10 - HARDWARE

S7092Y-...
Precision Socket Head Shoulder Screws pg. 10-6

A 9X25-...
Socket Head Shoulder Screws pg. 10-7

S7092Y-...
S7094Y-...
S7095Y-...
S7096Y-...
S7097Y-...
Precision Slotted Head Shoulder Screws pg. 10-8

A 9Q18-...
A 9X18-...

A 9X15-...
Slotted Head Shoulder Screws pg. 10-9

A 7Y 5-...
Shallow Head Shoulder Screws pg. 10-10

Hexagonal Nuts pg. 10-11

A 9X16-...
Flat, Fillister, and Round Head Machine Screws pg. 10-12

A 9A60-...
A 9B60-...
A 9C60-...
A 9X60-...

A 9X26-...
Metal Threaded Rods pg. 10-14

A 9Q26-...
Socket Head Cap Screws Stainless Steel pg. 10-15

A 9Q26-
Socket Head Cap Screws Kit pg. 10-18

Socket Head Cap Screws Moly Coated pg. 10-17

A 9Q26-KIT001
A 4T15-...
Socket Head Cap Screw Kit pg. 10-18

Hexagonal Wrenches pg. 10-18

A 9M52-...
Socket Head Cap Screws Nylon pg. 10-19

A 9P54-...
Hexagonal Head Cap Screws Nylon pg. 10-20

A 9X23-...
Hexagonal Nylon Insert Locknuts pg. 10-21

A 9M62-...
Plastic Hexagonal Nuts pg. 10-22

A 9X17-...
Socket Head Set Screws Stainless Steel pg. 10-23

A 9Q17-...
Socket Head Set Screws pg. 10-24
10 - HARDWARE

PHONE: 516.328.3300 • FAX: 516.326.8827 • WWW.SDP-SI.COM

Nylon Tipped Set Screws
A 9X93-...
pag. 10-25

Assembled Thumb Screw Knobs
A 9T41-...
pag. 10-26

Assembled Thumb Screw Knobs
A 9T41-...
pag. 10-27

Thumb Screw Knobs
A 9M41-...
pag. 10-28

Thumb Screw Knobs
A 9M41-...
pag. 10-28

Assorted Knob Kits
A 9M41-KIT...
pag. 10-29

Knurled Thumb Screws
Brass
A 9B41-...
pag. 10-30

Knurled Head Thumb Screws
Nylon
A 9P57-...
pag. 10-31

Captive Thumb Screws
A 9B41-...
pag. 10-32

Precision Knurled Knobs
Stainless Steel
A 9A45-...
pag. 10-33

Precision Handcranks
Aluminum
A 9A45-...
pag. 10-34

Oval Handles
A 9B45-...
pag. 10-35

Chassis Handles
A 9B47-...
pag. 10-35

Round Handles
A 9B44-...
pag. 10-36

End Ferrules
A 9A44-...
pag. 10-36

Molded Screw Insulators
Nylon
A 9M70-...
pag. 10-37

Shaft Spacers
Stainless Steel
A 7X 8-C...
pag. 10-38 & 10-39

Outer Race Shim Spacer
Stainless Steel
A 7X 8-A...
pag. 10-40

Shim Spacers
Laminated Brass
A 7B 8...
pag. 10-40

Arbor Spacers
Strip Steel
A 7C 8-D...
pag. 10-41

Arbor Shims
Strip Steel
A 7C 8-E...
pag. 10-42

Assembled Thumb Screw Knobs
A 9T41-...
pag. 10-26

Assembled Thumb Screw Knobs
A 9T41-...
pag. 10-27

Thumb Screw Knobs
A 9M41-...
pag. 10-28

Thumb Screw Knobs
A 9M41-...
pag. 10-28

Assorted Knob Kits
A 9M41-KIT...
pag. 10-29

Knurled Thumb Screws
Brass
A 9B41-...
pag. 10-30

Knurled Head Thumb Screws
Nylon
A 9P57-...
pag. 10-31

Captive Thumb Screws
A 9B41-...
pag. 10-32

Precision Knurled Knobs
Stainless Steel
A 9A45-...
pag. 10-33

Precision Handcranks
Aluminum
A 9A45-...
pag. 10-34

Oval Handles
A 9B45-...
pag. 10-35

Chassis Handles
A 9B47-...
pag. 10-35

Round Handles
A 9B44-...
pag. 10-36

End Ferrules
A 9A44-...
pag. 10-36

Molded Screw Insulators
Nylon
A 9M70-...
pag. 10-37

Shaft Spacers
Stainless Steel
A 7X 8-C...
pag. 10-38 & 10-39

Outer Race Shim Spacer
Stainless Steel
A 7X 8-A...
pag. 10-40

Shim Spacers
Laminated Brass
A 7B 8...
pag. 10-40

Arbor Spacers
Strip Steel
A 7C 8-D...
pag. 10-41

Arbor Shims
Strip Steel
A 7C 8-E...
pag. 10-42
10 - HARDWARE

Thread & Bolt Size Shims Spring Steel pg. 10-43

Flat Washers Stainless Steel pg. 10-44

Sintered Thrust Washers Bronze pg. 10-44

Sintered Thrust Washers "S" Series pg. 10-45

Nonmetallic Flat Washers pg. 10-46

Molded Shoulder Washers Nylon pg. 10-47

Wave Spring Washers Thin Wall Series pg. 10-50

Wave Spring Washers Screw Size Series pg. 10-50

Lock Washers Stainless Steel pg. 10-52

External Retaining Rings Bowed & Grooveless pg. 10-53

External Retaining Rings Stainless Steel pg. 10-54

External Retaining Rings pgs. 10-55 & 10-56

Internal Retaining Rings pg. 10-57

External Retaining Rings Snap-On Design pg. 10-58

External E-Rings pg. 10-59

Precision Dowel Pins Stainless Steel pg. 10-60

Hardened Standard Dowel Pins Stainless Steel pg. 10-61
10 - HARDWARE

A 9Q32-...
Precision Ground Standard Dowel Pins
Steel pg. 10-62

A 9Y35-...
Roll Pins
Stainless Steel pg. 10-63

A 9C35-...
Roll Pins
Spring Steel pg. 10-64

S7220Y-...
Precision Standard-Duty Spirol Pins
Stainless Steel pg. 10-65

A 9Q36-...
Medium-Duty Spirol Pins
Hardened Steel pg. 10-66

S7210Y-...
Precision Groove Pins
Stainless Steel pg. 10-67

A 9C37-...
Groove Pins
Steel, Zinc Plated pg. 10-68

A 9C38-...
Taper Pins
Steel pg. 10-69

A 9Q34-...
Internal Hitch Pins
pg. 10-70

S1228Y-...
Precision Disc Dials
Clockwise pg. 10-71

S5189Y-...
Precision Drum Dials
Clockwise pg. 10-72

S6900Y-GE-...
Precision Indexes
pg. 10-73

S6900Y-GF-...
Precision Drum Dial Indexes
pg. 10-73

S6900Y-GG-...
Precision Drum Dial Indexes
pg. 10-73

S7270Y-...
Spring Posts
Steel, Zinc Plated pg. 10-74

S78ESY-...
Extension Springs
Stainless Steel pgs. 10-75 & 10-76

S78CSY-...
Compression Springs
Stainless Steel pgs. 10-77 & 10-78

S78TSY-...
Left-Hand Wound Torsion Springs
Stainless Steel pg. 10-79

S78ASY-...
Anti-Backlash Torsion Springs
Stainless Steel pg. 10-79

A 9A43-...
Round Spacers
pg. 10-80
# MATERIAL: 303 Stainless Steel

## INCH COMPONENT

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### Specifications

- **O.D.**: ± .005
- **Dia.**: ± .005
- **H**: ± .01
- **L**: ± .001
- **S**: ± .01
- **T**: ± .01
- **U**: ± .01

