

C35 All

General Information

C35 is a medium Carbon steel, one of the most widely used for machinery parts. Excellent forgeability. Special variants can be made available for cold drawing. Due to the carbon content preheating and postheating are required when welding. Wide range of mechanical properties can be attained by quenching and tempering.

Similar designations

C35E, DIN Ck35, 080M36, XC38, 1035, GOST 35

Chemical composition

| Variant | Cast | Di | Weldability | | C % | Si % | Mn % | P % | S % | Cr % | Ni % |
|---------|------|------|-------------------------|-----|------|------|------|-------|-------|------|------|
| C35E | CC | 0.98 | CEV 0.65 _{max} | Min | 0.35 | 0.15 | 0.50 | - | 0.015 | - | - |
| | | | Pcm 0.49 _{max} | Max | 0.39 | 0.35 | 0.80 | 0.030 | 0.035 | 0.30 | 0.30 |

Mechanical Properties

| Variant | Condition | Format | Dimension [mm] | Yield strength min [MPa] | Tensile strength [MPa] | Elongation A ₅ [%] | Hardness | Impact (ISO-V) strength _{min} |
|---------|-----------|-----------|----------------|--------------------------|------------------------|-------------------------------|------------|--|
| C35E | +AR | Round bar | < 20 | 345* | 520-690 | 10 | < 230 HB | 0 °C 0 J (long) 0 °C 0 J (transv) |
| | | Round bar | 20 < 90 | 345* | 520-690 | 19 | 165-220 HB | - |

$RP_{0.2}$ * R_{eh} ** R_{el}

Transformation temperatures

| | Temperature °C |
|-----|----------------|
| MS | 355 |
| AC1 | 722 |
| AC3 | 781 |

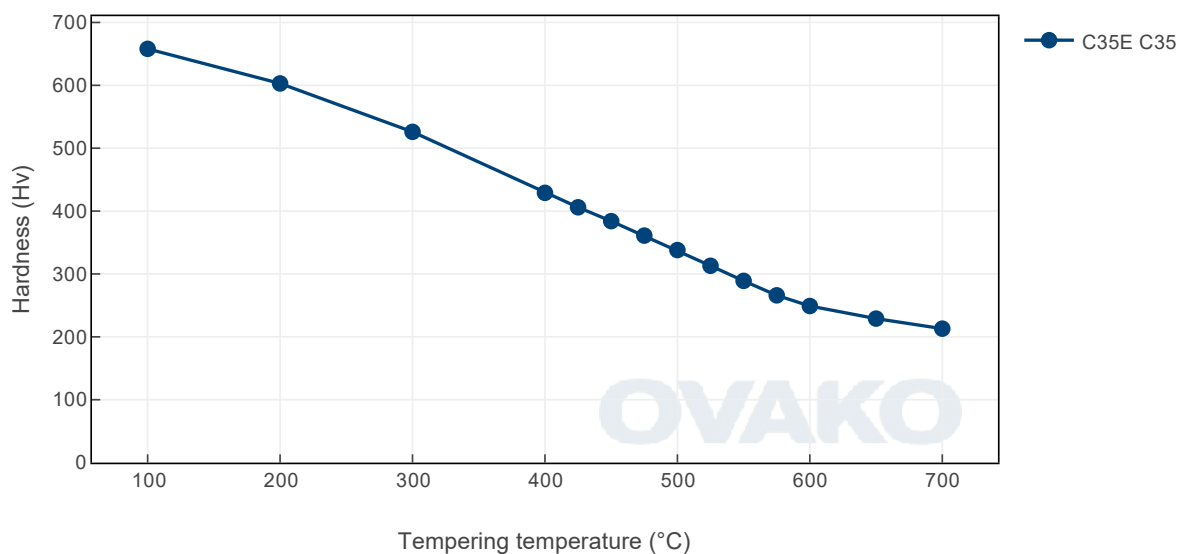
Heat treatment recommendations

| Treatment | Condition | Temperature cycle | Cooling/quenching |
|--------------------|-----------|--|-------------------|
| Hot forging | +AR | Heat to 1245°C | Cooling in air |
| Normalizing | +AR | Heat to 915°C (min 800°C) | Cooling in air |
| Quench & Tempering | +AR | Hardened at 845°C | Quenching in oil |
| Tempering | +QO | Tempering at 370°C in order to get tensile strength in the range 620-860 MPa | |

