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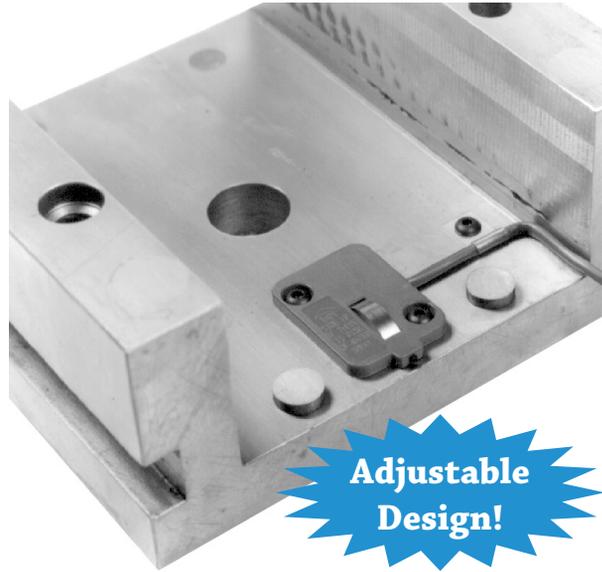
Limit Switch - Thinswitch®

THINSWITCH



Switch contact adjustment

LIMIT SWITCH



Adjustable Design!

Verifies ejector plate return before closing mold. Mount inside ejector housing and wire to machine controls. Use for core slides or any place where space is limited.

- Prevents costly mold damage
- 3/16" thick
- Fits behind ejector plate
- Requires only 2 screw holes
- Very economical to install
- Over 10 million cycle life
- Adjustable operating point
- Electrical capacity at 240V
4 AMP inductive 5 AMP resistive
- SPDT switching
- 6' wire included- leads stripped & tinned

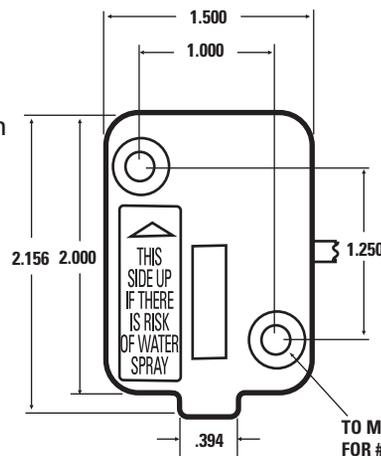
- .187" thick, same height as rest buttons
- Wire to machine controls to prevent mold closing before ejector plate has completely returned
- Use two in series in opposite corners of ejector housing of larger molds to ensure return of ejector plate
- Mounts inside ejector housing where it cannot be damaged
- Operating height adjustment between .187" and .250"

T222- for use up to 175°F (79.4°C)
HT291- for use up to 250°F (121°C)

Standard Temperature Thinswitch T222	
SP222A	Replacement Spring
CT222A	Replacement Cable Tab
High Temperature Thinswitch HT291	

Materials

- Body – Fiberglass reinforced nylon
- Spring – Stainless steel
- Wire – 22 GA stranded,
3-conductor w/jacket
- Screws – Hardened steel, black oxide finish
- Back Cover – Polyester film
- Max. Ambient Temperature – 175°F
- Max. Voltage – 250
- Electrical Specifications –
- 250 VAC 5 AMPS resistive
 4 AMPS inductive
- 28 VDC (sea level) 5 AMPS resistive
 4 AMPS inductive



Limit Switch - Thinswitch®



Liquid Resistant

General Description

Smartflow® Thinswitch® Liquid-Resistant Limit Switch is designed to verify ejector plate return in areas where occasional water or oil spray is present. The Thinswitch helps prevent accidental mold close in injection molding applications by providing a position switch that is tied to the injection molding machine control. The liquid resistant switch uses the same mounting hole locations as the original Thinswitch. The Thinswitch has been tested for reliability over 10 million cycles without failure. Two switches can be used in series for larger molds to ensure the ejector plate return, preventing costly mold damage.



US Patent 5,446,252
EU Patent 6,982,392

Features and Benefits

- Over 10 million cycle life
- 175°F (79.4°C) standard temperature rating
- 250°F (121°C) high temperature unit for higher temperature needs
- Adjustable actuation between .187" and .250" from the mold base
- 3/16" thick design fits snugly behind the ejector plate between the rest buttons
- Stripped and tinned 6 ft. wire leads
- Mounting screws and wire clips included

Specifications

Part Number/Operating Temperature

T222LR
Standard Model 175°F max.
(79.4°C max.)

HT291LR
High Temp Model 250°F max.
(121°C max.)

Switching SPDT

Electrical

250VAC 5 AMPS resistive
4 AMPS inductive

28VDC (sea level) 5 AMPS resistive
4 AMPS inductive

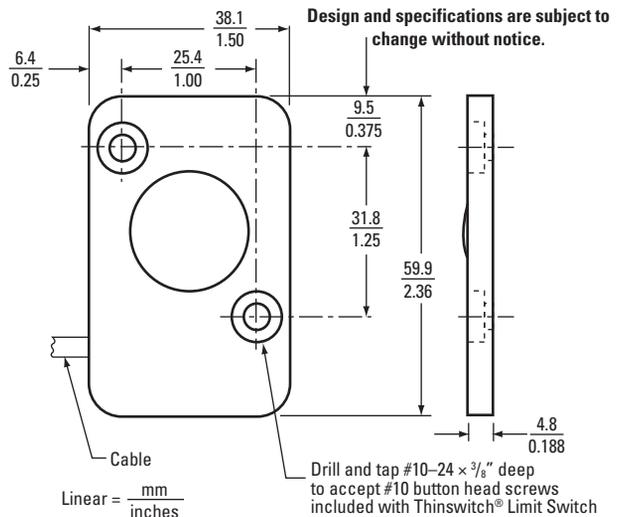
Materials

- Body Fiberglass-reinforced nylon
- Dome Polyurethane
- Back Cover Polyester film
- Wire Leads 22ga stranded, 3-conductor, shielded cable, 6 ft. (1.8m) long, ends stripped and tinned

LIMIT SWITCH

Rated Current vs. Steel Temperature					
T222LR			HT291LR		
AMPS	°F	°C	AMPS	°F	°C
5.0	85	29.4	5.0	100	37.7
4.0	120	49.0	4.5	155	68.3
3.0	155	68.3	4.0	210	98.8
2.0	175	79.4	3.5	250	121.1

The Thinswitch® Limit Switch is designed for use in very low power mold protection control circuits. It is not intended to switch heavy loads in power applications.





Limit Switch - Versaswitch®

- Fits behind core
- Simply screw into mounting hole
- Very economical to install
- One million cycle mechanical life
- Adjustable operating point
- Electrical capacity at 240V, 3 AMP inductive, 5 AMP resistive
- SPDT switching
- 6' wire included - leads stripped & tinned



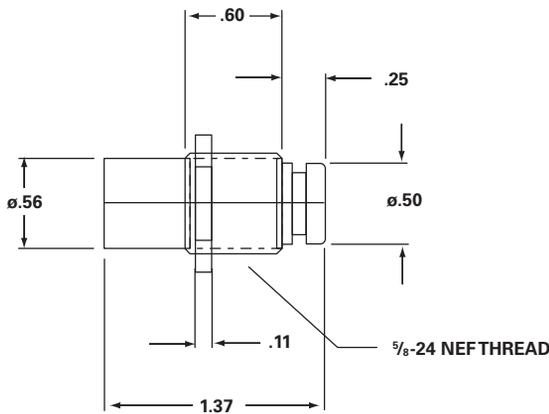
VERSASWITCH™



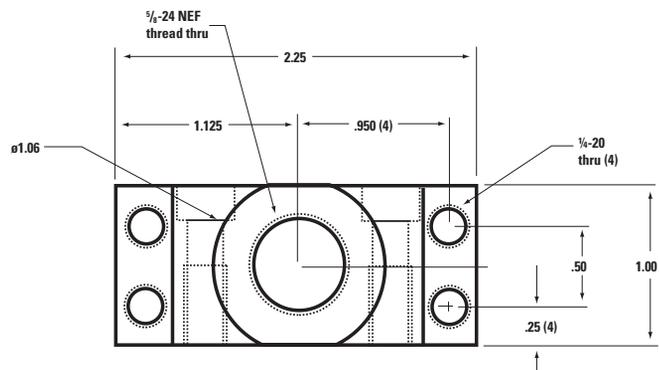
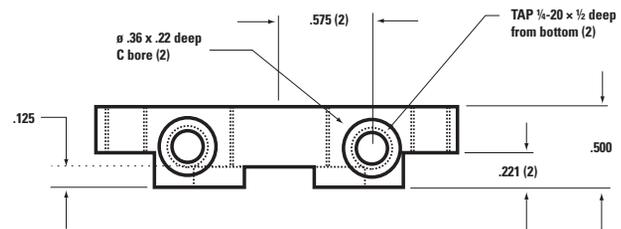
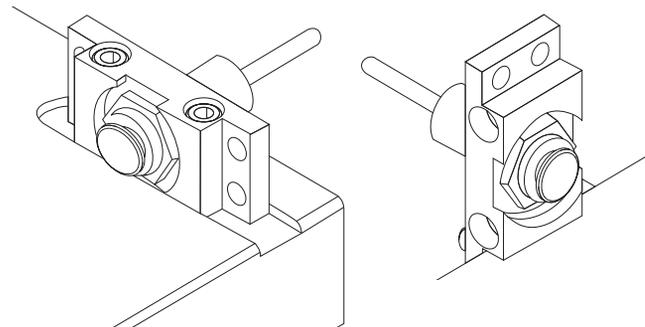
MODEL V222 MATERIALS

- Body – Anodized aluminum
- Plunger – Stainless steel
- Locknut – Stainless steel
- Wire – 22 ga stranded, 3 conductor with jacket

- Maximum ambient temperature – 180°F
- Maximum voltage – 240 VAC
- Operating force – 1.6 kg./3.5 lb.
- Pretravel to operating point – .060"
- Over travel – .010"



All dimensions in inches.



ACCESSORIES

P222	Twist lock electrical plug
BCR222	Electrical box, cover plate, and receptacle
VB222	Mounting bracket (red anodized aluminum)

SMARTLOCK

Operation

Installed in a slide, the plunger moves into a recess in the locking plate of the switch assembly, which is installed in the mold plate. The switch actuator, located in the bottom of the recess, closes the normally open switch contacts when the plunger is seated in the locking plate recess. When the breakaway force is applied to the slide, the lock is released, and the switch returns to its normal state.

Mode of



Slide Retainer & Limit Switch

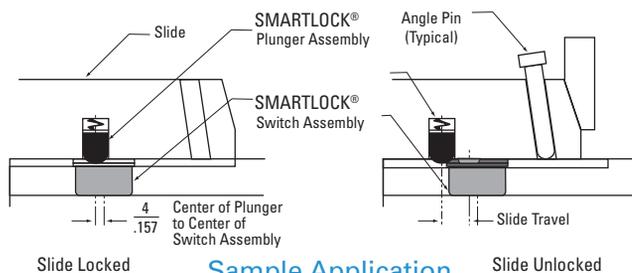
A revolutionary detent and safety switch. Slide position verification and prevention of mold damage result when the Smartlock slide retainer and limit switch is installed in a mold.

The Smartflow SMARTLOCK® slide retainer and limit switch is designed for injection molders to provide switching and slide retention in one unique package. The SMARTLOCK® locking function prevents premature slide movement during molded part ejection while the SPDT switch is simultaneously actuated.

The SMARTLOCK® slide retainer and limit switch has been tested for reliability over 10 million cycles without failure. Two or more switches may be used for larger molds, or molds with multiple slides. Slide position verification and prevention of mold damage results when the Smartlock slide retainer and limit switch is installed in a mold.

Features & Benefits

- Over 10 million cycle life provides long dependable service.
- 17–27 pounds holding force; adjustable for optimum operation
- 175°F (79.4°C) standard temperature rating allows installation into most molding applications
- 250°F (121°C) high temperature unit provides additional application flexibility
- Superior flush mount switch shielded from damage by mounting inside a protective milled pocket
- Stripped and tinned 6 ft. wire leads make the switch ready to install without modification
- Included mounting screws and wire clips help install



Sample Application

the SMARTLOCK® switch neatly and easily

The SMARTLOCK® slide lock and limit switch provides a slide lock and SPDT switch in one unique package for use in molding applications to verify slide position and prevent mold damage. Install the plunger and switch assemblies into corresponding milled pockets in the slide and mold plate. In operation, the plunger moves into a recess in the locking plate, providing a lock with 25 lbs maximum breakaway force. (The breakaway force is adjustable by changing the plunger bore depth.) The switch actuator is located in the bottom of locking plate recess. When the plunger is seated in the locking plate, the normally open contacts are closed. Specifications

Maximum Breakaway Force:

17–27 lbs. (8–12 kg)-user adjustable

Electrical:

250VAC, 28VDC (4 AMPS Inductive, 5 AMPS Resistive)

Operating Temperature:

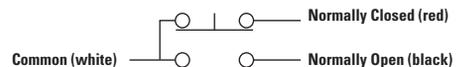
SL222: 175°F max. (79.4°C)

SL291: 250°F max. (121°C)

Switching: SPDT

Materials

Schematic Diagram



Body: Fiberglass-reinforced nylon

Locking Plate: Hardened steel

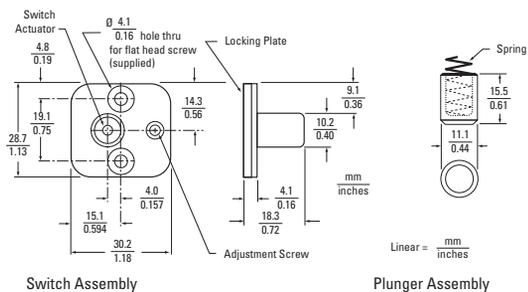
Plunger and Spring: Hardened steel

Wire Leads: 22ga stranded, 3-conductor, shielded cable, 6ft (1.8m) long, ends stripped and tinned

Parts Included

- (1) Switch Assembly
- (1) Plunger Assembly - Plunger - SLP222A
- Spring SLPS222
- (2) 6–32 flat head switch mounting screws - SLFH222A
- (2) 10–24 wire clamp mounting screws - 1024BHCSA
- (2) Wire clamps
- (1) Instruction sheet

SL222 Standard Smartlock® SL291 Hi-Temp Smartlock®



Dimensions





FasTie®

Quick Ejector Tie-In System

Description & Use

In an injection molding press, the FasTie® system quickly “ties-in” the mold ejector plate to the press ejection system, dramatically reducing mold change time. The greatest time savings are realized in presses where space is limited and the ejector system is difficult to tie in using solid knockout bars.

The FasTie® coupler may be permanently mounted to the press ejector plate. The quick-connect locking mechanism in the coupler snaps mechanically onto the mold-mounted pull stud during mold installation.

To release the ejectors, apply shop air to the coupler. The coupler opens to release the pull stud, disconnecting the press and tooling ejector plates. The coupler remains in the open position, ready for a new mold to be set.

For multiple ejector locations, an air manifold is recommended to release all couplers simultaneously. See the following catalog pages for installation examples.

The FasTie® couplers and pull studs are available in 3 sizes to suit various applications: 1”, 1-3/8” and 2”.

