EschmannStahlGrade

ESPRIMUS^{SL}

Products

ESCHMANNSTAHL

A Premium Hot Work Tool Steel

Modern plastics technology as well as heavy duty pressure die casting and forging tools put high requirements on hot work tool steel. With **ES**PRIMUS SL we succeeded in meeting the enhanced requirements of different industrial sectors.

ESPRIMUS SL itself is a technological refinement of the renowned material 1.2343 ESU which offers the following additional advantages:

- **Greater toughness**
- **Improved heat conductivity**
- **Increased wear protection due to greater hardness**
- **Excellent machinability**
- **Special hardening process provides for an isotropic structure.**

“ ESPRIMUS SL – for greater production safety and longer tool life ”

Functionality and Cost-Effectiveness Combined

The material **ES**PRIMUS SL displays almost identical toughness values in longitudinal and transverse directions. This provides for numerous advantages, particularly with complex geometries and heavy duty parts.

Injection Molding >>

Mirror polishability
due to special EschmannStahl
heat treatment process

Pressure Die Casting >>

ESPRIMUS SL – the directly
available alternative to 3D forging

Forging and Forming >>

High degree of production
and process safety due to
isotropic properties

>> Injection Molding

Your Benefits

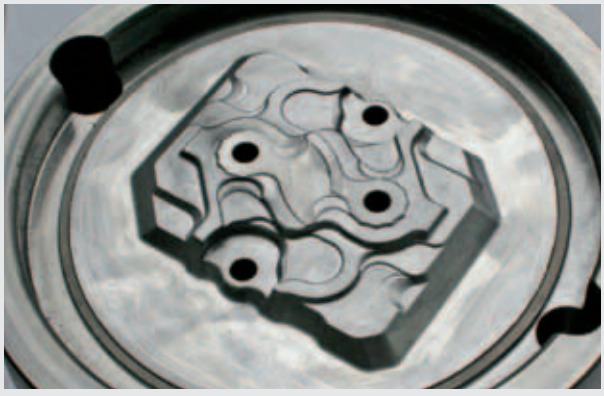
- Mirror polishability due to special EschmannStahl heat treatment process
- Improved wear resistance at high toughness
- Reduced cycle times due to higher heat conductivity
- Excellent machining properties in quenched and tempered state
- Stable mechanical values in all three spatial axes (diagrams on isotropic behavior on page 7)
- Excellent graining suitability

>> Pressure Die Casting

Your Benefits

- **ES**PRIMUS SL is a technical and cost-effective alternative to 3D forging because of its isotropic structure
- Reduced danger of thermally or mechanically induced crack formation
- Increased wear resistance and resistance to thermal shock
- **ES**PRIMUS SL meets all NADCA requirements

>> Forging and Forming



Your Benefits

- High degree of production and process safety due to uniform properties, regardless of fiber flow
- Reduced danger of thermally or mechanically induced crack formation
- Isotropic structure provides for a uniform absorption of forces even with complex gravures

Facts & Figures

Material Properties

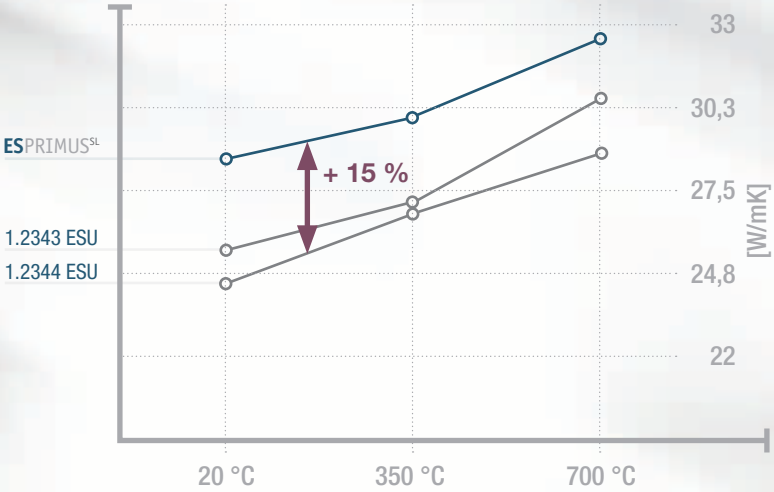
- ESU-melted with max. 230 HB
- Nitridable
- Large variety of coating options
- Normal working hardness 30–54 HRC

