

by Fritz Ruoss

SR1/SR1+: Tightening Torque Tolerance

The +/- tolerance of the tightening torque relative to the mean value ($MA_{nom} = (MA_{max} - MA_{min}) / 2$) is now printed in the table drawing and Quick outputs alongside alphaA.

ASSEMBLY (bolt driven)		
nue Rp		0,90
AlphaA / MAtol		1,69 / ± 7,0 %
MA max/min/nom	Nm	333,1 / 289,6 / 311,4
Alpha max/min	deg	49 / 29

AlphaA is the tightening factor—the ratio of maximum to minimum preload force. It should not be confused with alpha max and alpha min, which represent the tightening angles in degrees.

$AlphaA = FM_{max} / FM_{min}$

Does AlphaA also apply to the ratio of maximum to minimum tightening torque?

The equation $AlphaA = MA_{max} / MA_{min}$ holds true only in the theoretical scenario where friction tolerances are disregarded. In that case, the torque tolerance is $MA_{tol} = (MA_{max} - MA_{nom}) / MA_{nom}$, with $MA_{nom} = (MA_{max} + MA_{min}) / 2$.

$MA_{tol} = (alphaA - 1) / (alphaA + 1) * 100\%$

Example: $alphaA = 1.5$: $MA_{tol} = 0.5 / 2.5 * 100\% = 20\%$

At $alphaA = 1$, MA_{tol} is 0%. However, if friction tolerances are factored in, the tightening torque tolerance can drop below 0% much sooner—for instance, at $alphaA = 1.4$. Negative scatter is not possible; in such a case, the error message "MAmin > MA!" appears.

	Min.	Max.				
μG	coeff.of friction in thread μG	0,09	μG min	0,14	<	+10% +25% +50%
μK	coeff.of friction in head seat μK	0,09	μK min	0,14	<	+10% +25% +50%

MA max

☒ v Re
☐ MA,max
☐ FM,max

yield point factor for tightening 0,9 <
tightening torque MA,max (370,2 lim.) 333,1482 Nm
assembly prestress. force FM,max (150101 lim.) 135090,7 N

MA min

☐ alpha A
☒ Tol MA %
☐ MA,min
☐ FM,min

Tightening Factor alpha A 1,688354 < ?
tolerance torque MAtol/MA,nom 7 %
min. tightening torque MA,min 289,5587 Nm
min. assembly prestress. force FM,min 80013,22 N

$\mu G = 0,115 \pm 21,74 \%$
 $\mu K = 0,115 \pm 21,74 \%$
MA = 311,4 Nm ± 7,0 %
FM = 107552 ± 25,6 %
alpha = 39,4 ± 25,6 %

Calc

N <-> lbf

Help Text

Cancel

OK

☐ MA = 311,4 Nm ± 7,0 % Sigma 3 <

FED1+: EDI File Recalculation

EDI files can be used to exchange data with other programs. Few users will be aware of or utilize this option.

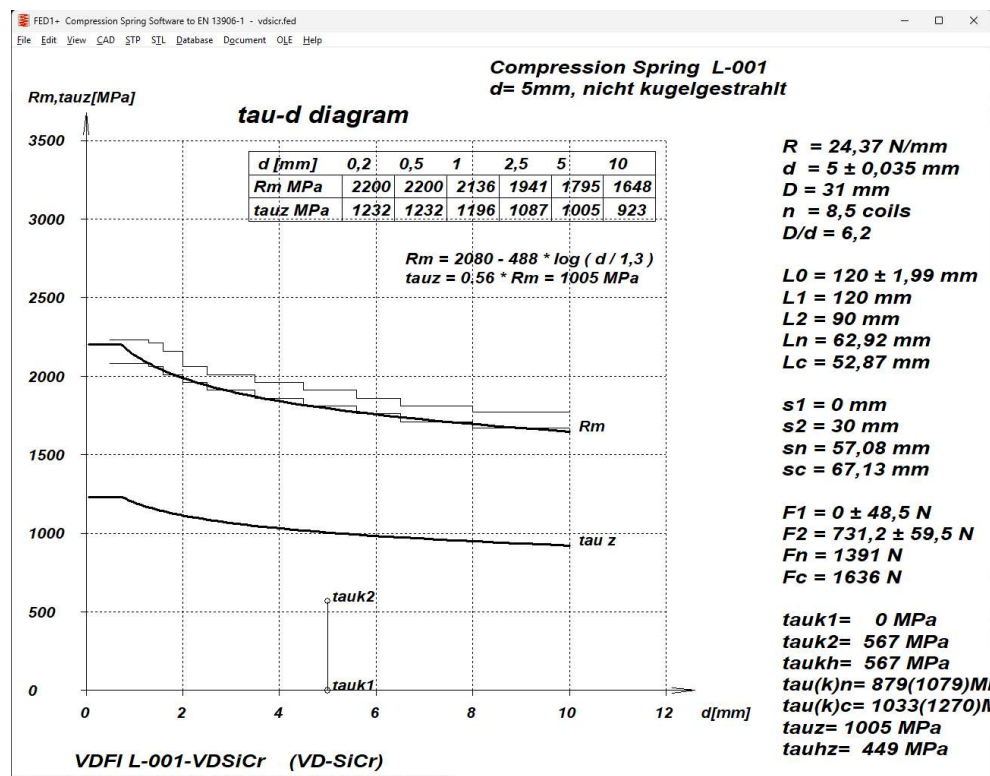
Two new lines have been added to the EDI files: spring length L0 (4297) and number of active coils n (4298). This data is used only for recalculation (4299:3).

```
4292 0,0000
4294 1,0000
4296 9,0000
4297 31,0000
4298 4,5
4299 3
< 4299: 1: F1,F2,sh
< 4299: 2: F1,F2,sh,De,Di,Dm,d(b,h)
< 4299: 3: d(b,h),De,L0,n,L1,L2,T
```

