



# STARCYL CYLINDERS

...To boldly go where no cylinder  
has gone before ...



- ☑ N.F.P.A. Interchangeable.
- ☑ Heavy Duty Air Cylinders
- ☑ Flush Mount standard.
- ☑ 11 Bore sizes From 1.5" through 12"
- ☑ Strokes - available to any practical length
- ☑ 18 standard Mounting Styles
- ☑ Adjustable Air Cushion Standard
- ☑ 250 PSI AIR/OIL
- ☑ Two Year Warranty
- ☑ Economic Design

## STAR3 SERIES

[WWW.STARCYL.COM](http://WWW.STARCYL.COM)



# STAR3 CYLINDERS - Design Features

## Born to Be an Heavy Duty Air Cylinder !

### Piston Rod

High Strength steel. STARNITE (Nitrocarburation) treatment on the rod gives better corrosion-resistant properties (out performs 12-micron, (.0005 in.) chromium electroplating by ratio up to 20:1.), Improved wear resistance, better lubrication retention, dent resistance without induction hardening (60Rc), environmentally friendly, no surface pitting, flaking, or hydrogen embrittlement. The finish created by the process is a lustrous black. (Available in Stainless Steel)

### Tie rods

Corrosion resistant STARNITE (Nitrocarburation), stress proof steel maintains uniform compression on tube end seals. (Available in Stainless Steel)

### Solid Aluminum Head & Cap

Machined from solid aluminum bar stock (6061 T6) and black anodized for corrosion resistance. (Available in Stainless Steel)

### The New STARNITE Cast Iron

This bushing has been designed for tough application with side load. The STARNITE Technology improves bearing resistance against wear with an hardened Layer on both parts.



### Hard Anodized ID Aluminum Tube

(60 Rc) Provides superior wear resistance, and lower friction coefficient for maximum seal life. (Available in Stainless Steel)

### Piston

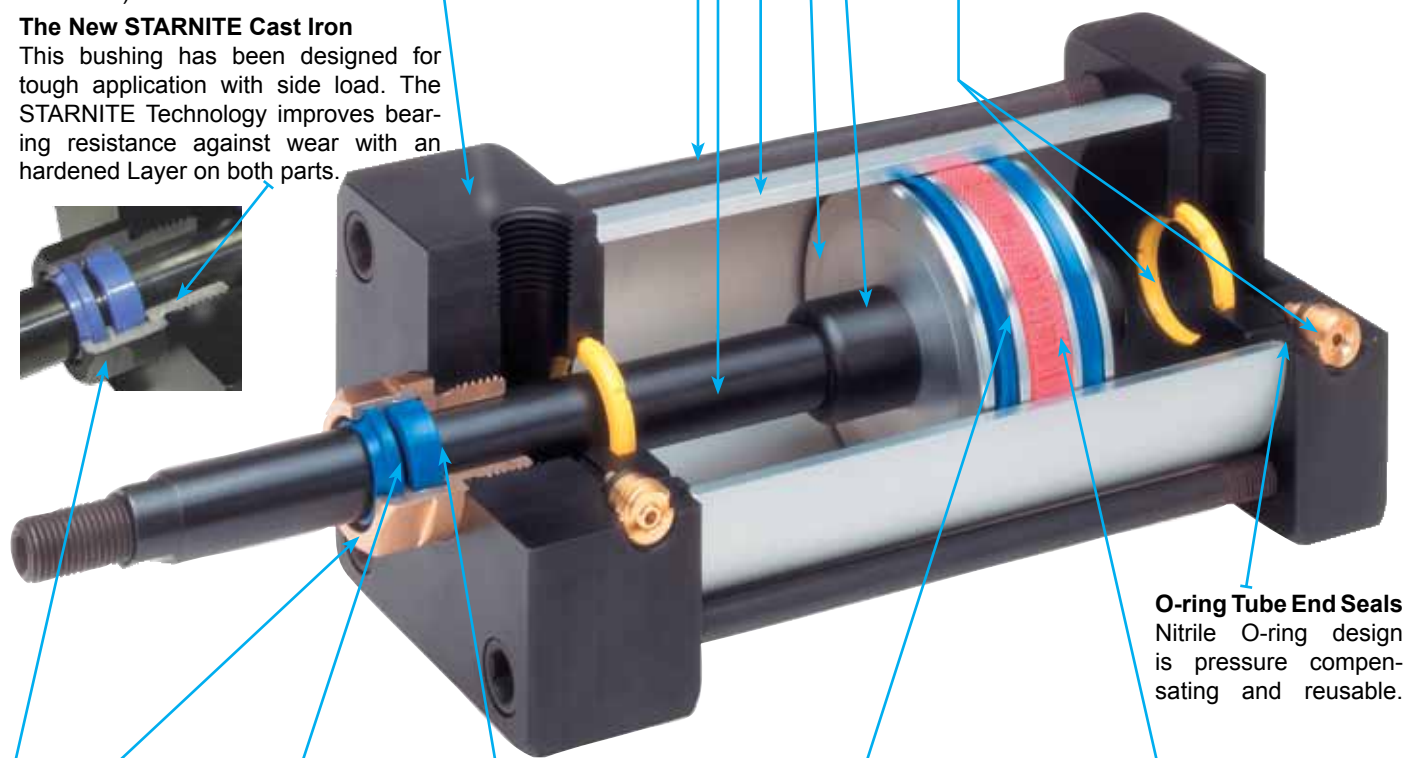
Machined from solid aluminum bar stock (6061-T6) Offers long bearing support

### Cushion Spud

Machined from Steel and STARNITE for hardness and corrosion resistance, to ensure min wear and constant dampening of the piston thru time.

### Check seal Cushion and Needle valves

(No charge adders - Standard on 1½" to 5" Bore) Precision Cushion spuds combine with a new style of floating cushion seal provide smooth deceleration at end of the stroke. Needle valves make adjustments easy. (brass or stainless steel)



### O-ring Tube End Seals

Nitrile O-ring design is pressure compensating and reusable.

### Rod Gland

Bronze Or Starnite Cast iron gland is externally removable without cylinder disassembly for easy maintenance. Designed to provide maximum rod bearing. (Also available in Acetal,)

### Wiper

The New Wiper wipes dirt out for less maintenance and longer life of the cylinder. (Urethane) (temperature: -50° to 230°F)

### Rod lips seal

Our New Design with a real rod u-cup is completely self compensating for zero leakage at all pressures (all seals can be used in a non lube application) (temperature: -50° to 230°F)

### Piston Seal

Lip-type low friction urethane piston seals are pressure energized and wear compensating for low friction and long life (temperature: -50° to 230°F) (Viton™ also Available up to 400°F) (all seals can be used in a non lube application)

### Piston Wear Ring

Nylon material is designed for low friction, and to ensure minimum wear in the cylinder's tubing in side load application. Eliminates metal-to-metal contact.

\*All Blue seals can withstand most chemical washdown, No Fluorocarbon Required



## STARNITE THE ANSWER TO WEAR, CORROSION AND FATIGUE PROBLEMS

### The STARNITE process improves component properties.

High wear resistance, as well as excellent sliding and running properties, is obtained through STARNITE treatment. The service life of cylinders parts is extended. The finish created by the STARNITE process is a lustrous black.

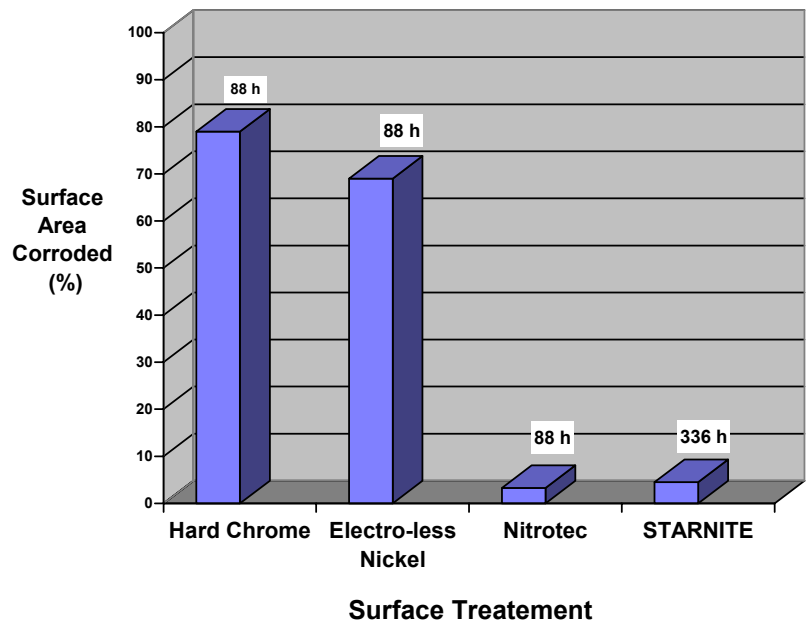
During the process, which takes place at 1075°F, the metal surface is enriched with nitrogen and carbon. A two part nitride layer consisting of a monophase compound layer and a diffusion layer is formed. Total depth ranges from 0.008-0.040", depending on composition of the base material and treating time. Hardness in the compound layer ranges from approximately HV 700 (60 Rc) to about HV 1600 for high alloyed tools steel. As part of the salt-bath nitriding and QPQP (Quench-Polish & Quench & Polish) sequence, finish-machine parts are polished and chemically processed to produce a highly corrosion-resistant surface with a finish suitable for bearing or seal-type applications.

## ENVIRONMENTALLY & ECONOMICALLY SAFE

Great concern exists in North America community regarding many critical materials because of North America's reliance on metals that are not native to this continent. Some 91% of the chromium used here is imported (9% balance from recycling). STARNITE process provides at least a partial solution to this problem and because it is not a plating or a coating but in the steel itself the process offers superior performance.

Corrosion resistance developed by the STARNITE technique out performs 12-micron (.0005 in.) chromium electroplating by ratio up to 20:1, and 20 micron (.0008 in.) nickel plating by a factor of 8:1.

**Corrosion Resistance Evaluation**  
Test conditions; Spool Shaft, ASTM B-117,  
(88h) test hours



## Chrome plated Vs STARNITE

Chromed plated cylinders	STARNITE Process on cylinders
<ul style="list-style-type: none"> <li>• Chrome plate can flake and blister.</li> <li>• Flakes and slivers will destroy seals and glands.</li> <li>• Loose chrome will cause massive leaking and rapid system failure.</li> <li>• Chrome lacks dimensional uniformity.</li> </ul>	<ul style="list-style-type: none"> <li>• Superior corrosion resistance.</li> <li>• Improved wear resistance.</li> <li>• Better lubrication retention.</li> <li>• Dent resistance without induction hardening.</li> <li>• Environmentally Friendly</li> <li>• No surface pitting, flaking, or hydrogen embrittlement.</li> <li>• INCREASED SERVICE LIFE.</li> </ul>

# STAR3 CYLINDERS - IR IMPACT REDUCTION, how it works ...

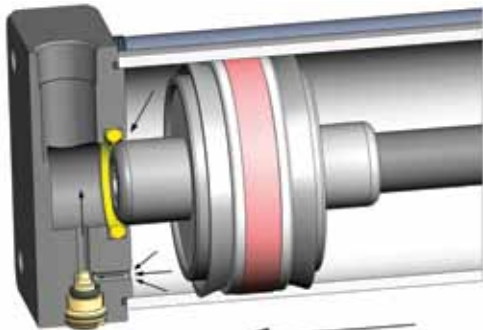


FIG 1

The cushioning process begins when the Cushion piston (Spud) enters the dynamic sealing lips (Fig 1.). The seal moves to the back of the groove creating a seal on the inside diameter and on the back of the cushion seal. The exhaust port is closed by the cushion seal. Pressure increases between the piston and the cushion seal due to the movement of the piston toward the end of the cylinder. Cushioning is adjusted by controlling the flow through a throttle port which is regulated by the needle valve.

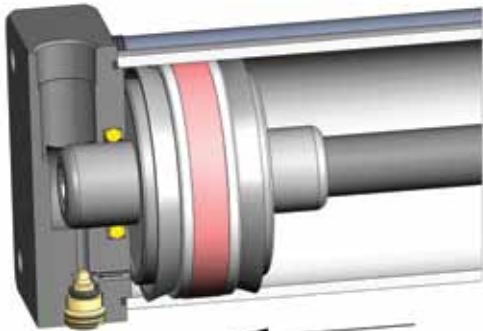


FIG 2

In addition the Starcyl IMPACT REDUCTION PISTON design includes special lip seals u-cup containing a dampening ring (bumper) which absorbs the remaining kinetic shock vibration and noise created by the impact (Fig. 2) giving a softer and quieter impact. With this design the cycle time can be increased by opening the needle valve of the air cushioning and let the bumpers absorb the rest. The Option NAC "non adjustable cushion" can be also ordered which reduces the restriction of the needle valve.

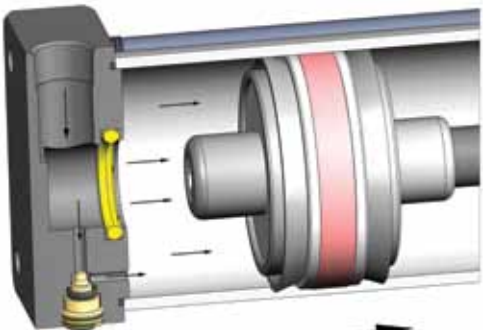


FIG 3

The return pressure moves the cushion axially (Fig. 3) until the stop cams reach the front of the groove. The pressure is allowed to by-pass the outside diameter of the seal to allow constant acceleration. In the same time, the Bumper seal releases its compressive energy to propel the piston away from the end cap, producing an immediate breakaway.

The spud on the other end of the piston enters the cushion seal on the head end and then the process starts over again.

## Effect of IR option on total stroke of cylinders

PSI	CYLINDER BORE					
	1.5	2.0	2.5	3.25	4.0	5.0
0	0.14	0.15	0.17	0.19	0.22	0.25
20	0.10	0.10	0.12	0.14	0.16	0.18
40	0.07	0.07	0.08	0.09	0.10	0.12
60	0.04	0.04	0.05	0.05	0.06	0.07
80	0.02	0.02	0.02	0.02	0.03	0.03
100	0.00	0.00	0.00	0.00	0.00	0.00

BORE	AREA	ROD SIZE	ROD AREA
(IN.)	(SQ. IN.)	(IN.)	(SQ.IN.)
1.50	1.76	5/8	0.307
2.00	3.14	5/8	0.307
2.50	4.90	5/8	0.307
3.25	8.29	1	0.785
4.00	12.56	1	0.785
5.00	19.64	1	0.785
6.00	28.27	1 3/8	1.485
7.00	38.48	1 3/8	1.485
8.00	50.26	1 3/8	1.485
10.00	78.54	1 3/4	2.405
12.00	113.10	2	3.14

## SELECTING BORE SIZE

The following formula may be used in the selection of the proper bore size:

- Extended (push) force in pounds =  
(bore area in sq. in.) x (pressure in psi)
- Retract (pull) force in pounds =  
(bore area in sq. In.) - (Rod area in sq. In.) x (pressure in psi)

Example: 3 1/4 bore, standard rod size 1" & shop air pressure of 90 psi

Push force: 8.296 (sq. in.) x 90 (pound / sq. In.) = 746.64 pounds

Pull force: 8.296 (sq. In.) - 0.785 (sq. In.) x 90 (pound / sq. In.) = 675 pounds

# STAR3 CYLINDERS - NFPA MOUNTS

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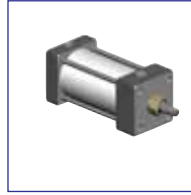
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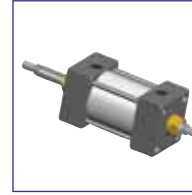
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### HOW TO ORDER

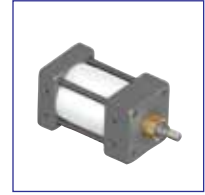
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Basic Mount (MX0)



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Double rod



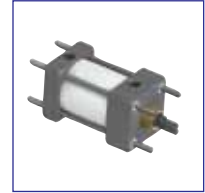
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Bottom Tap (MS4)



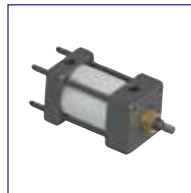
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Front Flange (MF1)



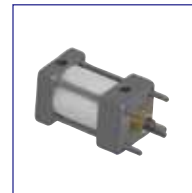
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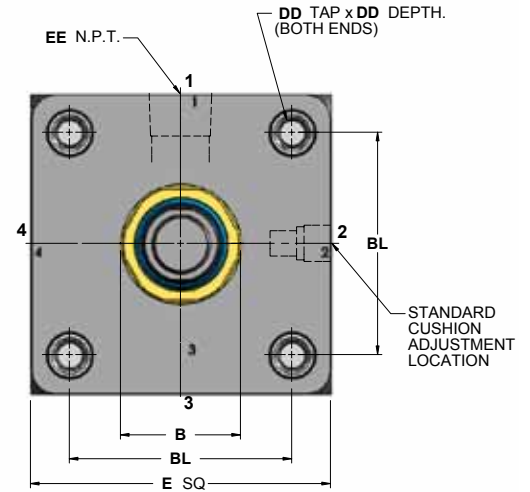
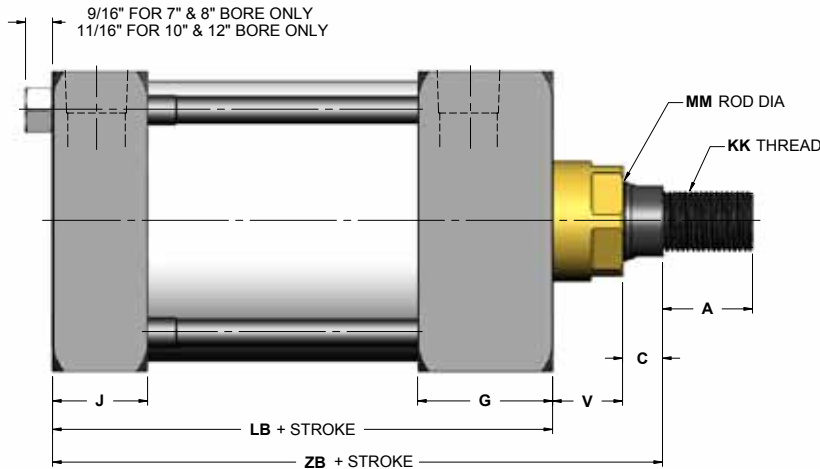