#### Thread Sizes
- #4-40 UNC-3A
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- #10-32 UNF-3A
- 1/4-20 UNC-3A
- 5/16-18 UNC-3A
- 3/8-16 UNC-3A
## SOCKET HEAD SHOULDER SCREWS

### ANSI/ASME B 18.31986

**MATERIAL:**
303 Stainless Steel

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303 Stainless Steel

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### SLOTTED HEAD SHOULDER SCREWS

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303 Stainless Steel

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**SLOTTED HEAD SHOULDER SCREWS**

**SHALLOW HEAD**

**MATERIAL:**
303 Stainless Steel

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**INCH COMPONENT**

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HEXAGONAL NUTS

> MATERIAL:
Alloy Steel or 18-8 Stainless Steel

> FINISH:
Alloy Steel, Zinc Plated

> SPECIFICATION:
Priced Per 100 Pieces

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Fig. 1 Alloy Steel, Zinc Plated

Fig. 2 18-8 Stainless Steel
## MACHINE SCREWS

**FLAT HEAD**
**FILLISTER HEAD**
**ROUND HEAD**

### MATERIAL:
18-8 Stainless Steel

### SPECIFICATION:
Priced Per 100 Pieces

*Length of flat head screws include head height.

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Aluminum, Brass, Mild Steel or Stainless Steel

**SPECIFICATION:**
Priced Per 3-Foot Rod

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MATERIAL:
303 Stainless Steel

SPECIFICATION:
Priced Per 100 Pieces

* Head may be supplied with or without knurl at SDP/SI option.

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**MATERIAL:**
Alloy Steel, Black Oxide

**SPECIFICATION:**
Priced Per 100 Pieces

* Head may be supplied with or without knurl at SDP/SI option.
**MOLY COATED SOCKET HEAD CAP SCREWS**

**MATERIAL:**
Alloy Steel, Black Oxide, coated with Dry Molybdenum Disulfide

**SPECIFICATION:**
Priced Per 100 Pieces

* Head may be supplied with or without knurl at SDP/SI option.

---

**INCH COMPONENT**

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SOCKET HEAD CAP SCREW KIT

- **MATERIAL:**
  Alloy Steel, Black Oxide

- **SPECIFICATION:**
  18 popular sizes - 360 Pieces

**INCH COMPONENT**

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<td>#8-32 x 1/2</td>
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<td>#4-40 x 1/2</td>
<td>#8-32 x 3/4</td>
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<td>#6-32 x 1/4</td>
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HEXAGONAL WRENCHES

- **MATERIAL:**
  Steel, Plated

Hex Key Set available: A 4Z15-HEXSET contains 15 keys (.028 to 3/8).

**INCH COMPONENT**

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<td>#0</td>
<td>#3 &amp; #4</td>
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<td>#1</td>
<td>#5 &amp; #6</td>
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<td>#2 &amp; #3</td>
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NYLON SOCKET HEAD CAP SCREWS

LIGHTWEIGHT
NONCORROSIVE
VIBRATION-RESISTANT
NONCONDUCTIVE
ANTIMAGNETIC

> MATERIAL:
Nylon (Zytel 101)

> SPECIFICATION:
Priced Per 100 Pieces

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<th>Catalog Number</th>
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* Not fully threaded.
HEXAGONAL NYLON INSERT LOCKNUTS

VIBRATION-RESISTANT
NO MARRING OF THREADS
REUSABLE
INSERT EFFECTIVE UP TO 250°F

**MATERIAL:**
- Locknut - 303 Stainless Steel
- Insert - Nylon

**SPECIFICATION:**
Priced Per 100 Pieces

INCH COMPONENT

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**THREAD SIZE:**

- **A**
- **B**

**MATERIAL:**
- Locknut - 303 Stainless Steel
- Insert - Nylon

**SPECIFICATION:**
Priced Per 100 Pieces
**PLASTIC HEXAGONAL NUTS**

**LIGHTWEIGHT**  
**NONCORROSIVE**  
**VIBRATION-RESISTANT**  
**NONCONDUCTIVE**  
**ANTIMAGNETIC**

**MATERIAL:**  
Nylon (6/6 Natural)

**SPECIFICATION:**  
Priced Per 100 Pieces

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### CUP POINT

- **MATERIAL:** Stainless Steel
- **SPECIFICATION:** Priced Per 100 Pieces
## SOCKET HEAD SET SCREWS

**CUP POINT**

- **MATERIAL:** Steel, Black Oxide
- **SPECIFICATION:** Priced Per 100 Pieces

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A 9Q17-252016 | 1/4-20      | 1/2
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A 9Q17-311828 | 5/16-18     | 7/8
NYLON TIPPED SET SCREWS

SELF-LOCKING
NONMARRING

MATERIAL:
Screw - 18-8 Stainless Steel
Tip - Nylon

For engineering assistance for all SDP/SI components, call on our application engineers.

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**ASSEMBLED THUMB SCREW KNOBS**

**DECORATIVE COLORS**

**VARIED LENGTHS**

> **MATERIAL:**
> - Knob - Acetal Resin
> - Screw - Steel Alloy

> **KNOB COLOR CODE:**
> - Black
> - Red

Using the data above, insert the desired Knob Color Code in the box in the catalog number. For example: A 9T41-R8399108 is a Red Knurled Head Knob 3/8" Dia. with a #6-32 Screw 3/4" long.

> **SPECIFICATION:**
> Priced Per 10 Pieces

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Continued on the next page
ASSEMBLED THUMB SCREW KNOBS

DECORATIVE COLORS
VARIED LENGTHS

› MATERIAL:
  Knob - Acetal Resin
  Screw - Steel Alloy

› KNOB COLOR CODE:
  B Black
  R Red

Using the data above, insert the desired Knob Color Code in the box in the catalog number.
For example: A 9T41-R8399171 is a Red Tee Knob 1" in length with a #10-32 Screw 3/8" long.

› SPECIFICATION:
Priced Per 10 Pieces

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Continued from the previous page
THUMB SCREW KNOBS

DECORATIVE COLORS
USED ON SOCKET HEAD SCREWS

> MATERIAL:
Acetal Resin

> KNOB COLOR CODE:
- B: Black
- G: Gray
- R: Red
- Y: Yellow

Using the data above, insert the desired Knob Color Code in the box in the catalog number. For example: A 9T41R8399108 is a Red Knurled Head Knob 5/8" Dia. for a #10 Screw.

> SPECIFICATION:
Priced Per 100 Pieces

Method of Assembly to
A 9026 Series Cap Screws
1. Preassemble into ribbed retaining socket.  
2. Simply press screw to shear and lock.

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ASSORTED KNOB KITS

DECORATIVE COLORS

SPECIFICATION:
Simple two-step assembly to standard socket head cap screws.

