METALLURGICA VENETA
ACCIAI SPECIALI

# 1.2367

Certified Company

| Quality | X38CrMoV5-3 | Supply conditions: |
|---|---|---|
| According to standards | UNI EN ISO 4957: 2002 | Annealed |
| Number | **1.2367** | |

## Chemical composition

| C% | Si% | Mn% | P% max | S% max | Cr% | Mo% | V% |
|---|---|---|---|---|---|---|---|
| 0,35-0,42 | 0,30-0,50 | 0,30-0,50 | 0,030 | 0,020 | 4,80-5,20 | 2,70-3,20 | 0,40-0,60 |
| ± 0.02 | ± 0.03 | ± 0.04 | + 0.005 | + 0.005 | ± 0.10 | ± 0.10 | ± 0.04 |

Product deviations are allowed

## Temperature °C

| Hot-forming | Quenching | Tempering see table | Stress-relieving | Stress-relieving must be done after machining and before quenching |
|---|---|---|---|---|
| 1100-900 | Heating up to 850, pause, then 1030-1080 oil, polymer, vacuum 10°/min. | Immediately after quenching minimum **2 cycles** | 600-650 furnace cooling to 300, then air | |

| Soft annealing | Stress relieving [1] | Pre-heating welding | Stress-relieving after welding |
|---|---|---|---|
| 800 furnace cooling max 25°/h to 600, then air (HB max 229) | 50° under the temperature of tempering | 350 | [1] |

| $Ac_1$ | $Ac_3$ | Ms | Mf |
|---|---|---|---|
| 850 | 950 | 335 | 120 |

## Mechanical properties

**Tempering table** values at room temperature on Ø 25 mm after quenching at 1040 °C in oil

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HB** | | 577 | 560 | 543 | 512 | 512 | 512 | 512 | 525 | 543 | 543 | 543 | 512 | 432 |
| **HRC** | | 56 | 55 | 54 | 52 | 52 | 52 | 52 | 53 | 54 | 54 | 54 | 52 | 46 |
| **R** | N/mm² | 2160 | 2070 | 2010 | 1880 | 1880 | 1880 | 1880 | 1950 | 2010 | 2010 | 2010 | 1880 | 1520 |
| Tempering at | **°C** | **50** | **100** | **150** | **200** | **250** | **300** | **350** | **400** | **450** | **500** | **550** | **600** | **650** |

**Mechanical values related to hardness HRC**

| **HRC** hardness | **R** N/mm² | **Rp** 0.2 N/mm² | **A%** | **Z%** |
|---|---|---|---|---|
| **52** | 1880 | 1552 | 12 | 35 |
| **48** | 1640 | 1331 | 13 | 38 |
| **44** | 1430 | 1179 | 13 | 40 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thermal expansion** | $10^{-6} \cdot K^{-1}$ | | 11.5 | 12.0 | 12.2 | 12.5 | 12.9 | 13.0 | | 13.2 | | |
| **Modulus of elasticity** | long. | GPa | 210000 | | | 175000 | | 166000 | | | | |
| **Modulus of elasticity** | tang. | GPa | 80000 | | | 67000 | | 64000 | | | | |
| **R** | | N/mm² | **1600** | | | 1350 | 1150 | 900 | 700 | | | |
| **Rp** 0.2 | | N/mm² | 1460 | | | 1150 | 950 | 700 | 580 | | | |
| Testing at | | **°C** | **20** | **100** | **200** | **300** | **400** | **500** | **600** | **650** | **700** | |

| Testing at **°C** | **Specific heat capacity** | **Density** Kg/dm³ | **Thermal conductivity** | **Specific electric resist.** | **Electrical conductivity** |
|---|---|---|---|---|---|
| | J/(Kg•K) | | W/(m•K) | Ohm•mm²/m | Siemens•m/mm² |
| **20** | 460 | 7.85 | 25.0 | 0.50 | 2.00 |
| **500** | 550 | 7.69 | 34.2 | 0.84 | 1.19 |
| **600** | 590 | 7.65 | 34.9 | 0.94 | 1.06 |

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**Chrome-molybdenum-vanadium alloyed tool steel** (designed for dies, moulds, punches subject to high-working temperatures)
- high resistance to thermal shock and hot cracking
- excellent mechanical characteristics and toughness in hot condition
- good resistance to tempering
- very low segregation level and excellent machinability
- applications: *dies for aluminium die-casting, dies subject to low pressure, chill moulds for gravity casting, containers and dies for aluminium extrusion, extrusion press blocks, injection moulds*