Grade  | C    | Si   | Mn   | P     | S     | Nb   | V    | Ti   | Cr   | Ni   | Mo   | Cu   | Al (min) | N     |
|--------|------|------|------|-------|-------|------|------|------|------|------|------|------|----------|-------|
| S420M  | 0.16 | 0.50 | 1.70 | 0.030 | 0.025 | 0.05 | 0.12 | 0.05 | 0.30 | 0.80 | 0.20 | 0.55 | 0.02     | 0.025 |
| S420ML |      |      |      | 0.025 | 0.020 |      |      |      |      |      |      |      |          |       |

### Metinvest's products

| Grade  | C    | Si   | Mn   | P     | S     | Nb   | V    | Ti   | Cr   | Ni   | Mo   | Cu   | Al (min) | N     |
|--------|------|------|------|-------|-------|------|------|------|------|------|------|------|----------|-------|
| S420M  | 0.15 | 0.30 | 1.70 | 0.020 | 0.007 | 0.04 | 0.12 | 0.05 | 0.30 | 0.80 | 0.20 | 0.55 | 0.02     | 0.010 |
| S420ML |      |      |      |       |       |      |      |      |      |      |      |      |          |       |

### Carbon equivalent

| Thickness, mm | CEV             |                      |
|---------------|-----------------|----------------------|
|               | DSTU EN 10025-4 | Metinvest's products |
| ≤ 16          | 0.43            | 0.41                 |
| 16 < t ≤ 40   | 0.45            | 0.43                 |
| 40 < t ≤ 50   | 0.46            | 0.44                 |

$$CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$$

## **Welding**

Due to their low carbon content and low carbon equivalent, these steels are suitable for both manual and automatic welding as per all known welding procedures.

Due to good cracking resistance properties, pre-heating before welding is unnecessary. However, the quality of joint weld depends on the welding procedure, its conditions and range of suitable additives. Use of gas welding is not recommended.

It is necessary to use welding wire and welding electrodes as additives suitable for the strength category. Electrodes with basic coating are recommended for manual welding. The grades are not suitable for heat treatment at temperatures higher than 580°C. Stress relieving (530-580°C) is only required when prescribed.

The company that works with these steel grades should make sure that its calculations, design and methods of treatment are suitable for this material.

## **Contacts**

### **Product development**

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