

Tension Springs

Medium to Heavy / Heavy Load

Tension Springs – Medium to Heavy Load
Tension Springs – Heavy Load

| Type | Material |
|------------|--------------------------|
| AW BWT | Spring Steel (ASTM A228) |
| AUT BUT | 304 Stainless Steel-WPB |

Medium to Heavy Load Type

| Part Number | Type | D - L | Wire Dia. dmm | Dynamic Load | | (Initial Tension) N | (Springs Constant) N/mm |
|-------------|---------|-------|---------------|--------------------------|-------------|---------------------|-------------------------|
| | | | | Max. Deflection Fmax. mm | Max. Load N | | |
| AWF | 3 - 10 | 0.45 | 0.45 | 2.2 | 6.47 | 1.57 | 2.26 |
| | | | | 4.5 | | | 1.08 |
| | | | | 6.7 | | | 0.74 |
| | | | | 9.1 | | | 0.54 |
| | | | | 11.4 | | | 0.43 |
| AWF | 4 - 15 | 0.55 | 0.55 | 4.5 | 8.43 | 1.86 | 1.47 |
| | | | | 7.1 | | | 0.93 |
| | | | | 10.0 | | | 0.66 |
| | | | | 12.6 | | | 0.52 |
| | | | | 15.2 | | | 0.43 |
| AWF | 5 - 15 | 0.7 | 0.7 | 3.9 | 14.71 | 2.45 | 3.14 |
| | | | | 6.9 | | | 1.77 |
| | | | | 9.6 | | | 1.28 |
| | | | | 12.5 | | | 0.98 |
| | | | | 15.6 | | | 0.78 |
| AWF | 6 - 20 | 0.9 | 0.9 | 3.9 | 23.54 | 5.88 | 4.51 |
| | | | | 6.0 | | | 2.94 |
| | | | | 7.8 | | | 2.26 |
| | | | | 10.0 | | | 1.77 |
| | | | | 12.0 | | | 1.47 |
| AWF | 8 - 25 | 1.1 | 1.1 | 5.8 | 31.38 | 6.86 | 4.23 |
| | | | | 8.3 | | | 2.94 |
| | | | | 10.9 | | | 2.26 |
| | | | | 13.2 | | | 1.86 |
| | | | | 15.6 | | | 1.57 |
| AWF | 10 - 30 | 1.4 | 1.4 | 6.5 | 49.03 | 12.75 | 5.58 |
| | | | | 8.7 | | | 4.17 |
| | | | | 10.7 | | | 3.39 |
| | | | | 12.9 | | | 2.81 |
| | | | | 15.2 | | | 2.39 |
| AWF | 12 - 35 | 1.8 | 1.8 | 5.0 | 83.36 | 23.54 | 12.0 |
| | | | | 7.0 | | | 8.55 |
| | | | | 9.0 | | | 6.65 |
| | | | | 11.0 | | | 5.44 |
| | | | | 13.0 | | | 4.60 |