Method of Assembly
1. Preassemble into ribbed retaining socket.
2. Simply press screw to shear and lock.

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#### MATERIAL:
Brass

#### FINISH:
Nickel Plated or Black Oxide Finish
NYLON KNURLED HEAD THUMB SCREWS

LIGHTWEIGHT  
NONCORROSIVE  
NONCONDUCTIVE  
VIBRATION-RESISTANT

**MATERIAL:**  
Nylon

**SPECIFICATION:**  
Priced Per 100 Pieces

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</table>

* These are not standard thread sizes; considerable price premium paid due to low production quantities.
## CAPTIVE THUMB SCREWS

### MATERIAL:
Half-Hard Brass

### FINISH:
Nickel Plated or Black Oxide

![Captive Thumb Screw Diagram]

### INCH COMPONENT

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<tr>
<th>Catalog Number</th>
<th>Thread Size</th>
<th>A</th>
<th>C</th>
<th>D</th>
<th>O.D.</th>
<th>F</th>
<th>G</th>
<th>H Dia.</th>
<th>J Dia.</th>
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**INCH COMPONENT**

- **Thread Size:** #6-32, #8-32, #10-32, 1/4-20, 1/4-20
- **Material:** Half-Hard Brass, Nickel Plated, Half-Hard Brass, Black Oxide
- **Finish:** Nickel Plated, Black Oxide

**Dimensions:**
- **A:** 0.040
- **B:** 0.040
- **C:** 0.040
- **D:** 0.040
- **E:** 0.040
- **F:** 0.040
- **G:** 0.040
- **H:** 0.040
- **J:** 0.040

**Materials:**
- **Material:** Half-Hard Brass
- **Finish:** Nickel Plated or Black Oxide
MATERIAL:
303 Stainless Steel

Special knobs are available on request.

### Precision Knurled Knobs

**Catalog Number**

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<th>A Dia.</th>
<th>B Dia.</th>
<th>C Dia.</th>
<th>D</th>
<th>Sub Drill</th>
<th>Set Screw</th>
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**Material:**

303 Stainless Steel

Special knobs are available on request.

**MATERIAL:**

303 Stainless Steel

Special knobs are available on request.
PRECISION HANDCRANKS

2 INCH DIAMETER

**MATERIAL:**
2024 Aluminum, Black Anodized

Other bores are available on special order. Name plates can be ordered separately.

**INCH COMPONENT**

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**OVAL HANDLES**

- **MATERIAL:** Aluminum, Black Anodized or Brass, Nickel Plated

**CHASSIS HANDLES**

- **MATERIAL:** Brass
- **FINISH:** Nickel Plated or Black Oxide

Nuts and washers are supplied, and come in various materials.

---

### INCH COMPONENT

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<thead>
<tr>
<th>Catalog Number</th>
<th>H Height</th>
<th>L Length</th>
<th>T Thread</th>
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<td>A 9A45-A30</td>
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<td>3</td>
<td>#10-24</td>
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<td>4 9/16</td>
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<td>1/2</td>
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<td>6 7/16</td>
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<td>A 9A45-A90</td>
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### INCH COMPONENT

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<td>A 9B47-A15N18</td>
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## MATERIAL
Brass, Nickel Plated, Stainless Steel or Aluminum, Black Anodized

---

### INCH COMPONENT

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</tr>
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<td>Stainless Steel</td>
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* Catalog number: A 9A44-A40 has an internal radius of 3/8".
MOLDED SCREW INSULATORS

NONCONDUCTIVE
NONCORROSIVE
LIGHTWEIGHT
SELF-SEALING
SELF-LOCKING

MATERIAL:
Nylon (Zytel 101)

SPECIFICATION:
Priced Per 100 Pieces

---

## INCH COMPONENT

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<th>I.D.</th>
<th>L Length</th>
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###shaft Spacers

**Material:**
300 Series Stainless Steel

Other spacers available on special order.

####Inch Component

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SHAFT SPACERS

MATERIAL:
300 Series Stainless Steel

Other spacers available on special order.

---

![Shaft Spacers Diagram](image)

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### MATERIAL:
300 Series Stainless Steel

Other spacers available on special order.

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![Shaft Spacers Diagram](image)
### OUTER RACE SHIM SPACERS

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300 Series Stainless Steel

#### SPECIFICATION:
Priced Per 100 Pieces

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#### LAMINATED BRASS SHIM SPACERS

#### MATERIAL:
Laminated Brass

#### SPECIFICATION:
Priced Per 100 Pieces

Other spacers available on special order.

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- **MATERIAL:** Strip Steel
- **SPECIFICATION:** Priced Per 100 Pieces

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Strip Steel

**SPECIFICATION:**
Priced Per 100 Pieces

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*To be discontinued when present stock is depleted.*
### MATERIAL:
Spring Steel

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#### Thread Size Shims
- I.D. Tolerance is +.000/-.005
- O.D. Tolerance is +.000/-.005

#### Bolt Size Shims
- I.D. Tolerance is +.002/-.000
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Priced Per 100 Pieces

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## FLAT WASHERS

**MATERIAL:** Stainless Steel

**SPECIFICATION:** Priced Per 100 Pieces

### INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>I.D. ± .01</th>
<th>O.D. ± .01</th>
<th>T ± .010</th>
<th>Screw Size</th>
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<td>.262</td>
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## SINTERED THRUST WASHERS

**MATERIAL:** Oil-Impregnated Bronze, Self-Lubricating

**SPECIFICATION:** Priced Per Each

### INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
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<th>O.D. ± .010</th>
<th>T Thickness ± .0025</th>
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SINTERED THRUST WASHERS

’S’ SERIES

MATERIAL:
Oil-Impregnated Bronze, Self-Lubricating

SPECIFICATIONS:
- I.D. tolerances: up to & including 1.253 is ± .005 over 1.253 & including 2.502 is ± .010
- O.D. tolerances: up to & including 1.500 is ± .010 over 1.500 & including 3.000 is ± .015, -0 over 3.000 is ± .020, -0

** Catalog Number **

<table>
<thead>
<tr>
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<th>O.D.**</th>
<th>T ± .0025</th>
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<td>1/16</td>
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INSULATES
SEALS
DAMPENS VIBRATION
PREVENTS GALLING

> MATERIAL:
Nylon, Natural (Zytel 101) or
Polyvinyl Chloride (PVC), Gray

> SPECIFICATIONS:
Nylon - Priced Per 1000 Pieces
PVC - Priced Per 100 Pieces

**INCH COMPONENT**

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<tr>
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<th>O.D.</th>
<th>T Thickness</th>
<th>Screw Size</th>
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<td>.010</td>
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<td>.015</td>
<td>#1</td>
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<td>.031</td>
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MOLDED SHOULDER WASHERS

INSULATES
SEALS
DAMPENS VIBRATION
PREVENTS GALLING

> MATERIAL:
Nylon (ZYTEL 101)

> SPECIFICATION:
Priced Per 100 Pieces

INCH COMPONENT

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COUNTERSUNK FINISHING WASHERS

MAXIMUM STRENGTH
INSULATES
DAMPENS VIBRATION
PREVENTS SCRATCHING

> MATERIAL:
Nylon (ZYTEL 101)

> SPECIFICATION:
Priced Per 100 Pieces

INCH COMPONENT

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<th>Screw Size</th>
<th>I.D.</th>
<th>O.D.</th>
<th>Length</th>
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MATERIAL:
1074 Spring Steel (ASTM-A684)
302 Stainless Steel (AMS 5906)

SPECIFICATION:
Priced Per 10 Pieces

**BELLEVILLE SPRING WASHERS**

**Fig. 1**
Series Stacking (washers opposing)
For a given load, the total deflection of the stack is approximately equal to the individual washer deflection multiplied by the number of washers in the stack.