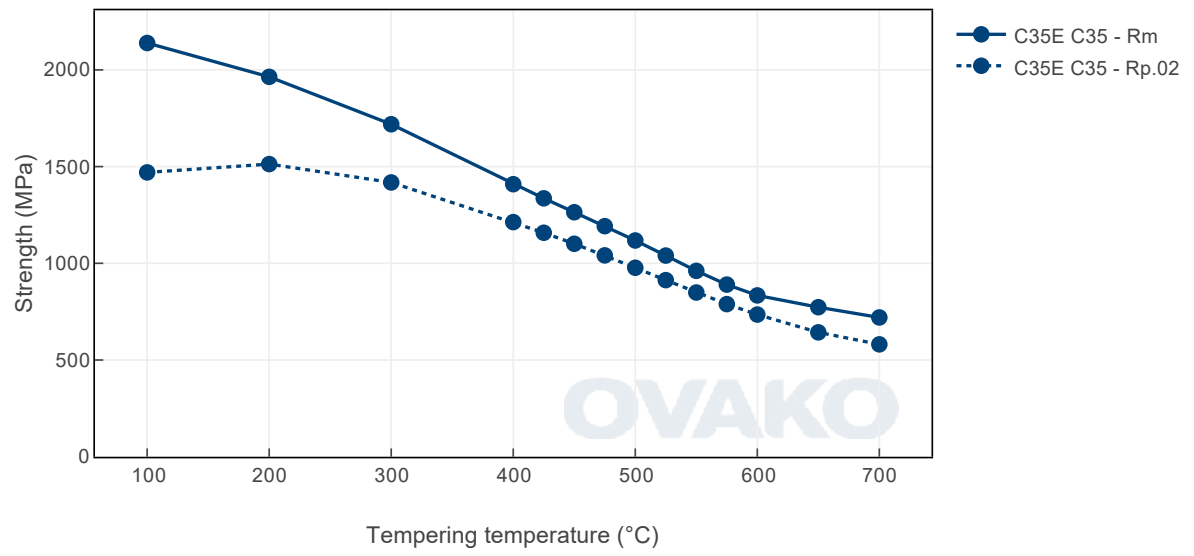
Heat Treatment Guide generated Graphs

The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.

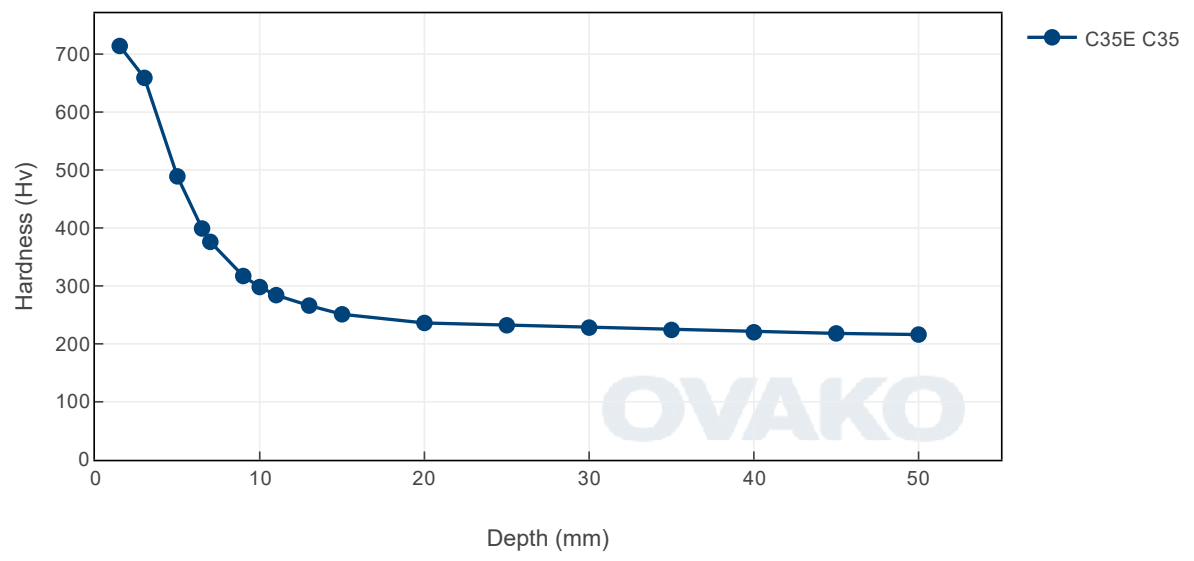
Tempering Diagram (hardness)



Tempering Diagram (strength)



Jominy



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 CO₂ 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) | Climate compensated Net emission = Scope 3 (CO2e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated) |
|-------------|----------|-----------|------------------------------------|---|
| C35E | Flat bar | +AR | 393 | 156 |

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 resistivity Ambient 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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Via telephone: +46 8 622 1300

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

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