

KEYLOS[®] 2738

Pre-treated steel
with enhanced
hardenability and
machinability



General characteristics

KeyLos[®] 2738 is a pre-treated steel obtained through a special 'super clean' production process, which allows high level of microcleanness.

KeyLos[®] 2738 is the best option for the user who is looking for:

- toughness and mechanical characteristics
- machinability
- micro-purity.

KeyLos[®] 2738 is supplied in the pre-treated condition to give a surface hardness between 290 and 340 HB.

High levels of machinability and microstructural homogeneity are obtained thanks to a calcium treatment process and to careful heat treatment.

KeyLos[®] 2738 is ideal for the production of blocks with thickness up to 1200 mm in that there is no major variation of internal hardness.

KeyLos[®] 2738 offers the following advantages:

- excellent machinability
- excellent suitability for photo-engraving
- excellent suitability for polishing
- good wear resistance
- optimised manufacturing cycle: from steel block to mould, with no need for intermediate treatments

KeyLos[®] 2738 is 100% ultrasonically inspected, according to the most restrictive standards.

Chemical analysis

| KEYLOS [®] 2738 | | Alloying % | |
|--------------------------|-------------|------------|-------------|
| C | 0,35 ÷ 0,45 | Cr | 1,80 ÷ 2,10 |
| Si | 0,20 ÷ 0,40 | Mo | 0,15 ÷ 0,25 |
| Mn | 1,30 ÷ 1,60 | Ni | 0,90 ÷ 1,20 |

Table for comparison of international classification

W. Nr. 1.2738

EN ISO 40CrMnNiMo8-6-4

Lucchini RS's tool steels have been researched and formulated to optimize the performance of the materials.

The brand name identifies the Lucchini RS product and the number evokes the Werkstoff classification or other means of reflecting the characteristics of use.

Main applications

KeyLos[®] 2738 in the pre-treated condition is suitable for the following applications:

Plastic moulding:

- medium and big sized moulds for the automotive industry
- moulds for food industry products
- moulds for rubber pressing
- pressure moulds (SMC, BMC)
- bolsters.

Extrusion

- dies and gauges for PVC extrusion
- mechanical parts for extrusion presses.

Physical and mechanical properties

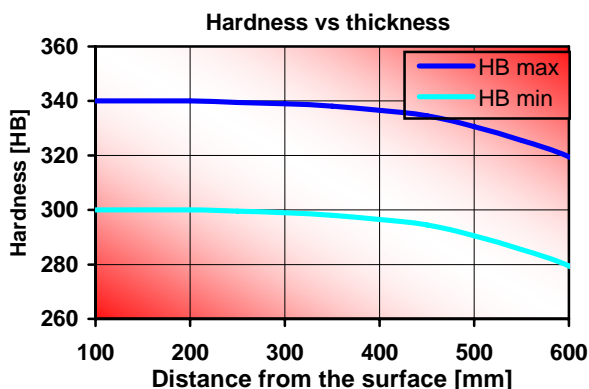
Main physical properties

| KEYLOS 2738 | at 20 °C | at 250 °C | at 500 °C |
|--|----------|-----------|-----------|
| Modulus of elasticity [kN/mm ²] | 210 | 196 | 177 |
| Coefficient of thermal expansion from 20 °C at [10 ⁻⁶ /K] | - | 12,7 | 14,3 |
| Thermal conductivity [W/m K] | 32,0 | 31,1 | 30,0 |

Main mechanical properties

| KEYLOS 2738 | at 20°C |
|--|---------|
| Ultimate tensile strength (UTS) [N/mm ²] | 1.020 |
| Yield stress (YS) [N/mm ²] | 900 |
| Elongation (A) [%] | 17 |
| Reduction of area (Z) [%] | 53 |

These values are average values obtained from the middle of the section of a 900 mm thick bar, subjected to hardening at 850 °C, oil quenching and tempering at 600° C.



Heat treatments

KeyLos® 2738 is supplied in the pre-treated condition. If it is necessary to obtain different hardness levels or if a heat treatment cycle is necessary, the parameters in the following table are recommended. The attached data are for information purposes only and must be varied dependent on the heat treatment facility and the thickness of the bar.

Soft annealing

| | |
|------------------------------|------------------------------|
| Suggested temperature | 700 °C |
| Soaking time | 60 min every 25 mm thickness |
| Cooling | Slow in the furnace |

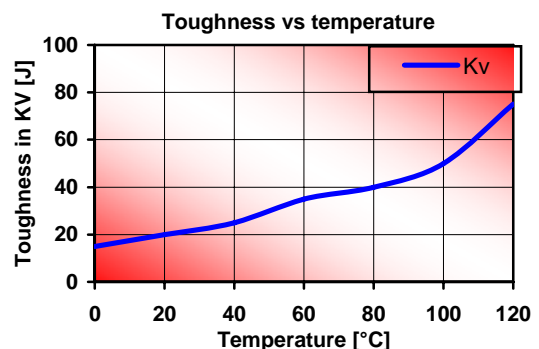
Soft annealing is useful to improve machinability. The obtained hardness is lower than 250 HB.