Features & Benefits

- FasTie® installs easily into existing tapped holes; no additional machining is required
- FasTie® reduces mold setting time by quickly uncoupling, plus there are no loose parts to stow
- FasTie® remains coupled during mold cycling for increased “tie-in” reliability and reduced wear
- SpeedBar® adjusts quickly without tools to the exact length required [$\pm 1/2$ ” (12.7 mm) from nominal in .006” (.15 mm) increments]*
- SpeedBar® relieves molders from the time and trouble of machining ejector bars to fit different molds*



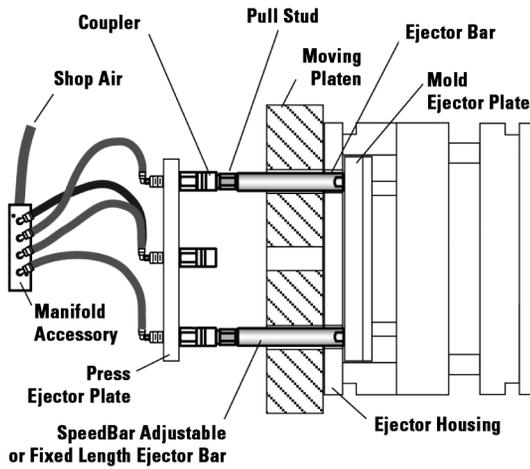
FasTie® Couplers U.S. Patent No. 6,379,072

FasTie® Pull Studs

Ideal for Center
Knock-Out

* 1-inch only

Quick Ejector Tie-In System Installation Examples



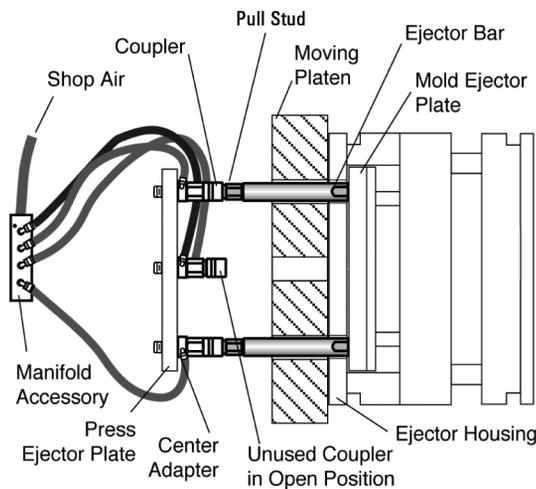
This setup is designed for custom molders who use a variety of injection molds with different ejector patterns and ejector housing thicknesses.

Typical Application - Couplers on Press Ejector Plate

Couplers are installed next to the press ejector plate. Pull studs are placed at the end of the mold-mounted ejector bars for easy removal. Molds are changed quickly without accessing the back of the press ejector plate. For example, a press with 4 ejector positions may be running molds using only the horizontal positions, but the next mold may need the 2 vertical ejector positions. Ejector housing shown is 1.062" thick. Air manifold supplies air to the end of each ejector bar for simultaneous coupler release.

Parts List

Qty	Part
2 or 4	FasTie Pull Stud
2 or 4	FasTie Coupler
2 or 4	Fixed Length Ejector Bars or SpeedBar® Adjustable Length Bars
1	Air Manifold with tubing



This setup is used where there is limited access to the back of the Press Ejector Plate. Custom molders using smaller presses will benefit from this application.

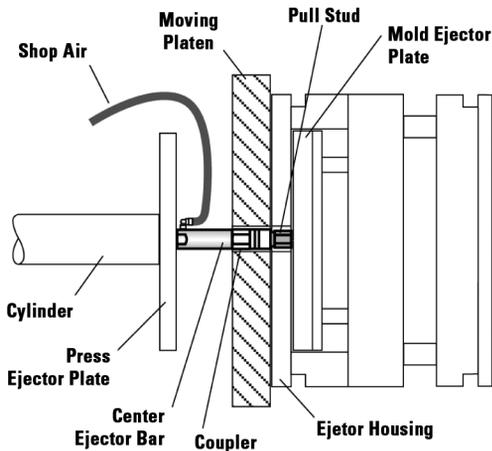
Couplers and Center Adapters on Press Ejector Plate

Couplers are installed next to the press ejector plate. Pull studs are placed at the end of the mold-mounted ejector bars for easy removal. Molds are changed quickly without accessing the back of the press ejector plate.

For example, a press with 4 ejector positions may be running molds using only the horizontal positions, but the next mold may need the 2 vertical ejector positions. Ejector housing shown is 1.062" thick. Air manifold supplies air to the mold side of the press ejector plate with the use of adapters.

Parts List

Qty	Part
2 or 4	FasTie Pull Stud
2 or 4	FasTie Coupler
2 or 4	Center Adapters
2 or 4	Fixed Length Ejector Bars or SpeedBar® Adjustable Length Bars
1	Air Manifold with tubing



For small presses with a center ejector, replace the cylinder bolt with a Center Ejector Bar and FasTie coupler.

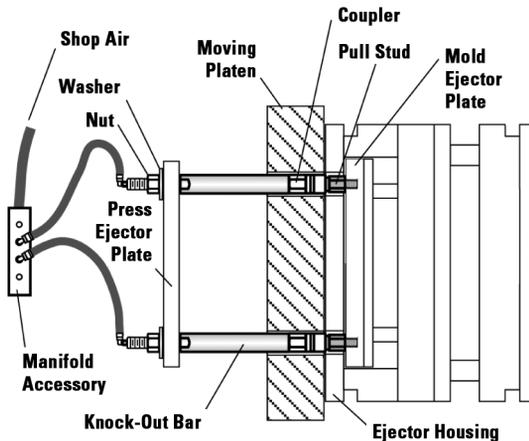
Coupler in Center Ejector Position

Center Ejector Bar and Coupler are installed into the press ejector plate, with the Coupler attached to the end. The pull stud is installed in the mold ejector plate. Molds are changed quickly without accessing the back of the press ejector plate. Ejector housing shown is 1.062" thick. Shop air is supplied to the side of the center adapter. No air manifold is needed. Fully-threaded Center Ejector Bar may be shortened to proper length on-site. In many small machines, there may not be room for an ejector bar.

Parts List

Qty	Part
1	FasTie Pull Stud
1	FasTie Coupler
1	Center Adapters

High Strength Couplers and Studs are recommended for 1" applications.



This setup is designed for captive molders, or shops with tools using a standard thickness ejector housing.

Couplers at the End of Ejector Bars

Couplers are located at the end of the ejector bars mounted to the press ejector plate. Pull studs are mounted to each mold in storage. Ejector connection is made without changing ejector bars. Ejector housing shown is 1.062" thick. Air manifold supplies compressed air to the end of each ejector bar for simultaneous coupler release. Fixed length bars are finished on-site, cut to length and tapped with 1/2-13 female thread.

Parts List

Qty	Part
2 or 4	FasTie Pull Stud
2 or 4	FasTie Coupler
2 or 4	Fixed Length Ejector Bars or SpeedBar®
1	Adjustable Length Bars
1	Air Manifold with tubing

Specifications and Accessories

Specifications

Maximum operating temp.....300°F (149°C)
 Air pressure range.....80–100 psi
 Pull stud material.....Hardened Steel (58–62 Rc)
 Ejector bar and coupler material.....High Strength Steel
 Threaded studs B7 Alloy or Comparable
 Air manifold materialAluminum
 Air tubing material 1/8" OD Nylon

Press Requirements

	Coupler Size		
	1-inch	1-3/8-inch	2-inch
Platen thru hole min.	ø1.063" ø27 mm	ø1.45" ø36.8 mm	ø2.063" ø52.4 mm
Ejector plate thru hole min.	ø0.512" ø14 mm	ø0.641" ø16.5 mm	ø0.765" ø19.4 mm
Ejector force per coupler max.	2.5 tons	5.5 tons	7.5 tons

Recommended FasTie Size Per Press Size & Knockout Qty

Press Tonnage	Knockout Quantity		
	1 (Center)	2	4
0–250	1"HS	1"HS	1"HS
250–500	1-3/8"	1"HS or 1-3/8"	1"HS or 1-3/8"
500–750	2"	1-3/8" or 2"	1-3/8" or 2"
750–1000	2"	1-3/8" or 2"	1-3/8" or 2"
1000+	Do not use	2"	2"

For best results, use the largest FasTie that will fit into the press.

Accessories

Additional parts to aid installation and use:

- SPEEDBAR Adjustable Length Ejector Bar*
Changes length without tools ± 1/2" in increments of .006". Air passes through the bar for air hook-up at the back of the press ejector plate.
- Fixed Length Ejector Bar
Provides an air passage to the back of the press ejector plate. Several lengths are stocked with one blank end for on-site finishing.
- Center Ejector Bar and Center Adapter
Provides an air passage in front of the press ejector plate for center knockout. Also for use with multiple knockouts.
- Air Manifold
Splits single air supply into four circuits to aid air connection. Comes with 1/8" diameter tubing and pneumatic connectors.

SpeedBar

U.S. Patent No. 6,315,544



Fixed Length Ejector Bar



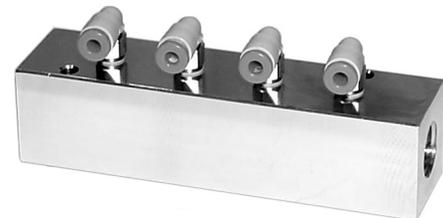
Center Ejector Bar



Center Adapter



Air Manifold



Contact DME for special thread sizes for Ejector Bars and Center Adapters

*1-inch, 1/2-13 threaded

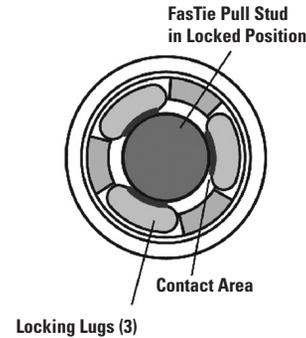


FasTie® - Quick Ejector Tie-In System

1-Inch Couplers and Pull Studs

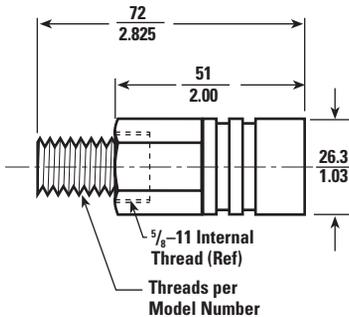
FasTie Coupler Design employs three locking lugs, to dramatically increase the load-bearing surface area of the components.

FasTies Coupler Bearing Surface Cross-Section

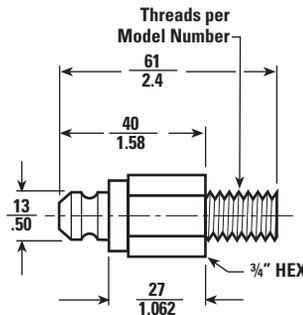


High Strength 1" FasTie

Standard FasTie Couplers and Pull Studs



FasTie Coupler



FasTie Pull Stud

Model Number	Thread Size
FTF50	1/2-13
FTF63	5/8-11
FTFM12	M12 x 1.75
FTFM16	M16 x 2

[FASTIE](#)

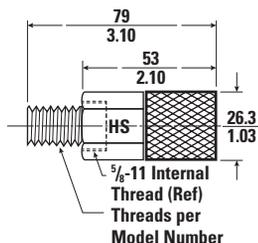
Model Number	Thread Size
FTM38	3/8-16
FTM50	1/2-13
FTM63	5/8-11
FTMM12	M12 x 1.75
FTMM16	M16 x 2
FTMM20	M20 x 2.5

High Strength FasTie Couplers and Pull Studs

Center knockout, multiple and high-speed ejection indicate the need for High Strength FasTie Couplers and Pull Studs. High Strength Couplers and Pull Studs are longer than the original parts (see above), and are not to be used in combination with Original Couplers and Pull Studs. All accessories are compatible with both styles of Couplers and Pull Studs.

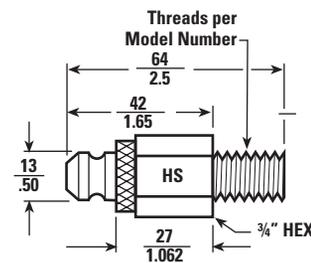
NOTE: Do not use HS FasTie Couplers in combination with standard version (above). Damage to couplers will result. Maximum installed center line misalignment of coupler and pull stud is +/- 3.5mm/0.138"

Model Number	Thread Size
FTMHS38	3/8-16
FTMHS50	1/2-13
FTMHS63	5/8-11
FTMHSM12	M12 x 1.75
FTMHSM16	M16 x 2
FTMHSM20	M20 x 2.5



FASTIE High Strength Coupler

Model Number	Thread Size
FTFHHS50	1/2-13
FTFHHS63	5/8-11
FTFHSM12	M12 x 1.75
FTFHSM16	M16 x 2



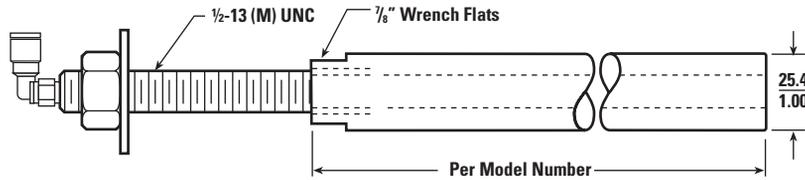
FASTIE High Strength Pull Stud

FasTie® - Quick Ejector Tie-In System



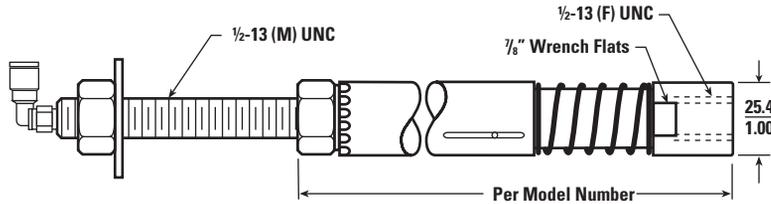
FasTie 1-Inch Accessories

Fixed Length Ejector Bar 1/2-13 threads



Model Number	Length
FTBB50-8	8"
FTBB50-10	10"
FTBB50-12	12"
FTBB50-14	14"

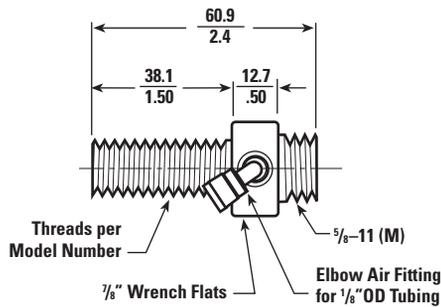
SPEEDBAR Adjustable Ejector Bar 1/2-13 threads
Adjusts +/- 1/2" from base height



Model Number	Length
SBAB50-6	6"
SBAB50-7	7"
SBAB50-8	8"
SBAB50-9	9"
SBAB50-10	10"
SBAB50-11	11"
SBAB50-12	12"
SBAB50-13	13"
SBAB50-14	14"

Center Adapter

[FASTIE](#)

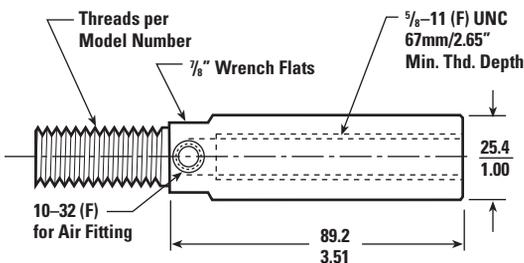


Model Number	Thread Size
FTCA63	5/8-11"
FTCAM16	M16 x 2
FTCAM20	M20 x 2.5

Air Handling Parts

FTAM100	Air Manifold Assembly
FTPF2	Pneumatic Fitting 90° Elbow, 10-32 x 1/8" OD tube
FTT125	Tubing 1/8" OD, nylon

Center Bar (use with FTFHS-63 only)



Model Number	Thread Size
FTCA63-63	5/8-11
FTCAM16-63	M16 x 2

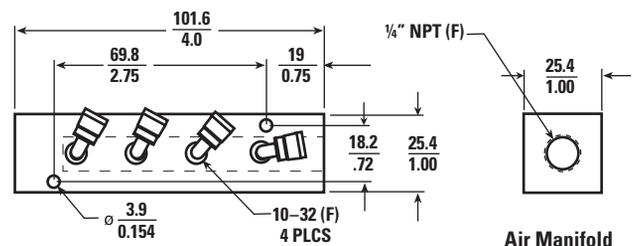
Call DME for a quote on thread sizes not shown

