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|----------------|-----------------|------------------------|----------------------------|
| Quality | X3CrNb17 | Ferritic | <i>Technical card 2018</i> |
| Number | 1.4511 | Stainless Steel | <i>Lucefin Group</i> |

Chemical composition

| C% | Si% | Mn% | P% | S% | Cr% | Nb% ^{a)} | N% | Mo% | |
|--------|--------|--------|---------|---------------------|-----------|-------------------|----|-----|------------------|
| max | max | max | max | max | | max | | | |
| 0,05 | 1,00 | 1,00 | 0,040 | 0,030 ^{b)} | 16,0-18,0 | 1,00 | - | - | EN 10088-3: 2014 |
| ± 0.01 | + 0.05 | + 0.03 | + 0.005 | ± 0.005 | ± 0.2 | + 0.05 | - | - | |

Product deviations are allowed. ^{a)} Nb: 12 x C; ^{b)} For polishability, it is suggested a controlled sulphur content of max 0,015 %

Temperature °C

| Melting range | Hot-forming | Solution annealing +AT | Stabilizing | Curie temperature | MMA welding – AWS electrodes |
|---------------|--------------|------------------------|-------------------|-------------------|---|
| 1500-1470 | 1100-850 | not suitable | not necessary | | <i>pre-heating</i> <i>post weldin</i> not necessary not necessary |
| Sensitization | Quenching +Q | Tempering +T | Soft annealing +A | | <i>joint with steel</i> carbon CrMo stainless E308 E309-E308 E308L <i>cosmetic welding</i> 1.4316 |
| not suitable | not suitable | not suitable | 850-750 air | | |

Chemical treatment - Pickling (15-25% HNO₃) + (1-8% HF) hot

Mechanical properties

Material annealed +A EN 10088-3: 2014 in conditions 1C, 1E, 1D, 1X, 1G, 2D

| size mm | | Testing at room temperature | | | | | |
|---------|----|-----------------------------|---------------------------|---------------------------|----------|----------|----------------------|
| from | to | R | Rp 0.2 | Rp 0.2 | A% t < 3 | A% t < 3 | HBW |
| | | N/mm ² | N/mm ² min (L) | N/mm ² min (T) | min (L) | min (T) | <i>for inf. only</i> |
| 50 | | 420-620 | 200 | - | 20 | - | 200 max |

(L) = longitudinal (T) = transversal

Bright bars of heat-treated material EN 10088-3: 2014 in conditions 2H, 2B, 2G, 2P

| size mm | | R | Rp 0.2 | A% |
|---------|----|-----------------------|-----------------------|-----|
| from | to | N/mm ² min | N/mm ² min | min |
| 10 | | 500-750 | 320 | 8 |
| 10 | 16 | 480-750 | 300 | 10 |
| 16 | 40 | 400-700 | 240 | 15 |
| 40 | 50 | 400-700 | 240 | 15 |

Effect of **cold-working** (hot-rolled +A+C). Approximate values

| R | N/mm ² | 450 | 560 | 600 | 620 | 660 | 700 | 750 | 790 |
|-----------|-------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Reduction | % | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |

Minimum values for the 0,2 % proof strength at elevated temperatures, annealed material +A EN 10088-2: 2014

| Rp 0.2 | N/mm ² | - | 190 | 180 | 170 | 160 | 155 | - | - | |
|-------------------------------|------------------------------------|-----------|------------|------------|------------|------------|------------|------------|------------|-----------------------|
| Test at | °C | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | |
| Thermal expansion | 10 ⁻⁶ • K ⁻¹ | | | | ► | 10 | 10 | 10.5 | 10.5 | 11 |
| Modulus of elasticity | longitudinal GPa | | | | 220 | 215 | 210 | 205 | 195 | |
| Poisson number | ν | | | | 0.28 ~ | | | | | |
| Electrical resistivity | Ω • mm ² /m | | | | 0.60 | 0.75 | 0.95 | 1.10 | 1.20 | |
| Electrical conductiv. | Siemens•m/mm ² | | | | 2.9 | | | | | |
| Specific heat | J/(Kg•K) | | | | 460 | | | | | |
| Density | Kg/dm ³ | | | | 7.70 | | | | | |
| Thermal conductivity | W/(m•K) | | | | 25 | 28 | 30 | 31.5 | 33 | 34 |
| °C | | | | | 20 | 100 | 200 | 300 | 400 | 500 600 |

The symbol ► indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C

| Corrosion resistance | Atmospheric | | Chemical | | | x steam, food and dairy products, organic acids, saline solutions |
|----------------------|-------------|--|----------|-----------|----------|---|
| | Fresh water | | medium | oxidizing | reducing | |
| x | x | | x | | | |

| | |
|-----------------------------------|--|
| Magnetic | yes |
| Machinability | good |
| Hardening | moderate by cold-drawn and other cold plastic deformations |
| Service temperature in air | oxidation resistance up to 900 |

| Europe | USA | USA | China | Russia | Japan | India | Republic of Korea |
|----------|-------|------|-------|--------|-----------|-------|-------------------|
| EN | UNS | ASTM | GB | GOST | JIS | IS | KS |
| X3CrNb17 | 430Nb | | | | SUS 430LX | | STS 430LX |



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| °C | | | | | 20 | 100 | 200 | 300 | 400 | 500 600 |

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| Corrosion resistance | Atmospheric | Chemical | x steam, food and dairy products, organic acids, saline solutions |
|----------------------|---------------------------------|--|---|
| Fresh water | <i>industrial</i> <i>marine</i> | <i>medium</i> <i>oxidizing</i> <i>reducing</i> | |
| x | x | x | |

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