**Fig. 2**
Parallel Stacking (washers resting)
For a given deflection, the total load applied to the stack is approximately equal to the individual washer load multiplied by the number of washers in the stack.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>I.D. Min.</th>
<th>O.D. Max.</th>
<th>T Stock Thick.</th>
<th>Hf Free Height</th>
<th>HL Loaded Height</th>
<th>Load @ HL lbf Min. – Max.</th>
<th>Load @ Flat</th>
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<td>A 70 9-06010</td>
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<td>.015</td>
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### MATERIAL:
- 301 Stainless Steel
- Spring Steel AISI C1075 Blued

### SPECIFICATION:
- Priced Per 10 Pieces

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#### INCH COMPONENT

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<th>H_L Loaded Height</th>
<th>Load @ H_L ± 15% lbf</th>
<th>Screw Size</th>
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<td>—</td>
<td>—</td>
<td>.200</td>
<td>.370</td>
<td>.0075</td>
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<td>3.00</td>
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<td>A 7X 9-1W03706</td>
<td>—</td>
<td>—</td>
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<td>.0060</td>
<td>.089</td>
<td>.025</td>
<td>2.75</td>
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<td>A 7Q 9-1W03709</td>
<td>—</td>
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<td>.423</td>
<td>.0090</td>
<td>.047</td>
<td>.028</td>
<td>4.50</td>
<td>#12</td>
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<tr>
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<td>.0100</td>
<td>.053</td>
<td>.032</td>
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<td>—</td>
<td>.0110</td>
<td>.063</td>
<td>.034</td>
<td>7.00</td>
<td>—</td>
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<tr>
<td>A 7X 9-1W05512</td>
<td>A 7Q 9-1W04911</td>
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<td>.490</td>
<td>.0075</td>
<td>.091</td>
<td>.046</td>
<td>3.50</td>
<td>1/4</td>
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<td>A 7Q 9-1W05512</td>
<td>A 7Q 9-1W04911</td>
<td>—</td>
<td>296</td>
<td>.551</td>
<td>.0120</td>
<td>.070</td>
<td>.038</td>
<td>8.00</td>
<td>9/32</td>
</tr>
<tr>
<td>A 7Q 9-1W06109</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.0130</td>
<td>.077</td>
<td>.042</td>
<td>9.00</td>
<td>5/16</td>
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<tr>
<td>A 7Q 9-1W06113</td>
<td>A 7Q 9-1W06113</td>
<td>—</td>
<td>.327</td>
<td>.612</td>
<td>.0090</td>
<td>.113</td>
<td>.060</td>
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<td>11/32</td>
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<td>A 7Q 9-1W06715</td>
<td>—</td>
<td>—</td>
<td>.363</td>
<td>.672</td>
<td>.0150</td>
<td>.081</td>
<td>.047</td>
<td>11.00</td>
<td>11/32</td>
</tr>
<tr>
<td>A 7Q 9-1W07311</td>
<td>A 7Q 9-1W07311</td>
<td>—</td>
<td>.395</td>
<td>.735</td>
<td>.0110</td>
<td>.129</td>
<td>.073</td>
<td>6.00</td>
<td>3/8</td>
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<tr>
<td>A 7Q 9-1W07316</td>
<td>A 7Q 9-1W07316</td>
<td>—</td>
<td>—</td>
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<td>.0160</td>
<td>.086</td>
<td>.050</td>
<td>12.00</td>
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<tr>
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<td>A 7Q 9-1W08518</td>
<td>—</td>
<td>.462</td>
<td>.857</td>
<td>.0180</td>
<td>.100</td>
<td>.057</td>
<td>15.00</td>
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<td>A 7Q 9-1W08814</td>
<td>—</td>
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<td>—</td>
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<td>.0140</td>
<td>.164</td>
<td>.083</td>
<td>10.00</td>
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<td>A 7Q 9-1W09821</td>
<td>A 7Q 9-1W09821</td>
<td>—</td>
<td>.525</td>
<td>.980</td>
<td>.0210</td>
<td>.110</td>
<td>.063</td>
<td>20.00</td>
<td>—</td>
</tr>
</tbody>
</table>

#### NOTE:
I.D. & O.D. are long axis dimensions.
THIN WALL SERIES

- **MATERIAL:**
  302 Stainless Steel (MIL-S-5057), Unfinished

- **SPECIFICATION:**
  Priced Per 10 Pieces

**WAVE SPRING WASHERS**

**INCH COMPONENT**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>I.D.</th>
<th>O.D.</th>
<th>T Stock Thickness</th>
<th>H F Free Height</th>
<th>H L Loaded Height</th>
<th>Load @ H L lbf</th>
<th>Use Inside Bore Ref.</th>
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</thead>
<tbody>
<tr>
<td>A 7X 9-3W03606</td>
<td>.265</td>
<td>.367</td>
<td>.006</td>
<td>.030</td>
<td>.015</td>
<td>2 – 4</td>
<td>3/8</td>
</tr>
<tr>
<td>A 7X 9-3W04907</td>
<td>.350</td>
<td>.492</td>
<td>.007</td>
<td>.035</td>
<td>.020</td>
<td>3 – 5</td>
<td>1/2</td>
</tr>
<tr>
<td>A 7X 9-3W06108</td>
<td>.440</td>
<td>.618</td>
<td>.008</td>
<td>.040</td>
<td>.025</td>
<td>3 – 5</td>
<td>5/8</td>
</tr>
<tr>
<td>A 7X 9-3W07309</td>
<td>.531</td>
<td>.734</td>
<td>.009</td>
<td>.050</td>
<td>.030</td>
<td>4 – 7</td>
<td>3/4</td>
</tr>
<tr>
<td>A 7X 9-3W08510</td>
<td>.650</td>
<td>.855</td>
<td>.010</td>
<td>.060</td>
<td>.030</td>
<td>4 – 7</td>
<td>7/8</td>
</tr>
<tr>
<td>A 7X 9-3W11012</td>
<td>.856</td>
<td>1.102</td>
<td>.012</td>
<td>.075</td>
<td>.037</td>
<td>9 – 13</td>
<td>1–1/8</td>
</tr>
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</table>

