

## Stock sizes in stainless steel

Associated Spring torsion springs are widely useful to store and release energy of rotation or to maintain a pressure over a short distance. Our stock selection includes torsion springs with four end positions, as shown in the drawings.

SPEC torsion springs are normally used over a supporting mandrel or arbor. Suggested mandrel sizes allow about 10% clearance at the deflections listed. If greater deflections are used, the arbor size should be reduced. Sufficient room (minimum axial space) must be provided in the assembly for the spring to function properly.

SPEC torsion springs should be used in the direction that winds the coils. In the unwinding direction the maximum load is lower because of residual stresses.

Torque values listed are suitable for average conditions. These values can be increased about 40% for static conditions with only slight setting. Infinite fatigue life can be expected under good mounting conditions, using torque values about 20% less than those listed.

## Material

Stainless Steel

Commercial Type 302  
AMS 5688

Certified to Military and Aircraft specifications where applicable. Certificate of compliance available on request.

## Ends

Straight torsion ends are standard.

Special end treatment available. Allow additional time.

## Finish

Plain finish is standard. Allow additional time for special finishes.

## Tolerances

Torque  $\pm 10\%$   
O.D.  $\pm 5\%$

## Disponibilité sur stock en acier inoxydable.

Les ressorts de torsion SPEC, sont souvent utiles pour amasser et libérer l'énergie de rotation ou pour maintenir une pression sur une courte distance. Notre sélection sur stock comprend des ressorts de torsion avec quatre différentes positions relatives des extrémités, comme indiqué dans les dessins.

Les ressorts de torsion SPEC sont normalement utilisés sur un mandrin ou un arbre de support. Les dimensions de mandrin recommandées permettent environ 1% de jeu aux déflexions listées. Si on utilise des déflexions plus importantes, le diamètre du mandrin doit être réduit. Suffisamment de place (jeu minimum axial) doit être prévue dans un assemblage pour que le ressort fonctionne correctement.

Les ressorts de torsion SPEC doivent être utilisés dans la direction qui enroule les spires. Dans la direction de déroulement la charge maximum est plus basse en raison des tensions résiduelles.

Les valeurs de couple listées sont compatibles avec des conditions moyennes. Ces valeurs peuvent être augmentées de 20% pour des conditions statiques avec seulement une déflexion permanente mineure. Une longévité infinie peut être obtenue si les conditions de montage sont bonnes, en utilisant des valeurs de couple d'environ 20% inférieures à celles à 50% de la plage de tension.

## Matériaux

Acier inoxydable

Commercial Type 302  
AMS 5688

certifié conforme aux spécifications militaires et aéronautiques s'il y a lieu. Certificat de conformité disponible sur demande.

## Extrémités

Les extrémités droites des torsion sont standard. Traitements d'extrémités spéciales possibles. Prévoyez du temps de livraison supplémentaire.

## Finition

Une finition naturelle est standard. Prévoyez du temps de livraison supplémentaire pour des finitions spéciales.

## Tolerances

Couple  $\pm 10\%$   
Diamètre extérieur  $\pm 5\%$

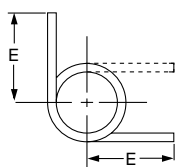
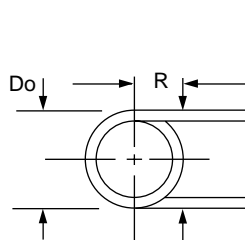


Fig 1. Déflexion 90°

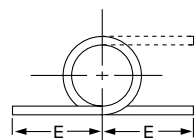


Fig 2. Déflexion 180°

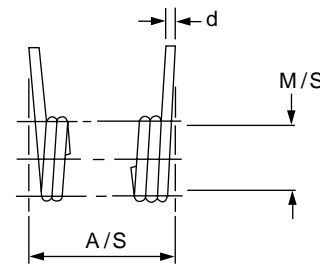


Fig 3. Déflexion 270°

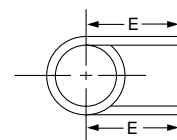


Fig 4. Déflexion 360°

d = Wire diameter  
Do = Outside diameter  
T = Torque N/mm  
R = Loaded position all Parts  
M/S = Recommended Mandrel size  
E = Leg Length (from centreline)  
A/S = Min Axle Length  
Fig = Position of Legs  
Deg° = Degrees Deflection

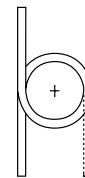
\*Direction of Helix Must be specified by suffix to catalogue number. Use L for left-hand wound, R for right-hand wound.

d = Diamètre du fil  
Do = Diamètre extérieur  
T = Couple N/mm  
R = Position de la charge pour toutes pièces  
M/S = Taille de mandrin recommandée  
E = Longueur du pied (de l'axe)  
A/S = Longueur d'arbre minimum  
Fig = Position des pieds  
Deg° = Déflexion en degrés

\*La direction d'enroulement doit être précisée par un suffixe au numéro de référence du catalogue.