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Head Square Flange (ME3)



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Cap Square Flange (ME4)

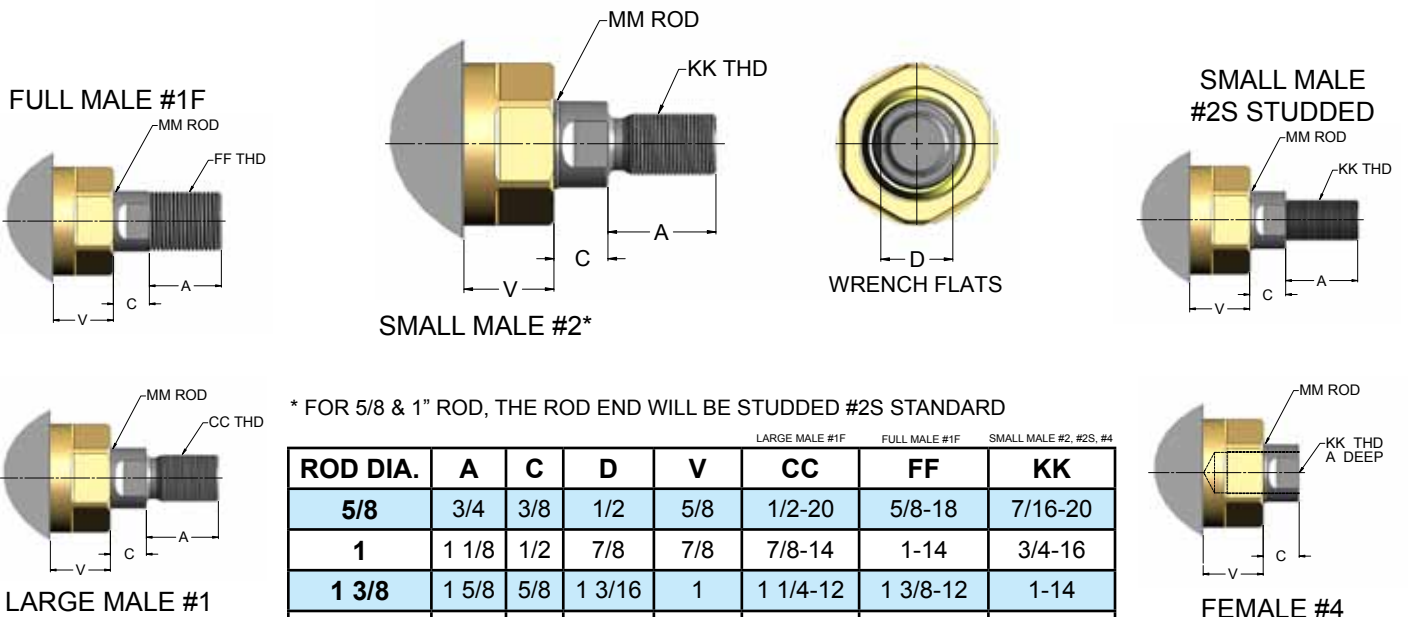
# STAR3 CYLINDERS - Standard Rod Diameters



BORE	A	B	BL	C	DD	DD depth*	E	EE	G	J	KK	LB	MM	V	ZB
1.5	3/4	1.123	1.43	3/8	1/4-28	0.50	2	3/8	1 1/2	1	7/16-20	3 5/8	5/8	5/8	4 5/8
2.0	3/4	1.123	1.84	3/8	5/16-24	0.50	2 1/2	3/8	1 1/2	1	7/16-20	3 5/8	5/8	5/8	4 5/8
2.5	3/4	1.123	2.19	3/8	5/16-24	0.50	3	3/8	1 1/2	1	7/16-20	3 3/4	5/8	5/8	4 3/4
3.25	1 1/8	1.498	2.76	1/2	3/8-24	0.63	3 3/4	1/2	1 3/4	1 1/4	3/4-16	4 1/4	1	7/8	5 5/8
4.0	1 1/8	1.498	3.32	1/2	3/8-24	0.63	4 1/2	1/2	1 3/4	1 1/4	3/4-16	4 1/4	1	7/8	5 5/8
5.0	1 1/8	1.498	4.10	1/2	1/2-20	0.75	5 1/2	1/2	1 3/4	1 1/4	3/4-16	4 1/2	1	7/8	5 7/8
6.0	1 5/8	1.998	4.88	5/8	1/2-20	0.75	6 1/2	3/4	2	1 1/2	1-14	5	1 3/8	1	6 5/8
7.0	1 5/8	1.998	5.73	5/8	5/8-18	0.75	7 1/2	3/4	2	1 1/2	1-14	5 1/8	1 3/8	1	6 3/4
8.0	1 5/8	1.998	6.44	5/8	5/8-18	0.75	8 1/2	3/4	2	1 1/2	1-14	5 1/8	1 3/8	1	6 3/4
10.00	2	2.373	7.92	3/4	3/4-16	1.00	10 5/8	1	2 1/4	2	1 1/4-12	6 3/8	1 3/4	1 1/8	8 1/4
12.00	2 1/4	2.623	9.41	7/8	3/4-16	1.00	12 3/4	1	2 1/4	2	1 1/2-12	6 7/8	2	1 1/8	8 7/8

\*Can be use for front or rear Mount direct with the face of the cylinder

## ROD END STYLE

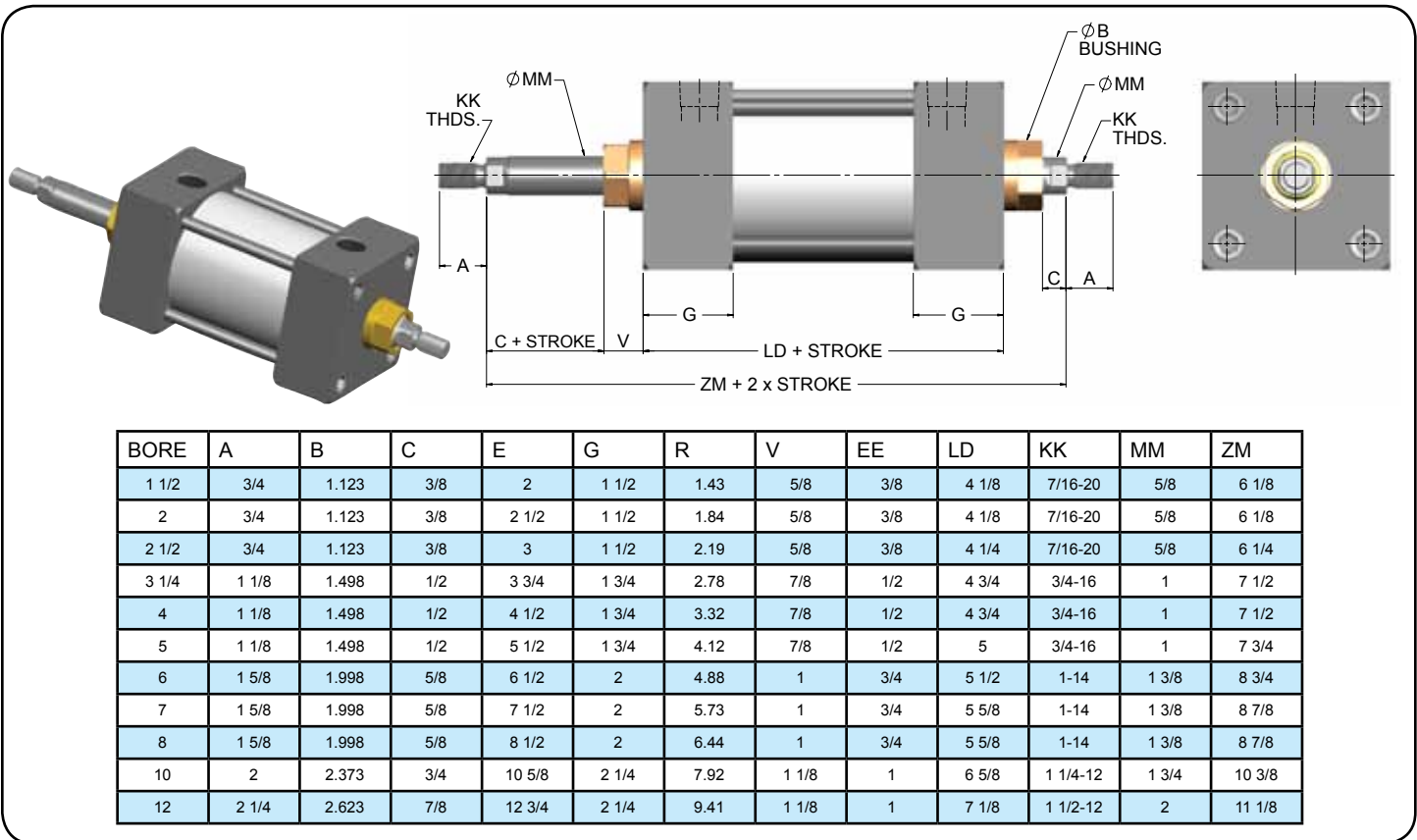
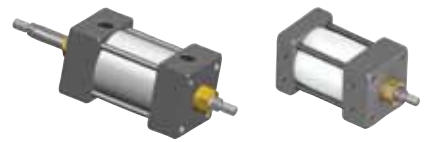


\* FOR 5/8 & 1" ROD, THE ROD END WILL BE STUDED #2S STANDARD

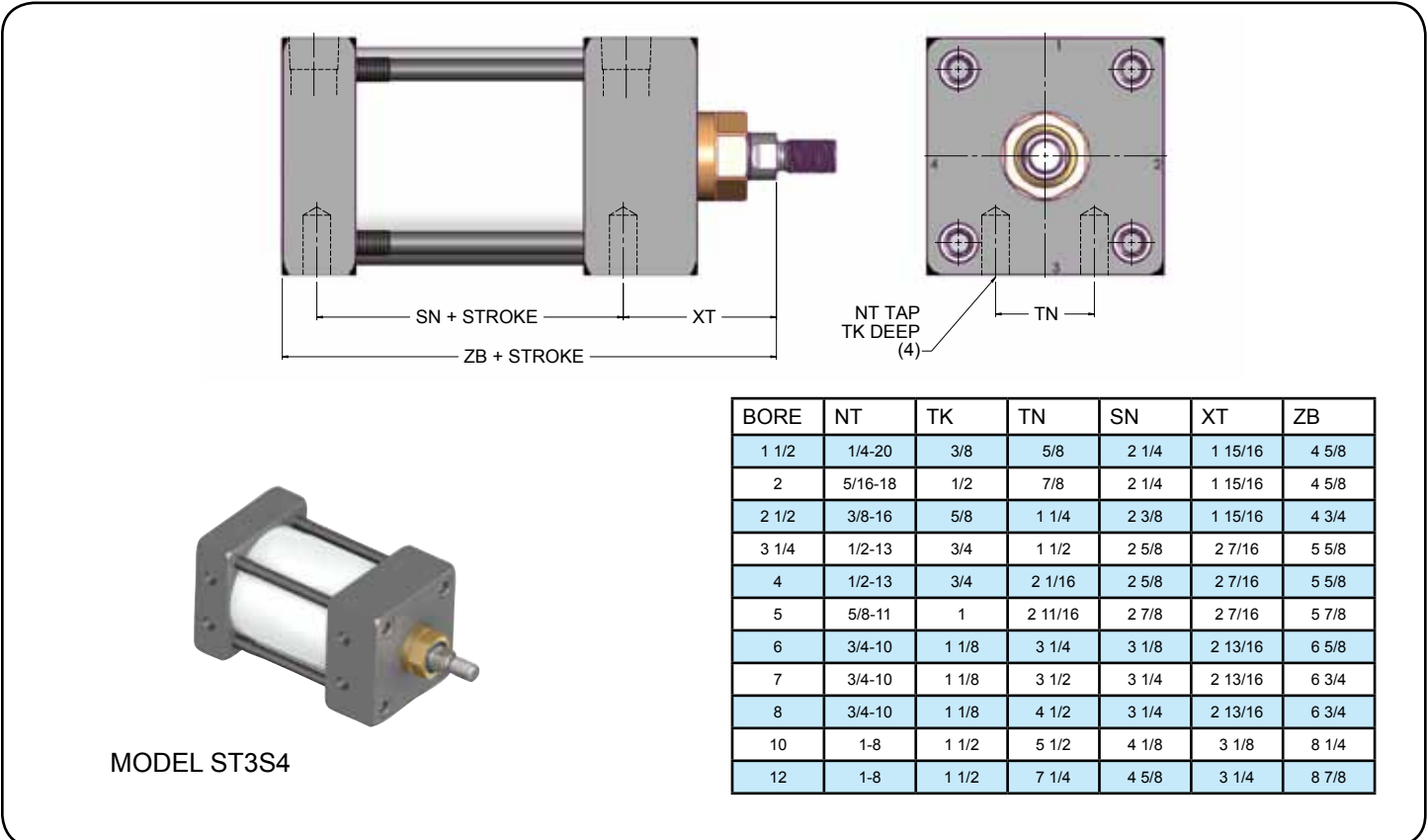
ROD DIA.	A	C	D	V	CC	FF	KK
5/8	3/4	3/8	1/2	5/8	1/2-20	5/8-18	7/16-20
1	1 1/8	1/2	7/8	7/8	7/8-14	1-14	3/4-16
1 3/8	1 5/8	5/8	1 3/16	1	1 1/4-12	1 3/8-12	1-14
1 3/4	2	3/4	1 1/2	1 1/8	1 1/2-12	1 3/4-12	1 1/4-12
2	2 1/4	7/8	1 3/4	1 1/8	1 3/4-12	2-12	1 1/2-12

# STAR3 CYLINDERS

## DOUBLE ROD END (ST3D)



## BOTTOM TAP MOUNT (NFPA MS4)



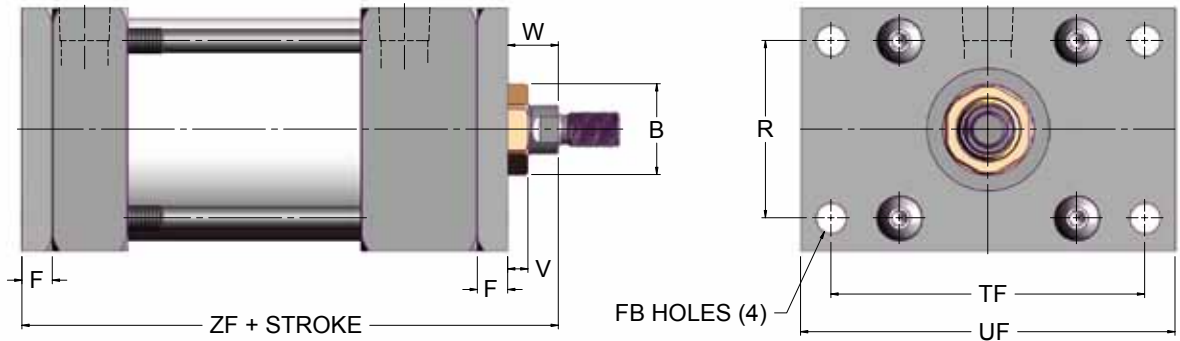
MODEL ST3S4



# STAR3 CYLINDERS



## FLANGE MOUNT (NFPA MF1 & MF2)



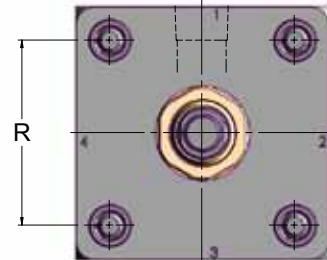
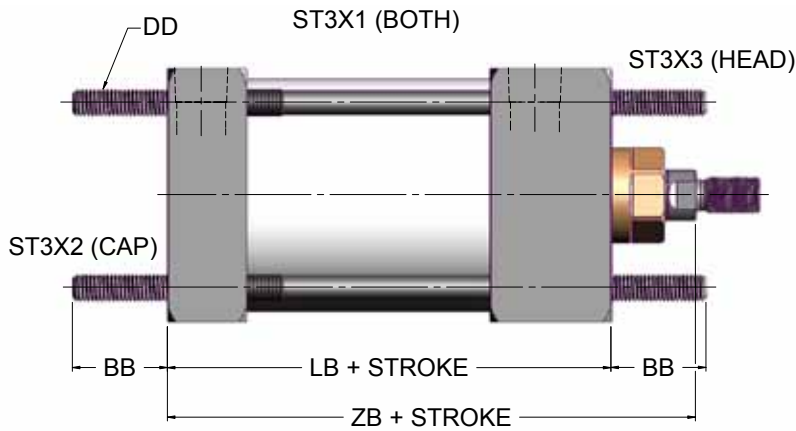
MODEL ST3F1

MODEL ST3F2



BORE	B	F	FB	R	TF	UF	V	W	ZF
1 1/2	1 1/8	3/8	5/16	1.43	2 3/4	3 3/8	1/4	5/8	5
2	1 1/8	3/8	3/8	1.84	3 3/8	4 1/8	1/4	5/8	5
2 1/2	1 1/8	3/8	3/8	2.19	3 7/8	4 5/8	1/4	5/8	5 1/8
3 1/4	1 1/2	5/8	7/16	2.76	4 11/16	5 1/2	1/4	3/4	6 1/4
4	1 1/2	5/8	7/16	3.32	5 7/16	6 1/4	1/4	3/4	6 1/4
5	1 1/2	5/8	9/16	4.10	6 5/8	7 5/8	1/4	3/4	6 1/2
6	2	3/4	9/16	4.88	7 5/8	8 5/8	1/4	7/8	7 3/8