**NOTE:** O.D. and I.D. are blank (before bend) dimensions.

**SCREW SIZE SERIES**

- **MATERIAL:**
  Beryllium Copper or Stainless Steel

- **SPECIFICATION:**
  Priced Per 100 Pieces

**INCH COMPONENT**

<table>
<thead>
<tr>
<th>Catalog Component</th>
<th>Beryllium Copper</th>
<th>Stainless Steel</th>
<th>I.D.</th>
<th>O.D.</th>
<th>T</th>
<th>H</th>
<th>Nominal Screw Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 3W03606</td>
<td>AB3401-EA15X006</td>
<td>AB3401-XP15X006</td>
<td>.075</td>
<td>.150</td>
<td>.006</td>
<td>.017</td>
<td>#0</td>
</tr>
<tr>
<td>A 3W04907</td>
<td>AB3401-EA20X006</td>
<td>AB3401-XP20X006</td>
<td>.095</td>
<td>.206</td>
<td>.006</td>
<td>.018</td>
<td>#2</td>
</tr>
<tr>
<td>A 3W06108</td>
<td>AB3401-EA25X006</td>
<td>AB3401-XP25X006</td>
<td>.125</td>
<td>.250</td>
<td>.006</td>
<td>.021</td>
<td>#4</td>
</tr>
<tr>
<td>A 3W07309</td>
<td>AB3401-EA26X006</td>
<td>AB3401-XP26X006</td>
<td>.134</td>
<td>.265</td>
<td>.006</td>
<td>.021</td>
<td>#5</td>
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<tr>
<td>A 3W08510</td>
<td>AB3401-EA30X008</td>
<td>AB3401-XP30X008</td>
<td>.152</td>
<td>.300</td>
<td>.008</td>
<td>.028</td>
<td>#6</td>
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<tr>
<td>A 3W11012</td>
<td>AB3401-EA34X010</td>
<td>AB3401-XP34X010</td>
<td>.176</td>
<td>.340</td>
<td>.010</td>
<td>.030</td>
<td>#8</td>
</tr>
<tr>
<td>A 3W37X012</td>
<td>AB3401-EA37X012</td>
<td>AB3401-XP37X012</td>
<td>.203</td>
<td>.375</td>
<td>.012</td>
<td>.032</td>
<td>#10</td>
</tr>
<tr>
<td>A 3W50X014</td>
<td>AB3401-EA50X014</td>
<td>AB3401-XP50X014</td>
<td>.268</td>
<td>.500</td>
<td>.014</td>
<td>.042</td>
<td>1/4</td>
</tr>
<tr>
<td>A 3W66X014</td>
<td>AB3401-EA66X014</td>
<td>AB3401-XP60X014</td>
<td>.332</td>
<td>.600</td>
<td>.014</td>
<td>.052</td>
<td>5/16</td>
</tr>
<tr>
<td>A 3W70X022</td>
<td>AB3401-EA70X022</td>
<td>AB3401-XP70X022</td>
<td>.406</td>
<td>.700</td>
<td>.022</td>
<td>.064</td>
<td>3/8</td>
</tr>
<tr>
<td>A 3W95X022</td>
<td>AB3401-EA95X022</td>
<td>AB3401-XP95X022</td>
<td>.531</td>
<td>.950</td>
<td>.022</td>
<td>.076</td>
<td>1/2</td>
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</table>
**MATERIAL:**
Alloy Steel or Stainless Steel

**FINISH:**
Black Oxide for Alloy Steel

**SPECIFICATION:**
Priced Per 100 Pieces

---

**INCH COMPONENT**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Screw Size Ref.</th>
<th>I.D. Max.</th>
<th>O.D. Max.</th>
<th>T Min.</th>
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<tbody>
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<td>A 9Q19-00</td>
<td>#0</td>
<td>.062</td>
<td>.137</td>
<td>.017</td>
</tr>
<tr>
<td>A 9Q19-02</td>
<td>#2</td>
<td>.094</td>
<td>.172</td>
<td>.020</td>
</tr>
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<td>A 9Q19-04</td>
<td>#4</td>
<td>.120</td>
<td>.209</td>
<td>.025</td>
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<td>A 9Q19-06</td>
<td>#6</td>
<td>.148</td>
<td>.250</td>
<td>.031</td>
</tr>
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<td>A 9Q19-08</td>
<td>#8</td>
<td>.174</td>
<td>.293</td>
<td>.040</td>
</tr>
<tr>
<td>A 9Q19-10</td>
<td>#10</td>
<td>.200</td>
<td>.334</td>
<td>.047</td>
</tr>
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<td>A 9Q19-25</td>
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<td>.260</td>
<td>.487</td>
<td>.062</td>
</tr>
<tr>
<td>A 9Q19-31</td>
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<td>.322</td>
<td>.583</td>
<td>.078</td>
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</table>
**LOCK WASHERS**

ASME B18.21.1

**MATERIAL:**
Stainless Steel

**SPECIFICATION:**
Priced Per 100 Pieces

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**INCH COMPONENT**

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<tr>
<th>Catalog Number</th>
<th>I.D. Screw Size</th>
<th>O.D.</th>
<th>T</th>
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<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td></td>
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<tr>
<td><strong>Fig. 1 Internal</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>A 9X21-I02</td>
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<td>A 9X21-I04</td>
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<td>A 9X21-I06</td>
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<td>.295</td>
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<td>.021</td>
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<tr>
<td>A 9X21-I08</td>
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<td>.340</td>
<td>.018</td>
<td>.023</td>
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<td>A 9X21-I10</td>
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<td>.381</td>
<td>.020</td>
<td>.025</td>
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<tr>
<td>A 9X21-I25</td>
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<td>.478</td>
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<tr>
<td>A 9X21-I31</td>
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<td>.610</td>
<td>.028</td>
<td>.034</td>
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<tr>
<td>A 9X21-I38A</td>
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<td>.692</td>
<td>.032</td>
<td>.040</td>
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<td>A 9X21-I38B</td>
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<td>.562</td>
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<td><strong>Fig. 2 External</strong></td>
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<td>A 9X21-E04</td>
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<td>.015</td>
<td>.019</td>
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<td>A 9X21-E06</td>
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<td>.320</td>
<td>.016</td>
<td>.022</td>
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<td>A 9X21-E08</td>
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<td>.018</td>
<td>.023</td>
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<tr>
<td>A 9X21-E10</td>
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<td>.410</td>
<td>.020</td>
<td>.025</td>
</tr>
<tr>
<td>A 9X21-E25</td>
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<td>.510</td>
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<td>.028</td>
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<td>A 9X21-E38</td>
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<td>.032</td>
<td>.040</td>
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</table>

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**Fig. 1 Internal**

**Fig. 2 External**
### INCH COMPONENT

#### EXTERNAL BOWED

RADIAL ASSEMBLY
FOR END-PLAY TAKE-UP

**MATERIAL:**
Stainless Steel (PH 15-7 Mo)

**SPECIFICATIONS:**
- G Tolerance: 
  - .095 to .147 in. +.002/-.000
  - .210 to .675 in. +.003/-.000

![Diagram of External Bowed Radial Assembly](image)