Utilisez 'L' pour l'enroulement à gauche et 'R' pour l'enroulement à droite.

| Do<br>Wire Dia<br>mm | Do<br>Outside Dia<br>mm | T<br>Torque<br>N/mm | R<br>Loaded Position<br>All Parts mm | M/S<br>Recom Mandrel<br>Size mm | E<br>Leg Length<br>mm | A/S<br>Min Axle Size<br>mm | Fig<br>Position of<br>Legs | Deg°<br>Degrees<br>Deflection | Part No.     | Price Group |
|----------------------|-------------------------|---------------------|--------------------------------------|---------------------------------|-----------------------|----------------------------|----------------------------|-------------------------------|--------------|-------------|
| 0.30                 | 2.36                    | 5.31                | 4.75                                 | 1.40                            | 9.52                  | 1.17                       | 1                          | 90.00                         | T012-090-055 | A           |
|                      | 2.77                    |                     | 4.75                                 | 1.70                            | 9.52                  | 2.18                       | 2                          | 180.00                        | T012-180-067 | A           |
|                      | 2.59                    |                     | 4.75                                 | 1.57                            | 9.52                  | 3.53                       | 3                          | 270.00                        | T012-270-062 | A           |
|                      | 4.22                    |                     | 6.35                                 | 2.77                            | 12.70                 | 1.50                       | 2                          | 180.00                        | T012-180-109 | A           |
|                      | 4.32                    |                     | 6.35                                 | 2.77                            | 12.70                 | 2.18                       | 3                          | 270.00                        | T012-270-109 | A           |
|                      | 4.42                    |                     | 6.35                                 | 2.77                            | 12.70                 | 2.84                       | 4                          | 360.00                        | T012-360-109 | A           |
| 0.36                 | 3.15                    | 7.91                | 6.35                                 | 1.60                            | 12.70                 | 1.70                       | 1                          | 90.00                         | T014-090-063 | A           |
|                      | 3.38                    |                     | 6.35                                 | 1.98                            | 12.70                 | 2.67                       | 2                          | 180.00                        | T014-180-078 | A           |
|                      | 3.15                    |                     | 6.35                                 | 1.60                            | 12.70                 | 4.01                       | 3                          | 270.00                        | T014-270-063 | A           |
|                      | 4.93                    |                     | 9.52                                 | 2.77                            | 19.05                 | 1.96                       | 2                          | 180.00                        | T014-180-109 | A           |
|                      | 5.11                    |                     | 9.52                                 | 3.18                            | 19.05                 | 2.59                       | 3                          | 270.00                        | T014-270-125 | A           |
|                      | 5.18                    |                     | 9.52                                 | 3.18                            | 19.05                 | 3.20                       | 4                          | 360.00                        | T014-360-125 | A           |
| 0.38                 | 2.79                    | 10.51               | 6.35                                 | 1.57                            | 12.70                 | 1.47                       | 1                          | 90.00                         | T015-090-062 | A           |
|                      | 3.30                    |                     | 6.35                                 | 1.98                            | 12.70                 | 2.72                       | 2                          | 180.00                        | T015-180-078 | A           |
|                      | 3.15                    |                     | 6.35                                 | 1.98                            | 12.70                 | 4.39                       | 3                          | 270.00                        | T015-270-078 | A           |
|                      | 4.65                    |                     | 9.52                                 | 2.77                            | 19.05                 | 1.91                       | 2                          | 180.00                        | T015-180-109 | B           |
|                      | 5.05                    |                     | 9.52                                 | 2.77                            | 19.05                 | 2.72                       | 3                          | 270.00                        | T015-270-109 | B           |
|                      | 5.26                    |                     | 9.52                                 | 2.77                            | 19.05                 | 3.56                       | 4                          | 360.00                        | T015-360-109 | B           |
| 0.43                 | 4.06                    | 13.22               | 6.35                                 | 2.36                            | 12.70                 | 2.06                       | 1                          | 90.00                         | T017-090-093 | A           |
|                      | 4.37                    |                     | 6.35                                 | 2.36                            | 12.70                 | 3.23                       | 2                          | 180.00                        | T017-180-093 | A           |
|                      | 4.06                    |                     | 6.35                                 | 2.36                            | 12.70                 | 4.88                       | 3                          | 270.00                        | T017-270-093 | A           |