Stress Relieving

| | |
|------------------------------|------------------------------|
| Suggested temperature | 550 °C |
| Soaking time | 60 min every 25 mm thickness |
| Cooling | Slow in the furnace |

If the suggested temperature is lower than the tempering temperature, the stress relieving temperature will be 50° C lower than the tempering temperature previously applied

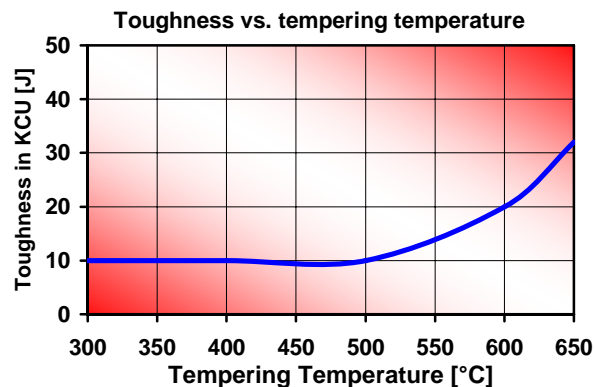
Stress relieving is recommended where it is necessary to eliminate residual stresses induced by mechanical working or by a preceding heat treatment.



Hardening

| | |
|------------------------------|------------------------------|
| Suggested temperature | 850 °C |
| Soaking time | 60 min every 25 mm thickness |
| Cooling | Oil or water quench |

We suggest to carry out hardening on material supplied in the annealed condition and tempering immediately afterwards.



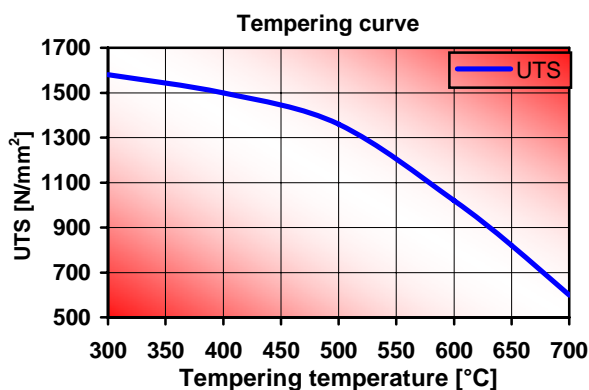
After tempering we suggest carrying out stress relieving at a temperature lower than 50 °C.

Tempering

| | |
|------------------------------|---|
| Suggested temperature | The tempering temperature to be applied to the material depends on the required mechanical properties. See following graph. |
| Soaking time | 60 min every 25 mm thickness |
| Cooling | Room temperature |

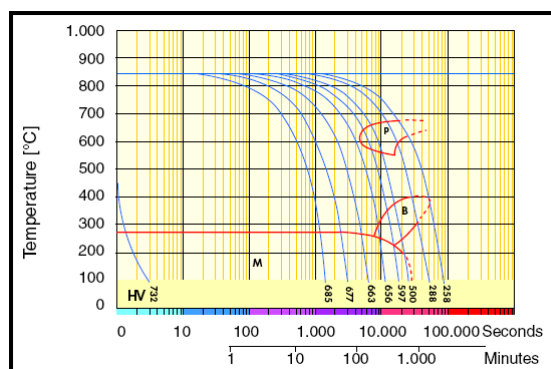
Induction hardening

On this steel it is possible to carry out induction hardening. We recommend cooling at room temperature and tempering after heat treatment.