Material

Reference analysis in %					
C	Si	Cr	Mo	V	
0.36	0.3	5.0	1.4	0.4	+ trace elements

Heat Conductivity

At 20 °C: 28.7 W/mK



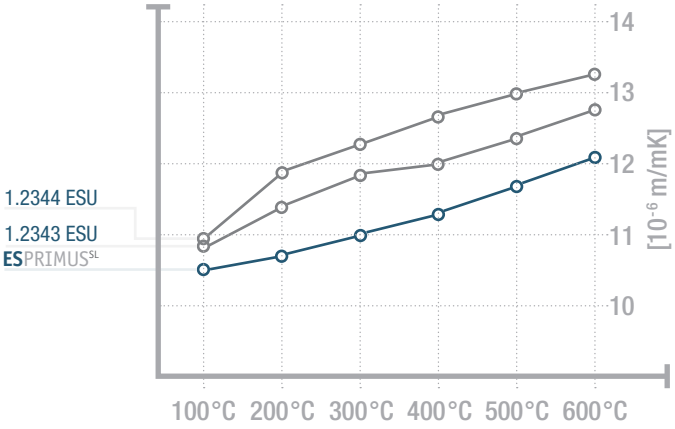
Material	20 °C	300 °C	700 °C
ESPRIMUS[SL]	28.7	30.0	32.4
1.2343 ESU	25.3	27.2	30.5
1.2344 ESU	24.5	26.8	28.8

Heat Treatment Data

Process step	Tempera-ture	Durati-on	Cooling
Soft annealing	780–840 °C	2–5 h	furnace
Stress relief heat treatment	600–650 °C	min. 4 h	furnace
Hardening	1000–1040 °C	–	oil, air, WB 500
Tempering	580–650 °C	min. 2 h	calm air

Thermal Expansion Coefficient

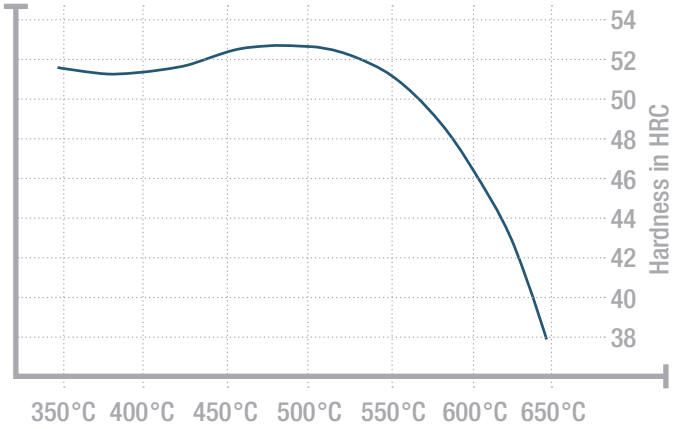
Between 20 °C and:



