KEY LOS® ON

The new steel for low thickness mould

LUCCHINI RS

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General characteristics

KeyLos® ON is the new steel grade that Lucchini RS, after careful metallurgical investigations and lab-tests, has designed for the manufacturing of bolsters for plastic moulding.

It is also suitable for punches and dies for plastic moulding.

The mix between its particular chemical analysis and a specific heat treatment guarantees to this new steel grade good machining performances and mechanical properties.

Thanks to a controlled chemical analysis and a particular production process, KeyLos® ON benefits from a small variation in mechanical characteristics between surface and core and is recommended for blocks of thickness up to 500 mm.

KeyLos® ON is supplied in pre-treated state to give hardness between 280 and 330 HB.

This steel has been designed for applications where a good equilibrium between hardenability, toughness and mechanical characteristics is required.

KeyLos® ON is the ideal choice when looking for a steel that needs good mechanical characteristics, without recourse to materials rich in alloying elements.

KeyLos® ON offers the following advantages:

- excellent machinability
- good wear resistance
- high level of weldability.

KeyLos® ON is weakly sulphur treated steel. Thanks to its, it guarantees high machinability without a high reduction of its finishing properties.

KeyLos® ON is 100% ultrasonically tested in accordance with the most stringent quality standards.

Chemical analysis

KEYLOS ON		Alloying %	
C	0,38 ÷ 0,48	Cr	0,70 ÷ 1,30
Si	0,40 ÷ 1,10	Mo	≤ 0,30
Mn	0,70 ÷ 1,30	Ni	≤ 0,30

Main applications

KeyLos® ON lends itself to the following applications:

Plastic moulding:

- die bolsters;
- moulds of small/medium size for the automotive industry
- particular moulds for the food industry
- moulds for the stamping of rubber
- moulds for compression stamping (SMC, BMC).

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Physical and mechanical properties

Main physical properties

KEYLOS ON	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	15,0
Thermal conductivity [W/mK]	35,2	34,8	34,2

Main mechanical properties

KEYLOS ON	a 20 °C
Ultimate tensile strength (**UTS**) [N/mm^2]	970
Yield stress (**YS**) [N/mm^2]	750

The data are average values obtained at half thickness on a bar of 400 mm hardened at 860 ° C quenched in oil and tempered at 540° C

Heat Treatments

KeyLos® ON is supplied in the pre-treated condition. If it's 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

Annealing can be useful where an improvement in the machinability of the material is required. The hardness obtained after treatment are less than 250 HB.

Stress Relieving

Suggested temperature	**450 °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.

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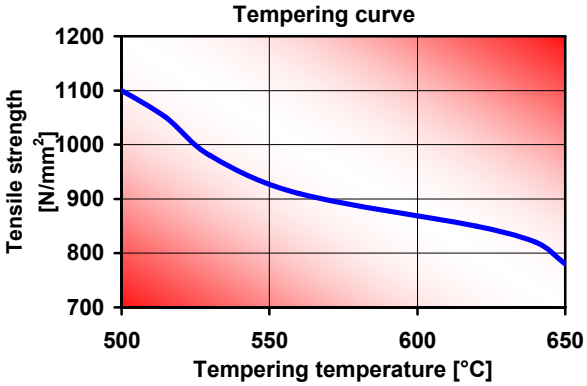
Hardening

Suggested temperature	**860 °C**
Soaking time	60 min every 25 mm thickness
Cooling	Oil or water quench

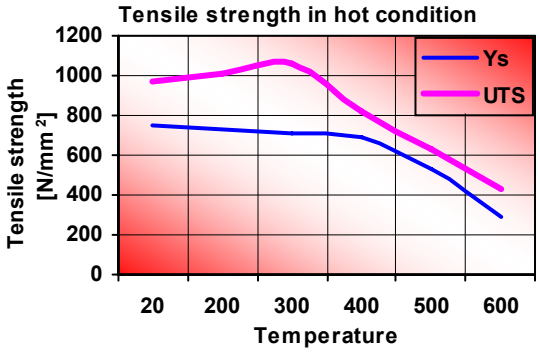
Hardenig is recommended on an annealed piece followed immediately by tempering

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



Tempering curve obtained on a test piece austenitised at 860° C. After tempering it may be useful to carry out a stress relieving cycle at a temperature lower by 50° C.