Part Number Example: **AWT10-50**

Heavy Load *marked dimensions are for AWT / AUT only

| Part Number | Type | D - L | Wire Dia. dmm | Dynamic Load | | (Initial Tension) N | (Springs Constant) N/mm |
|--------------------------|---------|-------|---------------|--------------------------|-------------|---------------------|-------------------------|
| | | | | Max. Deflection Fmax. mm | Max. Load N | | |
| AWT AUT BWT BUT | 3 - 10 | 0.5 | 0.5 | 2.0 | 8.8 | 2.16 | 3.24 |
| | | | | 3.7 | | | 1.77 |
| | | | | 5.2 | | | 1.27 |
| | | | | 6.8 | | | 0.98 |
| | | | | 8.5 | | | 0.78 |
| AWT AUT BWT BUT | 4 - 15 | 0.6 | 0.6 | 4.0 | 11.1 | 2.55 | 2.16 |
| | | | | 6.4 | | | 1.37 |
| | | | | 8.4 | | | 0.98 |
| | | | | 10.9 | | | 0.78 |
| | | | | 12.4 | | | 0.69 |
| AWT AUT BWT BUT | 5 - 15 | 0.8 | 0.8 | 2.9 | 20.79 | 5.1 | 5.39 |
| | | | | 4.6 | | | 3.43 |
| | | | | 6.4 | | | 2.45 |
| | | | | 8.4 | | | 1.86 |
| | | | | 10.0 | | | 1.57 |
| AWT BWT AUT BUT | 6 - 20 | 1.0 | 1.0 | 3.7 | 33.15 | 8.6 | 6.57 |
| | | | | 5.3 | | | 4.61 |
| | | | | 6.9 | | | 3.53 |
| | | | | 8.3 | | | 2.94 |
| | | | | 10.0 | | | 2.45 |
| AWT BWT AUT BUT | 8 - 25 | 1.2 | 1.2 | 5.3 | 41.19 | 9.81 | 5.88 |
| | | | | 7.3 | | | 4.31 |
| | | | | 9.1 | | | 3.43 |
| | | | | 11.9 | | | 2.85 |
| | | | | 13.6 | | | 2.35 |
| AWT BWT AUT BUT | 10 - 30 | 1.6 | 1.6 | 5.2 | 77.47 | 20.59 | 10.89 |
| | | | | 6.8 | | | 8.34 |
| | | | | 8.4 | | | 6.77 |
| | | | | 10.0 | | | 5.69 |
| | | | | 11.6 | | | 4.9 |
| AWT BWT AUT BUT | 12 - 40 | 2.0 | 2.0 | 6.6 | 120.62 | 34.3 | 13.04 |
| | | | | 7.7 | | | 11.18 |
| | | | | 9.4 | | | 9.22 |
| | | | | 10.5 | | | 8.24 |
| | | | | 12.1 | | | 7.16 |
| AWT | 14 - 40 | 2.3 | 2.3 | 5.8 | 154.95 | 45.11 | 19.02 |
| | | | | 7.0 | | | 15.59 |
| | | | | 8.4 | | | 13.14 |
| | | | | 9.6 | | | 11.47 |
| | | | | 10.9 | | | 10.1 |
| AWT | 16 - 50 | 2.6 | 2.6 | 7.5 | 195.15 | 55.9 | 18.63 |
| | | | | 9.0 | | | 15.49 |
| | | | | 10.4 | | | 13.34 |
| | | | | 11.9 | | | 11.67 |
| | | | | 13.4 | | | 10.4 |
| AWT | 18 - 55 | 2.9 | 2.9 | 8.3 | 236.34 | 68.65 | 20.1 |
| | | | | 10.0 | | | 16.67 |
| | | | | 11.6 | | | 14.71 |
| | | | | 12.5 | | | 13.44 |
| | | | | 14.1 | | | 11.77 |
| AWT | 20 - 80 | 3.2 | 3.2 | 9.2 | 281.45 | 82.38 | 21.57 |
| | | | | 11.9 | | | 16.67 |
| | | | | 14.7 | | | 13.53 |
| | | | | 17.5 | | | 11.38 |
| | | | | 20.1 | | | 9.9 |
| AWT | 24 - 80 | 4.0 | 4.0 | 11.7 | 430.51 | 123.6 | 26.48 |
| | | | | 13.7 | | | 22.46 |
| | | | | 16.6 | | | 18.63 |
| | | | | 22.5 | | | 13.63 |
| | | | | 28.5 | | | 10.79 |

① Initial tension and spring constant are for reference only. Load [kgf] = Load N x 0.101972
 ② AUT and BUT are not available from D14 to D24.

There's more on the web: misumiusa.com

Tension Springs

Configurable

Tension Springs – Configurable

| Type | Material |
|------|--------------------------|
| WFSP | Spring Steel (ASTM A228) |
| UFSP | 304 Stainless Steel-WPB |

① Calculation of L Dimension (Reference Value) S+(D-2d)x2
 ② BWFSF and BUFSF Hooks are reversed. ③ The opening part of hook is as shown in the above figure.