Where do the tensile strength and permissible shear stress values in FED come from?

Tensile strength and permissible shear stress values are not taken from a table; instead, they are calculated using a formula based on the wire diameter. You can find this formula under View > Stress > tau-d Diagram.

The tabular values from the standard also appear in the diagram as a step function. However, please note: the standard often lists values only for the as-delivered condition. Information indicating that values for certain materials are significantly higher after heat treatment is frequently found only in the appendix.



Update + key codes for installation on a new computer: 80 euros

If you want to install your software on a new computer and simultaneously upgrade to the latest version, you need to order both an update and a new key code; the total cost is 80 or 90 euros.

HEXAGON PRICE LIST 2026-09

Base price for single licences (perpetual)	EUR
DI1 Version 2.2 O-Ring Seal Software	190.-
DXF-Manager Version 9.1	383.-
DXFPLOT V 3.2	123.-
FED1+ V32.2 Helical Compression Springs incl. spring database, animation, relax., 3D,..	695.-
FED2+ V22.9 Helical Extension Springs incl. Spring database, animation, relaxation, ...	675.-
FED3+ V22.1 Helical Torsion Springs incl. prod.drawing, animation, 3D, rectang.wire, ...	600.-
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GR2 V1.4 Eccentric Gear Software	550.-
GR3 V1.3 Cycloidal Gear Software	600.-
HPGL Manager Version 9.1	383.-
LG1 V7.0 Roll-Contact Bearings	296.-
LG2 V3.1 Hydrodynamic Plain Journal Bearings	460.-
SR1 V25.5 Bolted Joint Design	640.-
SR1+ V25.5 Bolted Joint Design incl. Flange calculation	750.-
TOL1 V12.0 Tolerance Analysis	506.-
TOL2 Version 4.1 Tolerance Analysis	495.-
TOLPASS V4.1 Library for ISO tolerances	107.-
TR1 V6.5 Girder Calculation	757.-
WL1+ V21.9 Shaft Calculation incl. Roll-contact Bearings	945.-
WN1 V12.4 Cylindrical and Conical Press Fits	485.-
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WN2+ V11.6 Involute Splines to DIN 5480 and non-standard involute splines	380.-
WN3 V 6.0 Parallel Key Joints to DIN 6885, ANSI B17.1, DIN 6892	245.-
WN4 V 6.2 Involute Splines to ANSI B 92.1	276.-
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ZM3.V1.1 Synchronous Belt Drive Design	224.-

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- **Italiano**: FED1+, FED2+, FED3+, FED4, FED5, FED6, FED7, FED9+, FED13, FED14, FED17.
- **Swedish**: FED1+, FED2+, FED3+, FED5, FED6, FED7.
- **Portugues**: FED1+, FED17
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Updates:

Software Update Windows: 40 EUR, Update Win64: 50 EUR

Update Mechanical Engineering Package: 800 EUR, Update Complete Package: 1200 EUR

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Conditions for delivery and payment

Delivery by Email or download (zip file, manual as pdf files): EUR 0.

General packaging and postage costs for delivery on CD: EUR 60, (EUR 25 inside Europe)

Conditions of payment: bank transfer in advance with 2% discount, or PayPal (paypal.me/hexagoninfo) net.

After installation, software has to be released by key code. Key codes will be sent after receipt of payment.

Fee for additional key codes: 40 EUR