

SZMS1200

Martensitic grade

Material no.	–
according to	SZFG material data sheet
Tensile strength class	D

Usage

The steel grade SZMS1200 features a very high yield point and a tensile strength of greater than 1.200 MPa. Its elongation is high enough for cold forming processes.

Processing

The material SZMS1200 can be easily processed using all standard sheet-steel joining processes. These are the standard welding methods, such as resistance spot welding, the arc method and laser technology. Adhesion technology can be used for optimised material utilisation since the plane surface of the connection can transfer high forces across the joins without generating high stresses. Excellent results can also be obtained using flash welding or HF-welding.

As shown in the diagrams, even in crash tests, the weld seam absorbs the necessary forces without tearing. The section made from SZMS1200 reveals adequate folding properties without cracking. This clearly emphasises that, despite its high strength, the steel grade SZMS1200 still offers sufficient ductility. Therefore, this material is capable of making considerable contributions to lightweight engineering in automobile manufacturing.

Impact Test

Test conditions:

Drop-impact tester
Weight 466 kg
Speed 6.5 m/s

Sections:

Roll-formed rectangular sections
Closed with HF-welding
Speed 6.5 m/s



SZMS1200
in $t=1,5\text{mm}$
· Less buckling
· Adequate formation of wrinkles



DD14
in $t=2,0\text{mm}$
· Severe buckling
· Defined formation of wrinkles
(Reference made from highly ductile steel)

Chemical composition

(in percent by weight)

	min.	max.
C		0,18%
Si		0,15%
Mn		2,00%
P		0,020%
S		0,010%
Al	0,020%	
N		0,008%
Cr		0,60%

Available dimensions

Thickness in mm	Width in mm
2.00 – 3.00	900 – 1300

Mechanical properties

Yield strength R_{eH}	$\geq 900 \text{ MPa}$
Tensile strength R_m	1200 – 1450 MPa
Total elongation A_{80}	$\geq 5 \%$

The samples for the tensile test are taken transverse to rolling direction.

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Cold-forming

Steel grade SZMS1200 offers both high strength and good forming properties. The material thus represents a key contribution to innovative, lightweight chassis construction. Weight savings can be achieved by reducing the thickness of the sheet steel at the same time as meeting the requirements for high strength properties. In combination with closed crosssections, the application of SZMS1200 leads to both very stiff structures and weight reductions. Depending on the true strain, the material SZMS1200 can be processed via all standard forming methods.

Consequently, in components such as crossbeams, for example, it is possible to make maximum use of the advantages of partial forming during roll forming. This means that steel grade SZMS1200 can be used in the manufacture of relatively complex cross-sections with small radii.

Microstructure



Micrograph



Microstructure – diagram

Application examples

This steel grade is typically used in the construction of vehicle components that are subjected to high stresses and that are relevant to safety. Maximum use is made of the great tensile strength of the material at adequate residual elongation after cold forming.



Lateral impact protection