#### MATERIAL:
Stainless Steel (PH 15-7 Mo)

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>D Shaft Dia.</th>
<th>B Ring O.D.</th>
<th>G Groove Dia.</th>
<th>W Groove Width +.003 / -.000</th>
<th>V Ring Height ±.002</th>
<th>V Min.</th>
<th>End Play Takeup</th>
<th>Approx. Force Required to Flatten Rings lbf</th>
</tr>
</thead>
<tbody>
<tr>
<td>S73KW2-131-12</td>
<td>1/8</td>
<td>.125</td>
<td>.230</td>
<td>.095</td>
<td>.022</td>
<td>.010</td>
<td>.025</td>
<td>.005</td>
</tr>
<tr>
<td>S73KW2-131-18</td>
<td>3/16</td>
<td>.188</td>
<td>.335</td>
<td>.147</td>
<td>.030</td>
<td>.015</td>
<td>.033</td>
<td>.007</td>
</tr>
<tr>
<td>S73KW2-131-31</td>
<td>5/16</td>
<td>.312</td>
<td>.500</td>
<td>.250</td>
<td>.060</td>
<td>.035</td>
<td>.060</td>
<td>.010</td>
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<tr>
<td>S73KW2-131-37</td>
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<td>.375</td>
<td>.560</td>
<td>.303</td>
<td>.085</td>
<td>.075</td>
<td>.080</td>
<td>.014</td>
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<td>S73KW2-131-43</td>
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<td>.438</td>
<td>.667</td>
<td>.343</td>
<td>.110</td>
<td>.090</td>
<td>.090</td>
<td>.016</td>
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<tr>
<td>S73KW2-131-50</td>
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<td>.500</td>
<td>.800</td>
<td>.396</td>
<td>.140</td>
<td>.100</td>
<td>.100</td>
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</tr>
<tr>
<td>S73KW2-131-62</td>
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<td>.625</td>
<td>.940</td>
<td>.485</td>
<td>.170</td>
<td>.120</td>
<td>.120</td>
<td>.020</td>
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<td>.750</td>
<td>1.120</td>
<td>.580</td>
<td>.200</td>
<td>.140</td>
<td>.140</td>
<td>.020</td>
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</table>

* Thickness tolerance: ±.001

#### EXTERNAL GROOVELESS

FOR AXIAL ASSEMBLY
NO GROOVE REQUIRED

**MATERIAL:**
Stainless Steel (PH 15-7 Mo)

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>D Shaft Dia.</th>
<th>C Ring Clearance Dia.</th>
<th>H Ring Height</th>
<th>Thickness T</th>
<th>Tolerance</th>
<th>Allowable Load lbf</th>
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</thead>
<tbody>
<tr>
<td>S73NW2-GR555-09</td>
<td>3/32</td>
<td>.092</td>
<td>.096</td>
<td>.26</td>
<td>.025</td>
<td>±.002</td>
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<tr>
<td>S73NW2-GR555-12</td>
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<td>.123</td>
<td>.127</td>
<td>.33</td>
<td>.035</td>
<td>±.003</td>
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<tr>
<td>S73NW2-GR555-15</td>
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<td>.154</td>
<td>.158</td>
<td>.36</td>
<td>.042</td>
<td>±.003</td>
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<tr>
<td>S73NW2-GR555-18</td>
<td>3/16</td>
<td>.185</td>
<td>.189</td>
<td>.44</td>
<td>.050</td>
<td>±.003</td>
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<tr>
<td>S73NW2-GR555-25</td>
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<td>.252</td>
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<td>±.004</td>
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<tr>
<td>S73NW2-GR555-31</td>
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<td>.316</td>
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<td>.075</td>
<td>±.005</td>
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<td>S73NW2-GR555-37</td>
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<td>±.006</td>
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<td>S73NW2-GR555-43</td>
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<td>.440</td>
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<td>.105</td>
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<tr>
<td>S73NW2-GR555-50</td>
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<td>.503</td>
<td>.90</td>
<td>.120</td>
<td>±.008</td>
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<tr>
<td>S73NW2-GR555-62</td>
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<td>.622</td>
<td>.628</td>
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<td>.140</td>
<td>±.010</td>
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<tr>
<td>S73NW2-GR555-75</td>
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<td>.745</td>
<td>.755</td>
<td>1.32</td>
<td>.160</td>
<td>±.012</td>
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</table>
### MATERIAL:
Stainless Steel (PH 15-7 Mo)

### SPECIFICATIONS:
#### A Tolerance:
- .225 in. +.002/- .004
- .250 to .461 in. +.002/- .005
- .509 to .925 in. +.005/- .010
- 1.041 to 1.387 in. +.010/- .015
- 1.446 to 1.503 in. +.013/- .020

#### G Tolerance:
- .230 in. ± .0015
- .255 to .530 in. ± .002
- .588 to .940 in. ± .003
- 1.059 to 1.406 in. ± .004
- 1.468 to 1.529 in. ± .005

#### W Tolerance:
- .229 to .046 in. +.003/- .000
- .056 to .068 in. +.004/- .000

#### T Tolerance:
- .025 to .050 in. ± .002
- .062 in. ± .003

#### GROOVE DETAIL MAX. BOTTOM RADII:
- .003 (S73HW2-100-025 THRU S73HW2-100-035)
- .005 (S73HW2-100-037 THRU S73HW2-100-100)
- .010 (S73HW2-100-112 THRU S73HW2-100-162)

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*Max. ring thickness will be at least .002 less than listed minimum groove width W.

*Thrust Strength Factor of Safety: Rings = 4 Grooves = 2
**RETAILING RINGS**

**EXTERNAL**

- **MATERIAL:**
  - Beryllium Copper (Berylco 25)
  - Carbon Spring Steel (SAE 1065 - 1090), Oil-Dipped

- **TENSILE STRENGTH:** 45,000 psi

- **SPECIFICATIONS:**
  - A Tolerance:
    - .112 to .225 in. +.002/- .004
    - .250 to .461 in. +.002/- .005
  - G Tolerance:
    - .117 to .230 in. ± .0015
    - .25 to .468 in. ± .002
  - W Tolerance:
    - .012 to .18 in. +.002/- .000
    - .029 to .039 in. +.003/- .000
  - T Tolerance:
    - .01 in. ± .001
    - .015 to .035 in. ± .002

**GROOVE DETAIL MAX. BOTTOM RADII:**
- .003 (A 9Q27-012 THRU A 9Q27-035)
- .005 (A 9Q27-037 THRU A 9Q27-050)

**Priced Per 100 Pieces**

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**Carbon Spring Steel (SAE 1065 - 1090), Oil-Dipped**

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* Thrust Strength Factor of Safety: Rings = 4  Grooves = 2  Continued on the next page
### MATERIAL:
Carbon Spring Steel (SAE 1065 - 1090), Oil-Dipped

### TENSILE STRENGTH:
45,000 psi

### SPECIFICATIONS:
- **A Tolerance:**
  - .579 to .925 in. \(\pm .005\)/\(\pm .010\)
  - 1.041 to 1.156 in. \(\pm .010\)/\(\pm .015\)
  - 1.446 to 1.850 in. \(\pm .013\)/\(\pm .020\)
  - 1.964 to 2.313 in. \(\pm .015\)/\(\pm .025\)
  - 2.543 to 2.775 in. \(\pm .020\)/\(\pm .030\)

- **G Tolerance:**
  - .588 to .940 in. \(\pm .003\)
  - 1.059 to 1.176 in. \(\pm .004\)
  - 1.468 to 1.886 in. \(\pm .005\)
  - 2.003 to 2.838 in. \(\pm .006\)

- **W Tolerance:**
  - .039 to .046 in. \(\pm .003\)/\(\pm .000\)
  - .056 to .068 in. \(\pm .004\)/\(\pm .000\)
  - .086 to .103 in. \(\pm .005\)/\(\pm .002\)

- **T Tolerance:**
  - .035 to .050 in. \(\pm .002\)
  - .062 to .093 in. \(\pm .003\)

