

Powder metallurgy hardenable high C-steel

## Distinctive feature & main attribute

The LAW 100 X is a lead free machining steel of the latest generation for automatic Swiss lathes. Its development has been made in close collaboration with Carpenter Technology Corporation, Wyomissing, PA, USA. It has a low distortion proneness. It allows the production of high precision small parts satisfying the most severe requirements in terms of productivity and polish ability. It is easy to machine. Its machining behaviour is similar to the LAW 100 Pb steel it substitutes.

## Use & application range

This steel is specially designed for the very efficient production of small high precision parts for the watch, instrumentation and automotive industries.

## Material No. and norms

Material No.	1.1268
DIN Abbreviation	
AFNOR	
AISI/SAE/ASTM	AISI ~ 1095
ISO	
Euro Standard EN	
Others	

## Reference analysis

C	Si	Mn	S	Fe
0.90	0.15	0.30	0.04	balance
1.05	0.25	0.50	0.08	

## Execution, delivery form, standard sizes and availability

- ↳ Execution in 3 m (2 m) round bars as well as coils
- ↳ Standard size in stock: [see Product range](#)
- ↳ Other sizes on request

## Tolerances

- ↳  $\varnothing \leq 3.50$  mm, cold drawn; ISO h5 (h6); surface finish  $Ra \leq 0.1$
- ↳ Tighter tolerances on request

## Mechanical properties

- At delivery condition:
- ↳ Tensile strength (Rm/UTS):
    - a) cold drawn:  $\leq 1100$  MPa
    - b) tempered: max. 64/67 HRc
  - ↳ Hardness after tempering: see charts

## Heat treatment

- ↳ Hardening: 795 – 815 °C Quenching in oil
- ↳ Tempering: as required see chart
- ↳ Annealing: 550 – 600 °C, slow cooling in furnace
- ↳ Stress-relieved annealing: max. 500 °C

## Cutting rates

- vc ~ 60 – 80 m/min, value depending on the lubrication, cutting tools, strength of material, shape and required surface roughness as well as the dimensional tolerances of the workpiece. The vacuum melted powder metallurgy of the LAW 100 X steel leads to the formation of regular fine chips at all machining speeds and is appropriate for high speed machining operations.
- ↳ Cutting oil: e.g. SX15 of Motorex

Patent pending

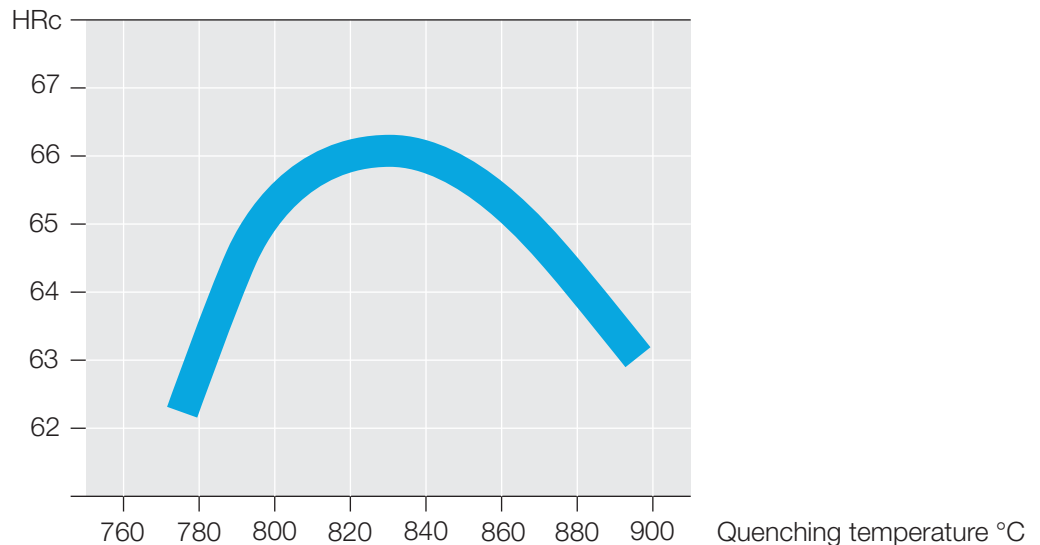


# LAW 100 X<sup>®</sup>

Powder metallurgy hardenable high C-steel

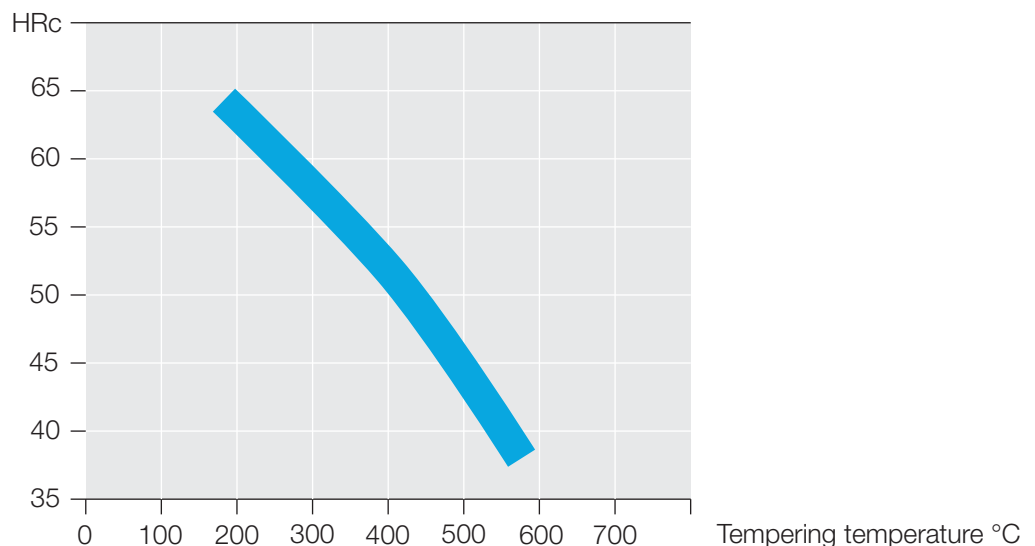
## HARDENING CURVE

- ↗ Quenching temperature: preferably at 795 – 815 °C (1463 – 1499 °F),  
(at & above 820 °C (1508 °F) there is a danger to overheat the microstructure)
- ↗ Holding time at the quenching temperature: up to 8 – 10 minutes
- ↗ Quenching in preheated oil: at 50 – 90 °C (122 – 194 °F)
- ↗ Water quenching is possible in preheated water: at 50 °C (122 °F)



## TEMPERING CURVE 3/4 hour

- ↗ Tempering temperature: as required, see chart
- ↗ Holding time at the tempering temperature: minimum 45 minutes,  
preferably 1 hour or twice 45 minutes
- ↗ Tempering the quenched parts as soon as possible after quenching



The curves above have been established with given sections. They are only indicative. Their validities should be checked for each application, part design, size and risk of distortion. The diligent observance of the recommended temperature ranges helps to avoid the formation of cracks.