FTAM100

Includes:

- Manifold
- (4) 1/8" elbow pneumatic fittings
- (4) ø1/8" x 4ft tubing

$$\text{Linear} = \frac{\text{mm}}{\text{inch}} \text{ (TYP)}$$



Air Manifold

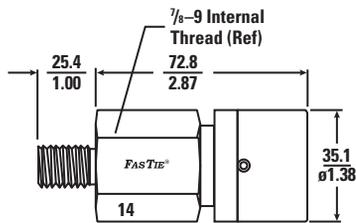


FasTie® - Quick Ejector Tie-In System

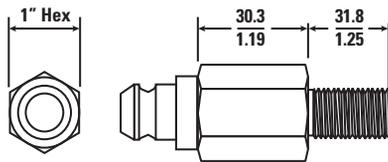
FASTIE

FasTie® 1-3/8-Inch Components

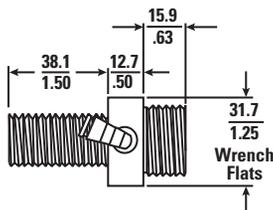
1-3/8" FasTie Coupler



1-3/8" FasTie Pull Stud



1-3/8" Center Adapter



Model Number	Thread Size
FTF1.4-63	5/8-11
FTF1.4-75	3/4-10
FTF1.4-M16	M16 x 2
FTF1.4-M20	M20 x 2.5

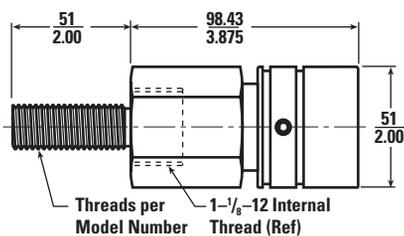
Model Number	Thread Size
FTM1.4-63	5/8-11
FTM1.4-75	3/4-10
FTM1.4-M16	M16 x 2
FTM1.4-M20	M20 x 2.5

Model Number	Thread Size
FTCA1.4-75	3/4-10
FTCA1.4-M16	M16 x 2
FTCA1.4-M20	M20 x 2.5

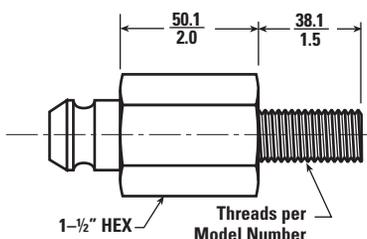
Maximum installed center line misalignment of coupler and pull stud is +/- 5mm/0.197"

FasTie 2-Inch Components

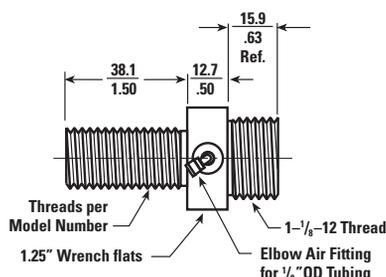
FasTie Coupler



2" FasTie Pull Stud



2" Center Adapter



Model Number	Thread Size
FTF2-63	5/8-11
FTF2-75	3/4-10

Model Number	Thread Size
FTM2-63	5/8-11
FTM2-75	3/4-10
FTM2M16	M16 x 2
FTM2M24	M24 x 2.5

Model Number	Thread Size
FTCA2-75	3/4-10
FTCA2M16	M16 x 2
FTCA2M20	M20 x 2.5

Maximum installed center line misalignment of coupler and pull stud is +/- 6mm/0.236"

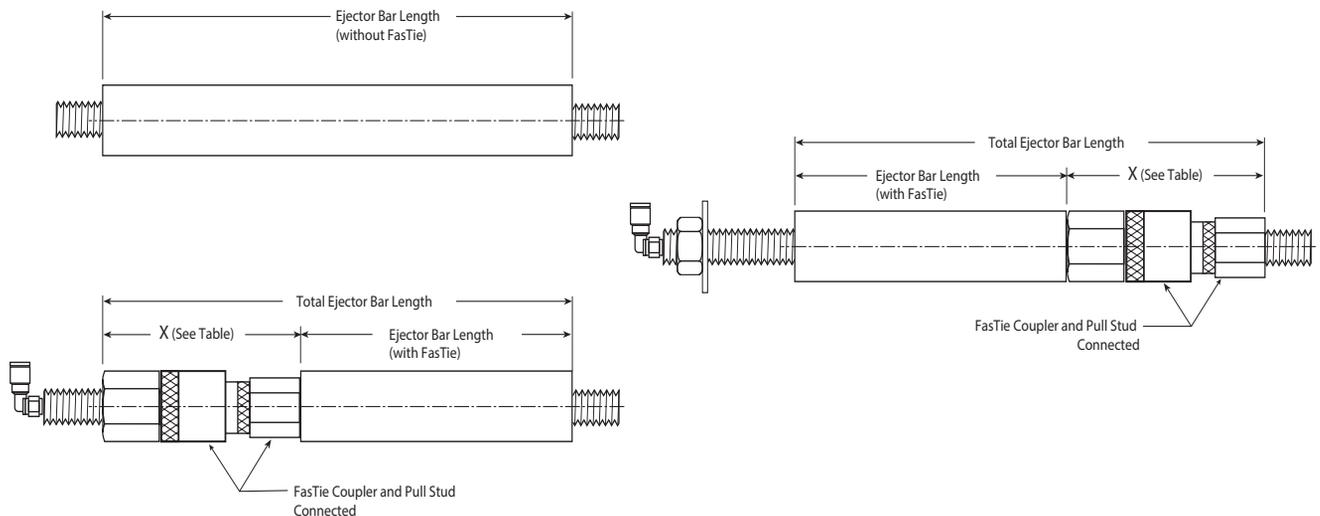
$$\text{Linear} = \frac{\text{mm}}{\text{Inch}} \text{ (TYP)}$$

Ejector Bars for 1-3/8-inch and 2-inch FasTie's are special orders.
Contact DME Industrial Supplies for information.

Determine Ejector Bar Length

- Determine length of Solid Ejector Bar
- Select Connected FasTie length from table
- Subtract Connected FasTie length from Solid Ejector Bar length
- Subtract Center Adapter length if necessary
- Result is FasTie Ejector Bar length

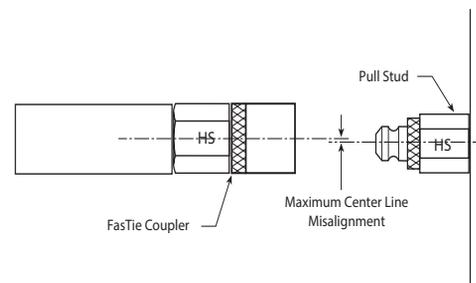
Connected FasTie Lengths		
Description	Part Numbers	"X" Length
Standard 1" FasTie	FTF-xx and FTM-xx	3.062"/77.8mm
High Strength 1" FasTie	FTFHS-xx and FTMHS-xx	3.162"/80.3mm
1 3/8" FasTie	FTF14-xx and FTM 14-xx	4.300"/109.2mm
2" FasTie	FTF2-xx and FTM2-xx	5.875"/149.2mm



Maximum Installed Misalignment (reference)

Maximum center line misalignment per coupler size:

1" HS	+/- 3.5mm (+/- .138")
1-3/8"	+/- 5mm (+/- .197")
2"	+/- 6mm (+/- .236")





SmartCaps™

Mold Status Identification Markers

"Now our molds tell us what needs to happen. The mold doesn't sit, waiting for someone to find out if it needs work. And we never hang a mold until it's ready. It's so simple."

– Excelerated Mold Group



SMARTCAPS

Yellow "P.M. REQ'D" caps also available!

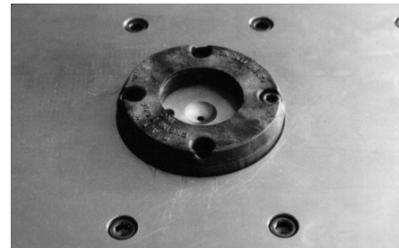
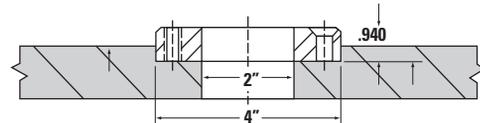
- Smart Caps snap on or off your mold locating rings quickly
- Indicates at a glance – even 50 feet away – the status of your molds
- Holds a condition note or work order safely under the Smart Cap.
- Three color – coded status caps available:

GREEN – Ready to mold
 RED – Mold needs work
 YELLOW – Mold needs preventive maintenance before storage

Part Number	Description
SCG	Green "Ready to Mold"
SCR	Red "Needs Work"
SCY	Yellow "P.M. Required"

Polycarbonate Locating Rings

- Made of engineering grade materials; 30% fiber-filled, flame-retardant Polycarbonate
 - Tensile strength – 16,500 PSI @ 73°
 - Flex strength – 23,000 PSI
 - Compressive strength – 21,000 PSI
 - Shear strength – 9,500 PSI
- 2 Aluminum inserts for 5/16" cap screws
- Reduces platen damage and nozzle band contact
- Form fits to worn platens
- Speeds setup, easy to clean
- Materials do not stick, "PEEL RIGHT OFF"!
- Prevents electrical shorts
- Replaces standard 6501 & 6501 LN locators
- Withstands 428°F continuous temperatures
- Mounting hole pattern fits DME or National
- Low prices!
- High quality!



LOCATING RINGS

Part Number	Description
P-6501	Polycarbonate Locating Ring

Plate Puller for 3 Plate Molds



Plate Puller

Part Number	Description	Wt. of Plate
PP100K	Male and Female Plate Puller with Spring	50 lbs.
PP200K	Male and Female Plate Puller with Spring	100 lbs.
PP300K	Male and Female Plate Puller with Spring	150 lbs.

Part Number	Description	Wt. of Plate
PPS100	Replacement Spring	50 lbs.
PPS200	Replacement Spring	100 lbs.
PPS300	Replacement Spring	150 lbs.



OBSOLETE

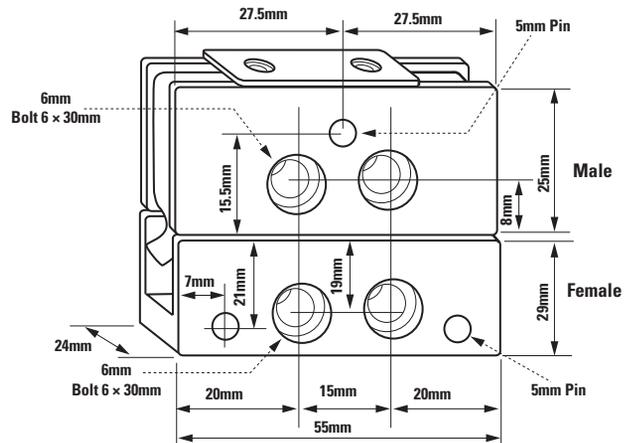
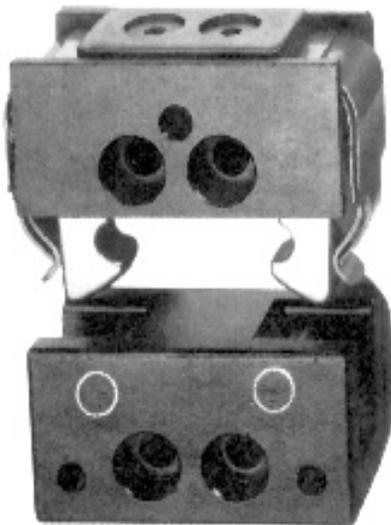
PPS300

Needed for
PP300K

PPS200

Needed for PP200K

- * Plate Puller is 55mm wide
- with 1 set of springs it is 60mm wide
- with 2 sets of springs it is 63mm wide
- with 3 sets of springs it is 66mm wide

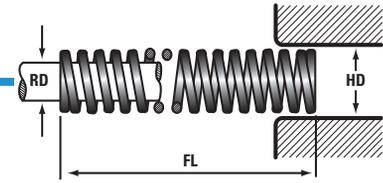




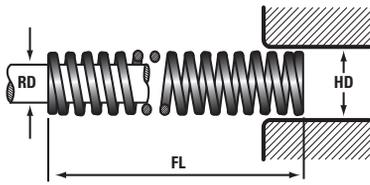
Danly Springs

Light Duty - Green

DANLY SPRINGS GREEN



Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/8	3/16	3/4	9-0603-11	8.4	16	0.19	19	0.23	25	0.30	32	0.38
		1	9-0604-11	6.3	16	0.25	19	0.30	25	0.40	35	0.52
		1 1/4	9-0605-11	5.0	16	0.31	19	0.38	25	0.50	36	0.67
		1 1/2	9-0606-11	4.2	16	0.37	19	0.45	25	0.60	37	0.80
		1 3/4	9-0607-11	3.6	16	0.43	19	0.52	25	0.69	37	0.96
		2	9-0608-11	3.1	15	0.50	18	0.60	25	0.80	36	1.08
		2 1/2	9-0610-11	2.6	16	0.63	19	0.76	26	1.01	38	1.45
		3	9-0612-11	2.1	16	0.75	19	0.90	25	1.20	39	1.70
1/2	9/32	12	9-0648-11	0.5	15	3.00	18	3.60	24	4.80	34	6.84
		3/4	9-0803-11	14.5	27	0.19	33	0.23	44	0.30	57	0.39
		1	9-0804-11	10.9	27	0.25	32	0.30	43	0.40	58	0.54
		1 1/4	9-0805-11	9.4	30	0.31	36	0.38	47	0.50	68	0.72
		1 1/2	9-0806-11	7.8	29	0.37	35	0.45	47	0.60	68	0.87
		1 3/4	9-0807-11	6.6	29	0.43	34	0.52	46	0.69	68	1.03
		2	9-0808-11	5.8	29	0.50	35	0.60	47	0.80	69	1.19
		2 1/2	9-0810-11	4.7	29	0.63	35	0.76	47	1.01	70	1.50
		3	9-0812-11	3.6	27	0.75	32	0.90	43	1.20	62	1.73
5/8	11/32	3 1/2	9-0814-11	3.1	27	0.88	32	1.05	43	1.40	62	2.03
		12	9-0848-11	0.8	25	3.00	30	3.60	40	4.80	58	6.88
		3/4	9-1003-11	22.0	41	0.19	50	0.23	66	0.30	79	0.36
		1	9-1004-11	18.0	44	0.25	53	0.30	71	0.40	95	0.53
		1 1/4	9-1005-11	13.4	42	0.31	51	0.38	68	0.50	87	0.65
		1 1/2	9-1006-11	12.0	45	0.37	54	0.45	72	0.60	100	0.83
		1 3/4	9-1007-11	10.0	43	0.43	52	0.52	69	0.69	97	0.97
		2	9-1008-11	9.3	47	0.50	56	0.60	75	0.80	107	1.16
		2 1/2	9-1010-11	7.2	45	0.63	54	0.76	73	1.01	103	1.44
		3	9-1012-11	5.9	44	0.75	53	0.90	71	1.20	103	1.74
3/4	3/8	3 1/2	9-1014-11	5.3	46	0.88	56	1.05	74	1.40	112	2.10
		4	9-1016-11	4.7	47	1.00	57	1.20	75	1.61	114	2.42
		12	9-1048-11	1.5	45	3.00	54	3.60	72	4.80	109	7.26
		3/4	9-1203-11	42.5	80	0.19	96	0.23	128	0.30	153	0.36
		1	9-1204-11	32.0	79	0.25	94	0.30	126	0.40	158	0.49
		1 1/4	9-1205-11	24.4	77	0.31	92	0.38	123	0.50	152	0.63
		1 1/2	9-1206-11	19.3	72	0.37	87	0.45	115	0.60	144	0.74
		1 3/4	9-1207-11	16.2	70	0.43	84	0.52	112	0.69	142	0.87
		2	9-1208-11	14.2	71	0.50	86	0.60	114	0.80	144	1.02
		2 1/2	9-1210-11	11.0	69	0.63	83	0.76	111	1.01	139	1.27
3/4	3/8	3	9-1212-11	9.2	69	0.75	83	0.90	110	1.20	142	1.55
		3 1/2	9-1214-11	7.7	67	0.88	81	1.05	108	1.40	137	1.79
		4	9-1216-11	6.8	68	1.00	82	1.20	109	1.61	140	2.07



