

# ES Primus SL

Typical analysis in %:

## Special alloy

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C Si Cr Mo V  
0.36 0.3 5.0 1.4 0.4 + Trace elements

As-supplied condition:

Annealed to a hardness of 230 HB (780 N/mm<sup>2</sup>), ESR

General fields of application:

**ES Primus SL** satisfies the most stringent demands of die-casting applications for aluminium, magnesium and other non-ferrous metals such as zinc, tin and lead as well as for the following applications: hot extrusion, forging dies, shear blades and hot steel moulds that are subjected to extreme shocks.

Whenever high resistance to thermal and mechanical induced cracking is required, our **ES Primus SL** is the correct steel to use. Its thermal stability and its excellent toughness increase the life cycle of moulds and tools.

## Heat treatment data:

	Temperatur	Dauer	Abkühlung
Soft annealing	780 - 840 °C	2 - 5 h	furnace
Stress-relief annealing	600 - 650 °C	min. 4 h	furnace
Hardening	1000 - 1040 °C		oil, air, WB 500 °C
Tempering	580 - 650 °C	min. 2 h	still air

## Physical characteristics:

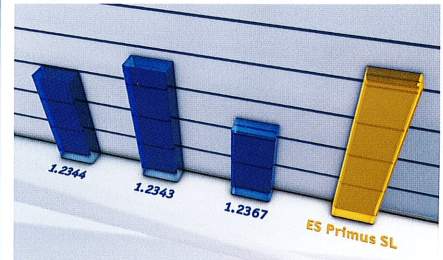
Coefficient of thermal expansion: between 20 °C and:

10 <sup>-6</sup> x m	100	200	300	400	500	600 °C
m x K	10.5	10.7	11.0	11.3	11.7	12.1

Thermal conductivity:	W	20	350	700 °C
m x K		28.7	30.0	32.4

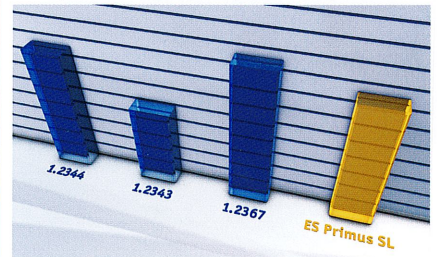
Normal working hardness: 30 - 54 HRC (1000 - 1900 N/mm<sup>2</sup>)

Toughness values according to ISO-V



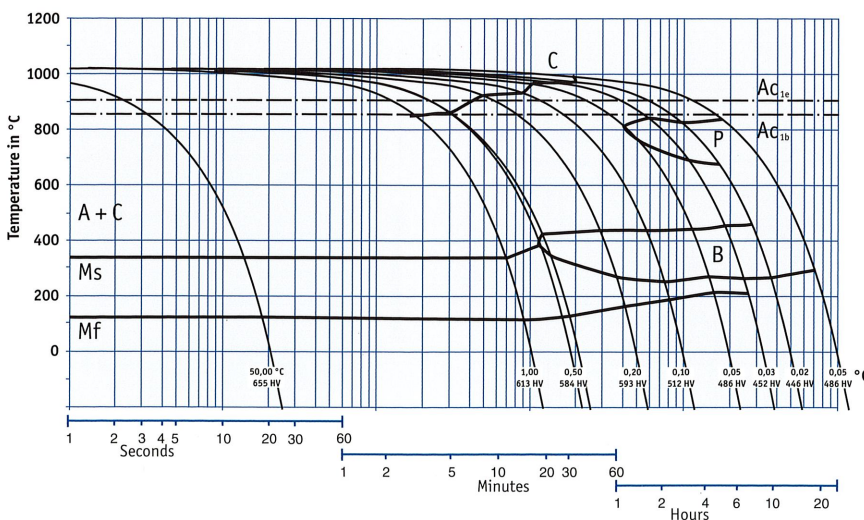
In spite of its increased thermal stability our new ESR special alloy ES Primus SL exhibits excellent toughness value when compared to the following ESR hot works steels: 1.2344 ESR and 1.2367 ESR.

Comparison of thermal stability

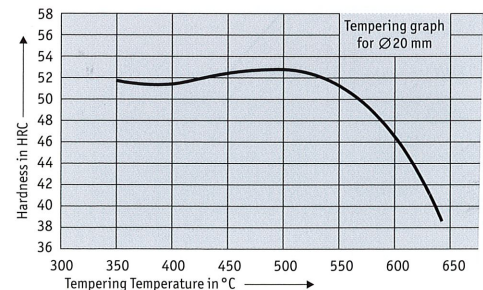


Although the toughness of our special alloy ES Primus SL is much higher than that of the hot work steel 1.2367 ESR it features a similar high degree of thermal crack resistance and exceeds the thermal stability of the grades 1.2343 ESR and 1.2344 ESR.

## Continuous time-temperature-transformation diagram



## Tempering diagram



ES Primus SL will be generally delivered in ESR condition.