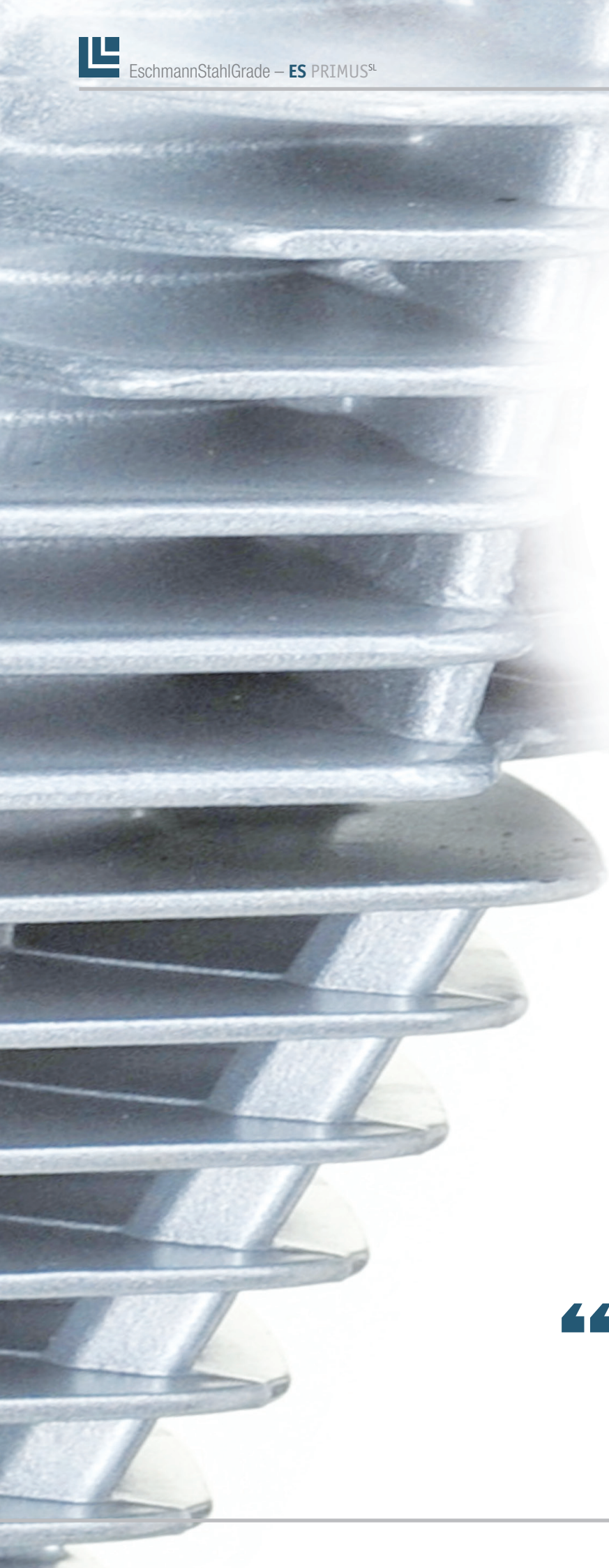


EschmannStahlGrade  
**ES PRIMUS<sup>SL</sup>**



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.

**ES PriMus 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.**

“ **ES PRIMUS<sup>SL</sup>** –  
*for greater production  
safety and longer tool life* ”

**i** Toughness  
minimum 350 J



## Injection Molding >>

Mirror polishability  
due to special Eschmann Stahl  
heat treatment process

## Pressure Die Casting >>

**ES** PriMus sL – the directly  
available alternative to 3D forging

## Forging and Forming >>

High degree of production  
and process safety due to  
isotropic properties

## 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



### Your Benefits

- Mirror polishability due to special Eschmann'stahl 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 geometries

# Facts & Figures

## Material Properties

- Esu -melted with max. 230 HB
- Nitridable
- Large variety of coating options
- Normal working hardness 30–54 H<sub>r</sub> C