Priced Per 100 Pieces

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*Thrust Strength Factor of Safety: Rings = 4  Grooves = 2*

Continued from the previous page
INTERNAL

**MATERIAL:**
Carbon Spring Steel (SAE 1065 - 1090), Oil-Dipped
Stainless Steel (PH 15-7 Mo)

**TENSILE STRENGTH:**
45,000 psi

**SPECIFICATIONS:**
- A Tolerance: 
  - .280 to .859 in.  +.010/-.005
  - .901 to 1.111 in.  +.015/-.010
- G Tolerance: 
  - .268 to .330 in.  ± .001
  - .397 to .796 in.  ± .002
  - .825 to 1.066 in.  ± .003
- W Tolerance: 
  - .018 in.  +.002/-.000
  - .029 to .046 in.  +.003/-.000

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EXTERNAL SNAP-ON DESIGN

› MATERIAL:
  Stainless Steel (PH 15-7 Mo)

› TENSILE STRENGTH:
  225,000 psi

› SPECIFICATIONS:
  G Tolerance:
    .052 to .147 in. +.002/-000
    .210 to .835 in. +.003/-000
  W Tolerance:
    .012 to .020 in. +.002/-000
    .029 to .056 in. +.003/-000

INCH COMPONENT

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* Thickness tolerance: ± .001
E-RINGS

**EXTERNAL**

- **MATERIAL:**
  - Beryllium Copper (Berylco 25) or
  - Carbon Spring Steel (SAE 1065-1090), Oil Dipped

- **TENSILE STRENGTH:**
  - 45,000 psi

- **SPECIFICATIONS:**
  - A Tolerance:
    - .025 to .207 in. + .001/- .003
    - .243 to .392 in. + .002/- .004
  
  - G Tolerance:
    - .026 to .188 in. + .002/- .000
    - .210 to .396 in. + .003/- .000
  
  - W Tolerance:
    - .012 to .018 in. + .002/- .000
    - .029 to .046 in. + .003/- .000
  
  - T Tolerance:
    - .010 in. ± .001
    - .015 to .042 in. ± .002

Priced Per 100 Pieces

Rings conform to MS16633 & MIL-R-21248

For engineering assistance for all SDP/SI components, call our application engineers.

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**MATERIAL:**
300 Series Stainless Steel, Clear Passivated

**Priced Per 100 Pieces**

Other lengths and diameters available on special order.

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* Chamfer or round ends at SDP option.
**STANDARD DOWEL PINS**

**HARDENED**

MS16555

> **MATERIAL:**
> Heat-Treated Type 416 Stainless Steel, Rc 36-42, Clear Passivated

> **SPECIFICATION:**
> Priced Per 100 Pieces

Modifications of standard parts performed at nominal charge.

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* Chamfer or round ends at SDP option.
### STANDARD DOWEL PINS

**PRECISION GROUND HARDENED**

ASME B18.8.2

**MATERIAL:**

Heat-Treated Alloy Steel, Rc 58-62

**SPECIFICATION:**

Priced Per 100 Pieces

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420 Stainless Steel, Rc 43-52
Will be passivated when current stock is depleted.

SPECIFICATION:
Priced Per 100 Pieces

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**MATERIAL:**
Carbon Spring Steel

**SPECIFICATION:**
Priced Per 100 Pieces

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# STAINLESS STEEL SPIROL PINS

**STANDARD DUTY**

- **MATERIAL:** 300 Stainless Steel
- **SPECIFICATION:** Priced Per 100 Pieces

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SPIROL PINS

MEDIUM-DUTY

- MATERIAL:
  Carbon Steel (Hardened),
  Rc Scale 46-53, Oiled Finish

- SPECIFICATION:
  Priced Per 100 Pieces

Other lengths and diameters available on special order.

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* Made of 420 Stainless Steel - Rc 46-55.

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## STAINLESS STEEL GROOVE PINS

### MATERIAL:
303 Stainless Steel

### SPECIFICATION:
Priced Per 100 Pieces

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![Image of STAINLESS STEEL GROOVE PINS](image)

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| .197       | 5/32      |
CARBON STEEL GROOVE PINS

MATERIAL:
Carbon Steel, Zinc Plated

SPECIFICATION:
Priced Per 1000 Pieces

SEE NOTE

MATERIAL:
Carbon Steel, Zinc Plated

SPECIFICATION:
Priced Per 1000 Pieces

SEE NOTE

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NOTE: The tapered groove pin style shown above will be replaced by a parallel groove type when present stock is depleted.

* To be discontinued when the present stock is depleted.
CARBON STEEL TAPER PINS

**MATERIAL:**
Carbon Steel (Unhardened)

**SPECIFICATION:**
Priced Per 100 Pieces

---

**INCH COMPONENT**

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<thead>
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<th>Catalog Number</th>
<th>Taper Pin No.</th>
<th>Gage Dia.</th>
<th>Gage Dia.</th>
<th>Length</th>
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* This item is hardened.
HITCH PINS

INTERNAL

- MATERIAL: Spring Wire, Oil-Tempered, Plated
- SPECIFICATION: Priced Per 1000 Pieces

EXTERNAL

- MATERIAL: Spring Wire, Oil-Tempered, Plated
- SPECIFICATION: Priced Per 1000 Pieces

Other materials available on special order.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>D Dia.</th>
<th>Drill Size Hole</th>
<th>Recommended Shaft Dia.</th>
<th>E Inside Dia. of Eye</th>
<th>L Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 9Q34-23</td>
<td>.042</td>
<td>3/64</td>
<td>3/16</td>
<td>1/4</td>
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<tr>
<td>A 9Q34-21</td>
<td>.047</td>
<td>1/16</td>
<td>1/8</td>
<td>3/16</td>
<td>1/8/19/32</td>
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<tr>
<td>A 9Q34-22</td>
<td>.062</td>
<td>5/64</td>
<td>1/4</td>
<td>1/2</td>
<td>5/16/1-5/16</td>
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<tr>
<td>A 9Q34-18</td>
<td>.080</td>
<td>3/32</td>
<td>1/4</td>
<td>3/8</td>
<td>1/4/1-3/16</td>
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<td>7/64</td>
<td>1/4</td>
<td>5/8</td>
<td>5/8/2-5/16</td>
</tr>
<tr>
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<td>7/64</td>
<td>3/8</td>
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<td>7/16/2-1/2</td>
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<table>
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<tr>
<th>Catalog Number</th>
<th>D Dia.</th>
<th>Recommended Groove Dimensions</th>
<th>E Inside Dia. of Eye</th>
<th>L Length</th>
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### MATERIAL:
2024 Aluminum, Black Hard Anodized

### MODIFICATION:
Assembled with hubs upon request at nominal charge.

See index for hubs

---

#### INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>O.D. +0.000 -0.003</th>
<th>No. of Graduations</th>
<th>Steps in Degrees</th>
<th>Dial Range</th>
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<tbody>
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<td>0 ... 120</td>
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### INCH COMPONENT

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<tr>
<th>Catalog Number</th>
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<th>O.D. ±.005</th>
<th>No. of Graduations</th>
<th>Steps in Degrees</th>
<th>Dial Range</th>
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PRECISION INDEXES

PRECISION INDEX
PRECISION LASER ENGRAVED

> MATERIAL:
GE-1 - Clear Plexiglass
GE-2 - 2024 Aluminum, Black Anodized

INCH COMPONENT

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PRECISION DRUM DIAL INDEX
PRECISION LASER ENGRAVED

> MATERIAL:
2024 Aluminum, Black Hard Anodized

Use with S5189Y-GB and GD Series Drum Dials.