No design changes necessary

Tempering Diagram

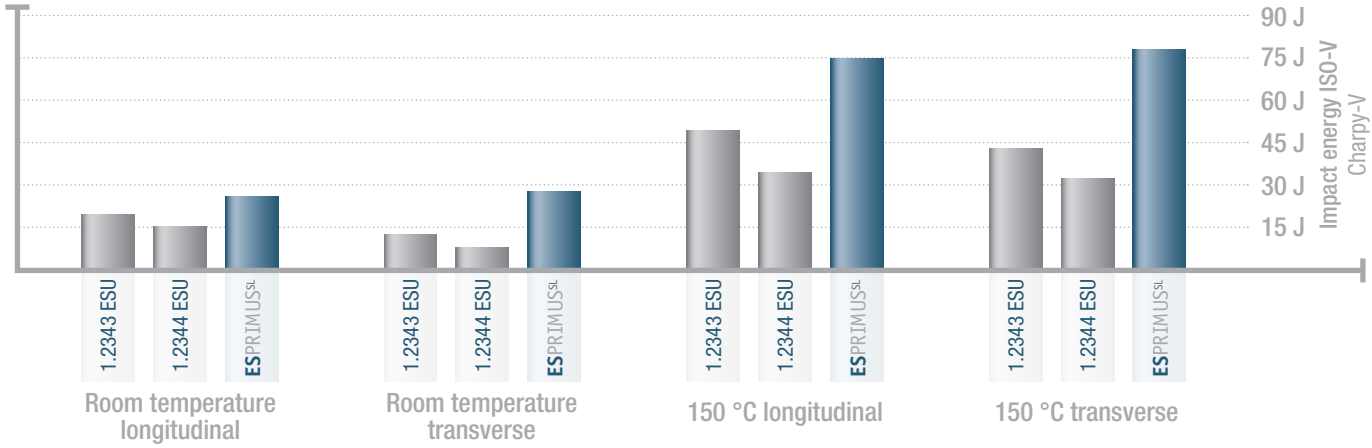
Tempering diagram for ø 20 mm



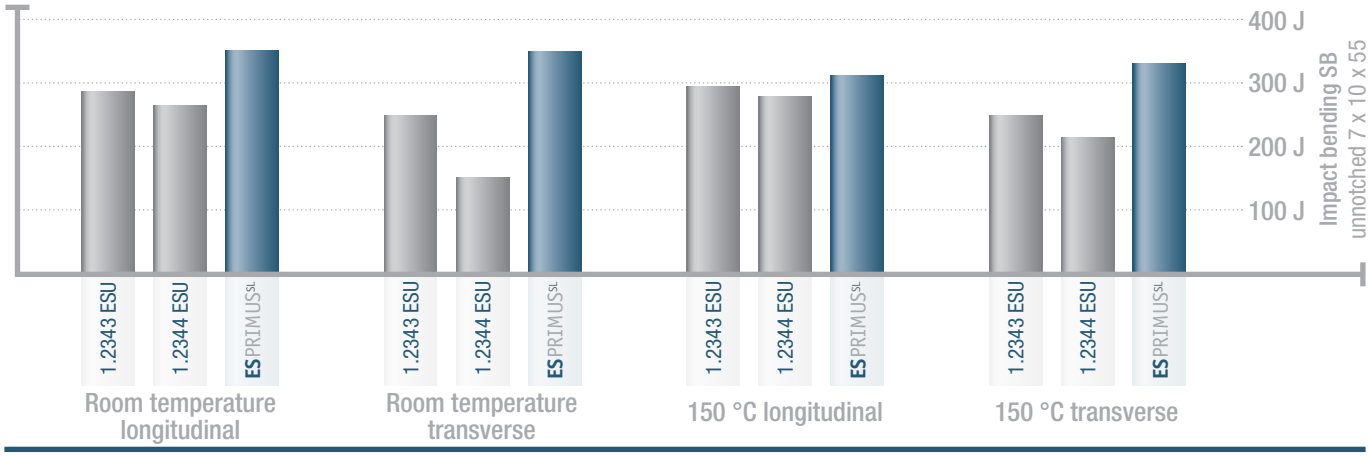
Hardening: 1010 °C | Tempering: 540–650 °C

Isotropic Structure

Comparison of impact strength longitudinal and transverse



Comparison of impact bending longitudinal and transverse



EschmannStahl GmbH & Co. KG

Dieringhauser Straße 161–183
51645 Gummersbach
Germany

Phone: +49 2261 706-0
Fax: +49 2261 706-100
E-mail: info@eschmannstahl.de

Härterei in Wehnrath

Otto-Hahn-Straße 3
51580 Reichshof-Wehnrath
Germany

ESCHMANNSTAHL