## TIE RODS EXTENDED MOUNT (NFPA MX1, MX2 & MX3)



MODEL ST3X1



MODEL ST3X2



MODEL ST3X3

BORE	BB	DD	LB	R	ZB
1 1/2	1	1/4-28	3 5/8	1.43	4 5/8
2	1 1/8	5/16-24	3 5/8	1.84	4 5/8
2 1/2	1 1/8	5/16-24	3 3/4	2.19	4 3/4
3 1/4	1 3/8	3/8-24	4 1/4	2.76	5 5/8
4	1 3/8	3/8-24	4 1/4	3.32	5 5/8
5	1 13/16	1/2-20	4 1/2	4.12	5 7/8
6	1 13/16	1/2-20	5	4.88	6 5/8
7*	2 5/16	5/8-18	5 1/8	5.73	6 3/4
8*	2 5/16	5/8-18	5 1/8	6.44	6 3/4
10*	2 9/16	3/4-16	6 3/8	7.92	8 1/4
12*	2 9/16	3/4-16	6 7/8	9.41	8 7/8

\*Only for 7,8,10,12" bore, Since they are not Flush Mount, Nuts will use on the opposite of the "Tie Rods extended Mount" Or cap end for the "ST3X1 Mount"



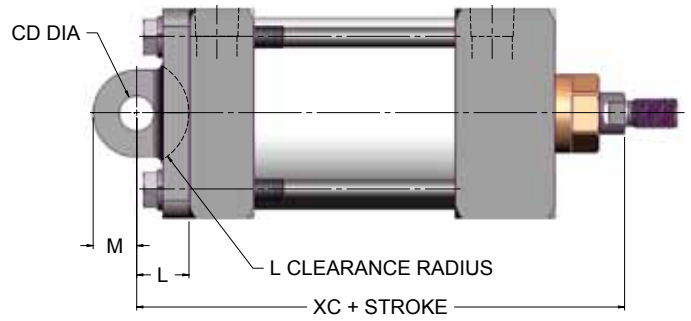
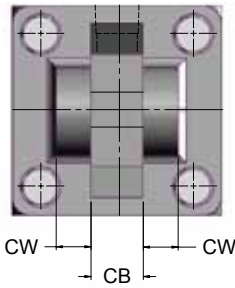
# STAR3 CYLINDERS

## CLEVIS MOUNT (NFPA MP1, MP2 & MP4)



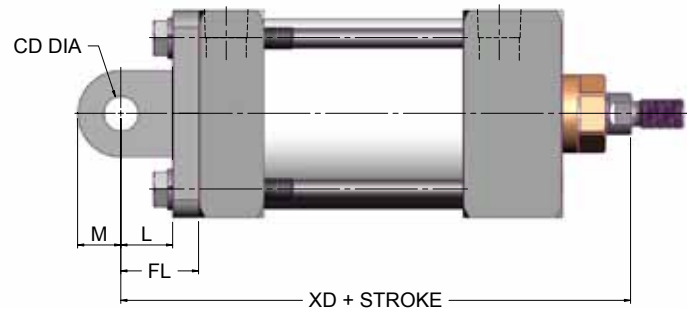
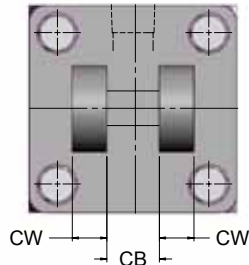
**MODEL ST3P1**

Pin and Snap ring Included



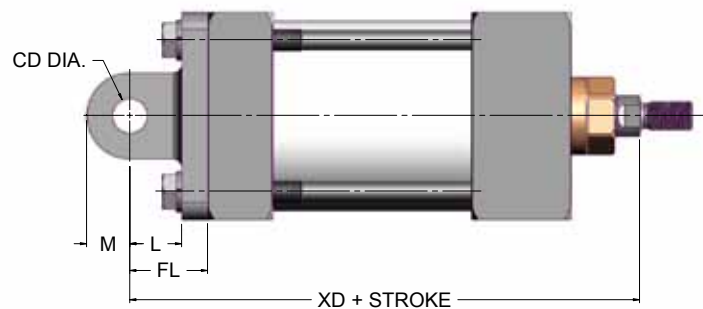
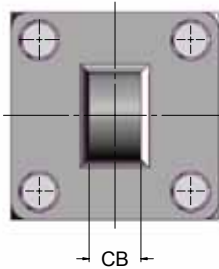
**MODEL ST3P2**

Pin and Snap ring Included



**MODEL ST3P4**

Pin and Snap ring NOT Included

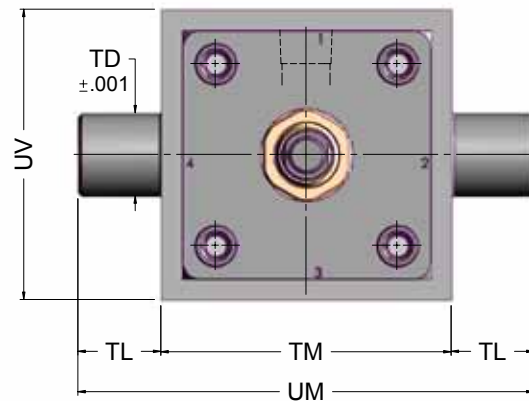
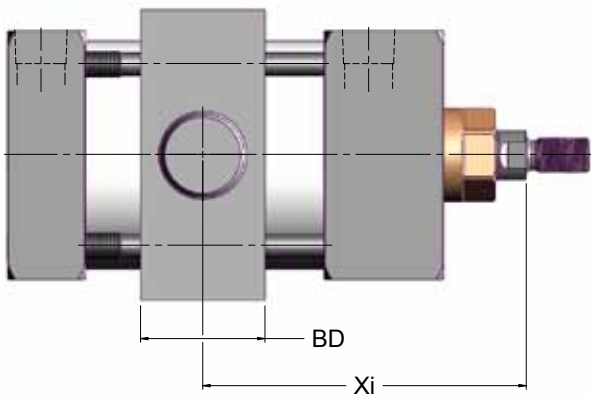
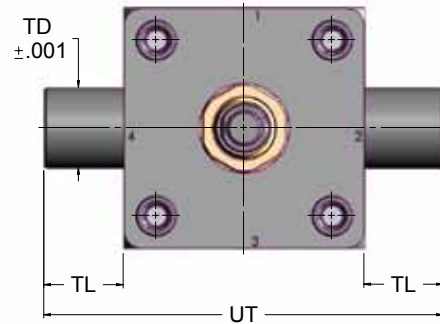
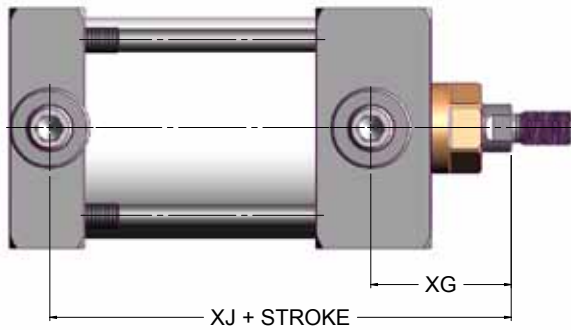


BORE	CB	CD	CW	FL	L	M	XC	XD
1 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 3/8	5 3/4
2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 3/8	5 3/4
2 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 1/2	5 7/8
3 1/4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	6 7/8	7 1/2
4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	6 7/8	7 1/2
5	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 1/8	7 3/4
6	1 1/2	1	3/4	2 1/4	1 1/2	1 1/4	8 1/8	8 7/8
7	1 1/2	1	3/4	2 1/4	1 1/2	1	8 1/4	9
8	1 1/2	1	3/4	2 1/4	1 1/2	1	8 1/4	9
10	2	1 3/8	1	N/A	2 1/8	1 3/8	10 3/8	N/A
12	2 1/2	1 3/4	1 1/4	N/A	2 1/4	1 3/4	11 1/8	N/A

# STAR3 CYLINDERS



## TRUNNION MOUNT (NFPA MT1, MT2 & MT4)



BORE	TD	TL	UT	ST3T1	ST3T2	ST3T4	UV	TM	UM	BD
				XG	XJ	Xi				
1 1/2	1	1	4	1 3/4	4 1/8	CUSTOMER MUST SPECIFY Xi	2 1/2	2 1/2	4 1/2	1 1/4
2	1	1	4 1/2	1 3/4	4 1/8		3	3	5	1 1/2
2 1/2	1	1	5	1 3/4	4 1/4		3 1/2	3 1/2	5 1/2	1 1/2
3 1/4	1	1	5 3/4	2 1/4	5		4 1/4	4 1/2	6 1/2	2
4	1	1	6 1/2	2 1/4	5		5	5 1/4	7 1/4	2
5	1	1	7 1/2	2 1/4	5 1/4		6	6 1/4	8 1/4	2
6	1 3/8	1 3/8	9 1/4	2 5/8	5 7/8		7	7 5/8	10 3/8	2 1/2
7	1 3/8	1 3/8	11 1/4	2 5/8	6		8 1/2	8 3/4	11 1/2	2 1/2
8	1 3/8	1 3/8	11 1/4	2 5/8	6		9 1/2	9 3/4	12 1/2	2 1/2



MODEL ST3T1



MODEL ST3T2



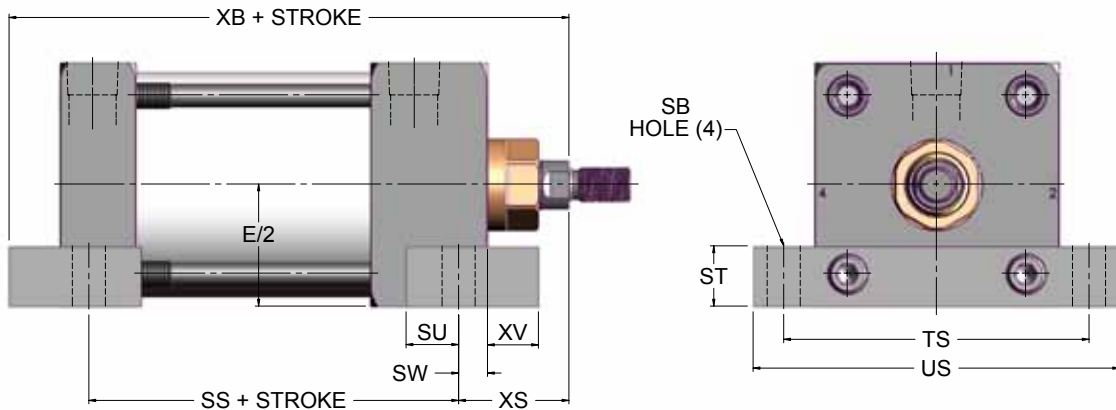
MODEL ST3T4

You can order the Trunnion in one piece steel for heavy duty applications. Use Suffix X  
 Ex : ST3T1X-2.5X3 (Option only available for ST3T1 Or ST3T2)

# STAR3 CYLINDERS



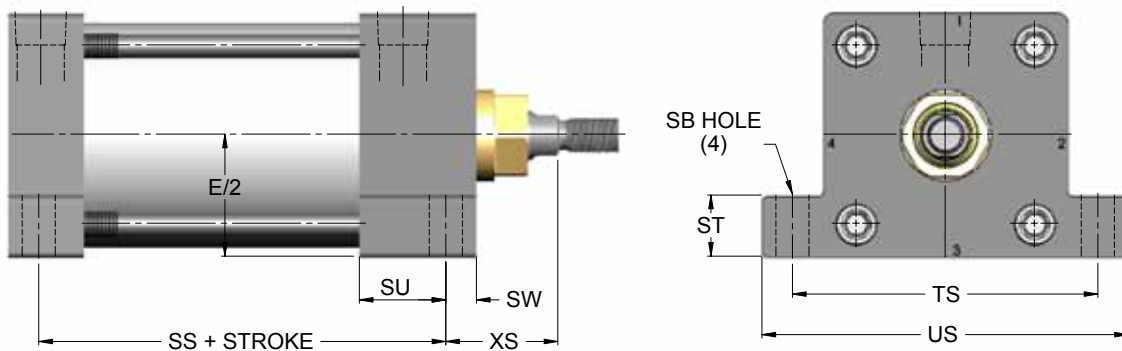
## DETACHABLE SIDE LUG MOUNT (NFPA MS2)



MODEL ST3S2

BORE	E	SB	SS	ST	SU	SW	TS	US	XB	XS	XV
1 1/2	2	13/32	2 7/8	9/16	5/8	3/8	2 3/4	3 1/2	5 1/8	1 3/8	1/2
2	2 1/2	13/32	2 7/8	5/8	5/8	3/8	3 1/4	4	5 1/4	1 3/8	5/8
2 1/2	3	13/32	3	3/4	5/8	3/8	3 3/4	4 1/2	5 3/8	1 3/8	5/8
3 1/4	3 3/4	17/32	3 1/4	1	3/4	1/2	4 3/4	5 3/4	6 3/8	1 7/8	3/4
4	4 1/2	17/32	3 1/4	1	3/4	1/2	5 1/2	6 1/2	6 3/8	1 7/8	3/4
5	5 1/2	25/32	3 1/8	1 1/4	9/16	11/16	6 7/8	8 1/4	6 13/16	2 1/16	15/16
6	6 1/2	25/32	3 5/8	1 1/2	7/8	11/16	7 7/8	9 1/4	7 9/16	2 5/16	15/16
7	7 1/2	25/32	3 3/4	1 3/4	7/8	11/16	9 7/8	11 1/4	7 13/16	2 5/16	15/16
8	8 1/2	25/32	3 3/4	1 3/4	7/8	11/16	9 7/8	11 1/4	7 13/16	2 5/16	15/16

## FIXED SIDE LUG MOUNT (NFPA MS2E)



MODEL ST3S2E

BORE	SB	SS	ST	SU	SW	TS	US	XB	XS
1 1/2	13/32	2 7/8	9/16	5/8	3/8	2 3/4	3 1/2	5 1/8	1 3/8
2	13/32	2 7/8	5/8	5/8	3/8	3 1/4	4	5 1/4	1 3/8
2 1/2	13/32	3	3/4	5/8	3/8	3 3/4	4 1/2	5 3/8	1 3/8
3 1/4	17/32	3 1/4	1	3/4	1/2	4 3/4	5 3/4	6 3/8	1 7/8
4	17/32	3 1/4	1	3/4	1/2	5 1/2	6 1/2	6 3/8	1 7/8

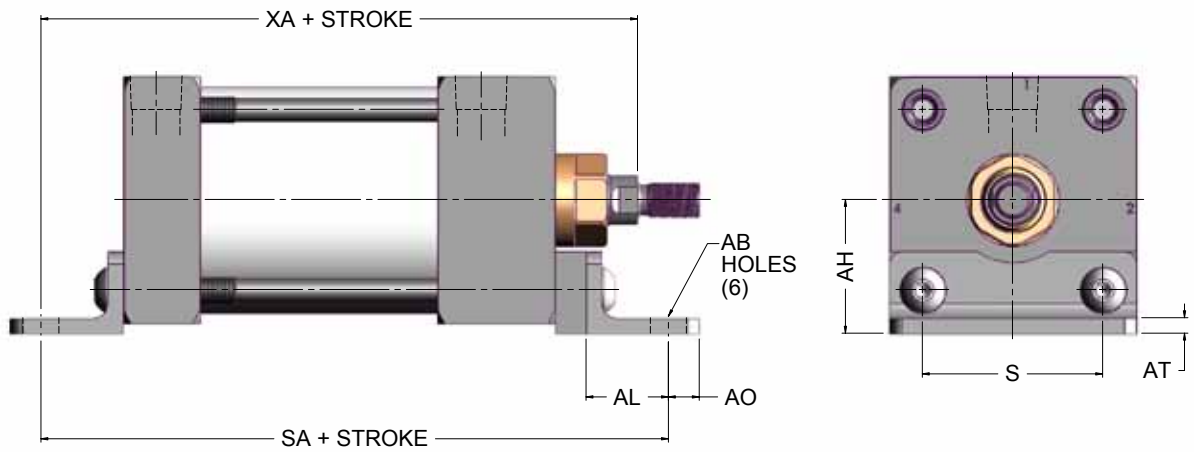
SPECIAL MID SIDE LUG MOUNT  
(ASK FACTORY)



# STAR3 CYLINDERS



## ANGLE MOUNT (NFPA MS1)

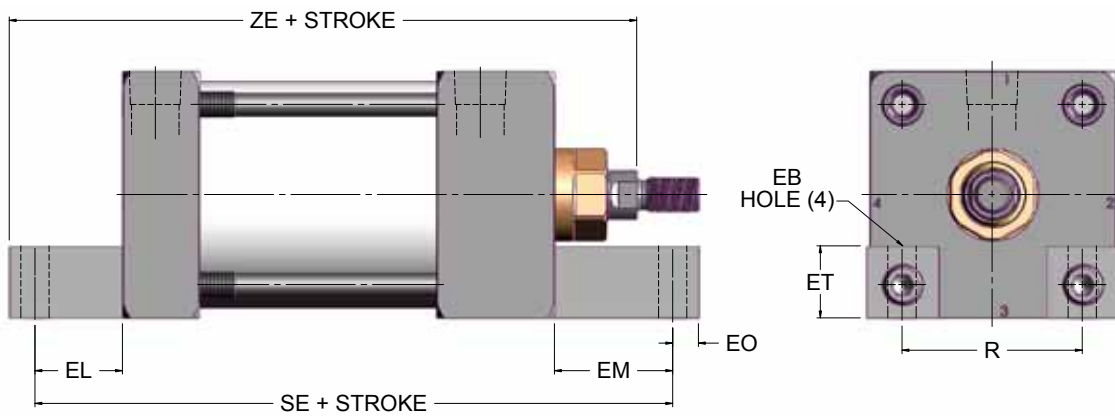


MODEL ST3S1

BORE	AB	AH	AL	AO	AT	S	SA	XA
1 1/2	7/16	1 3/16	1	3/8	1/8	1 1/4	6	5 5/8
2	7/16	1 7/16	1	3/8	1/8	1 3/4	6	5 5/8
2 1/2	7/16	1 5/8	1	3/8	1/8	2 1/4	6 1/8	5 3/4
3 1/4	9/16	1 15/16	1 1/4	1/2	3/16	2 3/4	7 3/8	6 7/8
4	9/16	2 1/4	1 1/4	1/2	3/16	3 1/2	7 3/8	6 7/8
5	11/16	2 3/4	1 3/8	1/2	3/16	4 1/4	7 7/8	7 1/4
6	11/16	3 1/4	1 3/8	5/8	1/4	5 1/4	8 1/2	8