INCH COMPONENT

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<th>Catalog Number</th>
<th>A</th>
<th>O.D. of Drum</th>
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<td>S6900Y-GF-2</td>
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PRECISION DISC DIAL INDEX
PRECISION LASER ENGRAVED

> MATERIAL:
2024 Aluminum, Black Hard Anodized

Use with S1228Y-GA and GC Series Disc Dials.

INCH COMPONENT

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<th>Catalog Number</th>
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<th>O.D. of Drum</th>
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**SPRING POSTS**

**GROOVE PIN (TYPE G)**
1/8 TO 1/4 DIAMETER

> **MATERIAL:**
Carbon Steel, Zinc Plated

> **SPECIFICATION:**
Priced Per 100 Pieces

---

**INCH COMPONENT**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>D Dia.</th>
<th>Recommended Hole Size</th>
<th>L Length</th>
<th>A</th>
<th>E Dia.</th>
<th>C</th>
<th>Crown Radius</th>
<th>I Crown Height</th>
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<tbody>
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<td></td>
<td>Max.</td>
<td>Min.</td>
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CROSSOVER LOOPS OR MACHINE LOOPS
CLOSE WOUND
UNIFORM BODY DIAMETER

MATERIAL:
302 Stainless Steel, Spring Temper

Supplied right- or left-hand wound at SDP/SI option. Loop orientation may vary.

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**EXTENSION SPRINGS**

Crossover Loops or Machine Loops

Uniform Body Diameter

**MATERIAL:**
302 Stainless Steel, Spring Temper

Supplied right- or left-hand wound at SDP/SI option. Loop orientation may vary.

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**MATERIAL:**
302 Stainless Steel, Spring Temper

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* Ends squared, not ground
\(\Delta\) Free length L is for reference only. Load at L1 is attained at length L1.

Continued on the next page
**COMPRESSION SPRINGS**

**SQUARED AND GROUND ENDS**

**RIGHT-HAND WOUND**

**MATERIAL:**

302 Stainless Steel, Spring Temper

---

**INCH COMPONENT**

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*Free length L is for reference only. Load at L₁ is attained at length L₁.*

Continued from the previous page
TORSION SPRINGS

LEFT-HAND WOUND

180° DEFLECTION

> MATERIAL:
302 Stainless Steel

Right-hand wound and other springs available on special order.

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* Space required on application to allow for operation of the spring.

ANTI-BACKLASH

> MATERIAL:
302 Stainless Steel, Spring Temper

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## ROUND SPACERS

SCREW SIZE BORES

> MATERIAL:  
- Aluminum - Plain
- Brass - Bright Dip
- Plastic - Nylon 6/6
- Stainless Steel

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**MATERIAL:**
- 303 Stainless Steel or Brass, Zinc Plated
**SPACERS**

**HEXAGONAL THREADED**

- **Material:**
  - Aluminum - Plain
  - Brass - Bright Dip
  - Stainless Steel

Government approved. Other sizes and finishes are available on special order.

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**INCH COMPONENT**

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*To be discontinued when present stock is depleted.*

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**SQUARE THREADED**

- **Material:**
  - Aluminum, Anodized

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**INCH COMPONENT**

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### ROUND STAND-OFFS

**THREADED SWAGE TYPE**  
1/4 O.D.

**MATERIAL:**  
Brass, Zinc Plated

---

![Diagram of Round Stand-Offs](image.png)

---

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1/32

1/16

1/8

5/32

---

**Panel Thickness:**

- 1/32
- 1/16
- 1/8
- 5/32
- 3/16

---

**Inch Component Diagram**

- Ø1/4
- Ø.188+.000-.003
- Ø.150 DRILL
- #6-32 THREAD
- 01/4 Panel Thickness
- H Height
- L Length
- Panel Thickness

---

**Catalog Numbers:**

- A 9B43-B104
- A 9B43-B106
- A 9B43-B108
- A 9B43-B112
- A 9B43-B116
- A 9B43-B204
- A 9B43-B206
- A 9B43-B208
- A 9B43-B212
- A 9B43-B216
- A 9B43-B308
- A 9B43-B312
- A 9B43-B404
- A 9B43-B406
- A 9B43-B408
- A 9B43-B412
- A 9B43-B416
- A 9B43-B516
- A 9B43-B608
- A 9B43-B612
- A 9B43-B616
HEXAGONAL STAND-OFFS

THREADED SWAGE TYPE

MATERIAL:
303 Stainless Steel

![Image of hexagonal stand-off components]

**THREADED SWAGE TYPE**

**MATERIAL:**
303 Stainless Steel

**Panel Thickness** L Length H Height

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* Items with #4-40 thread.
HEXAGONAL STAND-OFFS

THREADED SWAGE TYPE

> MATERIAL:
Brass, Zinc Plated

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* To be discontinued when present stock is depleted.
### HEXAGONAL NUT

**MATERIAL:**
- **Bushing:** Brass, Nickel Plated or Aluminum, Black Anodized
- **Nut:** Brass, Nickel Plated

#### PANEL BUSHINGS

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<th>B</th>
<th>C</th>
<th>D</th>
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**BUSHING**

- **Thread:** Panel Thickness
- **Hex. Nut:** Thread Size

**Panel Thickness:**
- 1/16
- 3/32
- 1/8
- 3/8
- 1/4
- 5/16
- 7/16
- 9/16
- 1/2
- 3/8
- 5/8
MANUFACTURING CAPABILITIES

Turning: .25" - 6.0" OD

Milling: maximum 12" x 20"

Gear Cutting:
  Gears and Racks:
    Inch: 16 DP to 200 DP
    Metric: 2.0 m to 0.2 m
  Worms and Worm Wheels: 16 DP to 72 DP

Gear Tolerances:
  Molded Gears: to AGMA 5
  Hobbed or Ground Gears: to AGMA 14

Shafts:
  Diameter: .03125" - 1.500"
  Straightness: up to .0003"
  Length: maximum 12'

Available Materials (abridged):
  Acetal
  Aluminum
  Brass
  Bronze
  Iconel
  Nylon
  Alloy Steel
  Stainless Steel
  Titanium

Compliances and Practices:
  ISO 9001:2008 + AS9100 Certified
  ITAR Compliant – DDTC Registered
  RoHS Compliant
  R.E.A.C.H. Compliant
  ISO 7 Class 10000 Clean Room

High-Volume Manufacturing Facility
Over 170 Machines

CNC Swiss Turning
  Multiple Spindle
  9-Axis

CNC Lathe (Mill-Turn)
  Multiple Spindle
  5-Axis

CNC Milling & Machining Centers
  4- & 5-Axis
  With Automation

Gear Cutting
  CNC Hobbing
  CNC Shaping
  Coniflex Bevel Gear Generators
  Rack Cutting

Fully Equipped Tool Room
  Grinding Department
  Deburring Department

For a free design consultation, call 516-328-3300 and speak to one of our engineers.