Danly Springs



Light Duty - Green

DANLY SPRINGS GREEN

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Reqd. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in.		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/4	3/8	4	9-1216-11	6.8	68	1.00	82	1.20	109	1.61	140	2.07
		4 1/2	9-1218-11	6.0	67	1.12	81	1.35	108	1.80	140	2.34
		5	9-1220-11	5.3	66	1.25	80	1.50	106	2.00	137	2.58
		5 1/2	9-1222-11	4.9	67	1.38	80	1.65	107	2.20	139	2.86
		6	9-1224-11	4.5	67	1.50	81	1.80	108	2.39	143	3.17
		12	9-1248-11	2.2	65	3.00	78	3.60	104	4.80	135	6.24
1	1/2	1	9-1604-11	61.2	151	0.25	181	0.30	241	0.40	296	0.48
		1 1/4	9-1605-11	46.2	146	0.31	175	0.38	233	0.50	284	0.62
		1 1/2	9-1606-11	37.0	138	0.37	166	0.45	221	0.60	277	0.75
		1 3/4	9-1607-11	30.6	133	0.43	159	0.52	212	0.69	268	0.87
		2	9-1608-11	26.5	133	0.50	160	0.60	213	0.80	269	1.01
		2 1/2	9-1610-11	20.4	129	0.63	154	0.76	206	1.01	258	1.25
		3	9-1612-11	16.8	126	0.75	151	0.90	201	1.20	256	1.50
		3 1/2	9-1614-11	14.1	124	0.88	148	1.05	198	1.40	251	1.75
		4	9-1616-11	12.1	121	1.00	146	1.20	194	1.61	247	2.01
		4 1/2	9-1618-11	10.7	120	1.12	144	1.35	192	1.80	244	2.25
		5	9-1620-11	9.6	120	1.25	144	1.50	192	2.00	244	2.52
		5 1/2	9-1622-11	8.7	120	1.38	144	1.65	192	2.20	247	2.80
		6	9-1624-11	8.0	120	1.50	144	1.80	191	2.39	250	3.10
		7	9-1628-11	6.9	121	1.75	145	2.10	193	2.80	252	3.63
8	9-1632-11	6.0	120	2.00	144	2.40	192	3.20	253	4.17		
12	9-1648-11	4.0	120	3.00	144	3.60	192	4.80	254	6.22		
1 1/4	5/8	1 1/2	9-2006-11	57.9	217	0.37	260	0.45	346	0.60	413	0.71
		1 3/4	9-2007-11	47.5	206	0.43	247	0.52	329	0.69	397	0.84
		2	9-2008-11	40.7	204	0.50	245	0.60	327	0.80	393	0.96
		2 1/2	9-2010-11	31.4	198	0.63	237	0.76	316	1.01	382	1.22
		3	9-2012-11	26.3	197	0.75	236	0.90	315	1.20	395	1.50
		3 1/2	9-2014-11	22.2	194	0.88	233	1.05	311	1.40	391	1.76
		4	9-2016-11	19.2	193	1.00	231	1.20	308	1.61	388	2.02
		4 1/2	9-2018-11	16.9	190	1.12	228	1.35	303	1.80	386	2.28
		5	9-2020-11	15.0	188	1.25	225	1.50	300	2.00	379	2.53
		5 1/2	9-2022-11	13.5	186	1.38	223	1.65	298	2.20	374	2.77
		6	9-2024-11	12.3	184	1.50	221	1.80	294	2.39	373	3.03
		7	9-2028-11	10.4	182	1.75	219	2.10	292	2.80	369	3.53
		8	9-2032-11	9.1	182	2.00	218	2.40	291	3.20	366	4.04
		10	9-2040-11	7.2	180	2.50	216	3.00	288	4.00	360	5.03
12	9-2048-11	5.9	177	3.00	213	3.60	283	4.80	357	6.03		

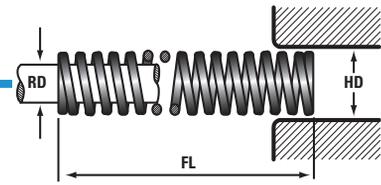




Danly Springs

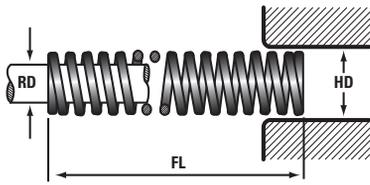
Light Duty - Green

DANLY SPRINGS GREEN



Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
1½	¾	2½	9-2408-11	60.3	303	0.50	363	0.60	484	0.80	584	0.97
		3	9-2410-11	45.8	289	0.63	346	0.76	462	1.01	558	1.22
		3½	9-2412-11	37.5	281	0.75	337	0.90	449	1.20	558	1.49
		4	9-2414-11	31.8	279	0.88	334	1.05	446	1.40	559	1.76
		4½	9-2416-11	27.3	274	1.00	329	1.20	439	1.61	547	2.01
		5	9-2418-11	24.1	270	1.12	324	1.35	433	1.80	549	2.28
		5½	9-2420-11	21.6	270	1.25	324	1.50	432	2.00	551	2.55
		6	9-2422-11	19.4	267	1.38	321	1.65	428	2.20	543	2.80
		7	9-2424-11	17.6	263	1.50	316	1.80	421	2.39	537	3.05
		8	9-2428-11	15.0	263	1.75	315	2.10	420	2.80	534	3.57
		10	9-2432-11	12.9	258	2.00	309	2.40	412	3.20	526	4.07
12	9-2440-11	10.3	258	2.50	309	3.00	412	4.00	524	5.11		
2	1	2½	9-2448-11	8.4	252	3.00	303	3.60	403	4.80	516	6.10
		3	9-0807-11	6.6	29	0.43	34	0.52	46	0.69	68	1.03
		3½	9-0808-11	5.8	29	0.50	35	0.60	47	0.80	69	1.19
		4	9-0810-11	4.7	29	0.63	35	0.76	47	1.01	70	1.50
		4½	9-0812-11	3.6	27	0.75	32	0.90	43	1.20	62	1.73
		5	9-0814-11	3.1	27	0.88	32	1.05	43	1.40	62	2.03
		5½	9-0848-11	0.8	25	3.00	30	3.60	40	4.80	58	6.88
		6	9-1003-11	22.0	41	0.19	50	0.23	66	0.30	79	0.36
		7	9-1004-11	18.0	44	0.25	53	0.30	71	0.40	95	0.53
		8	9-1005-11	13.4	42	0.31	51	0.38	68	0.50	87	0.65
		10	9-1006-11	12.0	45	0.37	54	0.45	72	0.60	100	0.83
12	9-1007-11	10.0	43	0.43	52	0.52	69	0.69	97	0.97		
2½	1½	3	9-1008-11	9.3	47	0.50	56	0.60	75	0.80	107	1.16
		3½	9-1010-11	7.2	45	0.63	54	0.76	73	1.01	103	1.44
		4	9-1012-11	5.9	44	0.75	53	0.90	71	1.20	103	1.74
		4½	9-1014-11	5.3	46	0.88	56	1.05	74	1.40	112	2.10
		5	9-1016-11	4.7	47	1.00	57	1.20	75	1.61	114	2.42
		5½	9-1048-11	1.5	45	3.00	54	3.60	72	4.80	109	7.26
		6	9-1203-11	42.5	80	0.19	96	0.23	128	0.30	153	0.36
		7	9-1204-11	32.0	79	0.25	94	0.30	126	0.40	158	0.49
		8	9-1205-11	24.4	77	0.31	92	0.38	123	0.50	152	0.63
		10	9-1206-11	19.3	72	0.37	87	0.45	115	0.60	144	0.74
		12	9-1207-11	16.2	70	0.43	84	0.52	112	0.69	142	0.87





Danly Springs



Medium Duty - Blue

DANLY SPRINGS BLUE

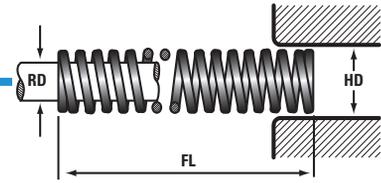
Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/8	3/16	3/4	9-0603-21	12.5	23	0.19	28	0.23	35	0.28	39	0.31
		1	9-0604-21	9.3	23	0.25	27	0.30	34	0.37	42	0.46
		1 1/4	9-0605-21	8.0	25	0.31	30	0.38	38	0.47	50	0.63
		1 1/2	9-0606-21	6.7	25	0.37	30	0.45	38	0.56	51	0.77
		1 3/4	9-0607-21	5.6	24	0.43	29	0.52	36	0.65	50	0.89
		2	9-0608-21	4.9	25	0.50	30	0.60	37	0.75	50	1.03
		2 1/2	9-0610-21	3.9	24	0.63	29	0.76	37	0.94	50	1.28
		3	9-0612-21	3.3	24	0.75	29	0.90	36	1.12	51	1.56
1/2	9/32	12	9-0648-21	0.8	23	3.00	27	3.60	34	4.50	46	6.07
		3/4	9-0803-21	21.0	39	0.19	47	0.23	59	0.28	63	0.30
		1	9-0804-21	16.5	41	0.25	49	0.30	61	0.37	82	0.50
		1 1/4	9-0805-21	12.9	41	0.31	49	0.38	61	0.47	82	0.63
		1 1/2	9-0806-21	10.9	41	0.37	49	0.45	61	0.56	86	0.78
		1 3/4	9-0807-21	9.2	40	0.43	48	0.52	60	0.65	84	0.91
		2	9-0808-21	8.0	40	0.50	48	0.60	60	0.75	85	1.06
		2 1/2	9-0810-21	6.3	40	0.63	48	0.76	60	0.94	82	1.32
5/8	11/32	3	9-0812-21	5.0	37	0.75	45	0.90	56	1.12	77	1.54
		3 1/2	9-0814-21	4.3	37	0.88	45	1.05	56	1.31	77	1.81
		12	9-0848-21	1.2	37	3.00	45	3.60	56	4.50	79	6.35
		3/4	9-1003-21	38.5	72	0.19	87	0.23	108	0.28	123	0.32
		1	9-1004-21	31.8	78	0.25	94	0.30	117	0.37	141	0.44
		1 1/4	9-1005-21	23.0	72	0.31	87	0.38	109	0.47	123	0.53
		1 1/2	9-1006-21	20.1	75	0.37	90	0.45	113	0.56	140	0.69
		1 3/4	9-1007-21	17.4	75	0.43	90	0.52	113	0.65	145	0.84
		2	9-1008-21	15.4	77	0.50	93	0.60	116	0.75	151	0.98
		2 1/2	9-1010-21	12.0	76	0.63	91	0.76	113	0.94	146	1.22
3/4	3/8	3	9-1012-21	10.1	76	0.75	91	0.90	113	1.12	153	1.51
		3 1/2	9-1014-21	8.7	76	0.88	91	1.05	114	1.31	155	1.78
		4	9-1016-21	7.6	76	1.00	92	1.20	114	1.51	154	2.04
		12	9-1048-21	2.4	71	3.00	85	3.60	106	4.50	142	6.01
		3/4	9-1203-21	68.5	128	0.19	154	0.23	193	0.28	199	0.29
		1	9-1204-21	51.5	127	0.25	152	0.30	190	0.37	208	0.40
		1 1/4	9-1205-21	38.9	123	0.31	147	0.38	184	0.47	198	0.51
		1 1/2	9-1206-21	31.3	117	0.37	140	0.45	176	0.56	192	0.61
1 3/4	9-1207-21	25.8	112	0.43	134	0.52	168	0.65	182	0.71		
3/4	3/8	2	9-1208-21	22.2	111	0.50	134	0.60	167	0.75	180	0.81
		2 1/2	9-1210-21	17.3	109	0.63	131	0.76	163	0.94	177	1.02
		3	9-1212-21	14.1	105	0.75	127	0.90	158	1.12	173	1.22
		3 1/2	9-1214-21	12.2	107	0.88	128	1.05	160	1.31	178	1.46
		4	9-1216-21	10.6	106	1.00	128	1.20	160	1.51	179	1.68

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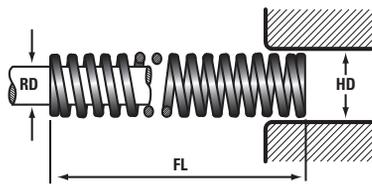
Danly Springs

Medium Duty - Blue



DANLY SPRINGS BLUE

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in.		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/4	3/8	4 1/2	9-1218-21	9.3	105	1.13	126	1.36	158	1.70	175	1.88
		5	9-1220-21	8.3	104	1.25	125	1.50	156	1.88	175	2.09
		5 1/2	9-1222-21	7.5	103	1.37	123	1.64	154	2.05	174	2.30
		6	9-1224-21	6.9	103	1.50	124	1.80	155	2.24	173	2.52
		12	9-1248-21	3.5	104	3.00	125	3.60	156	4.50	180	5.21
1	1/2	1	9-1604-21	94.9	234	0.25	280	0.30	350	0.37	371	0.39
		1 1/4	9-1605-21	71.2	224	0.31	269	0.38	336	0.47	357	0.50
		1 1/2	9-1606-21	56.3	211	0.37	253	0.45	316	0.56	338	0.60
		1 3/4	9-1607-21	47.5	206	0.43	247	0.52	309	0.65	341	0.72
		2	9-1608-21	41.0	206	0.50	247	0.60	309	0.75	344	0.84
		2 1/2	9-1610-21	31.4	198	0.63	237	0.76	297	0.94	327	1.04
		3	9-1612-21	25.8	193	0.75	232	0.90	289	1.12	325	1.26
		3 1/2	9-1614-21	21.6	189	0.88	227	1.05	284	1.31	317	1.46
		4	9-1616-21	18.8	189	1.00	226	1.20	283	1.51	316	1.68
		4 1/2	9-1618-21	16.7	189	1.13	227	1.36	284	1.70	320	1.92
		5	9-1620-21	15.0	188	1.25	225	1.50	281	1.88	320	2.14
		5 1/2	9-1622-21	13.5	185	1.37	222	1.64	277	2.05	319	2.36
		6	9-1624-21	12.4	186	1.50	223	1.80	278	2.24	319	2.58
		7	9-1628-21	10.5	184	1.75	221	2.10	276	2.63	314	3.00
8	9-1632-21	9.1	182	2.00	218	2.40	273	3.00	312	3.42		
12	9-1648-21	6.0	180	3.00	216	3.60	270	4.50	305	5.11		
1 1/4	5/8	1 1/2	9-2006-21	94.8	355	0.37	425	0.45	532	0.56	569	0.60
		1 3/4	9-2007-21	77.9	337	0.43	405	0.52	506	0.65	550	0.71
		2	9-2008-21	66.3	333	0.50	399	0.60	499	0.75	539	0.81
		2 1/2	9-2010-21	50.1	316	0.63	379	0.76	473	0.94	503	1.00
		3	9-2012-21	40.5	303	0.75	364	0.90	454	1.12	490	1.21
		3 1/2	9-2014-21	34.2	300	0.88	360	1.05	449	1.31	486	1.42
		4	9-2016-21	29.6	297	1.00	357	1.20	446	1.51	484	1.63
		4 1/2	9-2018-21	26.3	298	1.13	357	1.36	447	1.70	491	1.87
		5	9-2020-21	23.7	296	1.25	356	1.50	444	1.88	498	2.10
		5 1/2	9-2022-21	21.4	293	1.37	351	1.64	439	2.05	495	2.31
		6	9-2024-21	19.5	292	1.50	350	1.80	438	2.24	493	2.53
		7	9-2028-21	16.6	291	1.75	349	2.10	436	2.63	489	2.95
		8	9-2032-21	14.4	288	2.00	345	2.40	432	3.00	486	3.38
10	9-2040-21	11.4	285	2.50	342	3.00	428	3.75	483	4.23		
12	9-2048-21	9.5	285	3.00	342	3.60	428	4.50	484	5.10		