AVAILABLE IN 7, 8, 10 & 12" BORE ASK FACTORY

## END LUG MOUNT (NFPA MS7)



MODEL ST3S7

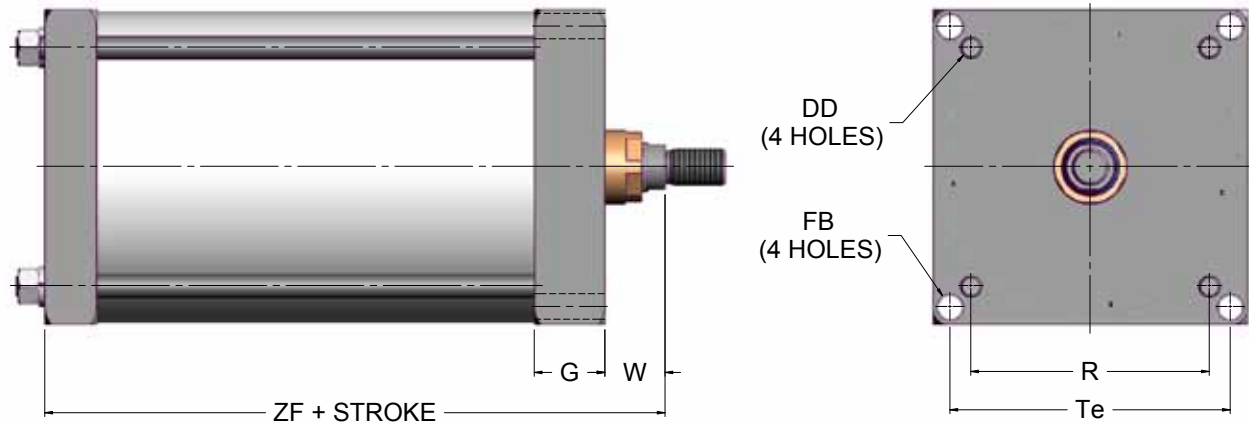
BORE	EB	EL	EM	EO	ET	SE	ZE	R
1 1/2	9/32	3/4	1 1/8	1/4	9/16	5 1/2	5 5/8	1.43
2	11/32	15/16	1 5/16	5/16	5/8	5 7/8	5 7/8	1.84
2 1/2	11/32	1 1/16	1 7/16	5/16	3/4	6 1/4	6 1/8	2.19
3 1/4	13/32	7/8	1 1/2	3/8	1	6 5/8	6 7/8	2.76
4	13/32	1	1 5/8	3/8	1 13/16	6 7/8	7	3.32
5	17/32	1 1/16	1 11/16	9/16	1 3/8	7 1/4	7 1/2	4.12
6	17/32	1	1 3/4	5/8	1 5/8	7 3/4	8 1/4	4.88
7	21/32	1 1/8	1 3/4	3/4	2	7 3/8	8 3/4	5.73
8	21/32	1 1/8	1 3/4	3/4	2	7 3/8	8 3/4	6.44



# STAR3 CYLINDERS



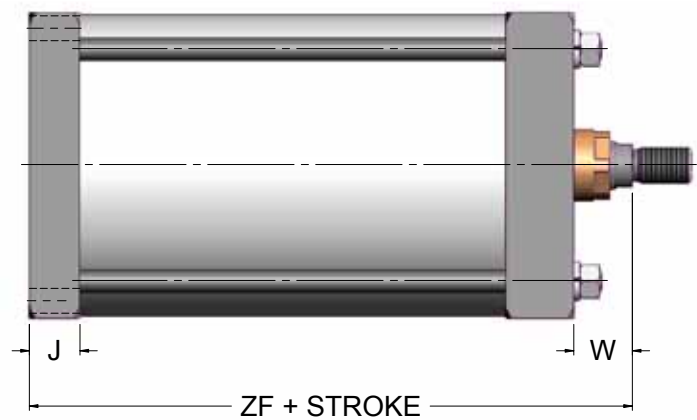
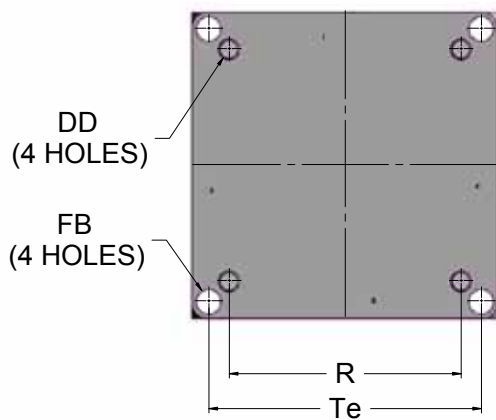
## SQUARE FLANGE HEAD MOUNT (NFPA ME3)



MODEL ST3E3

BORE	FB		G	R	DD	DD depth	Te	W	ZF
	(hole dia.)	For S.H.C.S.							
7	11/16	5/8	2	5.73	5/8-18	1	6.75	1 5/8	6 3/4
8	11/16	5/8	2	6.44	5/8-18	1	7.57	1 5/8	6 3/4
10	13/16	3/4	2 1/4	7.97	3/4-16	1 1/4	9.41	1 7/8	8 1/4
12	13/16	3/4	2 1/4	9.41	3/4-16	1 1/4	11.11	2	8 7/8

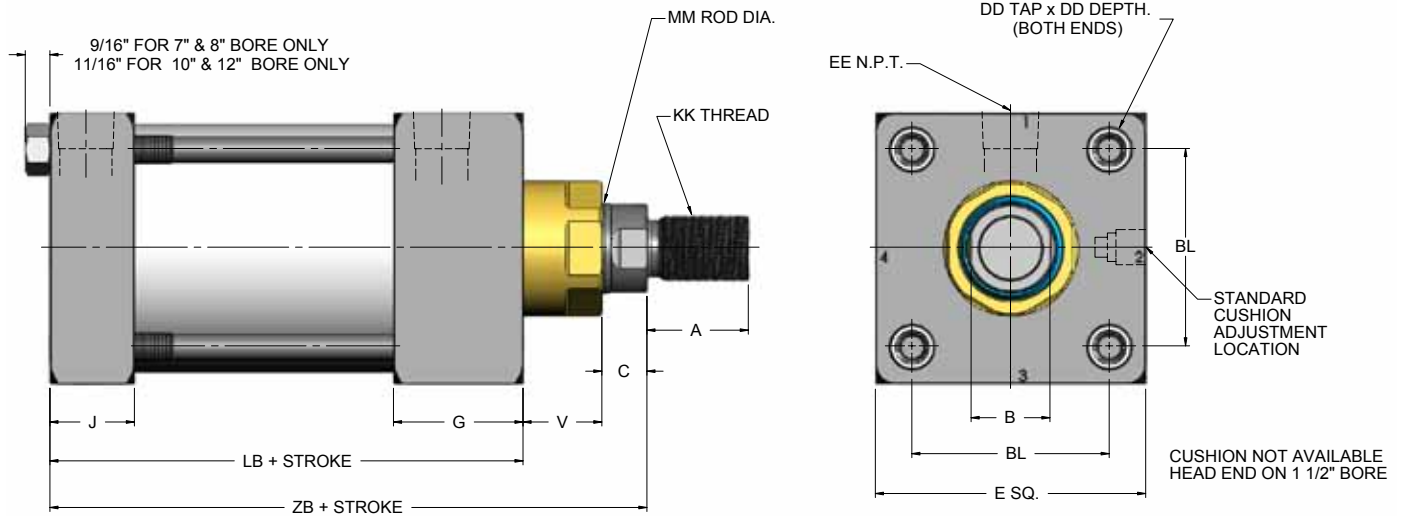
## SQUARE FLANGE CAP MOUNT (NFPA ME4)



MODEL ST3E4

BORE	FB		J	R	DD	DD depth	Te	W	ZF
	(hole dia.)	For S.H.C.S.							
7	11/16	5/8	1 1/2	5.73	5/8-18	1	6.75	1 5/8	6 3/4
8	11/16	5/8	1 1/2	6.44	5/8-18	1	7.57	1 5/8	6 3/4
10	13/16	3/4	2	7.97	3/4-16	1 1/4	9.41	1 7/8	8 1/4
12	13/16	3/4	2	9.41	3/4-16	1 1/4	11.11	2	8 7/8

# STAR30 CYLINDERS - Oversize Rod Diameters



BORE	A	B	BL	C	DD	DDdepth*	E	EE	G	J	KK	LB	MM	V	ZB
1.5	1 1/8	1.498	1.43	1/2	1/4-28	0.50	2	3/8	1 1/2	1	3/4-16	3 5/8	1	7/8	5
2.0	1 1/8	1.498	1.84	1/2	5/16-24	0.50	2 1/2	3/8	1 1/2	1	3/4-16	3 5/8	1	7/8	5
2.5	1 1/8	1.498	2.19	1/2	5/16-24	0.50	3	3/8	1 1/2	1	3/4-16	3 3/4	1	7/8	5 1/8
3.25	1 5/8	1.998	2.76	5/8	3/8-24	0.63	3 3/4	1/2	1 3/4	1 1/4	1-14	4 1/4	1 3/8	1	5 7/8
4.0	1 5/8	1.998	3.32	5/8	3/8-24	0.63	4 1/2	1/2	1 3/4	1 1/4	1-14	4 1/4	1 3/8	1	5 7/8
5.0	1 5/8	1.998	4.12	5/8	1/2-20	0.75	5 1/2	1/2	1 3/4	1 1/4	1-14	4 1/2	1 3/8	1	6 1/8
6.0	2	2.373	4.88	3/4	1/2-20	0.75	6 1/2	3/4	2	1 1/2	1 1/4-12	5	1 3/4	1 1/8	6 7/8
7.0	2	2.373	5.73	3/4	5/8-18	0.75	7 1/2	3/4	2	1 1/2	1 1/4-12	5 1/8	1 3/4	1 1/8	7
8.0	2	2.373	6.44	3/4	5/8-18	0.75	8 1/2	3/4	2	1 1/2	1 1/4-12	5 1/8	1 3/4	1 1/8	7
10.00	2 1/4	2.623	7.92	7/8	3/4-18	1.00	10 5/8	1	2 1/4	2	1 1/2-12	6 3/8	2	1 1/8	8 3/8
12.00	3	3.123	9.41	1	3/4-16	1.00	12 3/4	1	2 1/4	2	1 7/8-12	6 7/8	2 1/2	1 1/4	9 1/8

\*Can be use for front or rear Mount direct with the face of the cylinder

## ROD END STYLE

FULL MALE #1F  
MM ROD  
FF THD  
A  
C  
V

MM ROD  
KK THD  
A  
C  
V

WRENCH FLATS  
D

SMALL MALE #2S STUDED  
MM ROD  
KK THD  
A  
C  
V

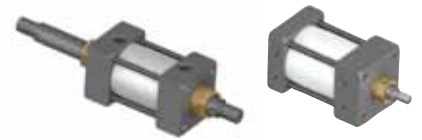
LARGE MALE #1  
MM ROD  
CC THD  
A  
C  
V

FEMALE #4  
MM ROD  
KK THD  
A DEEP  
A  
C  
V

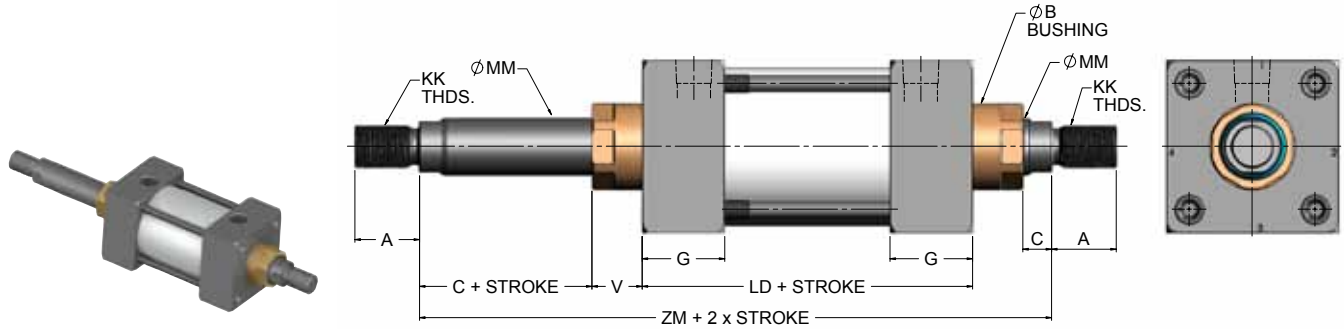
\* FOR 1" ROD, THE ROD END WILL BE STUDED #2S STANDARD

ROD DIA.	A	C	D	V	CC	FF	KK
1	1 1/8	1/2	7/8	7/8	7/8-14	1-14	3/4-16
1 3/8	1 5/8	5/8	1 3/16	1	1 1/4-12	1 3/8-12	1-14
1 3/4	2	3/4	1 1/2	1 1/8	1 1/2-12	1 3/4-12	1 1/4-12
2	2 3/8	7/8	1 3/4	1 1/8	1 3/4-12	2-12	1 1/2-12
2 1/2	3	1	2 1/16	1 1/4	2 1/4-12	2 1/2-12	1 7/8-12

# STAR30 CYLINDERS - Oversize Rod

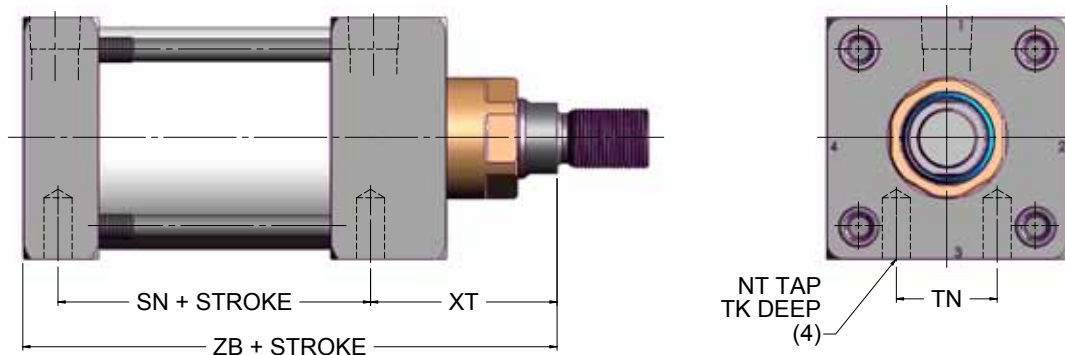


## DOUBLE ROD END (ST30D)



BORE	A	B	C	E	G	R	V	EE	LD	KK	MM	ZM
1 1/2	1 1/8	1.498	1/2	2	1 1/2	1.43	7/8	3/8	4 1/8	3/4-16	1	6 7/8
2	1 1/8	1.498	1/2	2 1/2	1 1/2	1.84	7/8	3/8	4 1/8	3/4-16	1	6 7/8
2 1/2	1 1/8	1.498	1/2	3	1 1/2	2.19	7/8	3/8	4 1/4	3/4-16	1	7
3 1/4	1 5/8	1.998	5/8	3 3/4	1 3/4	2.78	1	1/2	4 3/4	1-14	1 3/8	8
4	1 5/8	1.998	5/8	4 1/2	1 3/4	3.32	1	1/2	4 3/4	1-14	1 3/8	8
5	1 5/8	1.998	5/8	5 1/2	1 3/4	4.12	1	1/2	5	1-14	1 3/8	8
6	1 3/4	2.373	3/4	6 1/2	2	4.88	1 1/8	3/4	5 1/2	1 1/4-12	1 3/4	9 1/4
7	1 3/4	2.373	3/4	7 1/2	2	5.73	1 1/8	3/4	5 5/8	1 1/4-12	1 3/4	9 3/8
8	1 3/4	2.373	3/4	8 1/2	2	6.44	1 1/8	3/4	5 5/8	1 1/4-12	1 3/4	9 3/8
10	2	2.623	7/8	10 5/8	2 1/4	7.92	1 1/8	1	6 5/8	1 1/2-12	2	10 5/8
12	2 1/2	3.123	1	12 3/4	2 1/4	9.41	1 1/4	1	7 1/8	1 7/8-12	2 1/2	11 5/8

## BOTTOM TAP MOUNT (NFPA MS4)



MODEL ST30S4

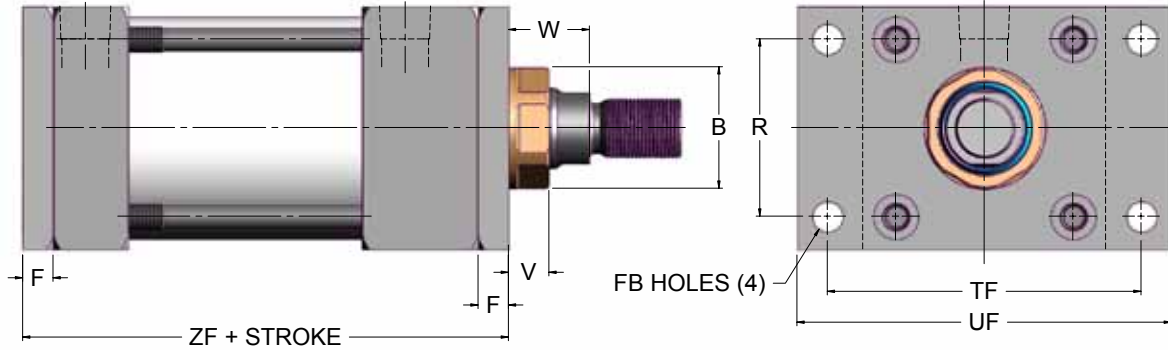


BORE	NT	TK	TN	SN	XT	ZB
1 1/2	1/4-20	3/8	5/8	2 1/4	2 5/16	5
2	5/16-18	1/2	7/8	2 1/4	2 5/16	5
2 1/2	3/8-16	5/8	1 1/4	2 3/8	2 5/16	5 1/8
3 1/4	1/2-13	3/4	1 1/2	2 5/8	2 11/16	5 7/8
4	1/2-13	3/4	2 1/16	2 5/8	2 11/16	5 7/8
5	5/8-11	1	2 11/16	2 7/8	2 11/16	6 1/8
6	3/4-10	1 1/8	3 1/4	3 1/8	3 1/16	6 7/8
7	3/4-10	1 1/8	3 1/2	3 1/4	3 1/16	7
8	3/4-10	1 1/8	4 1/2	3 1/4	3 1/16	7
10	1-8	1 1/2	5 1/2	4 1/8	3 1/4	8 7/8
12	1-8	1 1/2	7 1/4	4 5/8	3 1/2	9 1/8