| Type | Material |
|-------|--------------------------|
| BWFSF | Spring Steel (ASTM A228) |
| BUFSF | 304 Stainless Steel-WPB |

| Part Number | Type | D | Wire Dia. dmm | S 1mm Increment | Reference Max. Deflection (mm) | | Standard Spring Constant (N/mm) | | Initial Tension (N) | |
|-------------|-------|--------|---------------|-----------------|--------------------------------|------------|---------------------------------|------------|---------------------|-------|
| | | | | | WFSP BWFSF | UFSP BUFSF | WFSP BWFSF | UFSP BUFSF | BWFSF | BUFSF |
| 3 | WFSP | 10-300 | 0.3 | 10-300 | 88 | 87 | 0.025 | 0.021 | 0.18 | 0.21 |
| 4 | | | 41 | | 42 | 0.12 | 0.10 | 0.53 | 0.64 | |
| 5 | | | 86 | | 87 | 0.04 | 0.04 | 0.31 | 0.38 | |
| 6 | | | 48 | | 46 | 0.15 | 0.13 | 0.77 | 0.92 | |
| 7 | | | 84 | | 82 | 0.07 | 0.06 | 0.49 | 0.59 | |
| 8 | | | 50 | | 51 | 0.18 | 0.16 | 1.01 | 1.21 | |
| 9 | | | 79 | | 82 | 0.10 | 0.09 | 0.71 | 0.85 | |
| 10 | | | 36 | | 36 | 0.47 | 0.41 | 2.13 | 2.55 | |
| 11 | | | 70 | | 66 | 0.13 | 0.12 | 0.96 | 1.15 | |
| 12 | | | 35 | | 32 | 0.52 | 0.45 | 2.94 | 3.5 | |
| 13 | | | 74 | | 76 | 0.18 | 0.16 | 1.26 | 1.51 | |
| 14 | | | 41 | | 42 | 0.58 | 0.51 | 3.04 | 4.26 | |
| 15 | UFSP | 10-500 | 0.4 | 10-500 | 56 | 57 | 0.39 | 0.34 | 2.45 | 3.43 |
| 16 | | | 33 | | 33 | 1.05 | 0.93 | 4.41 | 6.17 | |
| 17 | | | 74 | | 70 | 0.27 | 0.24 | 1.96 | 2.74 | |
| 18 | | | 44 | | 43 | 0.73 | 0.65 | 4.31 | 6.03 | |
| 19 | | | 29 | | 28 | 1.70 | 1.50 | 7.64 | 10.7 | |
| 20 | | | 80 | | 76 | 0.20 | 0.17 | 1.45 | 2.01 | |
| 21 | | | 46 | | 45 | 0.53 | 0.47 | 3.24 | 4.51 | |
| 22 | | | 31 | | 30 | 1.24 | 1.08 | 6.39 | 8.87 | |
| 23 | | | 116 | | 113 | 0.15 | 0.13 | 1.18 | 1.65 | |
| 24 | | | 71 | | 70 | 0.39 | 0.35 | 2.84 | 3.98 | |
| 25 | | | 46 | | 46 | 0.91 | 0.80 | 5.39 | 7.55 | |
| 26 | | | 31 | | 30 | 1.88 | 1.66 | 8.72 | 12.21 | |
| 27 | BWFSF | 10-550 | 0.5 | 10-550 | 120 | 117 | 0.11 | 0.10 | 0.93 | 1.29 |
| 28 | | | 72 | | 71 | 0.31 | 0.27 | 2.17 | 3.01 | |
| 29 | | | 47 | | 47 | 0.70 | 0.61 | 3.95 | 5.49 | |
| 30 | | | 32 | | 31 | 1.42 | 1.24 | 7.75 | 10.76 | |
| 31 | | | 104 | | 96 | 0.24 | 0.21 | 2.06 | 2.88 | |
| 32 | | | 69 | | 65 | 0.54 | 0.48 | 3.82 | 5.35 | |
| 33 | | | 47 | | 45 | 1.11 | 0.98 | 6.66 | 9.32 | |
| 34 | | | 34 | | 33 | 2.10 | 1.86 | 10.6 | 14.84 | |
| 35 | | | 106 | | 98 | 0.19 | 0.17 | 1.50 | 2.09 | |
| 36 | | | 70 | | 66 | 0.43 | 0.38 | 3.03 | 4.21 | |
| 37 | | | 48 | | 46 | 0.88 | 0.76 | 4.74 | 6.59 | |
| 38 | | | 35 | | 34 | 1.69 | 1.47 | 9.25 | 12.85 | |