|                      | 6.32                    |                     | 9.52                                 | 3.96                            | 19.05                 | 2.39                       | 2                          | 180.00                        | T017-180-156 | B           |
|                      | 6.58                    |                     | 9.52                                 | 3.96                            | 19.05                 | 3.13                       | 3                          | 270.00                        | T017-270-156 | B           |
|                      | 5.97                    |                     | 9.52                                 | 3.56                            | 19.05                 | 4.32                       | 4                          | 360.00                        | T017-360-140 | B           |
| 0.46                 | 4.50                    | 15.82               | 6.35                                 | 2.77                            | 12.70                 | 1.78                       | 1                          | 90.00                         | T018-090-109 | A           |
|                      | 4.17                    |                     | 6.35                                 | 2.77                            | 12.70                 | 3.81                       | 2                          | 180.00                        | T018-180-109 | A           |
|                      | 4.06                    |                     | 6.35                                 | 2.77                            | 12.70                 | 5.79                       | 3                          | 270.00                        | T018-270-109 | A           |
|                      | 5.49                    |                     | 9.52                                 | 3.56                            | 19.05                 | 2.77                       | 2                          | 180.00                        | T018-180-140 | B           |
|                      | 6.22                    |                     | 9.52                                 | 3.96                            | 19.05                 | 3.81                       | 3                          | 270.00                        | T018-270-156 | B           |
|                      | 5.92                    |                     | 9.52                                 | 3.96                            | 19.05                 | 5.33                       | 4                          | 360.00                        | T018-360-156 | B           |
| 0.51                 | 4.85                    | 21.10               | 9.52                                 | 2.77                            | 19.05                 | 2.41                       | 1                          | 90.00                         | T020-090-109 | A           |
|                      | 4.55                    |                     | 9.52                                 | 2.77                            | 19.05                 | 4.32                       | 2                          | 180.00                        | T020-180-109 | A           |
|                      | 4.45                    |                     | 9.52                                 | 2.36                            | 19.05                 | 6.22                       | 3                          | 270.00                        | T020-270-093 | A           |
|                      | 6.15                    |                     | 12.70                                | 3.56                            | 25.40                 | 3.30                       | 2                          | 180.00                        | T020-180-140 | B           |
|                      | 6.81                    |                     | 12.70                                | 4.37                            | 25.40                 | 4.19                       | 3                          | 270.00                        | T020-270-172 | B           |
|                      | 6.45                    |                     | 12.70                                | 3.96                            | 25.40                 | 6.35                       | 4                          | 360.00                        | T020-360-156 | B           |
| 0.53                 | 4.72                    | 24.60               | 9.52                                 | 2.77                            | 19.05                 | 2.06                       | 1                          | 90.00                         | T021-090-109 | A           |
|                      | 4.70                    |                     | 9.52                                 | 2.77                            | 19.05                 | 4.39                       | 2                          | 180.00                        | T021-180-109 | A           |
|                      | 4.67                    |                     | 9.52                                 | 2.77                            | 19.05                 | 6.76                       | 3                          | 270.00                        | T021-270-109 | A           |
|                      | 6.27                    |                     | 12.70                                | 3.96                            | 25.40                 | 3.23                       | 2                          | 180.00                        | T021-180-156 | B           |
|                      | 7.19                    |                     | 12.70                                | 4.75                            | 25.40                 | 4.39                       | 3                          | 270.00                        | T021-270-187 | B           |
|                      | 6.88                    |                     | 12.70                                | 4.75                            | 25.40                 | 6.15                       | 4                          | 360.00                        | T021-360-187 | B           |
| 0.58                 | 5.18                    | 34.80               | 9.52                                 | 2.77                            | 19.05                 | 2.77                       | 1                          | 90.00                         | T023-090-109 | A           |
|                      | 4.85                    |                     | 9.52                                 | 2.77                            | 19.05                 | 4.98                       | 2                          | 180.00                        | T023-180-109 | A           |