Danly Springs

Medium Duty - Blue



DANLY SPRINGS BLUE

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
1½	¾	2	9-2408-21	97.4	489	0.50	587	0.60	733	0.75	762	0.78
		2½	9-2410-21	73.5	463	0.63	556	0.76	694	0.94	722	0.98
		3	9-2412-21	60.1	450	0.75	539	0.90	674	1.12	725	1.21
		3½	9-2414-21	50.1	439	0.88	527	1.05	658	1.31	704	1.40
		4	9-2416-21	43.4	436	1.00	523	1.20	654	1.51	707	1.63
		4½	9-2418-21	37.9	429	1.13	515	1.36	643	1.70	693	1.83
		5	9-2420-21	34.0	425	1.25	510	1.50	638	1.88	698	2.05
		5½	9-2422-21	30.6	419	1.37	502	1.64	628	2.05	687	2.25
		6	9-2424-21	27.9	417	1.50	501	1.80	626	2.24	691	2.47
		7	9-2428-21	23.7	415	1.75	498	2.10	623	2.63	687	2.89
		8	9-2432-21	20.6	412	2.00	494	2.40	617	3.00	683	3.32
		10	9-2440-21	16.5	413	2.50	495	3.00	619	3.75	693	4.21
12	9-2448-21	13.6	408	3.00	490	3.60	612	4.50	682	5.03		
2	1	2½	9-3210-21	121.0	762	0.63	915	0.76	1143	0.94	1193	0.99
		3	9-3212-21	95.6	715	0.75	858	0.90	1073	1.12	1130	1.18
		3½	9-3214-21	79.8	699	0.88	839	1.05	1049	1.31	1109	1.39
		4	9-3216-21	69.6	699	1.00	838	1.20	1048	1.51	1131	1.63
		4½	9-3218-21	61.2	693	1.13	831	1.36	1039	1.70	1134	1.85
		5	9-3220-21	54.0	675	1.25	810	1.50	1013	1.88	1105	2.05
		5½	9-3222-21	48.8	668	1.37	801	1.64	1001	2.05	1110	2.27
		6	9-3224-21	44.5	666	1.50	799	1.80	999	2.24	1112	2.50
		7	9-3228-21	37.9	664	1.75	797	2.10	996	2.63	1117	2.94
		8	9-3232-21	32.8	655	2.00	786	2.40	983	3.00	1103	3.36
		10	9-3236-21	29.1	656	2.25	787	2.70	984	3.38	1108	3.81
		12	9-3240-21	26.1	653	2.50	783	3.00	979	3.75	1111	4.26
2½	1½	3	9-4012-21	174.0	1304	0.75	1565	0.90	1956	1.12	2113	1.22
		3½	9-4014-21	143.0	1249	0.88	1499	1.05	1874	1.31	2056	1.44
		4	9-4016-21	121.0	1211	1.00	1453	1.20	1816	1.51	2016	1.66
		4½	9-4018-21	106.0	1195	1.13	1434	1.36	1793	1.70	2031	1.91
		5	9-4020-21	93.7	1172	1.25	1406	1.50	1758	1.88	2003	2.14
		5½	9-4024-21	75.9	1139	1.50	1366	1.80	1708	2.24	1963	2.59
		6	9-4028-21	63.8	1116	1.75	1339	2.10	1674	2.63	1935	3.04
		7	9-4032-21	55.0	1099	2.00	1319	2.40	1649	3.00	1916	3.48
		8	9-4036-21	48.8	1099	2.25	1318	2.70	1648	3.38	1944	3.98
		10	9-4040-21	43.9	1097	2.50	1316	3.00	1646	3.75	1964	4.48
12	9-4048-21	36.2	1087	3.00	1305	3.60	1631	4.50	1966	5.42		

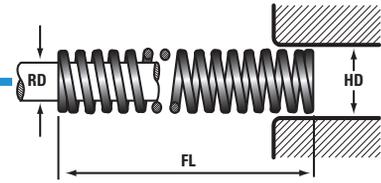
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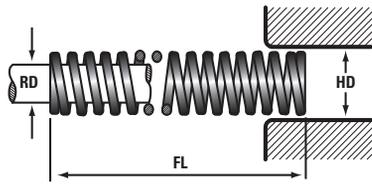
Danly Springs

Heavy Duty - Red



DANLY SPRINGS RED

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in.		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/8	3/16	3/4	9-0603-26	16.5	25	0.15	31	0.19	37	0.23	41	0.25
		1	9-0604-26	12.6	25	0.20	31	0.25	37	0.30	46	0.37
		1 1/4	9-0605-26	10.0	25	0.25	31	0.31	38	0.38	47	0.47
		1 1/2	9-0606-26	9.3	28	0.30	35	0.37	42	0.45	61	0.66
		1 3/4	9-0607-26	8.0	28	0.35	35	0.43	42	0.52	62	0.78
		2	9-0608-26	6.8	27	0.40	34	0.50	41	0.60	60	0.88
		2 1/2	9-0610-26	5.5	28	0.50	35	0.63	42	0.76	62	1.13
		3	9-0612-26	4.3	26	0.60	32	0.75	39	0.90	56	1.29
1/2	9/32	12	9-0648-26	1.1	26	2.40	32	3.00	39	3.60	56	5.27
		3/4	9-0803-26	31.0	47	0.15	58	0.19	70	0.23	96	0.31
		1	9-0804-26	23.6	46	0.20	58	0.25	70	0.30	103	0.44
		1 1/4	9-0805-26	18.8	47	0.25	59	0.31	71	0.38	106	0.56
		1 1/2	9-0806-26	15.5	46	0.30	58	0.37	70	0.45	107	0.69
		1 3/4	9-0807-26	13.3	46	0.35	58	0.43	69	0.52	109	0.82
		2	9-0808-26	11.4	46	0.40	57	0.50	69	0.60	107	0.94
		2 1/2	9-0810-26	8.7	44	0.50	55	0.63	66	0.76	99	1.14
		3	9-0812-26	7.7	46	0.60	58	0.75	69	0.90	114	1.47
		3 1/2	9-0814-26	6.2	43	0.70	54	0.88	65	1.05	102	1.64
5/8	11/32	12	9-0848-26	1.8	43	2.40	53	3.00	64	3.60	101	5.71
		3/4	9-1003-26	57.0	86	0.15	107	0.19	128	0.23	154	0.27
		1	9-1004-26	43.1	85	0.20	106	0.25	127	0.30	160	0.37
		1 1/4	9-1005-26	34.8	88	0.25	110	0.31	132	0.38	174	0.50
		1 1/2	9-1006-26	27.8	83	0.30	104	0.37	125	0.45	167	0.60
		1 3/4	9-1007-26	24.7	86	0.35	107	0.43	128	0.52	185	0.75
		2	9-1008-26	20.5	82	0.40	103	0.50	123	0.60	170	0.83
		2 1/2	9-1010-26	16.5	83	0.50	104	0.63	125	0.76	177	1.07
		3	9-1012-26	14.0	84	0.60	105	0.75	126	0.90	187	1.33
		3 1/2	9-1014-26	11.9	83	0.70	104	0.88	125	1.05	187	1.57
		4	9-1016-26	10.4	84	0.80	104	1.00	125	1.20	187	1.80
3/4	3/8	12	9-1048-26	3.3	80	2.40	100	3.00	120	3.60	181	5.44
		1	9-1204-26	137.0	270	0.20	337	0.25	405	0.30	422	0.31
		1 1/4	9-1205-26	103.0	260	0.25	324	0.31	389	0.38	407	0.40
		1 1/2	9-1206-26	82.2	246	0.30	307	0.37	369	0.45	398	0.48
		1 3/4	9-1207-26	68.5	237	0.35	297	0.43	356	0.52	392	0.57
		2	9-1208-26	57.8	232	0.40	290	0.50	348	0.60	371	0.64
		2 1/2	9-1210-26	44.0	222	0.50	277	0.63	333	0.76	344	0.78
		3	9-1212-26	36.2	217	0.60	271	0.75	325	0.90	347	0.96
3 1/2	9-1214-26	30.8	216	0.70	270	0.88	324	1.05	350	1.13		
4	9-1216-26	26.8	215	0.80	269	1.00	323	1.20	351	1.31		



Danly Springs

Heavy Duty - Red



DANLY SPRINGS RED

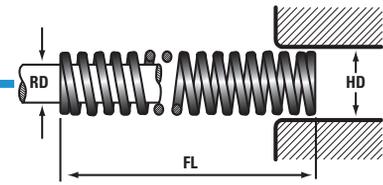
Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in.		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/4	3/8	4 1/2	9-1218-26	23.7	213	0.90	266	1.12	319	1.35	352	1.49
		5	9-1220-26	21.2	212	1.00	265	1.25	318	1.50	353	1.66
		5 1/2	9-1222-26	19.3	213	1.10	266	1.38	319	1.65	354	1.84
		6	9-1224-26	17.6	211	1.20	263	1.50	316	1.80	355	2.01
		12	9-1248-26	8.6	207	2.40	258	3.00	310	3.60	351	4.07
1	1/2	1	9-1604-26	215.0	423	0.20	529	0.25	635	0.30	622	0.29
		1 1/4	9-1605-26	163.0	411	0.25	513	0.31	616	0.38	648	0.40
		1 1/2	9-1606-26	127.0	380	0.30	475	0.37	570	0.45	602	0.47
		1 3/4	9-1607-26	109.0	378	0.35	472	0.43	566	0.52	646	0.60
		2	9-1608-26	89.4	359	0.40	449	0.50	539	0.60	581	0.65
		2 1/2	9-1610-26	69.1	348	0.50	435	0.63	522	0.76	571	0.83
		3	9-1612-26	57.0	341	0.60	426	0.75	512	0.90	584	1.02
		3 1/2	9-1614-26	48.0	336	0.70	420	0.88	505	1.05	575	1.20
		4	9-1616-26	41.8	336	0.80	420	1.00	504	1.20	584	1.40
		4 1/2	9-1618-26	37.1	333	0.90	416	1.12	500	1.35	591	1.59
		5	9-1620-26	33.1	331	1.00	414	1.25	497	1.50	585	1.77
		5 1/2	9-1622-26	30.0	331	1.10	413	1.38	496	1.65	590	1.97
		6	9-1624-26	27.5	329	1.20	411	1.50	494	1.80	595	2.16
		7	9-1628-26	23.5	329	1.40	412	1.75	494	2.10	602	2.56
8	9-1632-26	20.5	328	1.60	410	2.00	492	2.40	599	2.93		
12	9-1648-26	13.8	331	2.40	414	3.00	497	3.60	638	4.62		
1 1/4	5/8	1 1/2	9-2006-26	223.0	667	0.30	834	0.37	1001	0.45	1021	0.46
		1 3/4	9-2007-26	182.0	631	0.35	788	0.43	946	0.52	995	0.55
		2	9-2008-26	154.0	618	0.40	773	0.50	928	0.60	976	0.63
		2 1/2	9-2010-26	117.0	590	0.50	737	0.63	884	0.76	926	0.79
		3	9-2012-26	94.7	567	0.60	708	0.75	850	0.90	916	0.97
		3 1/2	9-2014-26	80.1	561	0.70	702	0.88	842	1.05	926	1.16
		4	9-2016-26	69.1	555	0.80	694	1.00	832	1.20	919	1.33
		4 1/2	9-2018-26	60.7	545	0.90	681	1.12	817	1.35	914	1.50
		5	9-2020-26	54.7	547	1.00	684	1.25	821	1.50	933	1.71
		5 1/2	9-2022-26	49.3	543	1.10	679	1.38	815	1.65	928	1.88
		6	9-2024-26	44.9	537	1.20	672	1.50	806	1.80	923	2.06
		7	9-2028-26	38.1	534	1.40	668	1.75	801	2.10	916	2.41
		8	9-2032-26	33.0	527	1.60	659	2.00	791	2.40	910	2.75
10	9-2040-26	26.4	528	2.00	660	2.50	792	3.00	925	3.51		
12	9-2048-26	21.8	524	2.40	654	3.00	785	3.60	916	4.20		





Danly Springs

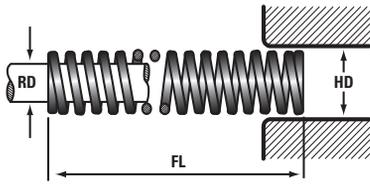
Heavy Duty - Red



DANLY SPRINGS RED

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Req'd. to Deflect 1/10 in.	Total Defl. Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
1½	¾	2	9-2408-26	208.0	835	0.40	1044	0.50	1253	0.60	1357	0.65
		2½	9-2410-26	153.0	771	0.50	964	0.63	1157	0.76	1233	0.80
		3	9-2412-26	125.0	748	0.60	935	0.75	1122	0.90	1252	1.00
		3½	9-2414-26	105.0	736	0.70	920	0.88	1104	1.05	1265	1.20
		4	9-2416-26	90.6	728	0.80	910	1.00	1091	1.20	1252	1.38
		4½	9-2418-26	80.4	722	0.90	902	1.12	1083	1.35	1285	1.60
		5	9-2420-26	71.5	715	1.00	894	1.25	1073	1.50	1273	1.78
		5½	9-2422-26	64.3	709	1.10	886	1.38	1063	1.65	1263	1.96
		6	9-2424-26	59.0	706	1.20	883	1.50	1059	1.80	1284	2.18
		7	9-2428-26	50.3	705	1.40	881	1.75	1057	2.10	1294	2.57
		8	9-2432-26	43.8	700	1.60	875	2.00	1050	2.40	1299	2.97
		10	9-2440-26	34.6	692	2.00	865	2.50	1038	3.00	1291	3.73
12	9-2448-26	28.7	689	2.40	862	3.00	1034	3.60	1300	4.53		
2	1	2½	9-3210-26	242.0	1220	0.50	1524	0.63	1829	0.76	1904	0.79
		3	9-3212-26	193.0	1155	0.60	1444	0.75	1732	0.90	1860	0.96
		3½	9-3214-26	160.0	1121	0.70	1402	0.88	1682	1.05	1831	1.14
		4	9-3216-26	140.0	1124	0.80	1406	1.00	1687	1.20	1891	1.35
		4½	9-3218-26	123.0	1104	0.90	1380	1.12	1656	1.35	1901	1.55
		5	9-3220-26	108.0	1080	1.00	1350	1.25	1620	1.50	1840	1.71
		5½	9-3222-26	96.4	1063	1.10	1328	1.38	1594	1.65	1797	1.86
		6	9-3224-26	88.0	1053	1.20	1317	1.50	1580	1.80	1812	2.06
		7	9-3228-26	75.0	1051	1.40	1314	1.75	1577	2.10	1836	2.45
		8	9-3232-26	65.3	1044	1.60	1305	2.00	1566	2.40	1854	2.84
		10	9-3240-26	51.3	1026	2.00	1283	2.50	1539	3.00	1816	3.54
		12	9-3248-26	42.6	1023	2.40	1279	3.00	1535	3.60	1842	4.32
2½	1½	3	9-4012-26	295.0	1770	0.60	2213	0.75	2655	0.90	2980	1.01
		3½	9-4014-26	241.0	1687	0.70	2109	0.88	2531	1.05	2952	1.23
		4	9-4016-26	205.0	1640	0.80	2050	1.00	2460	1.20	2952	1.44
		4½	9-4018-26	178.0	1602	0.90	2003	1.13	2403	1.35	2964	1.67
		5	9-4020-26	157.0	1570	1.00	1963	1.25	2355	1.50	2944	1.88
		5½	9-4024-26	128.0	1536	1.20	1920	1.50	2304	1.80	2880	2.25
		6	9-4028-26	108.0	1512	1.40	1890	1.75	2268	2.10	2835	2.63
		7	9-4032-26	93.0	1488	1.60	1860	2.00	2232	2.40	2790	3.00
		8	9-4036-26	82.0	1476	1.80	1845	2.25	2214	2.70	2768	3.38
		10	9-4040-26	73.5	1470	2.00	1838	2.50	2205	3.00	2756	3.75
12	9-4048-26	61.0	1464	2.40	1830	3.00	2196	3.60	2745	4.50		