# STAR30 CYLINDERS - Oversize Rod



## FLANGE MOUNT (NFPA MF1 & MF2)



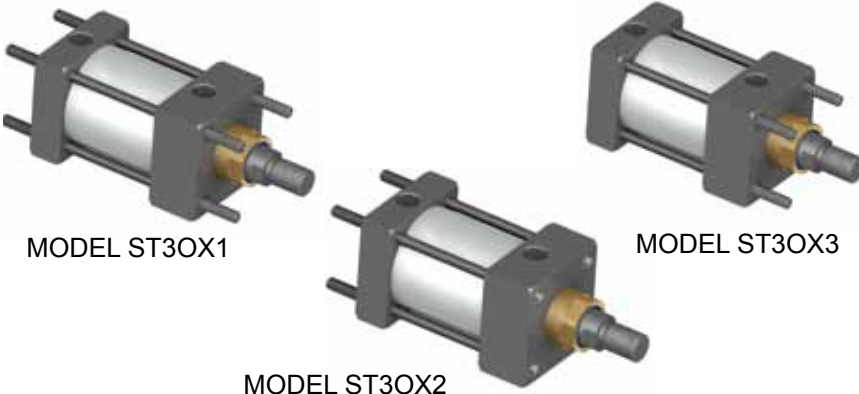
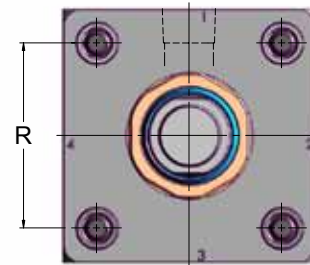
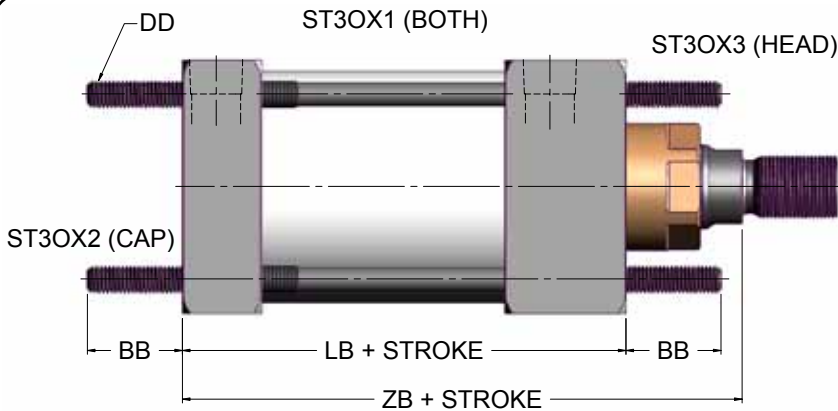
MODEL ST3OF1

MODEL ST3OF2



BORE	B	F	FB	R	TF	UF	V	W	ZF
1 1/2	1 1/2	3/8	5/16	1.43	2 3/4	3 3/8	1/2	1	5 3/8
2	1 1/2	3/8	3/8	1.84	3 3/8	4 1/8	1/2	1	5 3/8
2 1/2	1 1/2	3/8	3/8	2.19	3 7/8	4 1/8	1/2	1	5 1/2
3 1/4	2	5/8	7/16	2.76	4 11/16	5 1/2	3/8	1	6 1/2
4	2	5/8	7/16	3.32	5 7/16	6 1/4	3/8	1	6 1/2
5	2	5/8	9/16	4.10	6 5/8	7 5/8	3/8	1	6 3/4
6	2 3/8	3/4	9/16	4.88	7 5/8	8 5/8	3/8	1 1/8	7 5/8

## TIE RODS EXTENDED MOUNT (NFPA MX1, MX2 & MX3)



BORE	BB	DD	LB	R	ZB
1 1/2	1	1/4-28	3 5/8	1.43	5
2	1 1/8	5/16-24	3 5/8	1.84	5
2 1/2	1 1/8	5/16-24	3 3/4	2.19	5 1/8
3 1/4	1 3/8	3/8-24	4 1/4	2.76	5 7/8
4	1 3/8	3/8-24	4 1/4	3.32	5 7/8
5	1 13/16	1/2-20	4 1/2	4.12	6 1/8
6	1 13/16	1/2-20	5	4.88	6 7/8
7*	2 5/16	5/8-18	5 1/8	5.73	7
8*	2 5/16	5/8-18	5 1/8	6.44	7
10*	2 9/16	3/4-16	6 3/8	7.92	8 3/8
12*	2 9/16	3/4-16	6 7/8	9.41	9 1/8

\*Only for 7,8,10,12" bore, Since they are not Flush Mount, Nuts will use on the opposite of the "Tie Rods extended Mount" Or cap end for the "ST3X1 Mount"



# STAR30 CYLINDERS - Oversize Rod

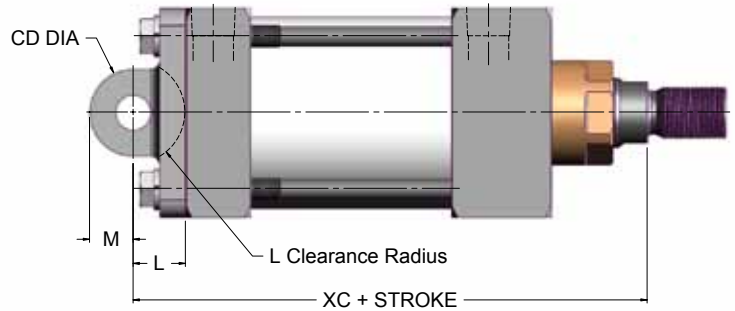
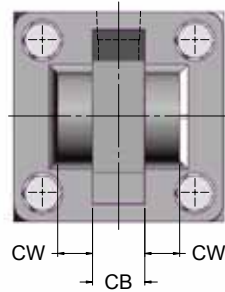


## CLEVIS MOUNT (NFPA MP1, MP2 & MP4)



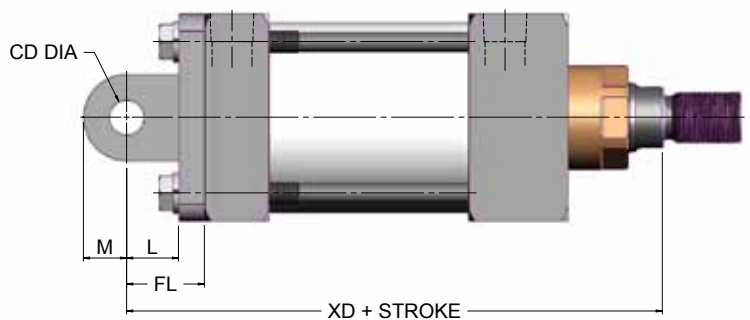
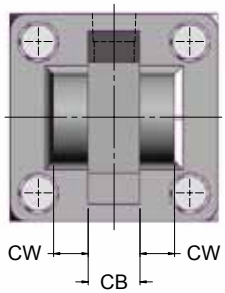
MODEL ST30P1

Pin and Snap ring Included



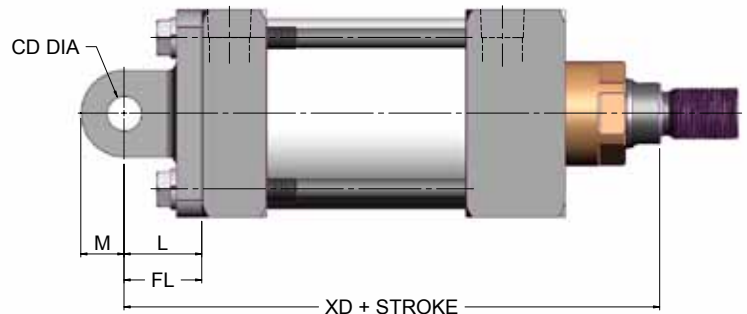
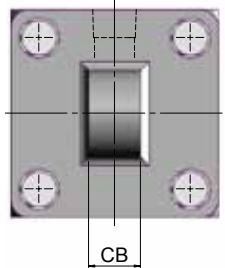
MODEL ST30P2

Pin and Snap ring Included



MODEL ST30P4

Pin and Snap ring NOT Included

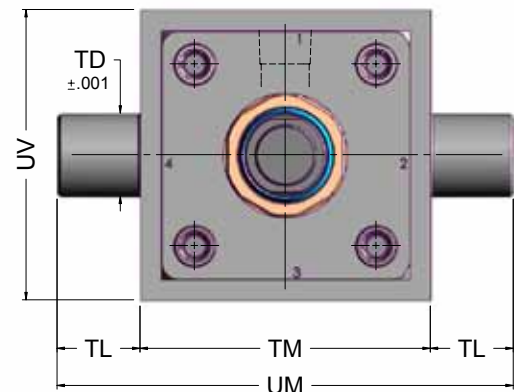
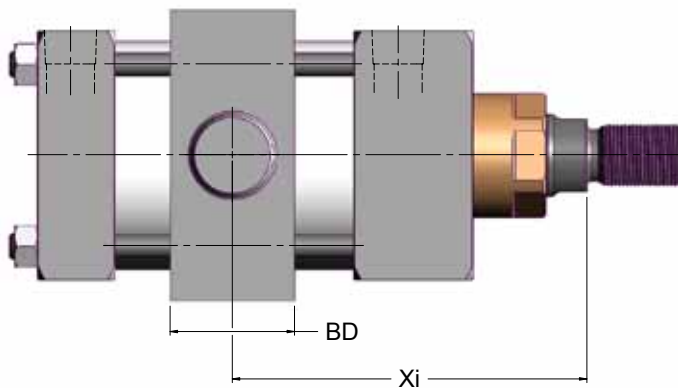
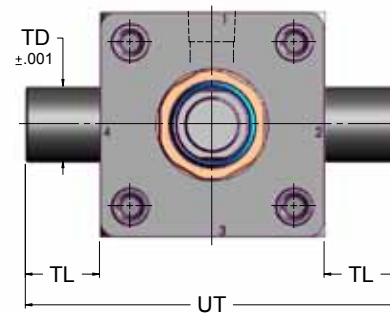
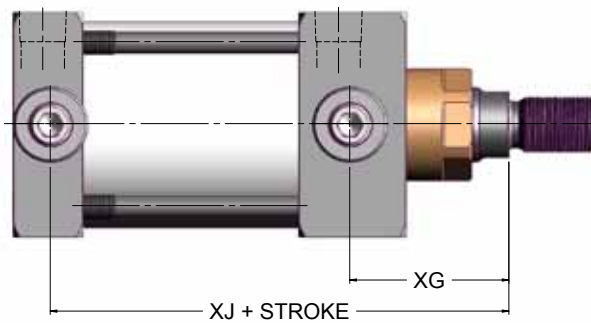


BORE	CB	CD	CW	FL	L	M	XC	XD
1 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 3/4	6 1/8
2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 3/4	6 1/8
2 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 7/8	6 1/4
3 1/4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 1/8	7 3/4
4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 1/8	7 3/4
5	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 3/8	8
6	1 1/2	1	3/4	2 1/4	1 1/2	1 1/4	8 3/8	9 1/8
7	1 1/2	1	3/4	2 1/4	1 1/2	1	8 1/2	9 1/4
8	1 1/2	1	3/4	2 1/4	1 1/2	1	8 1/2	9 1/4
10	2	1 3/8	1	N/A	2 1/8	1 3/8	10 1/2	N/A
12	2 1/2	1 3/4	1 1/4	N/A	2 1/4	1 3/4	11 1/2	N/A

# STAR30 CYLINDERS - Oversize Rod



## TRUNNION MOUNT (NFPA MT1, MT2 & MT4)



BORE	TD	TL	UT	ST3T1	ST3T2	ST3T4	UV	TM	UM	BD
				XG	XJ	Xi				
1 1/2	1	1	4	N/A*	4 1/2	CUSTOMER MUST SPECIFY XI	2 1/2	2 1/2	4 1/2	1 1/4
2	1	1	4 1/2	2 1/8	4 1/2		3	3	5	1 1/2
2 1/2	1	1	5	2 1/8	4 5/8		3 1/2	3 1/2	5 1/2	1 1/2
3 1/4	1	1	5 3/4	2 1/2	5 1/4		4 1/4	4 1/2	6 1/2	2
4	1	1	6 1/2	2 1/2	5 1/4		5	5 1/4	7 1/4	2
5	1	1	7 1/2	2 1/2	5 1/2		6	6 1/4	8 1/4	2
6	1 3/8	1 3/8	9 1/4	2 7/8	6 1/8		7	7 5/8	10 3/8	2 1/2
7	1 3/8	1 3/8	11 1/4	2 7/8	6 1/4		8 1/2	8 3/4	11 1/2	2 1/2
8	1 3/8	1 3/8	11 1/4	2 7/8	6 1/4		9 1/2	9 3/4	12 1/2	2 1/2



MODEL ST3OT1



MODEL ST3OT2



MODEL ST3OT4

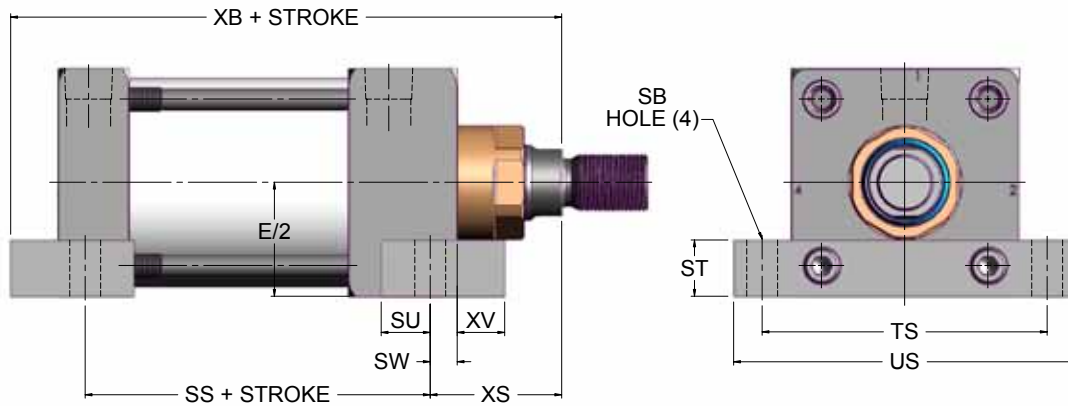
You can order the Trunnion in one piece steel for heavy duty applications. Use Suffix X  
 Ex : ST3OT1X-2.5X3 (Option only available for ST3OT1 Or ST3OT2)

\*Not available in Aluminum Construction, available in one piece steel. (see note above)

# STAR30 CYLINDERS - Oversize Rod



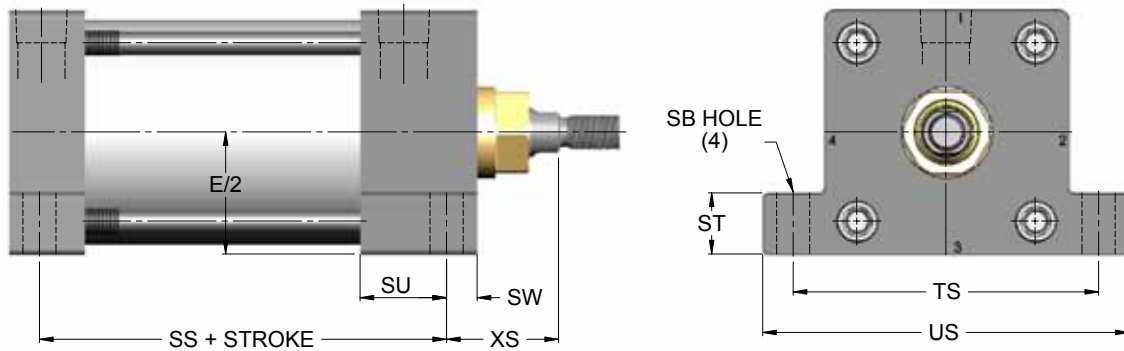
## DETACHABLE SIDE LUG MOUNT (NFPA MS2)



MODEL ST3OS2

BORE	E	SB	SS	ST	SU	SW	TS	US	XB	XS	XV
1 1/2	2	13/32	2 7/8	9/16	5/8	3/8	2 3/4	3 1/2	5 1/2	1 3/4	1/2
2	2 1/2	13/32	2 7/8	5/8	5/8	3/8	3 1/4	4	5 5/8	1 3/4	5/8
2 1/2	3	13/32	3	3/4	5/8	3/8	3 3/4	4 1/2	5 3/4	1 3/4	5/8
3 1/4	3 3/4	17/32	3 1/4	1	3/4	1/2	4 3/4	5 3/4	6 5/8	2 1/8	3/4
4	4 1/2	17/32	3 1/4	1	3/4	1/2	5 1/2	6 1/2	6 5/8	2 1/8	3/4
5	5 1/2	25/32	3 1/8	1 1/4	9/16	11/16	6 7/8	8 1/4	7 1/16	2 5/16	15/16
6	6 1/2	25/32	3 5/8	1 1/2	7/8	11/16	7 7/8	9 1/4	7 13/16	2 9/16	15/16
7	7 1/2	25/32	3 3/4	1 3/4	7/8	11/16	9 7/8	11 1/4	8 1/16	2 9/16	15/16
8	8 1/2	25/32	3 3/4	1 3/4	7/8	11/16	9 7/8	11 1/4	8 1/16	2 9/16	15/16

