

Material search results - COMPARISON REPORT

GENERAL INFORMATION	Material 1	Material 2
RECORD INFORMATION		
Material ID	180	186
Contributed by	MATDAT	MATDAT
Entry date	01.06.2011	01.06.2011
Source	Bol 87 B	Bol 87 B
MATERIAL INFORMATION		
Material designation		
DIN	25 Mn 4	49 MnVS 3
W.Nr. (DIN 17007)	<i>1.1177 ; 1.9441</i>	1.1199
EN		<i>49 MnVS 3</i>
AISI		
AFNOR		
ASTM		
BS		
GOST		
HRN		
ISO		
JIS		
JUS		
SAE		
SS		
UNS		
Other&Commercial	A-516 Gr 70	
ACRONI JESENICE		
JEKLO-LIVARNA RAVNE		
METAL RAVNE		
JEKLO ŠTORE		
VALJI ŠTORE		
Additional remarks	Multiple corresponding (equivalent) W.Nr. designations were determined according to DIN designation available from the original reference.	
Material group	Low-alloy steel	Low-alloy steel
Steel subgroup		
TESTED MATERIAL		
Chemical composition, (%)		
C	0.25000	0.45000
Si	0.25000	0.29000
Mn	1.12000	0.81000

P	0.02000	0.02700
S	0.02100	0.05700
Cr		0.16000
Mo		
Ni		
Cu		
Al		
Co		
Ti		
W		
V		0.09000
Nb		
N		
Other		
Heat treatment	normalized	
Microstructure		
Microstructure images		
Hardness		
Brinell		
Vickers		
Rockwell		
Mohs		
Knoop		

TESTING CONDITIONS - GENERAL		
Testing temperature, T (°C)	23	23
Testing medium	air	air

MONOTONIC TESTING	Material 1	Material 2
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MONOTONIC (STATIC) TESTING - SPECIMEN(S) - STRESS-STRAIN CURVE(S)		
Specimen(s)		
Monotonic stress-strain curve(s)		
Other		

MONOTONIC (STATIC) PROPERTIES - AXIAL LOADING		
Young's modulus, E (Nmm ⁻²)	205000	210200
Yield strength (conventional), R_e or $R_{p0,2}$ (Nmm ⁻²)	340.0	566.0
Ultimate tensile strength, R_m (Nmm ⁻²)		840.0
Elongation related to 5x diameter of specimen, A_5 (%)		44.0
Reduction of area at fracture, Z (RA) (%)		19.0
Poisson's ratio, ν		

Strength coefficient, K (Nmm ⁻²)	344.0	1428.0
Strain hardening exponent, n	0.0010	0.1940
True fracture stress, σ_f (Nmm ⁻²)		1152.0
True fracture strain, ε_f		0.3800

MONOTONIC (STATIC) PROPERTIES - TORSIONAL LOADING		
Shear modulus, G (Nmm ⁻²)		
Shear yield strength, (Nmm ⁻²)		
Ultimate shear strength, (Nmm ⁻²)		
Shear strength coefficient, (Nmm ⁻²)		
Shear strain hardening exponent		

CYCLIC/FATIGUE TESTING	Material 1	Material 2
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CYCLIC TESTING - SPECIMEN(S) - STRESS-STRAIN CURVE(S) - STRESS-LIFE / STRAIN-LIFE CURVE(S)		
Specimen(s)		
Cyclic stress-strain curve(s)		
Stress-life / strain-life curve(s)		
Other		