Danly Springs

Extra Heavy Duty - Yellow



DANLY SPRINGS YELLOW

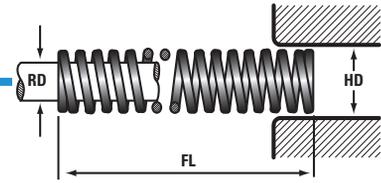
Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in.		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/8	3/16	3/4	9-0603-36	25.2	32	0.13	38	0.15	47	0.19	53	0.21
		1	9-0604-36	18.7	31	0.17	37	0.20	46	0.25	54	0.29
		1 1/4	9-0605-36	14.6	31	0.21	37	0.25	46	0.31	53	0.37
		1 1/2	9-0606-36	12.1	31	0.25	36	0.30	45	0.37	55	0.45
		1 3/4	9-0607-36	10.1	30	0.29	35	0.35	44	0.43	52	0.51
		2	9-0608-36	8.8	30	0.34	35	0.40	44	0.50	52	0.59
		2 1/2	9-0610-36	7.0	30	0.43	35	0.50	44	0.63	52	0.75
		3	9-0612-36	5.8	30	0.51	35	0.60	43	0.75	53	0.92
1/2	9/32	12	9-0648-36	1.4	29	2.04	34	2.40	42	3.00	52	3.71
		3/4	9-0803-36	44.5	57	0.13	67	0.15	83	0.19	102	0.23
		1	9-0804-36	33.5	56	0.17	66	0.20	82	0.25	105	0.31
		1 1/4	9-0805-36	25.2	54	0.21	63	0.25	79	0.31	97	0.38
		1 1/2	9-0806-36	20.7	53	0.25	62	0.30	77	0.37	97	0.47
		1 3/4	9-0807-36	17.5	52	0.29	61	0.35	76	0.43	98	0.56
		2	9-0808-36	15.4	53	0.34	62	0.40	77	0.50	103	0.67
		2 1/2	9-0810-36	12.4	53	0.43	62	0.50	78	0.63	109	0.88
5/8	11/32	3	9-0812-36	10.1	51	0.51	60	0.60	76	0.75	106	1.04
		3 1/2	9-0814-36	8.6	51	0.60	60	0.70	75	0.88	105	1.22
		12	9-0848-36	2.4	49	2.04	58	2.40	72	3.00	101	4.19
		3/4	9-1003-36	97.0	124	0.13	146	0.15	182	0.19	213	0.22
		1	9-1004-36	72.7	122	0.17	143	0.20	179	0.25	227	0.31
		1 1/4	9-1005-36	53.7	115	0.21	135	0.25	169	0.31	205	0.38
		1 1/2	9-1006-36	43.3	110	0.25	130	0.30	162	0.37	201	0.46
		1 3/4	9-1007-36	36.3	107	0.29	126	0.35	157	0.43	199	0.55
3/4	3/8	2	9-1008-36	31.7	108	0.34	127	0.40	159	0.50	205	0.65
		2 1/2	9-1010-36	24.7	106	0.43	124	0.50	156	0.63	201	0.81
		3	9-1012-36	20.3	103	0.51	121	0.60	152	0.75	199	0.98
		3 1/2	9-1014-36	17.3	103	0.60	121	0.70	152	0.88	201	1.16
		4	9-1016-36	15.1	103	0.68	121	0.80	152	1.00	203	1.35
		12	9-1048-36	4.9	100	2.04	117	2.40	146	3.00	204	4.17
		1	9-1204-36	183.0	306	0.17	360	0.20	450	0.25	469	0.26
		1 1/4	9-1205-36	137.0	293	0.21	345	0.25	431	0.31	461	0.34
3/4	3/8	1 1/2	9-1206-36	111.0	282	0.25	332	0.30	415	0.37	472	0.43
		1 3/4	9-1207-36	92.4	272	0.29	320	0.35	400	0.43	466	0.50
		2	9-1208-36	79.7	272	0.34	320	0.40	400	0.50	473	0.59
		2 1/2	9-1210-36	62.1	266	0.43	313	0.50	391	0.63	472	0.76
		3	9-1212-36	51.2	260	0.51	306	0.60	383	0.75	481	0.94
		3 1/2	9-1214-36	43.2	257	0.60	303	0.70	378	0.88	474	1.10
		4	9-1216-36	37.3	255	0.68	300	0.80	374	1.00	468	1.25





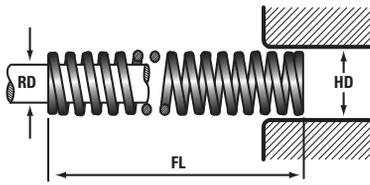
Danly Springs

Extra Heavy Duty - Yellow



DANLY SPRINGS YELLOW

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in.		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
3/4	3/8	4 1/2	9-1218-36	32.8	250	0.76	294	0.90	368	1.12	464	1.41
		5	9-1220-36	29.5	251	0.85	295	1.00	369	1.25	469	1.59
		5 1/2	9-1222-36	26.6	249	0.94	293	1.10	367	1.38	466	1.75
		6	9-1224-36	24.3	247	1.02	291	1.20	364	1.50	463	1.91
		12	9-1248-36	12.0	245	2.04	288	2.40	360	3.00	469	3.92
1	1/2	1 1/4	9-1605-36	202.0	433	0.21	509	0.25	636	0.31	709	0.35
		1 1/2	9-1606-36	160.0	407	0.25	479	0.30	598	0.37	692	0.43
		1 3/4	9-1607-36	132.0	389	0.29	457	0.35	572	0.43	686	0.52
		2	9-1608-36	113.0	386	0.34	454	0.40	567	0.50	681	0.60
		2 1/2	9-1610-36	87.8	376	0.43	442	0.50	553	0.63	684	0.78
		3	9-1612-36	71.4	363	0.51	427	0.60	534	0.75	676	0.95
		3 1/2	9-1614-36	60.2	359	0.60	422	0.70	527	0.88	671	1.11
		4	9-1616-36	52.0	355	0.68	418	0.80	522	1.00	667	1.28
		4 1/2	9-1618-36	46.2	353	0.76	415	0.90	518	1.12	681	1.47
		5	9-1620-36	41.2	350	0.85	412	1.00	515	1.25	677	1.64
		5 1/2	9-1622-36	37.5	351	0.94	413	1.10	516	1.38	686	1.83
		6	9-1624-36	34.4	351	1.02	413	1.20	516	1.50	695	2.02
		7	9-1628-36	29.3	349	1.19	410	1.40	513	1.75	697	2.38
		8	9-1632-36	25.5	347	1.36	408	1.60	510	2.00	700	2.74
12	9-1648-36	16.9	345	2.04	406	2.40	507	3.00	704	4.18		
1 1/4	5/8	1 1/2	9-2006-36	279.0	710	0.25	835	0.30	1044	0.37	1093	0.39
		1 3/4	9-2007-36	231.0	680	0.29	800	0.35	1000	0.43	1108	0.48
		2	9-2008-36	197.0	672	0.34	791	0.40	989	0.50	1119	0.57
		2 1/2	9-2010-36	152.0	651	0.43	766	0.50	957	0.63	1139	0.75
		3	9-2012-36	123.0	626	0.51	736	0.60	920	0.75	1121	0.91
		3 1/2	9-2014-36	104.0	619	0.60	729	0.70	911	0.88	1131	1.09
		4	9-2016-36	88.9	607	0.68	714	0.80	893	1.00	1100	1.24
		4 1/2	9-2018-36	77.5	591	0.76	696	0.90	870	1.12	1071	1.38
		5	9-2020-36	69.6	592	0.85	696	1.00	870	1.25	1090	1.57
		5 1/2	9-2022-36	63.6	596	0.94	701	1.10	876	1.38	1128	1.77
		6	9-2024-36	57.6	586	1.02	689	1.20	862	1.50	1108	1.92
		7	9-2028-36	48.9	583	1.19	685	1.40	857	1.75	1099	2.25
		8	9-2032-36	42.6	579	1.36	681	1.60	851	2.00	1111	2.61
		10	9-2040-36	34.0	578	1.70	680	2.00	850	2.50	1128	3.32
12	9-2048-36	28.3	578	2.04	680	2.40	850	3.00	1139	4.03		



Danly Springs

Extra Heavy Duty - Yellow



DANLY SPRINGS YELLOW

Hole Dia. (in) HD	Rod Dia. (in) RD	Free Length FL	Part Number	RATE Pounds Redq. to Deflect 1/10 in.	Total Defl Recom for				Max. Oper. Defl. 30% of FL		Total Travel to Solid	
					Long Life (20% of FL)		Avg. Life (25% of FL)		Load lbs.	Defl. in		
					Load lbs.	Defl. in.	Load lbs.	Defl. in.				
1½	¾	2	9-2408-36	319.0	1089	0.34	1281	0.40	1601	0.50	1757	0.55
		2½	9-2410-36	241.0	1032	0.43	1214	0.50	1518	0.63	1726	0.72
		3	9-2412-36	193.0	982	0.51	1155	0.60	1444	0.75	1698	0.88
		3½	9-2414-36	160.0	953	0.60	1121	0.70	1402	0.88	1636	1.03
		4	9-2416-36	139.0	949	0.68	1116	0.80	1395	1.00	1710	1.23
		4½	9-2418-36	122.0	931	0.76	1095	0.90	1369	1.12	1700	1.39
		5	9-2420-36	108.0	918	0.85	1080	1.00	1350	1.25	1687	1.56
		5½	9-2422-36	97.6	915	0.94	1076	1.10	1345	1.38	1681	1.72
		6	9-2424-36	88.7	902	1.02	1062	1.20	1327	1.50	1672	1.89
		7	9-2428-36	75.0	894	1.19	1051	1.40	1314	1.75	1662	2.22
		8	9-2432-36	65.0	883	1.36	1039	1.60	1299	2.00	1655	2.55
		10	9-2440-36	51.6	877	1.70	1032	2.00	1290	2.50	1675	3.24
12	9-2448-36	42.8	874	2.04	1028	2.40	1285	3.00	1686	3.94		
2	1	2½	9-3210-36	414.0	1773	0.43	2086	0.50	2608	0.63	2818	0.68
		3	9-3212-36	327.0	1663	0.51	1957	0.60	2446	0.75	2743	0.84
		3½	9-3214-36	271.0	1614	0.60	1899	0.70	2374	0.88	2694	1.00
		4	9-3216-36	231.0	1577	0.68	1855	0.80	2319	1.00	2659	1.15
		4½	9-3218-36	201.0	1534	0.76	1804	0.90	2255	1.12	2644	1.31
		5	9-3220-36	179.0	1522	0.85	1790	1.00	2238	1.25	2623	1.47
		5½	9-3222-36	161.0	1509	0.94	1775	1.10	2219	1.38	2659	1.65
		6	9-3224-36	145.0	1475	1.02	1735	1.20	2169	1.50	2593	1.78
		7	9-3228-36	123.0	1465	1.19	1724	1.40	2155	1.75	2578	2.10
		8	9-3232-36	106.0	1440	1.36	1694	1.60	2118	2.00	2562	2.41
		10	9-3240-36	83.5	1420	1.70	1670	2.00	2088	2.50	2544	3.05
		12	9-3248-36	68.9	1406	2.04	1655	2.40	2068	3.00	2533	3.68

C





Latch System/Mold Handling

~ How it works ~

The T.O.I.[™] (Tool Opening Interrupter) holds the mold closed for transporting, setup, teardown or storage.

The T.O.I.[™] is two pieces: a fixed piece that bolts to the stationary mold half, and a slide that moves within a track on the fixed piece. The slide bolts to the movable mold half. As the mold is lifted, the slide wedges tightly to the fixed piece, preventing the mold from opening.

To prevent damage to the tooling and machine, if the installer forgets to remove the T.O.I.[™] after installing the mold on the machine, the latch is designed to safely break apart when the machine opens the mold, thus not damaging eye bolts on handling hole.

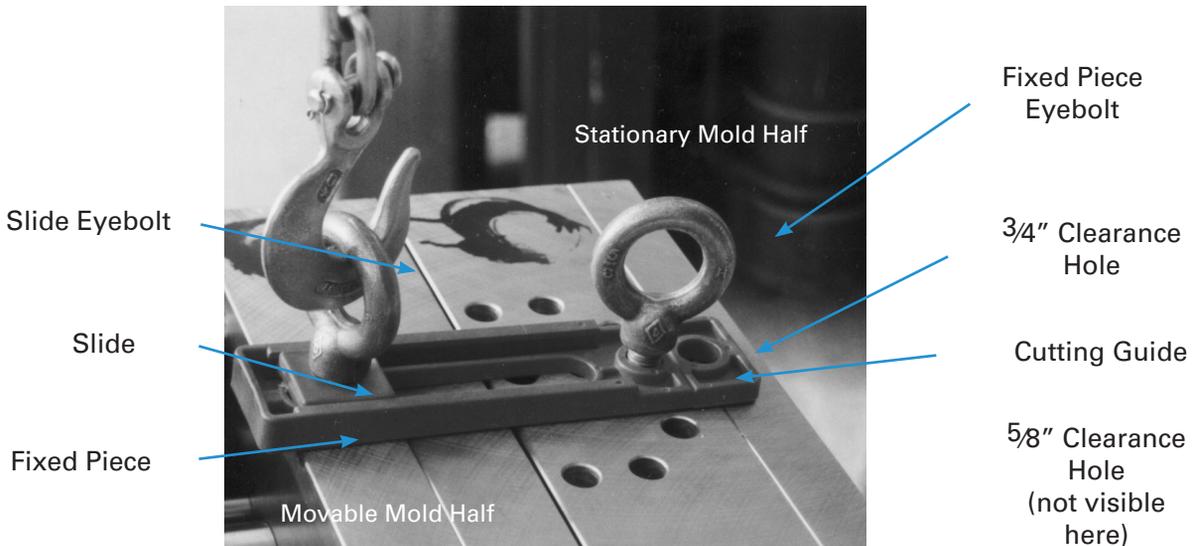
Caution: Close Mold Parting Line then install T.O.I.



9" Long
Part Number TOI9
(Ref# MAI0266)

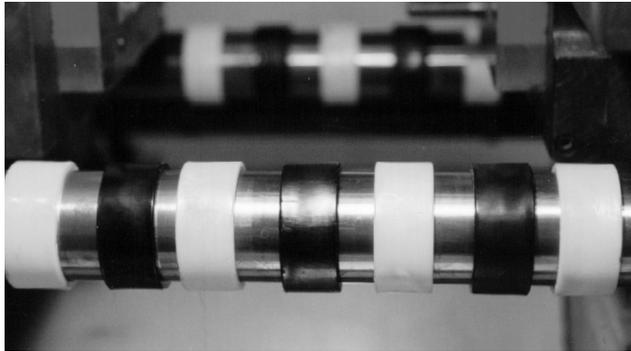
12" Long
Part Number TOI12
(Ref# MAI0264)

LATCH SYSTEM



Note: Hoist rings or shoulder-type eye bolts MUST be used with T.O.I. - not included.