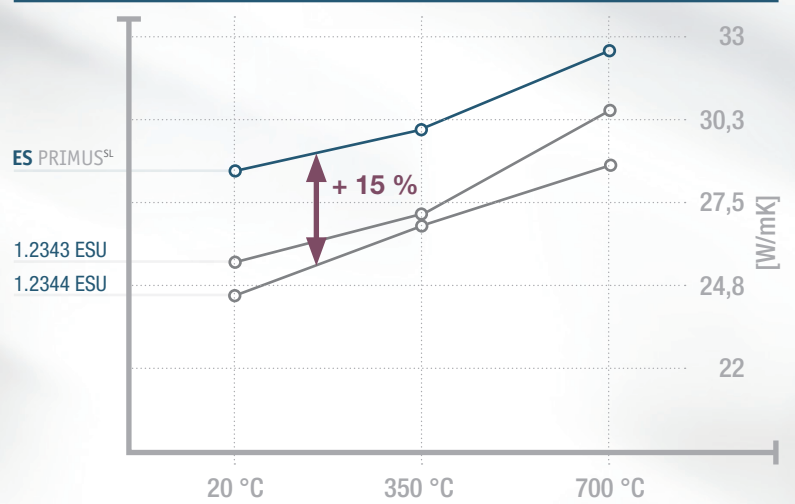


## Material

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



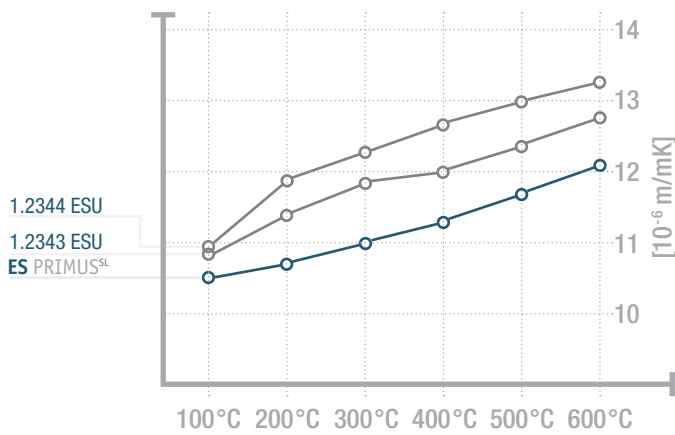
Material	20 °C	300 °C	700 °C
ES PRIMUS <sup>SL</sup>	28.7	30.0	32.4
1.2343 ESU	25.3	27.2	30.5
1.2344 ESU	24.5	26.8	28.8

## Heat Treatment Data

Process step	Temperature	Duration	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

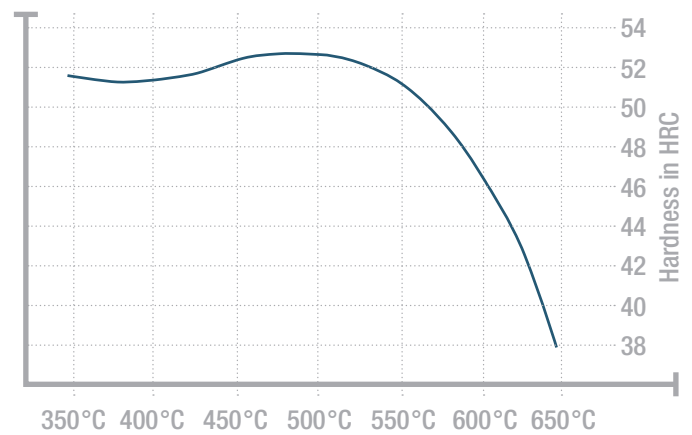
Between 20 °C and:



No design changes necessary

## Tempering Diagram

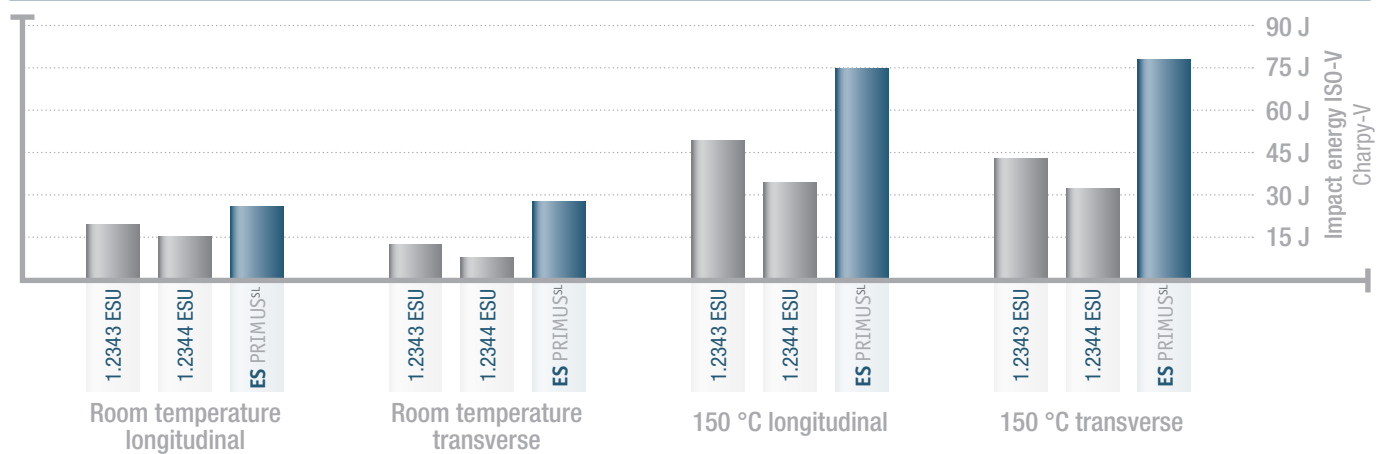
Tempering diagram for ø 20 mm



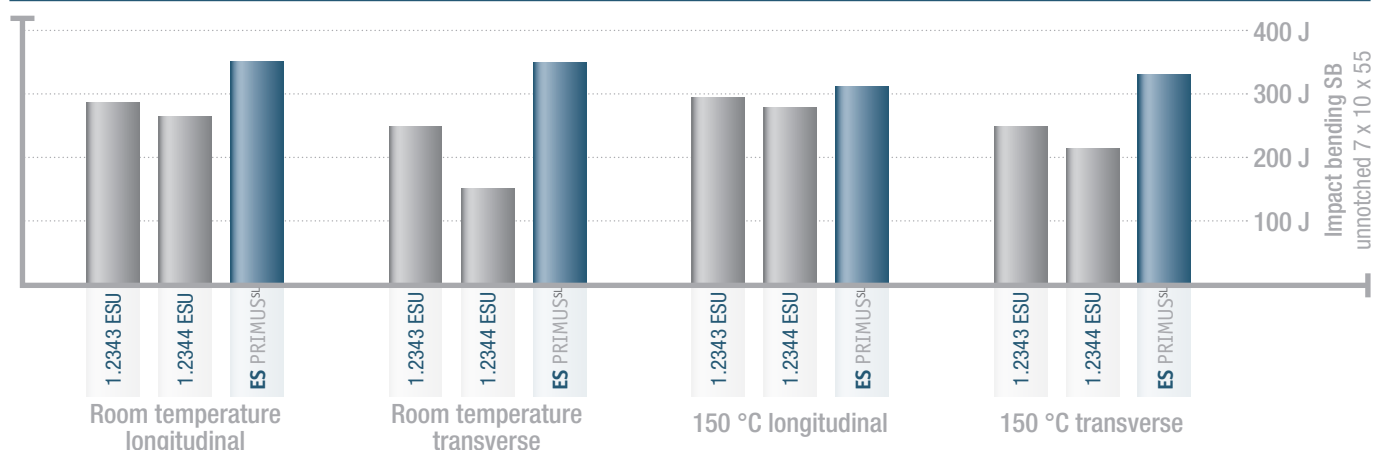
Hardening: 1010 °C | Tempering: 540–650 °C

## Isotropic Structure

Comparison of impact strength longitudinal and transverse



Comparison of impact bending longitudinal and transverse





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