## FIXED SIDE LUG MOUNT (NFPA MS2E)



MODEL ST3OS2E

BORE	SB	SS	ST	SU	SW	TS	US	XB	XS
1 1/2	13/32	2 7/8	9/16	5/8	3/8	2 3/4	3 1/2	5 1/2	1 3/4
2	13/32	2 7/8	5/8	5/8	3/8	3 1/4	4	5 5/8	1 3/4
2 1/2	13/32	3	3/4	5/8	3/8	3 3/4	4 1/2	5 3/4	1 3/4
3 1/4	17/32	3 1/4	1	3/4	1/2	4 3/4	5 3/4	6 5/8	2 1/8
4	17/32	3 1/4	1	3/4	1/2	5 1/2	6 1/2	6 5/8	2 1/8

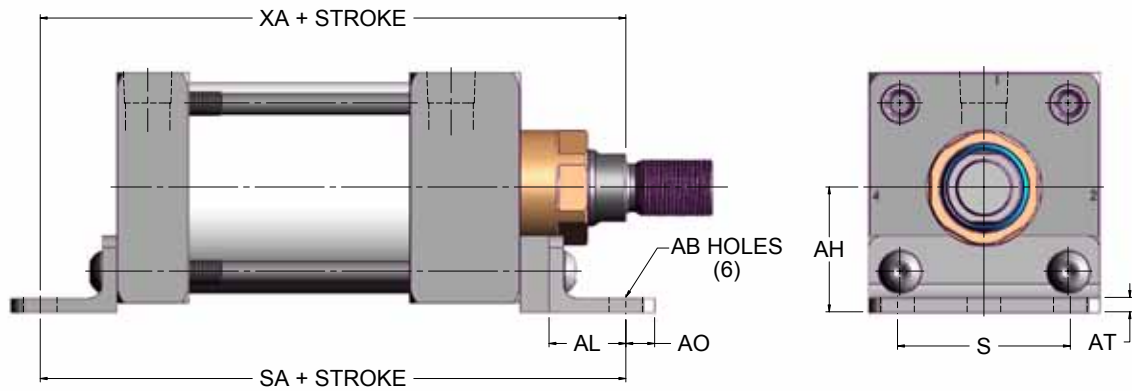


SPECIAL MID SIDE LUG MOUNT  
(ASK FACTORY)

# STAR30 CYLINDERS - Oversize Rod



## ANGLE MOUNT (NFPA MS1)

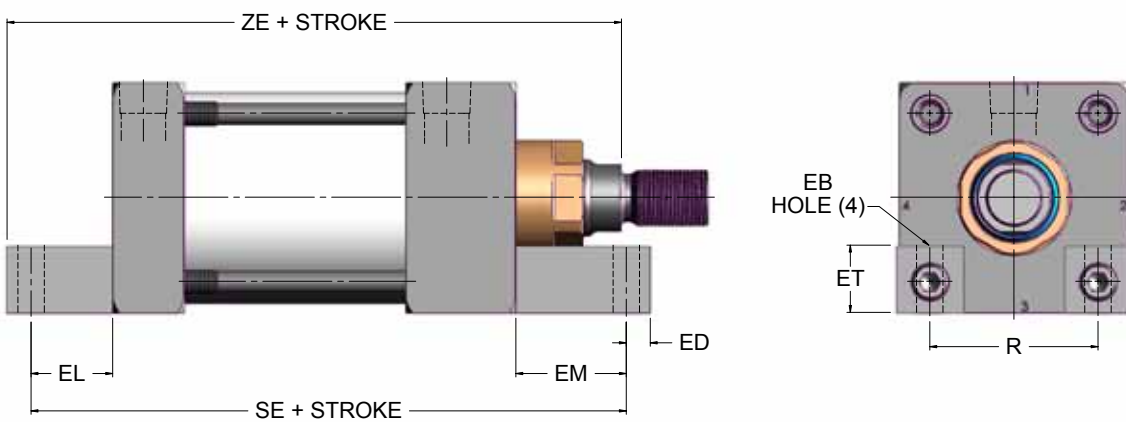


MODEL ST3OS1

BORE	AB	AH	AL	AO	AT	S	SA	XA
1 1/2	7/16	1 3/16	1	3/8	1/8	1 1/4	6	6
2	7/16	1 7/16	1	3/8	1/8	1 3/4	6	6
2 1/2	7/16	1 5/8	1	3/8	1/8	2 1/4	6 1/8	6 1/8
3 1/4	9/16	1 15/16	1 1/4	1/2	3/16	2 3/4	7 3/8	7 1/8
4	9/16	2 1/4	1 1/4	1/2	3/16	3 1/2	7 3/8	7 1/8
5	11/16	2 3/4	1 3/8	1/2	3/16	4 1/4	7 7/8	7 1/2
6	11/16	3 1/4	1 3/8	5/8	1/4	5 1/4	8 1/2	8 1/4

AVAILABLE IN 7, 8, 10 & 12" BORE ASK FACTORY

## END LUG MOUNT (NFPA MS7)



MODEL ST3OS7

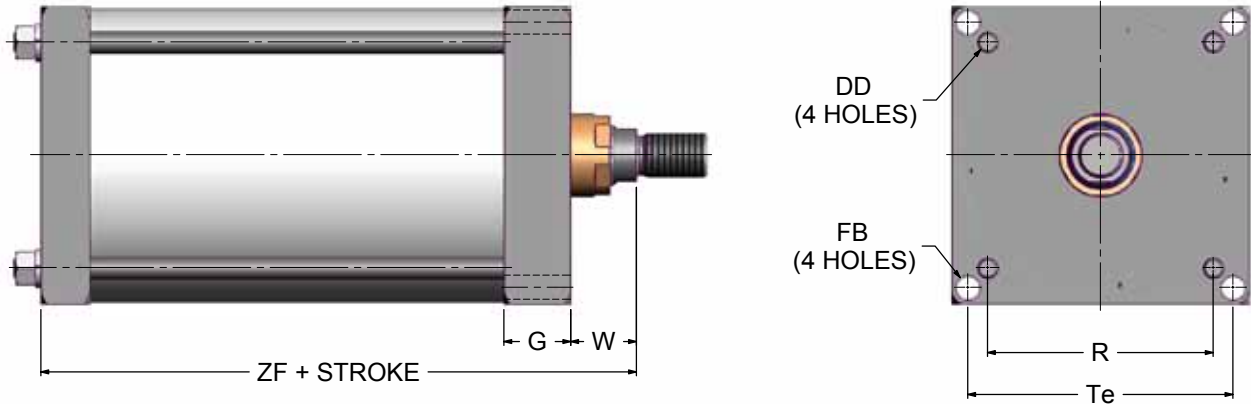
BORE	EB	EL	EM	EO	ET	SE	ZE	R
1 1/2	NOT AVAILABLE IN OVERSIZE ROD							
2	11/32	15/16	1 5/16	5/16	5/8	5 7/8	6 1/4	1.84
2 1/2	11/32	1 1/16	1 7/16	5/16	3/4	6 1/4	6 1/2	2.19
3 1/4	13/32	7/8	1 1/2	3/8	1	6 5/8	7 1/8	2.76
4	13/32	1	1 5/8	3/8	1 13/16	6 7/8	7 1/4	3.32
5	17/32	1 1/16	1 11/16	9/16	1 3/8	7 1/4	7 1/2	4.12
6	17/32	1	1 3/4	5/8	1 5/8	7 3/4	8 1/4	4.88
7	21/32	1 1/8	1 3/4	3/4	2	7 3/8	8 3/4	5.73
8	21/32	1 1/8	1 3/4	3/4	2	7 3/8	8 3/4	6.44



# STAR30 CYLINDERS - Oversize Rod



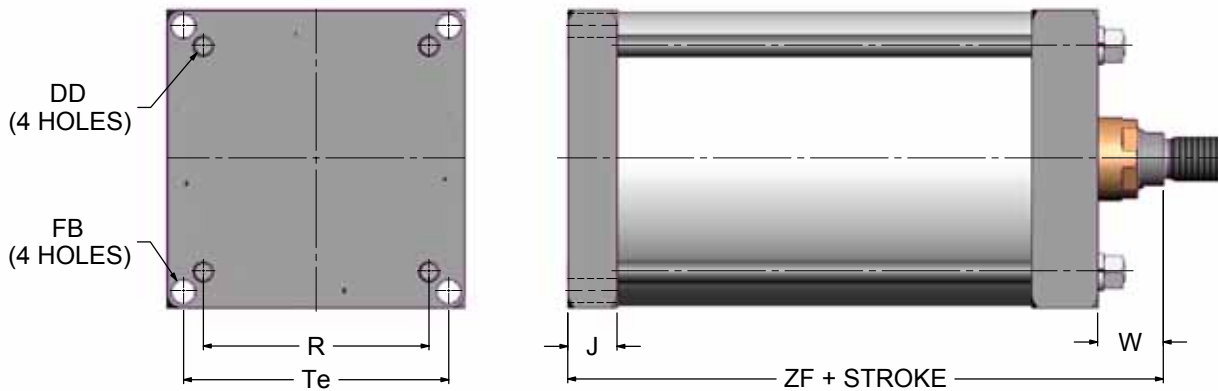
## SQUARE FLANGE HEAD MOUNT (NFPA ME3)



MODEL ST30E3

BORE	FB		G	R	DD	DD depth	Te	W	ZF
	(hole dia.)	For S.H.C.S.							
7	11/16	5/8	2	5.73	5/8-18	1	6.75	1 7/8	7
8	11/16	5/8	2	6.44	5/8-18	1	7.57	1 7/8	7
10	13/16	3/4	2 1/4	7.97	3/4-16	1 1/4	9.41	2	8 3/8
12	13/16	3/4	2 1/4	9.41	3/4-16	1 1/4	11.11	2 1/4	9 1/8

## SQUARE CAP FLANGE MOUNT (NFPA ME4)



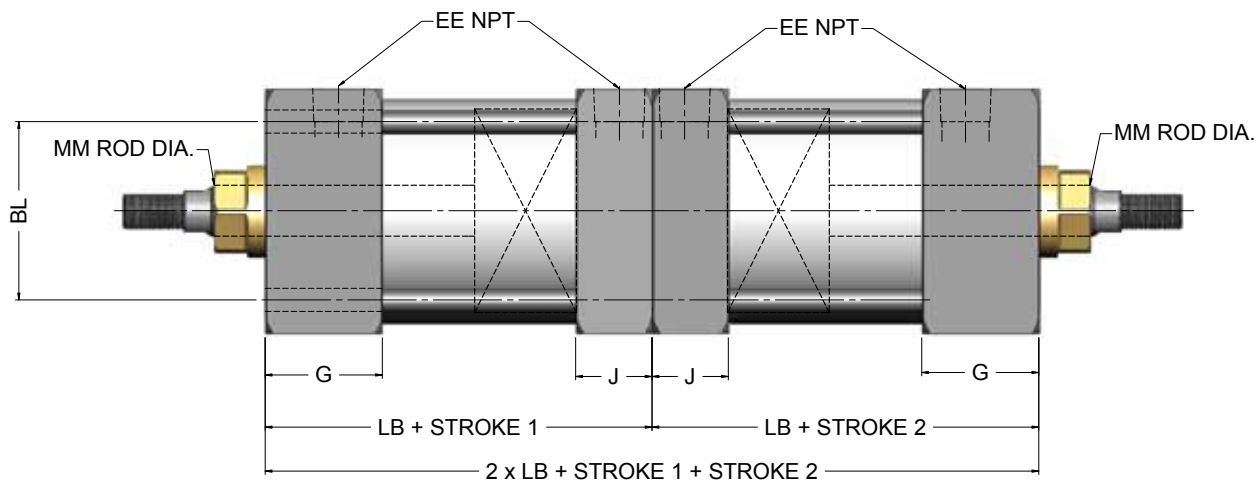
MODEL ST30E4

BORE	FB		J	R	DD	DD depth	Te	W	ZF
	(hole dia.)	For S.H.C.S.							
7	11/16	5/8	1 1/2	5.73	5/8-18	1	6.75	1 7/8	7
8	11/16	5/8	1 1/2	6.44	5/8-18	1	7.57	1 7/8	7
10	13/16	3/4	2	7.97	3/4-16	1 1/4	9.41	2	8 3/8
12	13/16	3/4	2	9.41	3/4-16	1 1/4	11.11	2 1/4	9 1/8

# STAR3 CYLINDERS



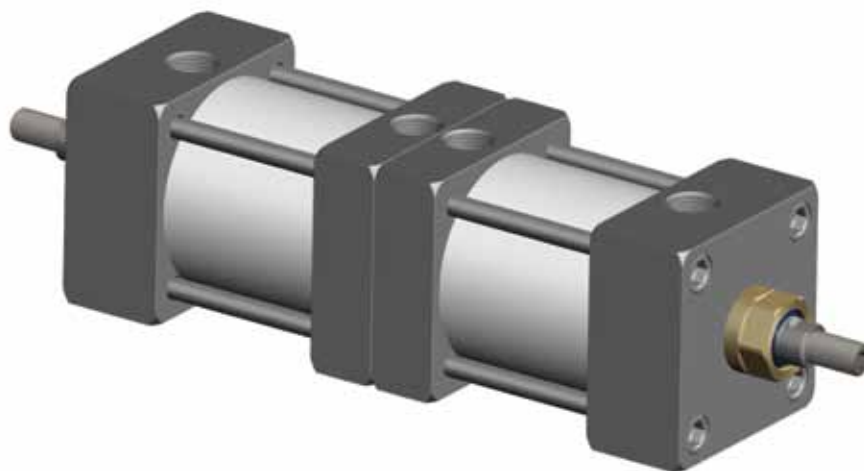
## BACK-TO-BACK (ST3BB)



MODEL	BORE	MM	E	EE	G	J	LB	BL
ST3BB & ST3OBB	1 1/2	5/8 & 1"	2	3/8	1 1/2	1	3 5/8	1.430
	2	5/8 & 1"	2 1/2	3/8	1 1/2	1	3 5/8	1.840
	2 1/2	5/8 & 1"	3	3/8	1 1/2	1	3 3/4	2.190
	3 1/4	1 & 1 3/8"	3 3/4	1/2	1 3/4	1 1/4	4 1/4	2.760
	4	1 & 1 3/8"	4 1/2	1/2	1 3/4	1 1/4	4 1/4	3.320
	5	1 & 1 3/8"	5 1/2	1/2	1 3/4	1 1/4	4 1/2	4.120
	6	1 3/8 & 1 3/4"	6 1/2	3/4	2	1 1/2	5	4.880

Also available in 7", 8", 10 & 12" bore

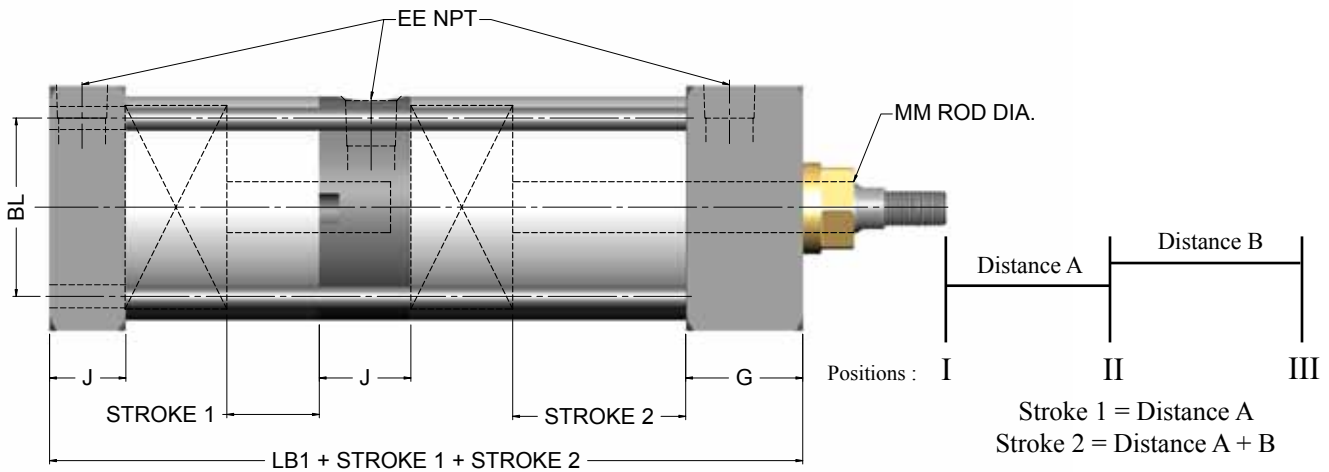
This Model is two cylinders mounted back to back. Each cylinder can be operated independently. The cylinders can have the same stroke or different strokes. This configuration enables you to have four positions of rods extended or retracted. Unlike a three-position cylinder (Multi position page 23), a back-to-back cylinder provides "Hard" stop positioning.



MODEL ST3BB or  
ST3OBB

# STAR3 CYLINDERS

## MULTI POSITION (ST3MP)



MODEL	BORE	MM	E	EE	G	J	LB1	BL
ST3MP & ST3OMP	1 1/2	5/8 & 1"	2	3/8	1 1/2	1	5 3/4	1.430
	2	5/8 & 1"	2 1/2	3/8	1 1/2	1	5 3/4	1.840
	2 1/2	5/8 & 1"	3	3/8	1 1/2	1	6	2.190
	3 1/4	1 & 1 3/8"	3 3/4	1/2	1 3/4	1 1/4	6 3/4	2.760
	4	1 & 1 3/8"	4 1/2	1/2	1 3/4	1 1/4	6 3/4	3.320
	5	1 & 1 3/8"	5 1/2	1/2	1 3/4	1 1/4	7 1/4	4.120
	6	1 3/8 & 1 3/4"	6 1/2	3/4	2	1 1/2	8	4.880

This model consists of multiple cylinders built as one unit having only one exposed working rod end, capable of delivering at least 3 positions. (Piston rod not attached) Three-Position cylinders rely on the back of the piston rod to push against the front piston rod to create the intermediate position, Care must be used to prevent the front piston rod from extending in the intermediate position.

Position I : Pressure to port "A" fully retracts cylinder

Position II : Pressure to port "D" advances cylinder to mid-stroke positions

Position III : Pressure to port "C" fully extends cylinder.

