



# SANDVIK 316LVM BAR

## DATASHEET

Sandvik 316LVM is a vacuum remelted, molybdenum alloyed, austenitic stainless steel.

The grade is characterized by:

- High strength
- High fatigue strength
- Excellent microcleanliness
- Excellent structural homogeneity
- High surface finish

### STANDARDS

- UNS: S31673
- DIN: X 2 CrNiMo 18 15 3

### Product standards

- Bar and wire: ASTM F138

### CHEMICAL COMPOSITION (NOMINAL)

#### Chemical composition (nominal) %

| C      | Si  | Mn  | P      | S      | Cr   | Ni | Mo  | Cu    | N     |
|--------|-----|-----|--------|--------|------|----|-----|-------|-------|
| ≤0.025 | 0.6 | 1.7 | ≤0.025 | ≤0.003 | 17.5 | 14 | 2.8 | ≤0.10 | ≤0.10 |

### APPLICATIONS

Sandvik 316LVM is used for implant applications; hip stems, femoral heads, spinal systems, acetabular cups, intramedullary nails, bone screws, knee joints, and pins, bone and nail plates, internal fixation devices, dental implants, staples.

This grade is also used for cardiovascular applications: guide wires, cardiac stents and for surgical instruments and tools; blood lancets, stylets, trocars.

### CORROSION RESISTANCE

Sandvik 316LVM has very good resistance in physiological environments to:

- General and intergranular corrosion due to high purity and low ferrite content
- Pitting and crevice corrosion due to the high molybdenum content

Sandvik 316LVM is capable of passing the Money Penny Strauss intergranular corrosion test, in accordance with ISO / ASTM requirements.

## FORMS OF SUPPLY

Sandvik 316LVM is supplied as both billet and hot-rolled round bar.

### Other product forms

Sandvik 316LVM can also be supplied as tube (thick wall or thin wall) and wire.

## MECHANICAL PROPERTIES

| Product form     | Condition          | Tensile strength |         | Proof strength    |     | Elongation, A | Hardness, Brinell |
|------------------|--------------------|------------------|---------|-------------------|-----|---------------|-------------------|
|                  |                    | R <sub>m</sub>   |         | R <sub>p0.2</sub> |     |               |                   |
|                  |                    | MPa              | ksi     | MPa               | ksi |               |                   |
|                  |                    | min              | min     | min               | min |               |                   |
| Bar, Wire        | Annealed           | 490              | 71      | 190               | 28  | 45            | 160               |
| Bar, Wire        | Medium tensile     | 900              | 131     | 700               | 101 | 15            | 285               |
| Bar, Wire        | High tensile       | 1100             | 160     | 800               | 116 | 12            | 300               |
| Bar, Wire        | Extra high tensile | 1400             | 203     |                   |     |               |                   |
| Tube, thick wall | Bright annealed    | 515-690          | 75-100  | 220               | 32  | min 45        | 155-210           |
| Tube, thick wall | Cold finished      | 860-1100         | 125-160 | 690               | 100 | min 12        | 260-330           |
| Profile          | Cold rolled        | 860-1100         | 125-160 | 690               | 100 | 12            | 260-330           |
| Tube, thin wall  | Annealed           | 490-690          | 71-100  | 190               | 28  | 40            |                   |
|                  | Cold worked        | 860-1100         | 125-160 | 690               | 100 | 12            |                   |
| Tube, thin wall  |                    | 1100             | 160     |                   |     |               |                   |

Note that extra high tensile strength can be achieved for diameter ≤ 5 mm

## PHYSICAL PROPERTIES

| Property  |                       |                         |
|---|-----------------------|-------------------------|
| Density ( 20 °C)                                | 8.0 g/cm <sup>3</sup> | 0.29 lb/in <sup>3</sup> |
| Modulus of elasticity, x10 <sup>3</sup> (20°C)  | 200 MPa               | 29.0ksi                 |
| Specific heat capacity (20°C)                   | 485 J/(kg °C)         | 0.11 Btu/(lb °F)        |
| Thermal conductivity (20°C)                     | 14W /(m °C)           | 8 Btu/(ft h °F)         |
| Thermal expansion, x10 <sup>-6</sup> (30-100°C) | 16.5 per °C           | 9.5 per °F              |

## MACHINING

|          | Hardness | Cutting speed range | Feed range |             |          |
|----------|----------|---------------------|------------|-------------|----------|
|          |          | SFM                 | m/min      | IPR         | mm/rev   |
| Turning  | 160-300  | 900-145             | 275-45     | 0.002-0.024 | 0.05-0.6 |
| Milling  | 160-300  | 870-165             | 265-50     | 0.002-0.016 | 0.05-0.4 |
| Drilling | 160-300  | 115-195             | 35-60      | 0.002-0.012 | 0.05-0.3 |

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