|                      | 4.75                    |                     | 9.52                                 | 2.77                            | 19.05                 | 7.16                       | 3                          | 270.00                        | T023-270-109 | A           |
|                      | 6.58                    |                     | 12.70                                | 3.96                            | 25.40                 | 3.81                       | 2                          | 180.00                        | T023-180-156 | B           |
|                      | 6.38                    |                     | 12.70                                | 3.96                            | 25.40                 | 5.41                       | 3                          | 270.00                        | T023-270-156 | B           |
|                      | 6.88                    |                     | 12.70                                | 4.37                            | 25.40                 | 6.43                       | 4                          | 360.00                        | T023-360-172 | B           |
| 0.64                 | 5.97                    | 42.40               | 9.52                                 | 3.56                            | 19.05                 | 2.44                       | 1                          | 90.00                         | T025-090-140 | A           |
|                      | 5.69                    |                     | 9.52                                 | 3.56                            | 19.05                 | 5.23                       | 2                          | 180.00                        | T025-180-140 | A           |
|                      | 5.56                    |                     | 9.52                                 | 3.56                            | 19.05                 | 8.03                       | 3                          | 270.00                        | T025-270-140 | A           |
|                      | 7.72                    |                     | 12.70                                | 5.16                            | 25.40                 | 3.84                       | 2                          | 180.00                        | T025-180-203 | B           |
|                      | 8.64                    |                     | 12.70                                | 5.54                            | 25.40                 | 5.23                       | 3                          | 270.00                        | T025-270-218 | B           |
|                      | 8.23                    |                     | 12.70                                | 5.54                            | 25.40                 | 7.32                       | 4                          | 360.00                        | T025-360-218 | B           |
| 0.71                 | 6.78                    | 58.20               | 12.70                                | 3.96                            | 25.40                 | 3.38                       | 1                          | 90.00                         | T028-090-156 | A           |
|                      | 6.32                    |                     | 12.70                                | 3.56                            | 25.40                 | 6.05                       | 2                          | 180.00                        | T028-180-140 | A           |
|                      | 6.22                    |                     | 12.70                                | 3.56                            | 25.40                 | 8.74                       | 3                          | 270.00                        | T028-270-140 | A           |
|                      | 8.64                    |                     | 12.70                                | 5.16                            | 25.40                 | 4.62                       | 2                          | 180.00                        | T028-180-203 | B           |
|                      | 8.36                    |                     | 12.70                                | 5.16                            | 25.40                 | 6.58                       | 3                          | 270.00                        | T028-270-203 | B           |
|                      | 9.02                    |                     | 12.70                                | 5.54                            | 25.40                 | 7.82                       | 4                          | 360.00                        | T028-360-218 | B           |
| 0.76                 | 7.14                    | 70.60               | 12.70                                | 4.37                            | 25.40                 | 2.95                       | 1                          | 90.00                         | T030-090-172 | B           |
|                      | 6.91                    |                     | 12.70                                | 4.37                            | 25.40                 | 6.30                       | 2                          | 180.00                        | T030-180-172 | B           |
|                      | 6.86                    |                     | 12.70                                | 4.37                            | 25.40                 | 9.65                       | 3                          | 270.00                        | T030-270-172 | B           |
|                      | 10.01                   |                     | 12.70                                | 6.35                            | 25.40                 | 4.60                       | 2                          | 180.00                        | T030-180-250 | C           |
|                      | 9.58                    |                     | 12.70                                | 6.35                            | 25.40                 | 7.11                       | 3                          | 270.00                        | T030-270-250 | C           |
|                      | 10.41                   |                     | 12.70                                | 6.35                            | 25.40                 | 8.79                       | 4                          | 360.00                        | T030-360-250 | C           |
| 0.81                 | 7.32                    | 92.70               | 12.70                                | 4.34                            | 25.40                 | 3.86                       | 1                          | 90.00                         | T032-090-172 | B           |