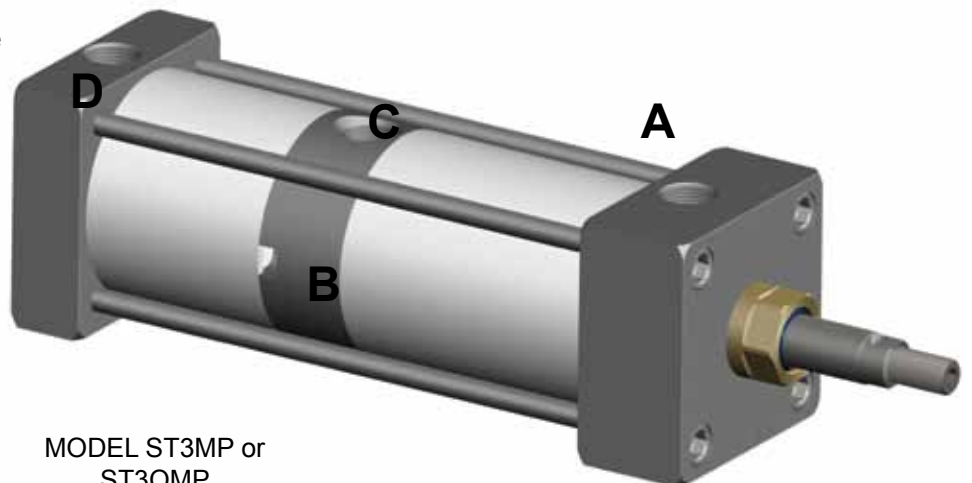
B : Breather/Vent

How to make the part number :

Application calls for a 1.5" bore with stroke position of 0", 2" and 4", with front flange mount.

The part number will be : ST3MPF1-1.5x2&4-#2

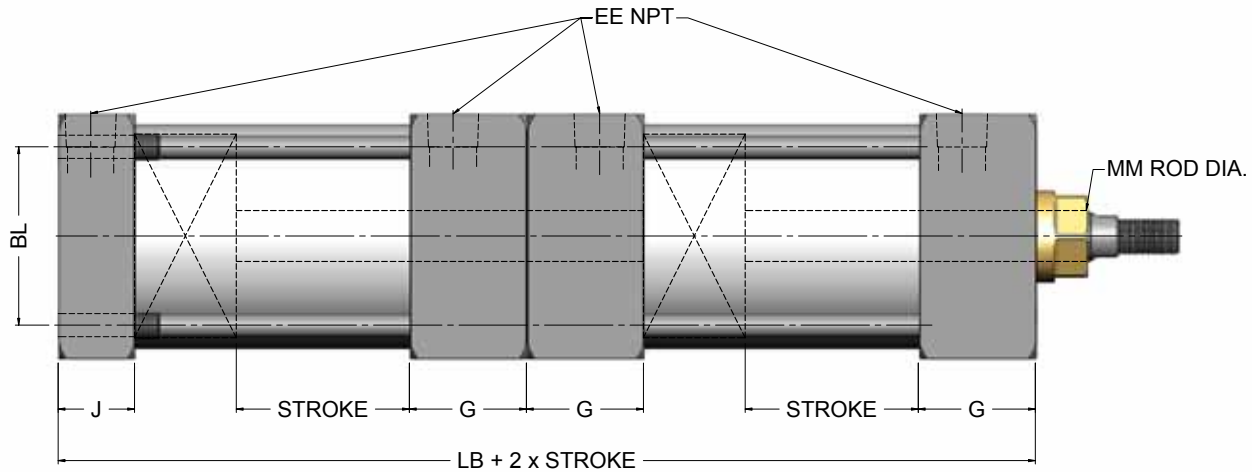
Also available in 7", 8", 10 & 12" bore



MODEL ST3MP or  
ST3OMP

# STAR3 CYLINDERS

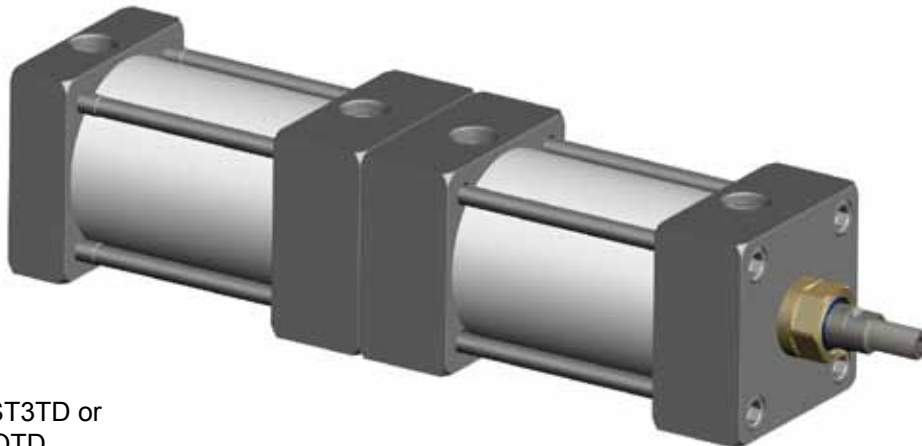
## TANDEM CYLINDER (ST3TD)



MODEL	BORE	MM	E	EE	G	J	LB	BL
ST3TD & ST3OTD	1 1/2	5/8 & 1"	2	3/8	1 1/2	1	3 5/8	1.430
	2	5/8 & 1"	2 1/2	3/8	1 1/2	1	3 5/8	1.840
	2 1/2	5/8 & 1"	3	3/8	1 1/2	1	3 3/4	2.190
	3 1/4	1 & 1 3/8"	3 3/4	1/2	1 3/4	1 1/4	4 1/4	2.760
	4	1 & 1 3/8"	4 1/2	1/2	1 3/4	1 1/4	4 1/4	3.320
	5	1 & 1 3/8"	5 1/2	1/2	1 3/4	1 1/4	4 1/2	4.120
	6	1 3/8 & 1 3/4"	6 1/2	3/4	2	1 1/2	5	4.880

Also available in 7", 8", 10 & 12" bore

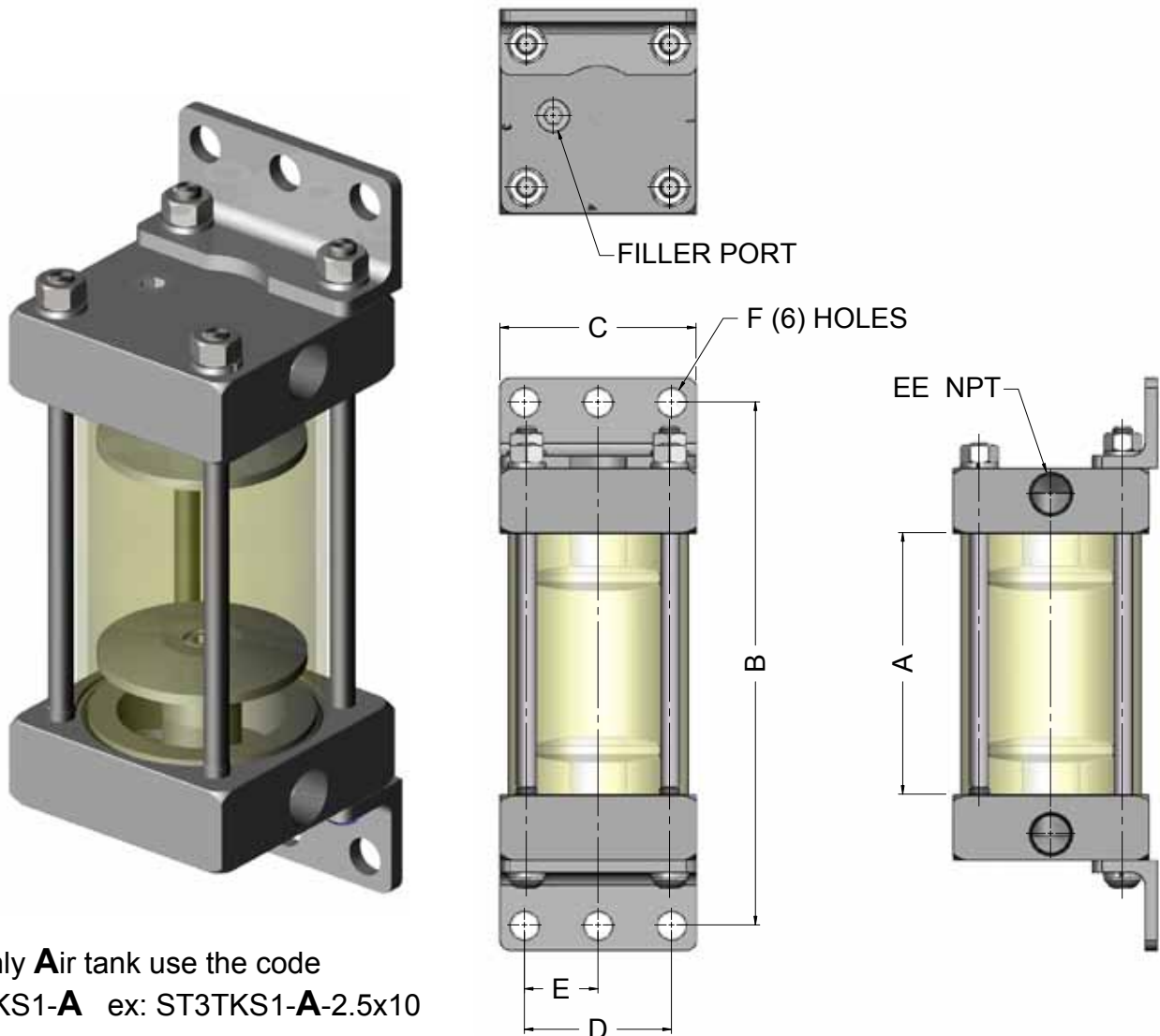
The Air over Oil design is the most use of tandem cylinders today. You can use any combination of mounts available. Air provides the force to extend and retract the cylinder in the first part while the second part filled with oil provides the precise control of the stroke. By metering the flow of the hydraulic side of the cylinder, a constant velocity is achieved throughout the stroke, even at very slow speed that air cylinder typically chatter.



MODEL ST3TD or  
ST3OTD

# STAR3 CYLINDERS - Air/Oil Tank

## AIR/OIL TANK (ST3TKS1)



For only **Air** tank use the code  
**ST3TKS1-A** ex: **ST3TKS1-A-2.5x10**

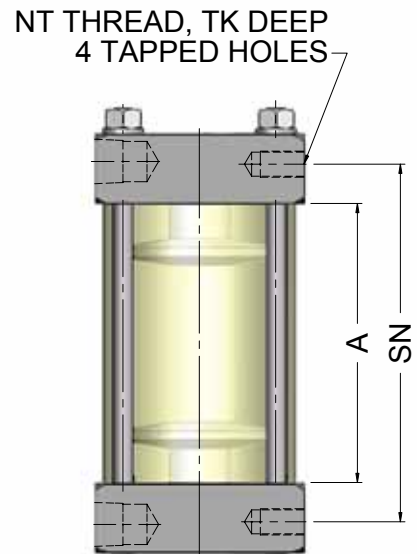
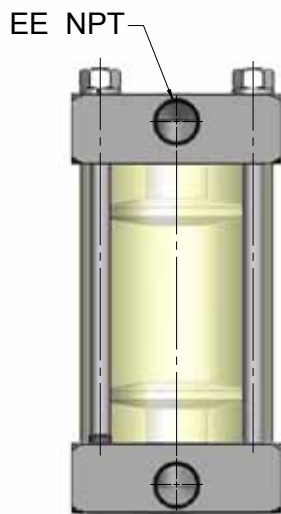
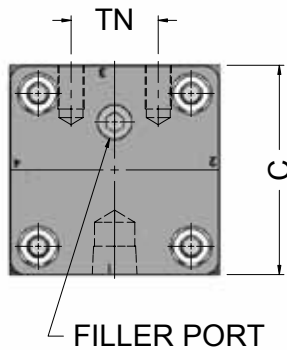
PART NUMBER & VOLUME				TANK DIMENSIONS						
				+ INTERNAL LENGTH		A	B	C	D	E
PART NO.	BORE	AREA	GALS PER INCH OF TANK	A	B	C	D	E	F	EE
<b>ST3TKS1-2.5</b>	2.50	4.90	0.0213	0	4	3	2 1/4	1 1/8	7/16	3/8
<b>ST3TKS1-3.25</b>	3.25	8.29	0.0359	0	5	3 3/4	2 3/4	1 3/8	9/16	1/2
<b>ST3TKS1-4</b>	4.00	12.56	0.0544	0	5	4 1/2	3 1/2	1 3/4	9/16	1/2
<b>ST3TKS1-5</b>	5.00	19.64	0.0850	0	5 1/4	5 1/2	4 1/4	2 1/8	11/16	1/2
<b>ST3TKS1-6</b>	6.00	28.00	0.1224	0	5 3/4	6 1/2	5 1/4	2 5/8	13/16	3/4
<b>ST3TKS1-8</b>	8.00	50.26	0.2175	0	6 5/8	8 1/2	7 1/8	3 9/16	13/16	3/4

HOW TO ORDER : Just use the internal length as suffix to the part number  
 Ex: **ST3TKS1-2.5X10**. Min Internal length (A) with Baffles: 3"



# STAR3 CYLINDERS - Air/Oil Tank

## AIR/OIL TANK (ST3TKS4)



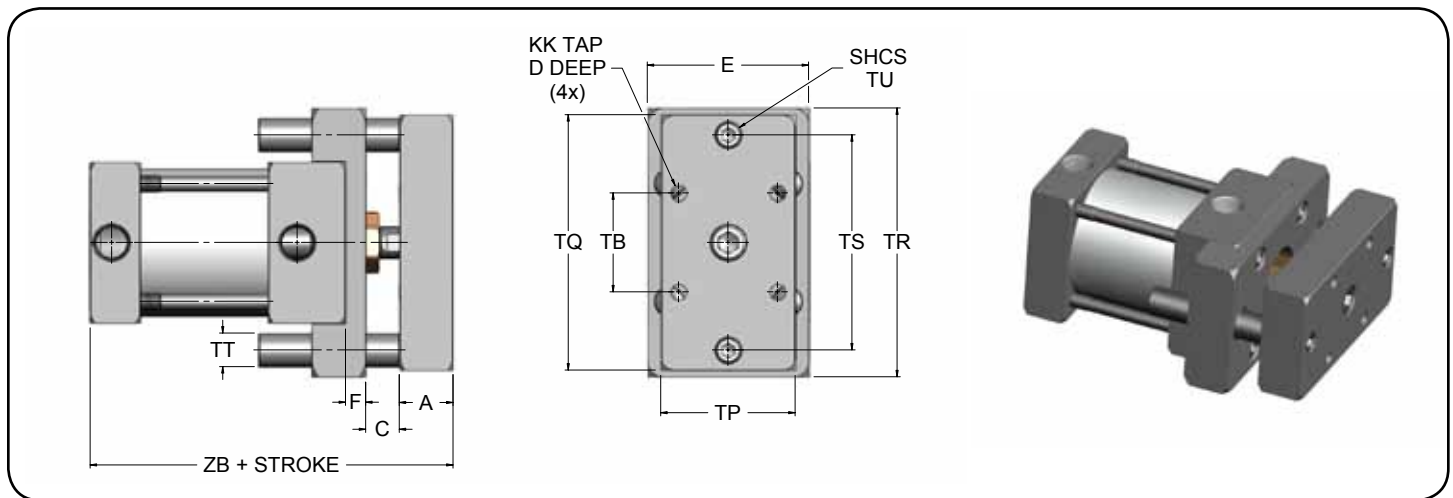
For only **A**ir tank use the code  
 ST3TKS4-**A** ex: ST3TKS4-**A**-2.5x10

PART NUMBER & VOLUME				+ INTERNAL LENGTH		TANK DIMENSIONS				
				A	SN	C	TN	NT	TK	EE
PART NO.	BORE	AREA	GALS PER INCH OF TANK							
ST3TKS4-2.5	2.50	4.90	0.0213	0	1 1/8	3	1 1/4	3/8-16	5/8	3/8
ST3TKS4-3.25	3.25	8.29	0.0359	0	1 3/8	3 3/4	1 1/2	1/2-13	3/4	1/2
ST3TKS4-4	4.00	12.56	0.0544	0	1 3/8	4 1/2	2 1/16	1/2-13	3/4	1/2
ST3TKS4-5	5.00	19.64	0.0850	0	1 3/8	5 1/2	2 11/16	5/8-11	1	1/2
ST3TKS4-6	6.00	28.00	0.1224	0	1 5/8	6 1/2	3 1/4	3/4-10	1 1/8	3/4
ST3TKS4-8	8.00	50.26	0.2175	0	1 5/8	8 1/2	4 1/2	3/4-10	1 1/8	3/4

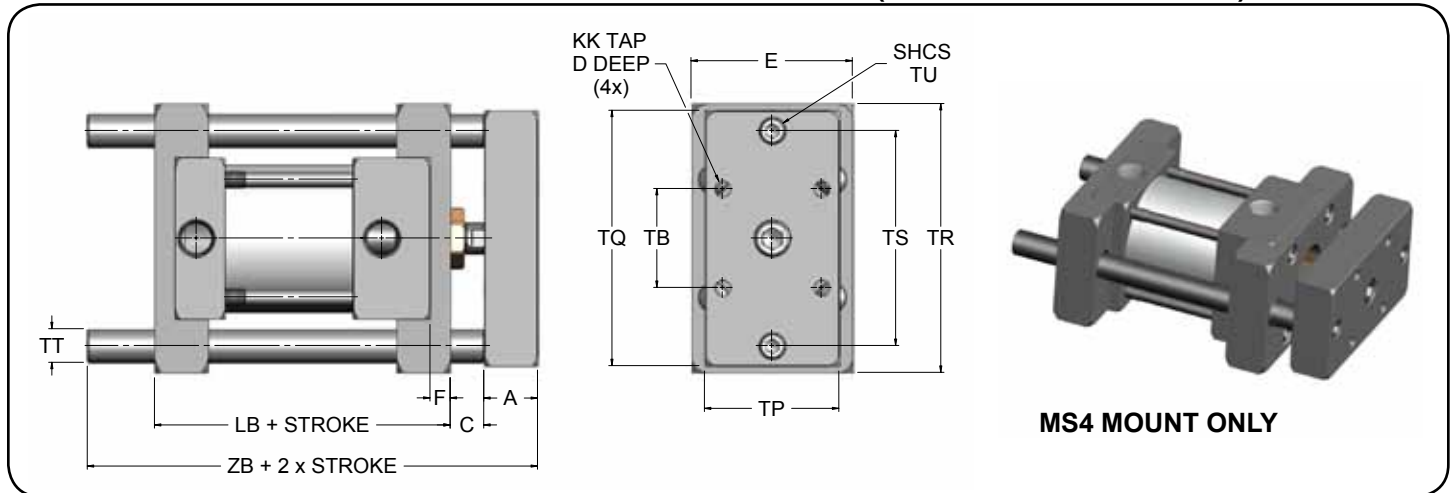
HOW TO ORDER : Just use the internal length as suffix to the part number  
 Ex: ST3TKS4-2.5X10. Min Internal length (A) with Baffles : 3"

