

| | | |
|------------------------|-------------------------|---|
| Quality | 30CrNiMo8 | <i>Technical card</i> Lucefin Group |
| According to standards | EN 10083-3: 2006 | |
| Number | 1.6580 | |

Chemical composition

| C% | Si% max | Mn% | P% max | S% max | Cr% | Mo% | Ni% | Product deviations are allowed |
|---------------------|----------------|---------------------|------------------|------------------|---------------------|---------------------|---------------------|--------------------------------|
| 0,26-0,34 ± 0.02 | 0,40 ± 0.03 | 0,50-0,80 ± 0.04 | 0,025 + 0.005 | 0,035 + 0.005 | 1,80-2,20 ± 0.05 | 0,30-0,50 ± 0.04 | 1,80-2,20 ± 0.07 | |

Temperature °C

| Hot-forming | Normalizing | Quenching | Quenching | Tempering | Stress-relieving | | |
|---|----------------------|---------------------------|----------------------------------|---------------------|---|------------------|------------------|
| 1050-880 | 870-880 air | 830-860 oil or polymer | 850 water | 540-660 air | 50° under the temperature of tempering | | |
| Soft annealing | +AR natural state | | End quench hardenability test | Pre-heating welding | Stress-relieving after welding | | |
| 650-700 cooling 10 °C/h to 600, then air (HB max 248) | (HB max 370) | | 850 water | 300 | 550 furnace cooling | | |
| | | | | Ac1 720 | Ac3 770 | Ms 310 | Mf 100 |

Mechanical and physical properties

Hot-rolled mechanical properties in **quenched and tempered** condition EN 10083-3: 2006/AC: 2008

| size d / t mm | | Testing at room temperature (longitudinal) | | | | | |
|------------------|---------|--|-----------------------------|------------|------------|---------------------|-----------------------|
| from | to | R N/mm ² | Rp 0.2 N/mm ² | A% min. | C% min. | Kv +20 °C J min. | HB for information |
| | 16/8 | 1250-1450 | 1050 | 9 | 40 | | 370-415 |
| 16/8 | 40/20 | 1250-1450 | 1050 | 9 | 40 | 30 | 370-415 |
| 40/20 | 100/60 | 1100-1300 | 900 | 10 | 45 | 35 | 331-380 |
| 100/60 | 160/100 | 1000-1200 | 800 | 11 | 50 | 45 | 298-359 |
| 160/100 | 250/160 | 900-1100 | 700 | 12 | 50 | 45 | 271-331 |

d = diameter t = thickness

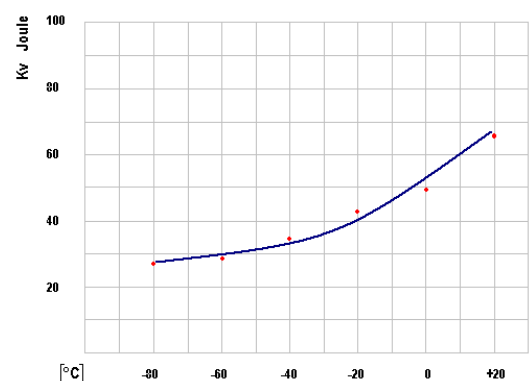
Table of tempering values obtained at room temperature on rounds of Ø 10 mm after quenching at 850 °C in oil

| | | | | | | | |
|-----------------|-------------------|------------|------------|------------|------------|------------|------------|
| HB | | 426 | 404 | 381 | 347 | 275 | 240 |
| HRC | | 45 | 43 | 41 | 37 | 28 | 23 |
| R | N/mm ² | 1500 | 1400 | 1290 | 1150 | 920 | 800 |
| Rp 0.2 | N/mm ² | 1350 | 1250 | 1090 | 960 | 780 | 640 |
| A | % | 10.0 | 10.0 | 11.0 | 14.0 | 16.0 | 18.0 |
| C | % | 42 | 45 | 48 | 50 | 52 | 52 |
| Kv | J | 20 | 50 | 60 | 75 | 80 | 92 |
| Tempering at °C | | 450 | 500 | 550 | 600 | 650 | 700 |

Transition-curve; LUCEFIN experience

Kv values obtained on hot-rolled 32 mm round
Quenched and tempered (induction) R **1260** N/mm²
Rp 0.2 **1110** N/mm² – A% **11,8** – C% **59**

| °C | J | average | | |
|------------|--------------|---------|--------------|---------|
| | | J | Lat. Exp. mm | Shear % |
| +20 | 58 – 72 – 68 | 66 | 0,62 | 50 |
| 0 | 53 – 46 – 49 | 49 | 0,42 | 40 |
| -20 | 44 – 44 – 45 | 42 | 0,34 | 20 |
| -40 | 31 – 32 – 35 | 33 | 0,27 | 10 |
| -60 | 28 – 28 – 27 | 28 | 0,25 | 10 |
| -80 | 28 – 26 – 26 | 27 | 0,16 | 10 |