|                      | 6.86                    |                     | 12.70                                | 3.96                            | 25.40                 | 6.91                       | 2                          | 180.00                        | T032-180-156 | B           |
|                      | 6.71                    |                     | 12.70                                | 3.96                            | 25.40                 | 9.70                       | 3                          | 270.00                        | T032-270-156 | B           |
|                      | 9.30                    |                     | 12.70                                | 5.54                            | 25.40                 | 5.28                       | 2                          | 180.00                        | T032-180-218 | C           |
|                      | 8.99                    |                     | 12.70                                | 5.54                            | 25.40                 | 7.52                       | 3                          | 270.00                        | T032-270-218 | C           |
|                      | 9.70                    |                     | 12.70                                | 5.95                            | 25.40                 | 8.94                       | 4                          | 360.00                        | T032-360-234 | C           |
| 0.89                 | 8.00                    | 113.00              | 15.88                                | 4.75                            | 31.75                 | 3.43                       | 1                          | 90.00                         | T035-090-187 | B           |
|                      | 7.70                    |                     | 15.88                                | 4.75                            | 31.75                 | 7.37                       | 2                          | 180.00                        | T035-180-187 | B           |
|                      | 7.90                    |                     | 15.88                                | 4.75                            | 31.75                 | 11.23                      | 3                          | 270.00                        | T035-270-187 | B           |
|                      | 11.43                   |                     | 15.88                                | 7.14                            | 31.75                 | 5.38                       | 2                          | 180.00                        | T035-180-281 | C           |
|                      | 11.05                   |                     | 15.88                                | 7.14                            | 31.75                 | 8.33                       | 3                          | 270.00                        | T035-270-281 | C           |
|                      | 11.96                   |                     | 15.88                                | 7.92                            | 31.75                 | 10.29                      | 4                          | 360.00                        | T035-360-312 | C           |
| 0.97                 | 9.80                    | 134.50              | 15.88                                | 5.94                            | 31.75                 | 4.57                       | 1                          | 90.00                         | T038-090-234 | B           |
|                      | 9.35                    |                     | 15.88                                | 5.54                            | 31.75                 | 8.20                       | 2                          | 180.00                        | T038-180-218 | B           |
|                      | 8.97                    |                     | 15.88                                | 5.54                            | 31.75                 | 11.81                      | 3                          | 270.00                        | T038-270-218 | B           |
|                      | 12.37                   |                     | 15.88                                | 8.08                            | 31.75                 | 6.27                       | 2                          | 180.00                        | T038-180-312 | C           |
|                      | 12.12                   |                     | 15.88                                | 7.92                            | 31.75                 | 8.94                       | 3                          | 270.00                        | T038-270-312 | C           |
|                      | 13.06                   |                     | 15.88                                | 8.33                            | 31.75                 | 10.62                      | 4                          | 360.00                        | T038-360-328 | C           |
| 1.02                 | 7.85                    | 155.40              | 15.88                                | 4.75                            | 31.75                 | 5.03                       | 1                          | 90.00                         | T040-090-187 | B           |
|                      | 8.84                    |                     | 15.88                                | 5.54                            | 31.75                 | 9.50                       | 2                          | 180.00                        | T040-180-218 | B           |
|                      | 9.09                    |                     | 15.88                                | 5.54                            | 31.75                 | 13.97                      | 3                          | 270.00                        | T040-270-218 | B           |
|                      | 13.16                   |                     | 25.40                                | 8.71                            | 50.80                 | 6.15                       | 2                          | 180.00                        | T040-180-343 | C           |
|                      | 12.98                   |                     | 25.40                                | 8.71                            | 50.80                 | 9.50                       | 3                          | 270.00                        | T040-270-343 | C           |
|                      | 12.88                   |                     | 25.40                                | 8.71                            | 50.80                 | 12.90                      | 4                          | 360.00                        | T040-360-343 | C           |