Tempering curve of a sample which has been austenitised at 850 °C

CCT Curve

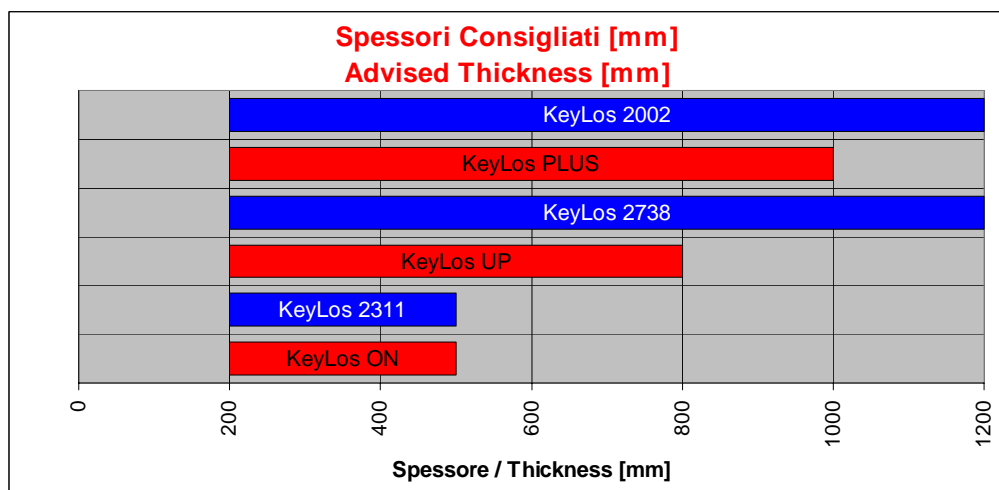
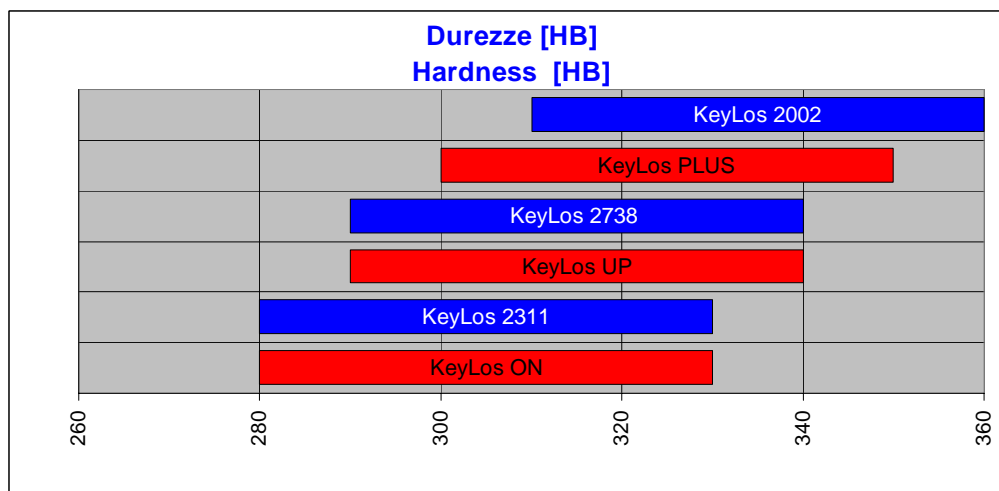


Critical points

| | | | |
|------------|--------------|-----------|--------------|
| Ac1 | 705°C | Ms | 215°C |
| Ac3 | 795°C | Mf | 20°C |

Lucchini RS Main Tool Steels

| | Machinability | Polishing | Texturing | Weldability |
|--------------------|---------------|-----------|-----------|-------------|
| KEYLOS 2002 | ★ ★ | ★ ★ ★ | ★ ★ ★ ★ | ★ ★ ★ |
| KEYLOS PLUS | ★ ★ ★ | ★ ★ ★ | ★ ★ ★ ★ | ★ ★ ★ |
| KEYLOS 2738 | ★ ★ ★ | ★ ★ ★ | ★ ★ ★ ★ | ★ |
| KEYLOS UP | ★ ★ ★ | ★ ★ ★ | ★ ★ ★ ★ | ★ ★ |
| KEYLOS 2311 | ★ ★ ★ | ★ ★ | ★ ★ | ★ ★ |
| KEYLOS ON | ★ ★ ★ ★ | ★ ★ | ★ ★ | ★ ★ ★ |



Welding

Welding of KeyLos[®] 2738 can give good results if the following procedure is followed:

| | | |
|-----------------------------------|---|-----|
| Welding technique | TIG | MMA |
| Pre-heating at | 250÷300 °C | |
| Recommended heat treatment | Stress relieving (see heat treatment paragraph) | |

For further information, please refer to the brochure.

Photo-engraving

Thanks to modern production processes and to the low sulphur content, KeyLos[®] 2738 is suitable for photo-engraving to obtain various patterns. For further information, please refer to the brochure.

Polishing

KeyLos[®] 2738 is particularly suitable for polishing. For further information, please refer to the brochure.

The logo for LUCCHINI RS features the company name in a bold, italicized, sans-serif font. Above the text is a stylized graphic element consisting of a green swoosh that transitions into a red swoosh, both pointing towards the right.

Via G. Paglia, 45

24065 Lovere (BG) - ITALY

Tel. + 39 035 963492

Fax + 39 035 963551

Web <http://www.LucchiniRS.it>

E-mail toolsteels@LucchiniRS.