B.A.R. Barrier Against Repairs



[TIE BAR COVERS](#)

Prevent damage to those expensive tie bars!!

... cover each tie bar with expandable nylon rings in alternating yellow and black colors. Molds may then be installed or removed without gouging, scraping or scratching tie bars. When machine is operating, the rings remain in the forward position. When installing or removing a mold, simply spread out the rings along the tie bars (see photo). Rings have $\frac{5}{32}$ " wall thickness and are tough and resilient nylon. Easily spread open (by hand) to install or remove. Suggest installing permanently... no need to remove. Rings should be installed in proper quantities to accommodate minimum shut mold-height, and are shipped in packages of 32 (16 yellow, 16 black).

Part Number	For Tie Bar Dia.	Ring I.D.	Ring Width
TBR125	1½" – 1⅞"	1½"	1"
TBR200	2" – 2⅜"	2"	1"
TBR250	2½" – 2⅞"	2½"	1⅛"
TBR300	3" – 3⅜"	3"	1⅛"
TBR350	3½" – 3⅞"	3½"	1¼"
TBR400	4" – 4⅞"	4"	1¼"
TBR500	5" – 5⅞"	5"	1½"
TBR600	6" – 6⅞"	6"	1½"

**All Sizes One Price:
Kit of 32 total
(16 black, 16 yellow)**



Forged Eye Bolts

- High-quality U.S. forged eye bolts
- Shoulder design
- Shows full engagement
- Huge savings, always in stock!

Material: C1030 steel, forged, heat-treated, quenched and drawn

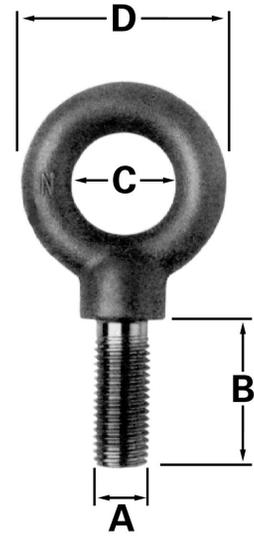
Tensile strength: 65,000 PSI min.

Yield strength: 50,000 PSI min.

Elongation: 30% min.

Reduction of area: 60% min.

Warning: Rated capacity is substantially reduced when loading at any angle greater than 45° from bolt centerline. At an angle of 45°, rated capacity is reduced to 1/4 of shown rating.



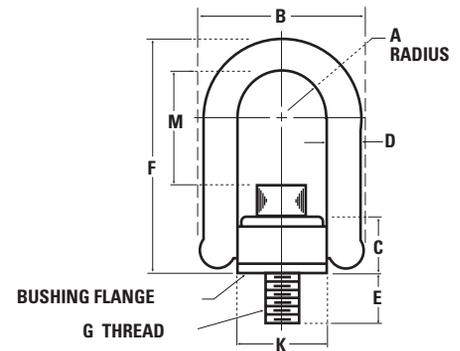
U.S. Thread (UNC-2A)			A-B-C-D (refer to photo)			
Part Number	Reference #	Safe Working Load [lbs]	Thread Size "A"	Shank Lgth "B"	Eye I.D. "C"	Eye O.D. "D"
EB250	EB21	500	1/4-20	1"	3/4"	1 3/16"
EB312	EB22	900	5/16-18	1 1/8"	7/8"	1 7/8"
EB375	EB23	1300	3/8-16	1 1/4"	1"	1 11/16"
EB437	EB24	1800	7/16-14	1 3/8"	1 1/16"	1 13/16"
EB500	EB25	2400	1/2-13	1 1/2"	1 3/16"	2 1/8"
EB625	EB27	4000	5/8-11	1 3/4"	1 3/8"	2 9/16"
EB750	EB28	5000	3/4-10	2"	1 1/2"	2 13/16"
EB875	EB29	7000	7/8-9	2 1/4"	1 5/8"	3 3/16"
EB1000	EB30	9000	1-8	2 1/2"	1 13/16"	3 9/16"
EB1125	EB31	12000	1 1/8-7	2 3/4"	2"	4 1/16"
EB1250	EB32	15000	1 1/4-7	3"	2 3/16"	4 7/16"
EB1500	EB34	21000	1 1/2-6	3 1/2"	2 1/2"	5 3/16"
EB1750	-	28000	1 3/4-5	3 3/4"	2 7/8"	6"
EB2000	-	38000	2-4 1/2	4"	3 1/4"	6 7/8"

HOIST RINGS INCH

Metric Sizes						
Part Number	Reference #	Safe Working Load [lbs]	Thread Size "A"	Shank Lgth "B"	Eye I.D. "C"	Eye O.D. "D"
EBM6	EBM6					
EBM8	EBM8	500	M8 x 1.25	16 mm	25 mm	43 mm
EBM10	EBM10	740	M10 x 1.5	20 mm	27 mm	46.0 mm
EBM12	EBM12	1030	M12 x 1.75	24 mm	30 mm	54.0 mm
EBM16	EBM16	1600	M16 x 2.0	32 mm	35 mm	65.0 mm
EBM20	EBM20	2860	M20 x 2.5	40 mm	41 mm	81.0 mm
EBM24	EBM24	3850	M24 x 3.0	48 mm	46 mm	90.4 mm
EBM30	EBM30	6400	M30 x 3.5	60 mm	55 mm	112.7 mm
EBM36	EBM36	8970	M36 x 4.0	72 mm	63 mm	131.8 mm
EBM42	-	11960	M42 x 4.5	84 mm	73 mm	152.4 mm
EBM48	-	16400	M48 x 5.0	96 mm	82 mm	174.6 mm

FORGED EYE BOLTS METRIC

- 100% magnetic particle inspected
- OSHA approved
- Minimum 5 to 1 safety factor in ratings
- Range of movement: swivel 360°, pivot 180°
- Meets Military Specification No. MIL-STD 1365 (11) or MIL-STD 209C.
- Independent laboratory tested
- Manufactured for over 25 years
- Mil. Spec. – Mil.-Std. 1365 (11) or –209C
- Don't accept "look alike" imitations



Hoist Rings vs. Eyebolts

Side or angle pulling forces can cause eyebolts to twist, bend or break when heavy, angular unbalanced loads are involved.

The quality you need at a price you can afford. Made to OSHA specs, these hoist rings are often specifically required by many companies and marked by number on many blueprints. We've added many larger sizes and longer bolt lengths for your convenience. If you are looking for something we don't list, please contact DME Industrial Supplies to request a special order.

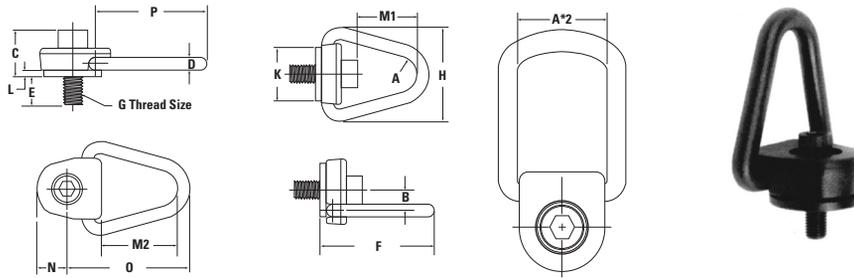
FORGED EYEBOLTS INCH

METRIC

Part Number	"G" Thread	Lbs. Cap.	Dimensions						Foot Lbs.	Wt.	Spare Bolt w/Ring Part Number
			A	B	C	E	F	K			
33212	5/16-18	800	0.65	2.29	0.96	0.56	3.23	1.25	7	0.52	33252
33214	5/16-18	800	0.65	2.29	0.96	1.06	3.23	1.25	7	0.54	33254
33312	3/8-16	1000	0.65	2.29	0.96	.56	3.23	1.25	12	0.56	33352
33314	3/8-16	1000	0.65	2.29	0.96	1.06	3.23	1.25	12	0.58	33354
33515	1/2-13	2500	1.00	3.50	1.50	1.00	5.31	1.89	28	1.72	33555
33516	1/2-13	2500	1.00	3.50	1.50	1.25	5.31	1.89	28	1.82	33556
33614	5/8-11	4000	1.00	3.50	1.50	1.00	5.31	1.89	60	1.78	33654
33615	5/8-11	4000	1.00	3.50	1.50	1.25	5.31	1.89	60	1.88	33655
33714	3/4-10	5000	1.00	3.50	1.50	1.00	5.31	1.89	100	1.89	33754
33716	3/4-10	5000	1.00	3.50	1.50	1.50	5.31	1.89	100	2.02	33756
33102	3/4-10	7000	1.50	5.10	2.05	1.20	7.37	2.81	100	7.23	33122
33103	3/4-10	7000	1.50	5.10	2.05	1.45	7.37	2.81	100	7.25	33123
33101	7/8-9	8000	1.50	5.10	2.05	1.20	7.37	2.81	160	7.33	33121
33105	1-8	10000	1.50	5.10	2.05	1.45	7.37	2.81	230	7.57	33125
33106	1-8	10000	1.50	5.10	2.05	1.20	7.37	2.81	230	7.63	33126
33107	1-8	10000	1.50	5.10	2.05	2.20	7.37	2.81	230	7.81	33127
33401	1 1/4-7	15000	2	6.75	2.87	2.63	9.22	3.88	470	16	33421
33420	1 3/8-6	20000	2	6.75	2.87	2.63	9.22	3.88	670	17.2	33429
33424	1 1/2-6	24000	2	6.75	2.87	2.63	9.22	3.88	800	18.1	33422
33427	2-4 1/2	30000	2	6.75	2.87	2.96	9.22	3.88	1100	22.9	NA
Metric sizes											
		KG Cap.	A	B	C	E	F	K	Nm	Kg	
34212	M8 x 1.25	400	16.50	58.20	24.40	16	82	31.80	9.5	.24	34252
34312	M10 x 1.5	450	16.50	58.20	24.40	16	82	31.80	16.0	.25	34352
34515	M12 x 1.75	1050	25.40	88.90	38.10	25	134.9	48.00	37.0	.78	34555
34614	M16 x 2.0	1900	25.40	88.90	38.10	25	134.9	48.00	80.0	.81	34654
34714	M20 x 2.5	2200	25.40	88.90	38.10	25	134.9	48.00	135.0	.86	34130
34102	M24 x 3.0	4200	35.60	129.50	52.10	28	177.8	71.40	311.0	3.29	34121
34105	M30 x 3.5	4500	35.60	129.50	52.10	38	177.8	71.40	311.0	3.44	34126
34401	M30 x 3.5	7000	50.80	171.50	72.90	67	234.2	98.50	637.2	7.26	34421
34402	M36 x 4.0	11000	50.80	171.50	72.90	67	234.2	98.50	1085.5	8.21	34422
34403	M42 x 4.5	12500	50.80	171.5	72.90	80	234.2	98.50	1085.5	10.14	NA
34404	M48 x 5.0	13500	50.80	171.5	72.90	80	234.2	98.50	1085.5	10.59	NA



Side Pull Hoist Rings



STANDARD

Part Number	Rated Load (KG)	G	A	B	C	D	E	F	H	K	L	M1	M2	N	O	P	TL ft/lbs
36305	800	5/16 - 18	3/4	7/8	1 ²¹ / ₆₄	1/2	.479	4 ²³ / ₃₂	3/8	2 ³ / ₁₆	7/32	2 ⁵⁷ / ₆₄	3 ³ / ₁₆	1 1/4	5 1/8	4 1/4	7
36310	1000	3/8 - 16	3/4	7/8	1 ²⁵ / ₆₄	1/2	.479	4 ²³ / ₃₂	3/8	2 ³ / ₁₆	7/32	2 ²⁷ / ₃₂	3 ³ / ₁₆	1 1/4	5 1/8	4 1/4	12
36315	2500	1/2 - 13	3/4	7/8	1 ¹⁷ / ₃₂	1/2	.979	4 ²³ / ₃₂	3/8	2 ³ / ₁₆	7/32	2 ⁴⁵ / ₆₄	3 ³ / ₁₆	1 1/4	5 1/8	4 1/4	28
36320	4000	5/8 - 11	3/4	7/8	1 ⁴¹ / ₆₄	1/2	.979	4 ²³ / ₃₂	3/8	2 ³ / ₁₆	7/32	2 ⁵⁹ / ₆₄	3 ³ / ₁₆	1 1/4	5 1/8	4 1/4	60
36325	5000	3/4 - 10	3/4	7/8	1 ²⁵ / ₃₂	1/2	1.229	4 ²³ / ₃₂	3/8	2 ³ / ₁₆	7/32	2 ¹⁵ / ₁₆	3 ³ / ₁₆	1 1/4	5 1/8	4 1/4	100
36330	7000	3/4 - 10	7/8	1 1/4	2 1/4	3/4	1 1/4	6 1/4	5 1/4	3 3/8	5/16	4	4 ³ / ₁₆	1 5/8	6 3/4	5 5/8	100
36335	8000	7/8 - 9	7/8	1 1/4	2 3/8	3/4	1 1/4	6 1/4	5 1/4	3 3/8	5/16	3 3/8	4 ³ / ₁₆	1 5/8	6 3/4	5 5/8	160
36340	10000	1 - 8	7/8	1 1/4	2 1/2	3/4	1 1/2	6 1/4	5 1/4	3 3/8	5/16	3 3/4	4 ³ / ₁₆	1 5/8	6 3/4	5 5/8	230

Part Number	Description
36305	HDSP .8K LB 5/16-18 x .479TP
36310	HDSP 1K LB 3/8-16 x .479TP
36315	HDSP 2.5K LB 1/2-13 x .979TP
36320	HDSP 4K LB 5/8-11 x .979TP
36325	HDSP 5K LB 3/4-10 x 1.229TP
36330	HDSP 7K LB 3/4-10 x 1 1/4TP
36335	HDSP 8K LB 7/8-9 x 1 1/4TP
36340	HDSP 10K LB 1-8 x 1 1/2TP

- Self-aligning in the direction of the load
- Rotates 360°
- Alloy steel, black oxide finish
- 100% magnetic particle inspected

METRIC

Part Number	Rated Load (KG)	G	A	B	C	D	E	F	H	K	L	M1	M2	N	O	P	TL N.M.
36805	400	M8 x 1.25	19	22	34	13	14	120	99	56	5	73	81	32	130	108	9.5
36810	450	M10 x 1.5	19	22	36	13	24	120	99	56	5	71	81	32	130	108	16.0
36815	1050	M12 x 1.75	19	22	38	13	37	120	99	56	5	69	81	32	130	108	37.0
36820	1900	M16 x 2.0	19	22	42	13	37	120	99	56	5	65	81	32	130	108	80.0
36825	2200	M20 x 2.5	19	22	46	13	37	120	99	56	5	61	81	32	130	108	135.0
36830	3000	M20 x 2.5	22	32	57	19	39	159	133	79	8	83	106	41	171	143	135.0
36835	4200	M24 x 3.0	22	32	61	19	43	159	133	79	8	79	106	41	171	143	311.0

Part Number	Description
36805	400KG M8X1.25 x 14MMTP
36810	450KG M10X1.5 x 24MMTP
36815	1050KG M12X1.75 x 37MMTP
36820	1900KG M16X2.0 x 37MMTP
36825	2200KG M20X2.5 x 37MMTP
36830	3000KG M20X2.5 x 39MMTP
36835	4200KG M24X3.0 x 43MMTP

EZ-Torque Hoist Ring eliminate the need for locating and using expensive hydraulic tensioners or torque multipliers for heavy load (WLL) capacity hoist rings.

A 75,000 lb. WLL Hoist Ring requires the mounting bolt to be torqued to 4,300 lbs-ft. EZ-Torque requires only a standard torque wrench and 92 lbs-ft of torque per screw.