| Do<br>Wire Dia<br>mm | Do<br>Outside Dia<br>mm | T<br>Torque<br>N/mm | R<br>Loaded Position<br>All Parts mm | M/S<br>Recom Mandrel<br>Size mm | E<br>Leg Length<br>mm | A/S<br>Min Axle Size<br>mm | Fig<br>Position of<br>Legs | Deg°<br>Degrees<br>Deflection | Part No.      | Price Group |
|----------------------|-------------------------|---------------------|--------------------------------------|---------------------------------|-----------------------|----------------------------|----------------------------|-------------------------------|---------------|-------------|
| 1.14                 | 9.07                    | 226.00              | 15.88                                | 5.16                            | 31.75                 | 6.58                       | 1                          | 90.00                         | T045-090-203  | B           |
|                      | 9.58                    |                     | 15.88                                | 5.54                            | 31.75                 | 10.85                      | 2                          | 180.00                        | T045-180-218  | B           |
|                      | 9.70                    |                     | 15.88                                | 5.94                            | 31.75                 | 15.11                      | 3                          | 270.00                        | T045-270-234  | B           |
|                      | 14.61                   |                     | 25.40                                | 9.12                            | 50.80                 | 7.44                       | 2                          | 180.00                        | T045-180-359  | C           |
|                      | 14.12                   |                     | 25.40                                | 9.12                            | 50.80                 | 10.54                      | 3                          | 270.00                        | T045-270-359  | C           |
| 13.94                | 25.40                   | 9.12                | 50.80                                | 13.72                           | 4                     | 360.00                     | T045-360-359               | C                             |               |             |
| 1.22                 | 9.53                    | 282.00              | 15.88                                | 5.54                            | 31.75                 | 6.05                       | 1                          | 90.00                         | T048-090-218  | B           |
|                      | 10.26                   |                     | 15.88                                | 6.35                            | 31.75                 | 11.43                      | 2                          | 180.00                        | T048-180-250  | B           |
|                      | 10.57                   |                     | 15.88                                | 6.35                            | 31.75                 | 16.76                      | 3                          | 270.00                        | T048-270-250  | B           |
|                      | 15.70                   |                     | 25.40                                | 10.31                           | 50.80                 | 7.42                       | 2                          | 180.00                        | T048-180-406  | C           |
|                      | 15.24                   |                     | 25.40                                | 10.31                           | 50.80                 | 11.43                      | 3                          | 270.00                        | T048-270-406  | C           |
| 15.09                | 25.40                   | 10.31               | 50.80                                | 15.49                           | 4                     | 360.00                     | T048-360-406               | C                             |               |             |
| 1.30                 | 10.36                   | 328.00              | 25.40                                | 5.94                            | 50.80                 | 7.44                       | 1                          | 90.00                         | T051-090-234  | C           |
|                      | 10.92                   |                     | 25.40                                | 6.35                            | 50.80                 | 12.32                      | 2                          | 180.00                        | T051-180-250  | C           |
|                      | 11.15                   |                     | 25.40                                | 6.76                            | 50.80                 | 17.15                      | 3                          | 270.00                        | T051-270-266  | C           |
|                      | 14.12                   |                     | 25.40                                | 8.74                            | 50.80                 | 9.70                       | 2                          | 180.00                        | T051-180-344  | F           |
|                      | 14.50                   |                     | 25.40                                | 9.12                            | 50.80                 | 13.26                      | 3                          | 270.00                        | T051-270-359  | F           |
| 15.95                | 25.40                   | 10.31               | 50.80                                | 15.62                           | 4                     | 360.00                     | T051-360-406               | F                             |               |             |
| 1.37                 | 12.29                   | 370.00              | 25.40                                | 7.52                            | 50.80                 | 7.87                       | 1                          | 90.00                         | T054-090-296  | F           |
|                      | 12.93                   |                     | 25.40                                | 7.92                            | 50.80                 | 13.00                      | 2                          | 180.00                        | T054-180-312  | F           |
|                      | 13.06                   |                     | 25.40                                | 7.92                            | 50.80                 | 18.16                      | 3                          | 270.00                        | T054-270-312  | F           |
|                      | 16.61                   |                     | 25.40                                | 10.69                           | 50.80                 | 10.26                      | 2                          | 180.00                        | T054-180-421  | G           |
|                      | 16.61                   |                     | 25.40                                | 11.10                           | 50.80                 | 14.10                      | 3                          | 270.00                        | T054-270-437  | G           |
| 16.61                | 25.40                   | 11.51               | 50.80                                | 17.91                           | 4                     | 360.00                     | T054-360-453               | G                             |               |             |
| 1.50                 | 12.67                   | 475.00              | 25.40                                | 7.52                            | 50.80                 | 8.64                       | 1                          | 90.00                         | T059-090-296  | F           |
|                      | 13.36                   |                     | 25.40                                | 8.33                            | 50.80                 | 14.22                      | 2                          | 180.00                        | T059-180-328  | F           |
|                      | 13.64                   |                     | 25.40                                | 8.33                            | 50.80                 | 19.94                      | 3                          | 270.00                        | T059-270-328  | F           |
|                      | 17.30                   |                     | 25.40                                | 11.10                           | 50.80                 | 11.30                      | 2                          | 180.00                        | T059-180-437  | G           |
|                      | 17.75                   |                     | 25.40                                | 11.51                           | 50.80                 | 15.37                      | 3                          | 270.00                        | T059-270-453  | G           |