30CrNiMo8

Lucefin Group

Hot-rolled, quenched and tempered, **cold-drawn** +QT +C

| size | | Testing at room temperature (longitudinal) | | | |
|------|----|--|-----------------------|-----------|-----------|
| mm | | R | Rp 0.2 | A% | HB |
| from | to | N/mm ² | N/mm ² min | min | max |

No indications from reference standards

| Cold-drawn | | Testing at room temperature (longitudinal) | | | | size | Cold-drawn | Cold-drawn annealed or |
|-------------------|----|--|-----------------------|-----------|-----------|------|---------------------|-------------------------------|
| mm | | R | Rp 0.2 | A% | HB | mm | obtained from | annealed + peeled-reeled |
| from | to | N/mm ² | N/mm ² min | min | | | hot-rolled annealed | max HB |

No indications from reference standards

Forged quenched and tempered UNI EN 10250-3: 2001

| size d / t | | Testing at room temperature | | | | | | | | | HB min. |
|------------|---------|-----------------------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------|----------------|
| mm | | R | Rp 0.2 | A% L | A% T | A% Q | Kv L | Kv T | Kv Q | | |
| from | to | N/mm ² | N/mm ² min | min | min | min | J min | J min | J min | <i>for inform.</i> | |
| | 250/160 | 900 | 700 | 12 | 8 | | 45 | 22 | | 271 | |
| 250/160 | 500/330 | 850 | 630 | 12 | 8 | | 45 | 22 | | 253 | |
| 500/330 | 990/660 | 800 | 590 | 12 | 8 | | 40 | 20 | | 240 | |

L = longitudinal T = tangential Q = radial
d = diameter t = thicknessEN 10083-3: 2006 **Jominy test HRC** grain size 5 min.

mm distance from quenched extremity

| | 1.5 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | symbol |
|------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------|
| min | 48 | 48 | 48 | 48 | 47 | 47 | 47 | 46 | 46 | 45 | 45 | 44 | 44 | 43 | 43 | H |
| max | 56 | 56 | 56 | 56 | 55 | 55 | 55 | 55 | 55 | 54 | 54 | 54 | 54 | 54 | 54 | |
| min | 51 | 51 | 51 | 51 | 50 | 50 | 50 | 49 | 49 | 48 | 48 | 47 | 47 | 47 | 47 | HH |
| max | 56 | 56 | 56 | 56 | 55 | 55 | 55 | 55 | 55 | 54 | 54 | 54 | 54 | 54 | 54 | |
| min | 48 | 48 | 48 | 48 | 47 | 47 | 47 | 46 | 46 | 45 | 45 | 44 | 44 | 43 | 43 | HL |
| max | 53 | 53 | 53 | 53 | 52 | 52 | 52 | 52 | 52 | 51 | 51 | 51 | 51 | 50 | 50 | |

| Temperature | Mod. of elasticity | Thermal expansion | Specific heat capacity | Specific electric resistivity | Thermal conductivity |
|---------------|--------------------|------------------------------------|------------------------|-------------------------------|----------------------|
| Testing at °C | E long. GPa | 10 ⁻⁶ · K ⁻¹ | J/(Kg·K) | Ohm·mm ² /m | W/(m·K) |
| -100 | 217 | 10.5 | 423 | | |
| 0 | 213 | 11.4 | 456 | | |
| 20 | 212 | 11.5 | 461 | 0.309 | 33.7 |
| 100 | 207 | 12.1 | 479 | 0.354 | 36.2 |
| 200 | 199 | 12.7 | 499 | 0.418 | 37.8 |
| 300 | 192 | 13.2 | 517 | 0.505 | 37.2 |
| 400 | 184 | 13.6 | 536 | 0.609 | 35.7 |
| 500 | 175 | 14.0 | 558 | 0.727 | 34.0 |
| 600 | 164 | 14.4 | 587 | 0.867 | 32.0 |

Density +20 °CKg/dm³

7.80

Physical properties according to DIN SEW 310 (08/1992) standard

| EUROPE EN | ITALY UNI | CHINA GB | GERMANY DIN | FRANCE AFNOR | U.K. B.S. | RUSSIA GOST | USA AISI/SAE |
|-----------|-----------|----------|-------------|--------------|-----------|-------------|--------------|
| 30CrNiMo8 | 30CrNiMo8 | | 30CrNiMo8 | 30NCD8 | 823M30 | | A320L43 |