CYCLIC / FATIGUE PROPERTIES - AXIAL LOADING, FULLY REVERSED, R=-1		
Cyclic yield strength, $R'_{p0,2}$ (Nmm ⁻²)		
Transition life, N_T		
Calculated transition life (cycles)		
Cyclic strength coefficient, K' (Nmm ⁻²)		
Cyclic strain hardening exponent, n'		
Fatigue strength coefficient, σ'_f (Nmm ⁻²)		
Fatigue ductility coefficient, ε'_f		
Fatigue strength exponent, b		
Fatigue ductility exponent, c		
Stress amplitude at number of cycles N_E (endurance/fatigue limit) 50%, σ_E (Nmm ⁻²)		
Strain amplitude at number of cycles N_E (endurance/fatigue limit) 50%, ε_E		
Exponent of $S-N$ curve		
Number of cycles corresponding to the endurance/fatigue limit,		

M_E		
Stress amplitude at endurance/fatigue limit (10%), $\sigma_E, 10\%$ (Nmm ⁻²)		
Strain amplitude at endurance/fatigue limit (10%), $\epsilon_E, 10\%$		
Stress amplitude at endurance/fatigue limit (90%), $\sigma_E, 90\%$ (Nmm ⁻²)		
Strain amplitude at endurance/fatigue limit (90%), $\epsilon_E, 90\%$		
10/90 scatter band for stress amplitudes, T_σ		
10/90 scatter band for plastic strain amplitudes, $T_{\epsilon p}$		

CYCLIC / FATIGUE PROPERTIES - TORSIONAL LOADING, FULLY REVERSED, R=-1



Cyclic shear yield strength, (Nmm ⁻²)		
Shear transition life (cycles)		
Calculated shear transition life (cycles)		
Cyclic shear strength coefficient, K'_0 (Nmm ⁻²)		
Cyclic shear hardening exponent, n'_0		
Shear fatigue strength coefficient, τ_{yf} (Nmm ⁻²)		
Shear fatigue ductility coefficient, γ_{yf}		
Shear fatigue strength exponent, b_0		
Shear fatigue ductility exponent, c_0		
Shear stress amplitude at number of cycles $M_{E,t}$ (endurance/fatigue limit) 50%, (Nmm ⁻²)		
Shear strain amplitude at number of cycles $M_{E,t}$ (endurance/fatigue limit) 50%		
Exponent of S-N curve		
Number of cycles corresponding to the endurance/fatigue limit, $M_{E,t}$		
Shear stress amplitude at endurance/fatigue limit (10%), (Nmm ⁻²)		
Shear strain amplitude at endurance/fatigue limit (10%)		
Shear stress amplitude at endurance/fatigue limit (90%), (Nmm ⁻²)		
Shear strain amplitude at endurance/fatigue limit (90%)		

CYCLIC / FATIGUE PROPERTIES - BENDING LOADING, FULLY REVERSED R=-1



Stress amplitude at number of cycles $M_{E,b}$ (endurance/fatigue limit) 50%, (Nmm ⁻²)		
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Strain amplitude at number of cycles $\Lambda_{E,b}$ (endurance/fatigue limit) 50%		
Exponent of $S-N$ curve		
Number of cycles corresponding to the endurance/fatigue limit, $\Lambda_{E,b}$		
Stress amplitude at endurance/fatigue limit (10%), (Nmm^{-2})		
Strain amplitude at endurance/fatigue limit (10%)		
Stress amplitude at endurance/fatigue limit (90%), (Nmm^{-2})		
Strain amplitude at endurance/fatigue limit (90%)		

CYCLIC / FATIGUE PROPERTIES - BENDING LOADING, ROTATING BENDING



Stress amplitude at number of cycles $\Lambda_{E,rb}$ (endurance/fatigue limit) 50%, (Nmm^{-2})		
Strain amplitude at number of cycles $\Lambda_{E,rb}$ (endurance/fatigue limit) 50%		
Exponent of $S-N$ curve		
Number of cycles corresponding to the endurance/fatigue limit, $\Lambda_{E,rb}$		
Stress amplitude at endurance/fatigue limit (10%), (Nmm^{-2})		
Strain amplitude at endurance/fatigue limit (10%)		
Stress amplitude at endurance/fatigue limit (90%), (Nmm^{-2})		
Strain amplitude at endurance/fatigue limit (90%)		