| 18.01                | 25.40                   | 11.66               | 50.80                                | 19.56                           | 4                     | 360.00                     | T059-360-459               | G                             |               |             |
| 14.22                | 25.40                   | 8.71                | 50.80                                | 9.19                            | 1                     | 90.00                      | T063-090-343               | G                             |               |             |
| 1.60                 | 15.01                   | 582.00              | 25.40                                | 9.12                            | 50.80                 | 15.24                      | 2                          | 180.00                        | T063-180-359  | G           |
|                      | 15.24                   |                     | 25.40                                | 9.53                            | 50.80                 | 21.21                      | 3                          | 270.00                        | T063-270-375  | G           |
|                      | 19.48                   |                     | 25.40                                | 12.70                           | 50.80                 | 12.07                      | 2                          | 180.00                        | T063-180-500  | J           |
|                      | 19.91                   |                     | 25.40                                | 13.11                           | 50.80                 | 16.38                      | 3                          | 270.00                        | T063-270-516  | J           |
|                      | 20.27                   |                     | 25.40                                | 13.11                           | 50.80                 | 20.83                      | 4                          | 360.00                        | T063-360-516  | J           |
| 1.78                 | 15.06                   | 791.00              | 25.40                                | 9.12                            | 50.80                 | 10.16                      | 1                          | 90.00                         | T070-090-359  | G           |
|                      | 15.88                   |                     | 25.40                                | 9.91                            | 50.80                 | 16.89                      | 2                          | 180.00                        | T070-180-390  | G           |
|                      | 16.23                   |                     | 25.40                                | 9.91                            | 50.80                 | 23.62                      | 3                          | 270.00                        | T070-270-390  | G           |
|                      | 20.57                   |                     | 25.40                                | 13.08                           | 50.80                 | 13.34                      | 2                          | 180.00                        | T070-180-515  | J           |
|                      | 20.98                   |                     | 25.40                                | 13.49                           | 50.80                 | 18.21                      | 3                          | 270.00                        | T070-270-531  | J           |
| 21.41                | 25.40                   | 13.87               | 50.80                                | 23.11                           | 4                     | 360.00                     | T070-360-546               | J                             |               |             |
| 1.91                 | 16.13                   | 989.00              | 25.40                                | 9.53                            | 50.80                 | 10.92                      | 1                          | 90.00                         | T075-090-375  | G           |
|                      | 17.15                   |                     | 25.40                                | 10.72                           | 50.80                 | 18.03                      | 2                          | 180.00                        | T075-180-422  | G           |
|                      | 17.78                   |                     | 25.40                                | 12.70                           | 50.80                 | 25.15                      | 3                          | 270.00                        | T075-270-500  | G           |
|                      | 19.69                   |                     | 25.40                                | 12.29                           | 50.80                 | 16.26                      | 2                          | 180.00                        | T075-180-484  | J           |
|                      | 20.96                   |                     | 25.40                                | 13.49                           | 50.80                 | 21.59                      | 3                          | 270.00                        | T075-270-531  | J           |
| 24.77                | 25.40                   | 16.26               | 50.80                                | 26.67                           | 4                     | 360.00                     | T075-360-640               | J                             |               |             |
| 1.98                 | 17.22                   | 1102.00             | 25.40                                | 10.31                           | 50.80                 | 11.43                      | 1                          | 90.00                         | T078-090-406  | G           |
|                      | 18.49                   |                     | 25.40                                | 11.51                           | 50.80                 | 18.80                      | 2                          | 180.00                        | T078-180-453  | G           |
|                      | 18.49                   |                     | 25.40                                | 11.51                           | 50.80                 | 26.16                      | 3                          | 270.00                        | T078-270-453  | G           |
|                      | 20.40                   |                     | 25.40                                | 12.70                           | 50.80                 | 16.76                      | 2                          | 180.00                        | T078-180-500  | J           |
|                      | 21.67                   |                     | 25.40                                | 13.87                           | 50.80                 | 22.35                      | 3                          | 270.00                        | T078-270-546  | J           |
| 22.94                | 25.40                   | 14.68               | 50.80                                | 27.69                           | 4                     | 360.00                     | T078-360-578               | J                             |               |             |
| 2.16                 | 18.16                   | 1356.00             | 31.75                                | 10.72                           | 63.50                 | 12.42                      | 1                          | 90.00                         | T085-090-422  | G           |
|                      | 19.30                   |                     | 31.75                                | 11.91                           | 63.50                 | 20.52                      | 2                          | 180.00                        | T085-180-469  | G           |
|                      | 20.07                   |                     | 31.75                                | 12.70                           | 63.50                 | 28.60                      | 3                          | 270.00                        | T085-270-500  | G           |
|                      | 25.25                   |                     | 31.75                                | 16.28                           | 63.50                 | 16.21                      | 2                          | 180.00                        | T085-180-641  | J           |
|                      | 26.42                   |                     | 31.75                                | 17.07                           | 63.50                 | 22.12                      | 3                          | 270.00                        | T085-270-672  | J           |