| 39 | BUFSF | 10-550 | 0.6 | 10-550 | 96 | 91 | 0.35 | 0.31 | 3.04 | 4.26 |
| 40 | | | 66 | | 65 | 0.71 | 0.63 | 5.10 | 7.14 | |
| 41 | | | 48 | | 47 | 1.33 | 1.18 | 8.33 | 11.66 | |
| 42 | | | 34 | | 35 | 2.37 | 2.10 | 12.60 | 17.64 | |
| 43 | | | 97 | | 92 | 0.29 | 0.25 | 2.21 | 3.08 | |
| 44 | | | 67 | | 66 | 0.58 | 0.50 | 4.03 | 5.60 | |
| 45 | | | 49 | | 48 | 1.11 | 0.97 | 6.74 | 9.37 | |
| 46 | | | 35 | | 36 | 1.98 | 1.73 | 10.90 | 15.13 | |
| 47 | | | 88 | | 87 | 0.48 | 0.42 | 4.02 | 5.63 | |
| 48 | | | 64 | | 64 | 0.90 | 0.80 | 6.47 | 9.06 | |
| 49 | | | 47 | | 48 | 1.59 | 1.40 | 10.00 | 14.00 | |
| 50 | | | 31 | | 30 | 3.40 | 3.01 | 18.70 | 26.18 | |
| 51 | 84 | 78 | 0.63 | 0.56 | 5.10 | 7.14 | | | | |
| 52 | | | 0.7 | | 61 | 60 | 1.11 | 0.99 | 7.94 | 11.12 |
| 53 | | | 41 | | 40 | 2.37 | 2.10 | 15.20 | 21.28 | |
| 54 | | | 29 | | 29 | 4.64 | 4.10 | 23.60 | 33.04 | |
| 55 | | | 75 | | 74 | 0.81 | 0.72 | 7.35 | 10.30 | |
| 56 | | | 53 | | 52 | 1.72 | 1.52 | 11.80 | 16.50 | |
| 57 | | | 37 | | 37 | 3.35 | 2.96 | 19.60 | 27.40 | |
| 58 | | | 27 | | 27 | 6.09 | 5.39 | 33.30 | 46.60 | |
| 59 | | | 72 | | 72 | 1.12 | 0.99 | 9.80 | 13.70 | |
| 60 | | | 50 | | 52 | 2.17 | 1.92 | 15.70 | 22.00 | |
| 61 | | | 38 | | 36 | 3.93 | 3.48 | 22.50 | 31.50 | |
| 62 | | | 28 | | 27 | 6.75 | 5.97 | 34.30 | 48.00 | |
| 63 | | | 69 | | 64 | 1.49 | 1.32 | 12.70 | 17.80 | |
| 64 | 51 | 49 | 2.69 | 2.38 | 17.60 | 24.60 | | | | |
| 65 | 39 | 37 | 4.58 | 4.05 | 27.40 | 38.40 | | | | |
| 66 | 31 | 29 | 7.49 | 6.62 | 39.20 | 54.90 | | | | |

① WFSP and BWFSF are not available from S301-S550 for D3 and D4. ② UFSP and BUFSF are not available from S301-S550 for D3 and D4.

Part Number Example: **WFSP3 - 0.3 - 10**
UFSP20 - 2.6 - 498

Reference maximum elongation and standard spring constant are the values when S Dimension is 50. For other dimensions, use the formula below for calculation.

Max. Elongation (mm) = $\frac{\text{Configurable S Dimension}}{50 \text{ (Reference S Dimension)}} \times \text{Reference Max. Elongation}$

Spring Constant (N/mm) = $\frac{50 \text{ (Reference S Dimension)}}{\text{Configurable S Dimension}} \times \text{Standard Spring Constant}$

Accuracy Standards

| D/d ¹ | Tolerance |
|------------------|-------------------------------------|
| 8 or less | ±1.5% of D dimension (Min. ±0.2 mm) |
| 8~20 | ±2% of D dimension (Min. ±0.3 mm) |

¹D/d = Spring Index
S Dimension Tolerance
 When d≤0.5, ±2 x Wire Dia. (Ex: When d=0.3, ±0.6)
 When d>0.6, ± Wire Dia. (Ex: When d=1.0, ±1.0)