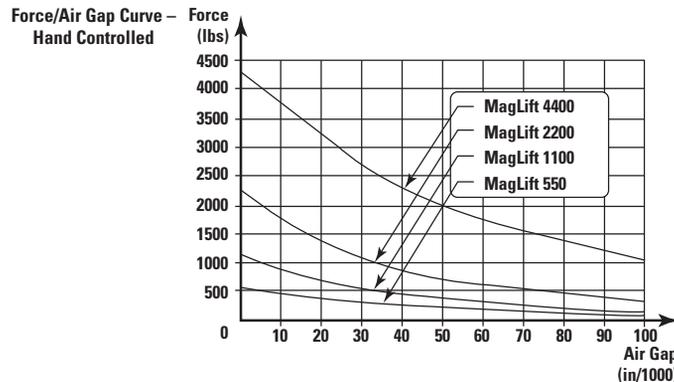
Part Number	WLL	Normal Torque (lbs.-ft.)	EZ-Torque (lbs.-ft.)	Thread
23490	15,000#	470	10	1¼"-7
23494	24,000#	800	18	1½"-6
23290	30,000#	800	23	2"-4½
23590	50,000#	2,100	49	2½"-8
23592	50,000#	2,100	49	2½"-4
23690	75,000#	4,300	92	3"-4
23790	100,000#	6,600	98	3½"-4
23792	150,000#	12,000	123	4¼"-4
23794	200,000#	19,800	193	5"-4
23798	250,000#	29,000	207	6"-4



Bunting Maglift™

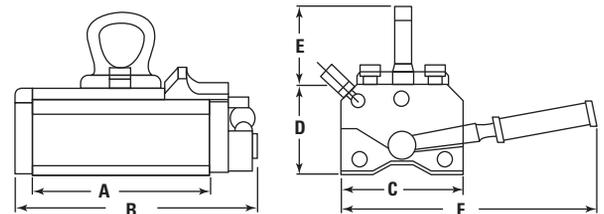
Bunting® MagLift™ Hand-Controlled Permanent Magnetic Lifters

Bunting® MagLift Permanent Magnetic Lifters are powered by blocks of high-energy neodymium magnetic material. Switching is achieved by making one of these blocks reversible. In the "on" position, the reversible block is in parallel with the static blocks so that a concentrated magnetic field is produced at the pole feet for lifting. In the "off" position, the reversible block is rotated through 180 degrees to provide a total magnetic short circuit within the lifter body.



BUNTING MAGLIFT

Standard Magnetic Lifter



Model	Lifter Weight (lbs)	Dimensions						Safe Work Load (lbs)	Flat Section		Round Section		
		A (in)	B (in)	C (in)	D (in)	E (in)	F (in)		Min. Thickness (in)	Max Length (inches)	Safe Work Load (lbs)	Max Diameter (in)	Max Length (in)
MAGLIFT275	9.9	4.3	5.9	3.0	2.4	2.1	5.9	275	0.6	60	110	10	60
MAGLIFT550	18.7	6.5	8.3	3.5	2.8	3.0	7.9	550	0.8	60	220	12	60
MAGLIFT1100	38.5	8.9	11.1	4.2	3.5	4.1	9.6	1100	1.0	80	440	16	80
MAGLIFT2200	80.3	12.8	15.4	5.4	4.1	4.4	14.4	2200	1.4	120	880	18	120
MAGLIFT4400	173.8	15.7	19.0	7.3	5.2	6.7	20.7	4400	2.8	120	1760	24	120

The maximum stated length is not the maximum diameter (always work within the stated Safe Work Load). Above values are based on cold-rolled mild steel.



Heavy Duty Lifting Slings



- Red "Safety Alert" threads sewn into plies - red shows when sling should be replaced. Protects employees and employer!
- Meets OSHA requirements
- 3/16" thick - 2 ply nylon web
- Coated for abrasion resistance
- Use to 200°F
- Do not overload!
Follow all manufacturers recommendations.
- Eye lengths:
1" wide sling = 5 1/2"
2" wide sling = 6 1/2"
- 3 foot overall length
- Use for: Barrels, Screws, End Caps, Molds and other lifting requirements within their lifting range
- Slings are impervious to most chemicals

Don't Take A
Chance On
Worn Slings!



**Meets OSHA
Requirements**

Part Number	Size	Rated Capacity-Lbs.		
		Vertical	Choker	Basket
EE2-801	1" x 3 FT.	3,100	2,480	6,200
EE2-801-4	1" x 4 FT.			
EE2-801-6	1" x 6 FT.			
EE2-801-8	1" x 8 FT.			
EE2-802	2" x 3 FT.	6,200	4,960	12,400
EE2-802-4	2" x 4 FT.			
EE2-802-6	2" x 6 FT.			
EE2-802-8	2" x 8 FT.			

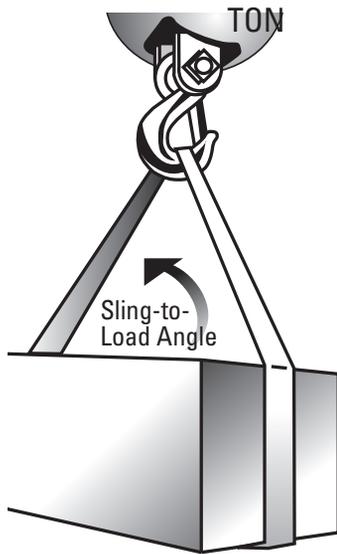


HEAVY DUTY LIFTING SLINGS

Sling Load Chart

As the sling-to-load angle decreases, so does the rated capacity of a sling.

Use this chart for
all type slings: rope, chain or synthetic web.



Sling-To-Load Angle is always the angle between the sling leg and the horizontal surface.

	RATED SLING CAPACITY (one leg)		
	SLING LIFTING EFFICIENCY	SLING CAPACITY AT 90°	ACTUAL SLING CAPACITY
90°	100%	1000#	1000#
75°	96.6%	1000	966
60°	86.6%	1000	866
45°	70.7%	1000	707
30°	50.0%	1000	500
15°	25.8%	1000	258
5°	8.7%	1000	87





Polishing Wands

Polishing Wands

These disposable wands make it possible to use diamond compound or carborundum grit with the air filer. Apply diamond compound directly to the side of the wand with radiused edges. It may also be used as a sander by gluing a small piece of carborundum cloth to the flat side of the wand. Instruction sheet included.

Part Number AFW includes set of 12 wands; 2 each of 6 different sizes



[POLISHING WANDS](#)

**Check out Section D for
a complete listing of Mill Files
and other abrasives!**

PNEUMATIC MINI GRINDER



Part Number DG390

- 1/8" collet size, includes wrenches and coupler
- 54,000 RPM/8 CFM
- Ideal for access to confined areas, comfortable to use
- Finger operated speed control; convenient and precise
- 5' braided hose & 13" protector, ensures long-term use
- Smooth running
- Low cost!

Die Grinders

C

SM512M 1/4" High Speed Die Grinder

- Heavy duty, lightweight construction for general high-speed polishing & grinding
- Rear exhaust
- Ball bearing construction for longer tool life
- Grooved handle design for firm grip
- Variable speed throttle for positive speed control
- Cylinder constructed of high-quality steel
- 1 year warranty against defects
- 22,000 RPM/4 CFM

DIE GRINDERS



SM522 Pneumatic 1/4" Angle Die Grinder

- Heavy duty, lightweight construction for general high-speed polishing & grinding
- Chrome-plated "paddle" safety trigger
- Ball bearing construction for longer tool life
- Grooved handle design for firm grip
- Variable speed throttle for positive speed control
- Cylinder constructed of high-quality steel
- 1 year warranty against defects
- 20,000 RPM/4 CFM



Kit SM512K

includes:

- | | |
|---------------------------|-----------------------|
| 1 - SM512M die grinder | 10 - mounted wheels |
| 1 - 1/4" collet installed | 1 - blow molded case, |
| 1 - 1/8" extra collet | coupler, wrenches |

Model Number	Speed RPM	Collet Size	Inlet Size NPT	Hose Size	Air Press. PSI	Air Cons. CFM	Length	Weight Lbs.	
SM512M	22,000	1/4"	1/4"	3/8"	90	4	6 3/4"	1 1/8	
SM512C		1/8"	1/8" Collet for Grinders						
SM512K	22,000	1/4"	1/4"	3/8"	90	4	6 3/4"	1 1/8	
SM522	20,000	1/4"	1/4"	3/8"	90	4	5-1/2"	3/4	



Solid Carbide Burrs

SOLID CARBIDE BURRS

Highest quality carbide burrs in a wide selection of sizes and styles at very attractive prices!
Burrs of any size, shape and cut can be manufactured to your specifications.

Cylindrical



Part Number	Dia.	Face Length
SA1	1/4	5/8
SA3	3/8	3/4

Cylindrical End Cut



Part Number	Dia.	Face Length
SB12M	1/8	5/8
SB1M	1/4	5/8
SB2M	5/16	3/4
SB2AM	5/16	1"
SB3M	3/8	3/4
SB4M	7/16	1"

Cylindrical Radius Cut



Part Number	Dia.	Face Length
SC12	1/8	5/8
SC14	3/16	5/8
SC1	1/4	5/8
SC1A	1/4	1"
SC2	5/16	3/4
SC2A	5/16	1"
SC3	3/8	3/4
SC3A	3/8	1"
SC5	1/2	1"

Round Tree Shape



Part Number	Dia.	Face Length
SF1	1/4	5/8
SF1A	1/4	3/4

Pointed Tree Shape



Part Number	Dia.	Face Length
SG3	3/8	3/4

Oval Shape



Part Number	Dia.	Face Length
SE3	3/8	5/8
SE5	1/2	7/8

Ball Shape



Part Number	Dia.	Face Length
SD12	1/8	1/8
SD2	5/16	5/16
SD4	7/16	7/16
SD5	1/2	1/2
SD6	5/8	5/8

Cone Shape



Part Number	Dia.	Face Length
SM1	1/4	1/2
SM3	1/4	1"
SM3B	5/16	3/4
SM4	3/8	5/8
SM6	5/8	1"

14° Taper-Radius End



Part Number	Dia.	Face Length
SL2	5/16	7/8
SL4	1/2	1 1/8

90° Included



Part Number	Dia.	Face Length
SK1	1/4	1/8
SK2	3/8	3/16
SK7	3/4	3/8

60° Included



Part Number	Dia.	Face Length
SJ1	1/4	3/16
SJ3	3/8	1/4

Flame Shape



Part Number	Dia.	Face Length
SH1	1/4	1/2
SH2	5/16	3/4
SH5	1/2	1 1/4

Inverted Cone (E = End Cut)



Part Number	Dia.	Face Length
SN1	1/4	5/16

Carbide Thin Disk (Flat)



Part Number	Dia.	Face Length
X261F	1/4	3/32
X264F	1/2	1/8

Carbide Thin Disk (Radius)



Part Number	Dia.	Face Length
X262R	5/16	3/32
X263R	3/8	1/8
X264R	1/2	1/8

Solid Carbide Burrs



SOLID CARBIDE BURRS

Series 40 - Solid Carbide

Set #1 - 8 Rotary Files indicated by * - in a plastic case.

Part Number SA9999

SA43*

$1/8 \times 9/16$



SB41 ECO

$1/8$



SD42*

$1/8$



SH41

$1/8 \times 1/4$



SG41

$1/8 \times 1/4$



SM43

$1/8 \times 5/8$ -7° Incl.Taper



SL42

$1/8 \times 1/2$ -8° Incl.Taper



SK42

$1/8$ -90° Incl.Taper



SA42

$3/32 \times 7/16$



SC42*

$1/8 \times 9/16$



SD41

$3/32$



SG44*

$1/8 \times 1/2$



SF42*

$1/8 \times 1/2$



SM42

$1/8 \times 7/16$
-14° Incl.Taper



SL41*

$1/8 \times 7/16$
-8° Incl.Taper



SN42*

$1/8 \times 3/6$
-10° Incl.Taper



SA41

$1/16 \times 1/4$



SC41

$3/32 \times 7/16$



SE41*

$1/8 \times 1/4$



SG43

$1/8 \times 3/8$



SE41

$1/8 \times 1/4$



SM41

$1/8 \times 11/32$
-12° Incl.Taper



SJ42

$1/8$
-60° Incl.Taper



SN41

$3/32 \times 1/8$
-10° Incl.Taper



Series 51 Set #4

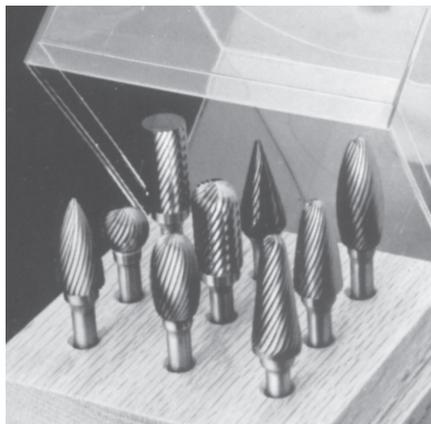
- All files in this group

Part Number 51-9999

Note: Does not include case

1/4" Diameter Carbide Head
1/8" Dia. Shank (heat-treated steel)

1 1/4" Shank Length - 1 3/4" max. overall



Carbide Burr Sets

Burr Set A			Burr Set B		
Part Number C250-9			Part Number C500-9		
SA1	SC1	SD1	SA5	SC5	SD5
SE1	S1	SG1	SE5	SF5	SG5
SH1	SL1	SM1	SH5	SL4	SM5
Burr Set C			Burr Set D		
Part Number C375-9			Part Number C927-9		
SA3	SC3	SD3	SA5	SC1	SD3
SE3	SF3	SG3	SE5	SF1	SG3
SH2	SL3	SM4	SH5	SL3	SM1



High-Quality Needle Files

Mascot Needle Files

Number	Shape
NF33860	Equalling
NF33861	Flat
NF33862	Half-Round
NF33863	Round
NF33864	Square
NF33865	Three-Square
6 Shapes Above In A Plastic Pouch	
NF33867	Assortment

Economical, Swiss single-cut files do not clog as easily as double-cut. Overall length 5¹/₂"; smooth cut only.



HIGH QUALITY NEEDLE FILES



Tell Needle Files

Shape	Medium Cut Number	Fine Cut Number
Barrette	NF33880	NF33881
Crossing	NF33882	NF33883
Equalling	NF33884	NF33885
Half-Round	NF33886	NF33887
Knife	NF33890	NF33891
Round	NF33894	NF33895
Square	NF33898	
Three-Square	NF33900	NF33901
Warding	NF33902	NF33903

Tell Needle Files in Sets of 6 or 12

NF33906	6 Pcs/Med Cut
NF33907	6 Pcs/Fine Cut
NF33908	12 Pcs/Med Cut
NF33909	12 Pcs/Fine Cut

6-Piece Sets include one of each Barrette, Equalling, Half-Round, Round, Square and Three-Square Files

12-Piece Med. Cut Set includes one of each style plus 1 extra of the following: Equalling, Round, Three-Square

12-Piece Fine Cut Set includes one of each style except Square, plus one extra of the following: Barrette, Half-Round, Round and Three-Square

DIAMOND NEEDLE FILES

Diamond Needle Files



Excellent quality, economically priced files; available in the five most popular shapes. Deliver excellent performance deburring, smoothing and finishing ultrahard materials, such as hardened steel, carbide, ceramics, glass. All files are 5¹/₂" (14cm) long, with 2¹/₂" diamond surface bonded to file faces by special process. Available in just one surface fineness.

Diamond Needle Files

Number	Shape
NF33961	Equalling
NF33962	Half-Round
NF33963	Round
NF33964	Square
NF33965	Three-Square
5 Shapes Above in a Plastic Pouch	
NF33960	Assortment