Induction Hardening

It is possible to interpose an induction hardening cycle. Air-cooling is recommended, followed by tempering

Welding

KeyLos® ON can be welded with good results by observing the following procedures:

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

KeyLos® ON in a weakly sulphur treated steel.
It is not suitable where high texture results are required. For further information, please refer to the brochure.

Polishing

KeyLos® ON in a weakly sulphur teatd steel.
It is not suitable where high polishing results are required

For further information, please refer to the brochure.

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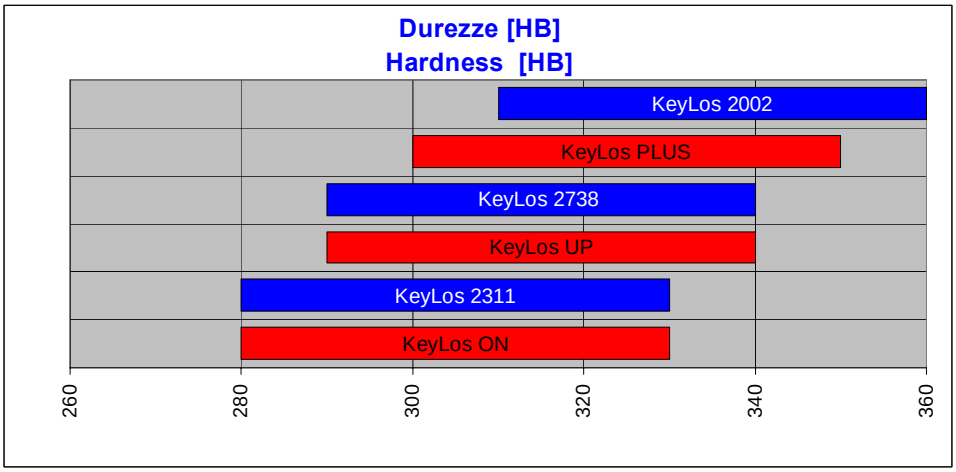
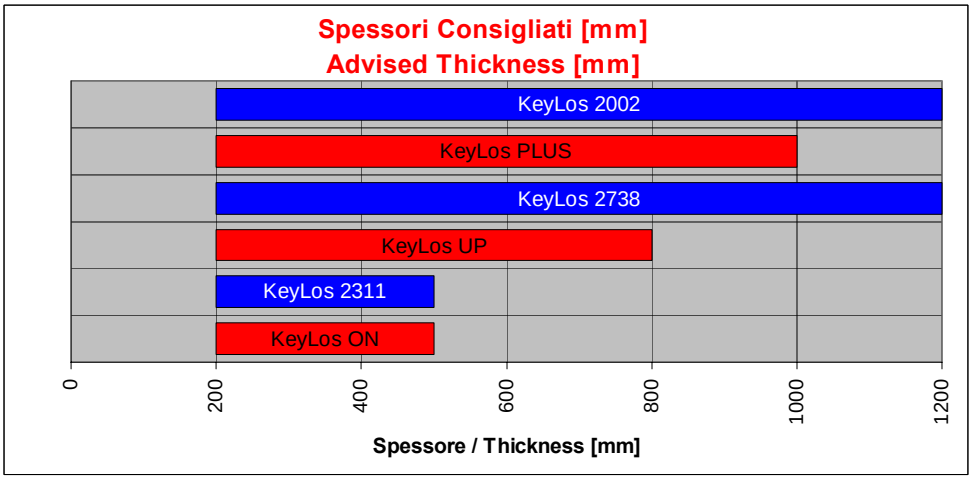
Lucchini RS Main Tool Steels

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





KEYLOS ON		
Machinability	★★★★	**Excellent, thanks to optimized chemical analysis**
Polishing	★★	**Good, thanks to a low sulphur content**
Texturing	★★	**Good, thanks to a low sulphur content and to its homogeneity microstructure.**
Weldability	★★★	**Very good, thanks to a low carbon equivalent.**

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