MATERIAL DATA SHEET

# STEEL GRADE

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OVAKO

## 42CrMo4 All

### General Information

42CrMo4 is a steel for quenching and tempering, which has a good combination of strength and toughness in the quenched and tempered condition. After the oil quenching, the steel will be through hardened up to ø60 mm bar diameter. The microstructure of larger dimensions is not fully martensite. The steel is applicable to induction hardening. The surface hardness will exceed min. 53 HRC. 42CrMo4 can be delivered M-treated in order to optimize the machinability.

Variant 6082 is offered under the name MoC410M

Variant 6115 conform with SAE 4140 and ISO 898 Grade 10.9 up to 60 mm bar diameter

Variant 6137 conform with L7 ASTM A320 and ISO 898 Grade 10.9 up to 50 mm bar diameter

Variant SB4288 is offered under the name SB42CrMo4

Variant 327S is a continuous cast variant with slightly increased hardenability, similar to the ingot casted variant 327A

Variant 327A is an ingot cast variant with slightly increased hardenability.

Variant 326C  is a BQ-steel variant which fulfils SAE 4140 standard but has a restricted sulphur content for improved cleanliness and a lower maximum allowed phosphorus content for improved mechanical properties

### Similar designations

AISI 4140, 42CD4(AFNOR), 708M40(B.S.), SS 2244, SS142244, SAE 4140H, ASTM A193 B7, 41Cr4, 42CrMoS4, 1.7225

### Chemical composition

| Variant | Cast | Di | Weldability | | C % | Si % | Mn % | P % | S % | Cr % | Ni % | Mo % | Cu % | Al % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB 4288 | CC | 4.9 | CEV $0.8_{max}$ | Min | 0.40 | 0.20 | 0.75 | - | 0.020 | 0.90 | - | 0.15 | - | - |
| | | | Pcm $0.57_{max}$ | Max | 0.43 | 0.35 | 0.90 | 0.025 | 0.035 | 1.10 | 0.30 | 0.20 | 0.25 | 0.040 |

## Mechanical Properties

| Variant | Condition | Format | Dimension [mm] | Yield strength min [MPa] | Tensile strength [MPa] | Elongation $A_5$ [%] |
|---|---|---|---|---|---|---|
| SB 4288 | +QT | Round bar | 15 < 64 | 940** | 1050-1140 | 9 |

*$Rp_{0.2}$ * $R_{eh}$, ** $R_{el}$*

## Transformation temperatures

| | Temperature °C |
|---|---|
| MS | 320 |
| AC1 | 740 |
| AC3 | 770 |

## Heat treatment recommendations

| Treatment | Condition | Temperature cycle | Cooling/quenching |
|---|---|---|---|
| Hot forging | +U | 850-1050°C | In air |
| Soft annealing | +A | 680-720°C | Slowly ( 15°C/h) until 600°C |
| Stress relieve annealing | +SRA | 450-650°C | In air |
| Quench & Tempering | +QT | 840-880°C | In oil or water. Temper in 540-680°C |
| Stress relieve annealing | +SRA | 150-180°C ( after Induction Hardening ) | In air |

## SUSTAINABILITY-ENVIRONMENTAL IMPACT DATA

At Ovako sustainability and reduction of our environmental impact is a major focus in everything we do.
Further information is found here.

| Steel works | Hofors | Smedjebacken | Imatra |
|---|---|---|---|
| CO2e/kg | 120 | 62 | 76 |

To get the full picture of our products environmental impact we have to look at all of our $CO_2$ emission sources.
Not only the steel work Scope 1-2 itself, but all operations downstream in our production, heating and heat treatment furnaces etc (full scope 1-2) as well as all the emission from input material, eg. alloys, scope 3.

| Steel Grade | Format | Condition | Scope 1-3 (CO2e kg /1000 kg steel) |
|---|---|---|---|
| 327 | Round bar | +AR | 621 |
| 327 | Round bar | +QT | 627 |
| 327 | Tube,wall | +AR | 643 |
| 327 | Tube,wall | +QT | 651 |
| 326C | Round bar | +AR | 615 |
| 326C | Round bar | +QT | 621 |
| 326C | Tube,wall | +AR | 638 |
| 326C | Tube,wall | +QT | 646 |
| SB 4288 | Flat bar | +A | 433 |
| L7 ASTM A320 (6137) | Round bar | +AR | 531 |
| L7 ASTM A320 (6137) | Round bar | +QT | 786 |
| 6082 | Round bar | +AR | 524 |
| 6082 | Round bar | +QT | 778 |
| 42CrMnMo4-3, ASTM A 320 L7 | Round bar | +AR | 531 |
| 42CrMnMo4-3, ASTM A 320 L7 | Round bar | +QT | 786 |
| 42CrMnMo4-4,SAE 4140 | Round bar | +AR | 530 |
| 42CrMnMo4-4,SAE 4140 | Round bar | +QT | 783 |

All above data are to be seen as typical values for the specified format and condition. Detailed information about your specific product please contact your sales contact.

### Other properties (typical values)

| Youngs module (GPa) | Poisson´s ratio (-) | Shear module (GPa) | Density (kg/m3) |
|---|---|---|---|
| 210 | 0.3 | 80 | 7800 |
| **Average CTE 20-300°C (µm/m°K)** | **Specific heat capacity 50/100°C (J/kg °K)** | **Thermal conductivity Ambient temperature (W/m°K)** | **Electrical resistivityAmbient temperature (µΩm)** |
| 12 | 460 - 480 | 40 - 45 | 0.20 - 0.25 |

## Contact us

Would you like to know more about our offers? Don´t hesitate to contact us:

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For more detailed information please visit http://www.ovako.com/en/Contact-Ovako/

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