| 26.77                | 31.75                   | 17.48               | 63.50                                | 28.07                           | 4                     | 360.00                     | T085-360-688               | J                             |               |             |
| 2.41                 | 19.71                   | 1808.00             | 38.10                                | 11.51                           | 76.20                 | 13.87                      | 1                          | 90.00                         | T095-090-453  | J           |
|                      | 22.07                   |                     | 38.10                                | 13.49                           | 76.20                 | 22.94                      | 2                          | 180.00                        | T095-180-531  | J           |
|                      | 23.50                   |                     | 38.10                                | 14.68                           | 76.20                 | 31.98                      | 3                          | 270.00                        | T095-270-578  | J           |
|                      | 28.73                   |                     | 38.10                                | 18.64                           | 76.20                 | 18.11                      | 2                          | 180.00                        | T095-180-734  | K           |
|                      | 30.56                   |                     | 38.10                                | 20.24                           | 76.20                 | 24.74                      | 3                          | 270.00                        | T095-270-797  | K           |
| 31.12                | 38.10                   | 20.65               | 76.20                                | 31.37                           | 4                     | 360.00                     | T095-360-813               | K                             |               |             |
| 2.67                 | 21.54                   | 2373.00             | 44.45                                | 12.70                           | 88.90                 | 15.34                      | 1                          | 90.00                         | T105-090-500  | K           |
|                      | 24.94                   |                     | 44.45                                | 15.47                           | 88.90                 | 25.35                      | 2                          | 180.00                        | T105-180-609  | K           |
|                      | 27.69                   |                     | 44.45                                | 17.86                           | 88.90                 | 35.33                      | 3                          | 270.00                        | T105-207-703  | K           |
|                      | 31.70                   |                     | 44.45                                | 20.65                           | 88.90                 | 20.02                      | 2                          | 180.00                        | T105-180-813  | L           |
|                      | 34.09                   |                     | 44.45                                | 22.63                           | 88.90                 | 27.33                      | 3                          | 270.00                        | T105-270-891  | L           |
| 34.77                | 44.45                   | 23.01               | 88.90                                | 34.67                           | 4                     | 360.00                     | T105-360-906               | L                             |               |             |
| 2.92                 | 24.84                   | 3164.00             | 50.80                                | 15.09                           | 101.60                | 16.79                      | 1                          | 90.00                         | T115-090-594  | L           |
|                      | 26.49                   |                     | 50.80                                | 16.28                           | 101.60                | 27.76                      | 2                          | 180.00                        | T115-180-641  | L           |
|                      | 27.58                   |                     | 50.80                                | 17.48                           | 101.60                | 38.68                      | 3                          | 270.00                        | T115-270-688  | L           |
|                      | 34.21                   |                     | 50.80                                | 21.82                           | 101.60                | 21.92                      | 2                          | 180.00                        | T115-180-859  | M           |
|                      | 36.45                   |                     | 50.80                                | 23.83                           | 101.60                | 29.95                      | 3                          | 270.00                        | T115-270-938  | M           |
| 37.21                | 50.80                   | 24.61               | 101.60                               | 37.97                           | 4                     | 360.00                     | T115-360-969               | M                             |               |             |
| 3.18                 | 25.12                   | 3616.00             | 50.80                                | 15.01                           | 101.60                | 21.44                      | 1                          | 90.00                         | T125-090-591  | N           |
|                      | 27.48                   |                     | 50.80                                | 16.92                           | 101.60                | 36.53                      | 2                          | 180.00                        | T125-180-666  | N           |
|                      | 30.20                   |                     | 50.80                                | 19.08                           | 101.60                | 48.41                      | 3                          | 270.00                        | T125-270-751  | N           |
|                      | 34.44                   |                     | 50.80                                | 22.48                           | 101.60                | 30.18                      | 2                          | 180.00                        | T125-180-885  | P           |
|                      | 38.51                   |                     | 50.80                                | 25.73                           | 101.60                | 38.89                      | 3                          | 270.00                        | T125-270-1013 | P           |
| 40.77                | 50.80                   | 27.53               | 101.60                               | 47.63                           | 4                     | 360.00                     | T125-360-1084              | P                             |               |             |
| 3.43                 | 27.99                   | 4519.00             | 50.80                                | 16.92                           | 101.60                | 23.14                      | 1                          | 90.00                         | T135-090-666  | O           |
|                      | 30.20                   |                     | 50.80                                | 18.67                           | 101.60                | 39.45                      | 2                          | 180.00                        | T135-180-735  | O           |
|                      | 33.05                   |                     | 50.80                                | 20.96                           | 101.60                | 52.30                      | 3                          | 270.00                        | T135-270-825  | O           |
|                      | 37.87                   |                     | 50.80                                | 24.82                           | 101.60                | 32.59                      | 2                          | 180.00                        | T135-180-977  | R           |
|                      | 42.16                   |                     | 50.80                                | 28.24                           | 101.60                | 42.01                      | 3                          | 270.00                        | T135-270-1112 | R           |
| 44.58                | 50.80                   | 30.18               | 101.60                               | 51.44                           | 4                     | 360.00                     | T135-360-1188              | R                             |               |             |