# STAR3 CYLINDERS - NON ROTATING/SIDE

## NON ROTATING EXTERNAL SINGLE (OPTION -NRE)



## NON ROTATING EXTERNAL DOUBLE (OPTION -NRED)

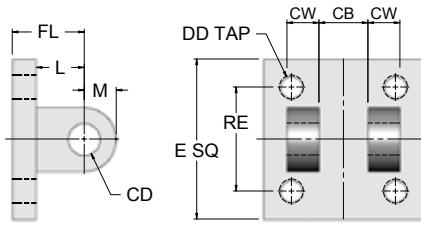


		-NRE AND -NRED DIMENSIONS									
		Bore	1.5	2	2.5	3.25	4	5	6		
<b>MP4 MOUNT</b>		A	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	<b>MX2 MOUNT</b>	
		C	5/8	5/8	5/8	3/4	3/4	3/4	7/8		
		D	3/4	3/4	1	1	1	1 1/4	1 1/2		
		E	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2		
<b>MP2 MOUNT</b>		F	3/8	3/8	3/8	5/8	5/8	5/8	3/4	<b>MT2 MOUNT</b>	
		KK	10-32	1/4-28	5/16-24	3/8-24	3/8-24	1/2-20	1/2-20		
		TB	1.12	1.43	1.84	2.19	2.78	3.32	4.12		
		TP	1 1/2	2	2 1/2	3	3 3/4	4 1/2	5 1/2		
<b>MP1 MOUNT</b>		TQ	3 3/4	4 1/4	4 3/4	6 1/2	7 1/4	8 1/4	10	<b>MF2 MOUNT</b>	
		TR	4	4 1/2	5	6 3/4	7 1/2	8 1/2	10 1/2		
		TS	3	3 1/2	4	5 1/4	6	7	8 1/2		
		TT	5/8	5/8	5/8	1	1	1	1 3/8		
		TU	5/16-24	5/16-24	5/16-24	1/2-20	1/2-20	1/2-20	5/8-18		
		ZB	5 5/8	5 5/8	5 3/4	6 7/8	6 7/8	7 1/8	8 1/8		

# STAR3 CYLINDERS - Accessories

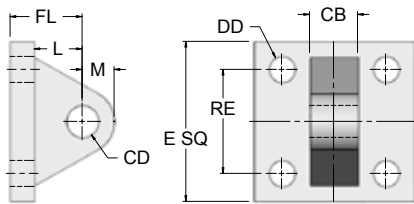


## NFPA CLEVIS BRACKET



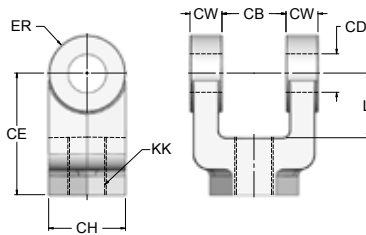
Part #	CB	CD PIN DIA.	CW	DD	E	FL	L	M	RE	USED WITH MP4
CB-05	.765	1/2	1/2	3/8-24	2 1/2	1 1/8	3/4	1/2	1 5/8	1.5, 2 & 2.5
CB-07	1.265	3/4	5/8	1/2-20	3 1/2	1 7/8	1 1/4	3/4	2 9/16	3.25, 4 & 5
CB-10	1.515	1	3/4	5/8-18	4 1/2	2 1/4	1 1/2	1	3 1/4	6, 7 & 8
CB-13	2.032	1 3/8	1	5/8-18	5	3	2 1/8	1 3/8	3 13/16	8, 10 & 12
CB-17	2.531	1 3/4	1 1/4	7/8-14	6 1/2	3 1/8	2 1/4	1 3/4	4 15/16	10 & 12

## NFPA EYE BRACKET



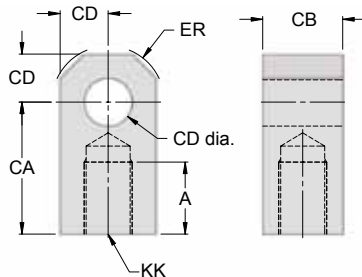
Part #	CB	CD PIN DIA.	DD	E	FL	L	M	RE	USED WITH MP1 & MP2
EB-05	.750	1/2	13/32	2 1/2	1 1/8	3/4	1/2	1 5/8	1.5, 2 & 2.5
EB-07	1.25	3/4	17/32	3 1/2	1 7/8	1 1/4	3/4	2 9/16	3.25, 4 & 5
EB-10	1.50	1	21/32	4 1/2	2 1/4	1 1/2	1	3 1/4	6, 7 & 8
EB-13	2.00	1 3/8	21/32	5	3	2 1/8	1 3/8	3 13/16	8, 10 & 12
EB-17	2.50	1 3/4	29/32	6 1/2	3 1/8	2 1/4	1 3/4	4 15/16	10 & 12

## NFPA ROD CLEVIS



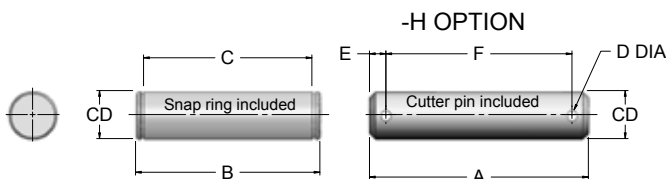
Part #	CB	CD PIN DIA.	CE	CH HEX.	CW	ER	KK	L
RC-05	.765	1/2	1 1/2	1	1/2	1/2	7/16-20	3/4
RC-07	1.265	3/4	2 3/8	1 1/4	5/8	3/4	3/4-16	1 1/4
RC-10	1.515	1	3 1/8	1 1/2	3/4	1	1-14	1 1/2
RC-13	2.032	1 3/8	4 1/8	2	1	1 3/8	1 1/4-12	2 1/8
RC-17	2.531	1 3/4	4 1/2	2 3/8	1 1/4	1 3/4	1 1/2-12	2 1/4
RC-20	2.531	2	5 1/2	2 15/16	1 1/4	2	1 7/8-12	2 1/2

## NFPA ROD EYE



Part #	A	CA	CB	CD PIN DIA.	ER	KK
RE-05	3/4	1 1/2	3/4	1/2	5/8	7/16-20
RE-07	1 1/8	2 1/16	1 1/4	3/4	7/8	3/4-16
RE-10	1 5/8	2 13/16	1 1/2	1	1 3/16	1-14
RE-13	2	3 7/16	2	1 3/8	1 9/16	1 1/4-12
RE-17	2 1/4	4	2 1/2	1 3/4	2	1 1/2-12
RE-20	3	5	2 1/2	2	2 1/2	1 7/8-12

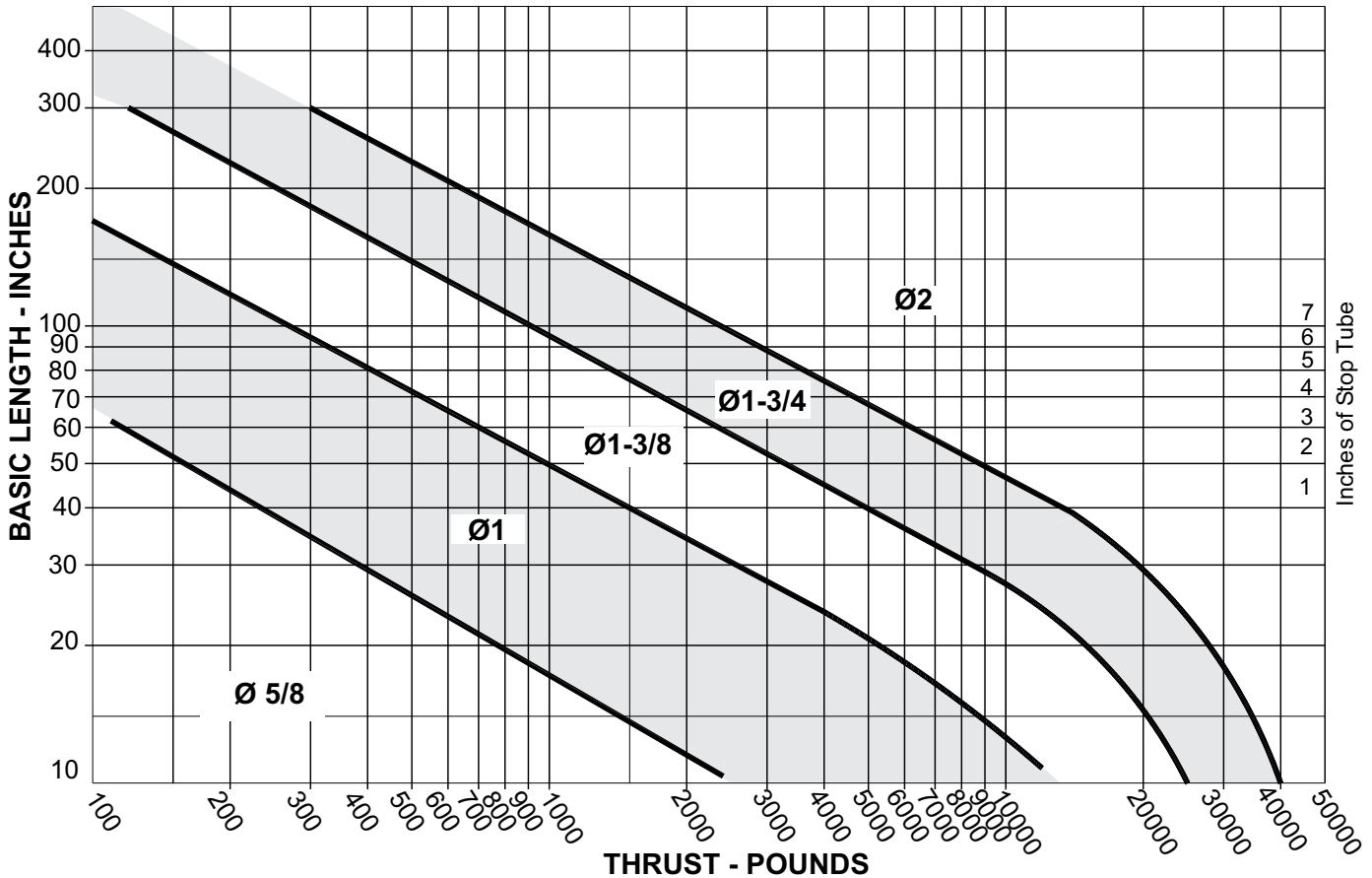
## NFPA PIN



Part #	CD	A	B	C	D	E	F
P-05	1/2	2.281	2.094	1.875	0.106	0.172	1.938
P-07	3/4	3.094	2.875	2.625	0.140	0.188	2.719
P-10	1	3.594	3.375	3.125	0.140	0.188	3.219
P-13	1 3/8	4.656	4.485	4.187	0.173	0.203	4.25
P-17	1 3/4	5.656	5.547	5.188	0.173	0.219	5.250
P-20	2	5.719	5.547	5.188	0.204	0.234	5.281

# STAR3 CYLINDERS - Rod and stop tube selection

## ROD DIAMETER CHART



### ROD SIZE SELECTION

To determine the minimum recommended piston rod dia for your application:

- 1) Determine the cylinder thrust using the force volume chart. (Page 4) (Thrust equals bore area multiplied by the operating pressure.)
- 2) Select from the diagram beside the type of mounting you will use.
- 3) Determine the basic length by multiplying the real stroke by the stroke factor.
- 4) Enter the graph along the values of "basic length" and "Thrust".

The stripe within which these lines intersect represents the minimum recommended piston rod diameter.

### STOP TUBE SELECTION

Stop tubes are installed between the piston and the head on long stroke cylinders to reduce the load on the bearing. That, in turn, reduces bearing wear and tendency to buckle.

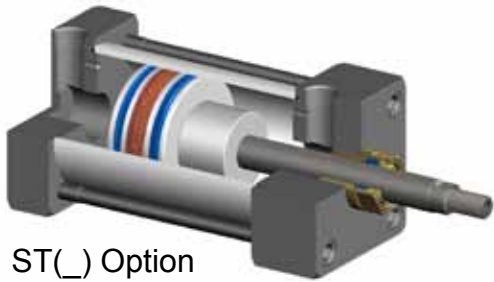
To determine if a stop tube is required and, if so, its length, first determine the "basic length" from the diagram. Step 1, 2 & 3 of The Rod Selection.

If the "basic length" is less than 40", no stop tube is needed. If its over than 40", a one-inch stop tube is recommended for every 10" (or fraction thereof) over 40"  
**See Page 30 on Stop Tube Option and how to Order**

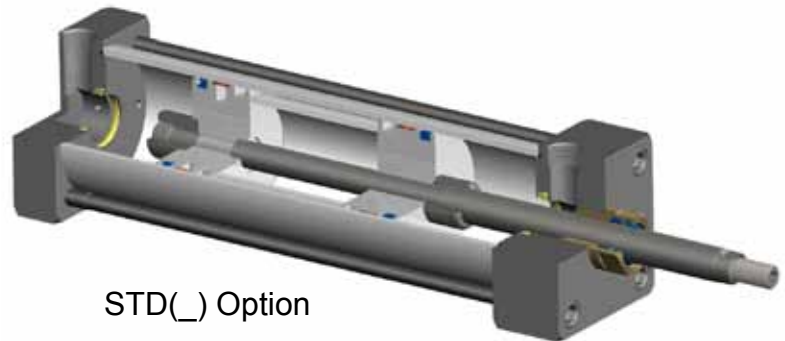
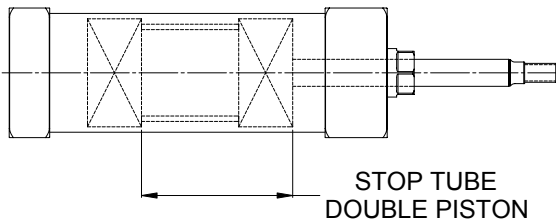
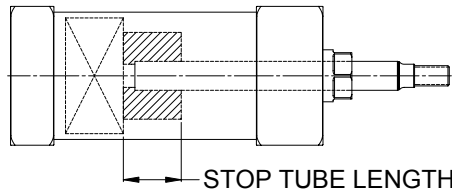
MOUNTING STYLE		ROD END CONNECTION	STROKE FACTOR
<b>Center line Mounting</b> Centerline mounting places the mounting bolts in simple shear or simple tension so that the mechanism is protected from compound forces. Centerline mounting is a rigid mounting style and this requires accurate cylinder alignment to prevent damage to the cylinder working parts. Mountings are : MX1, MX2, MX3, MF1, MF2, ME3, ME4.		 Fixed & Rigidly Guided	0.50
		 Pivoted & Rigidly Guided	0.70
		 Supported but not Rigidly Guided	2.00
		 Unsupported	4.00
<b>Pivot Mounting</b> Pivot mounting is used when the cylinder must pivot during piston motion. Clevis and Trunnion mounts are two methods used to allow this motion. The Clevis end design locates the pivot point at the cap end of the cylinder. Trunnion mounting uses the head or the cap of the cylinder to allow it to pivot at any of the two locations. The Mountings are: MP1, MP2, MP4, MT1, MT2, MT4.	MT1 TRUNNION ON HEAD END	 Pivoted & Rigidly Guided	1.00
	MT4 INTERMEDIATE TRUNNION	 Pivoted & Rigidly Guided	1.50
	MT2 TRUNNION ON CAP END	 Pivoted & Rigidly Guided	2.00
	MP1, MP2, MP4 CLEVIS ON CAP	 Pivoted & Rigidly Guided	2.00

# STAR3 CYLINDERS - Options

## Stop Tube Design



ST(\_) Option



STD(\_) Option

### Stop Tube

Option Code **ST(\_)** or **STD(\_)**

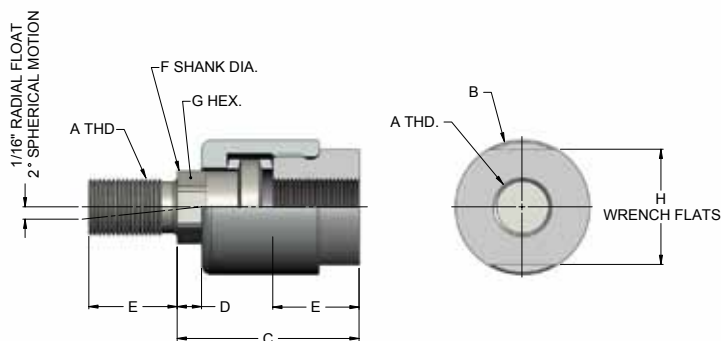
Enhances the transverse load carrying capability of a long stroke cylinder by increasing the distance between the piston and the rod bearing at full extension when placed on head end. Ideal for applications requiring longer strokes or where additional rod stability is desired. Specify stop tube length when ordering.

Starcyl supplies two types of stop tubes for air cylinders. A cylinder with over two inches of stop tube, cushioned or not, utilizes dual piston construction **STD(\_)** option for added bearing surface as well increasing distance between bearings. A cylinder requiring a stop tube under two inches uses a spacer only and only non cushion **ST(\_)** Option.

### How To Order Stop Tube option

ex: ST3-3.25x60-STD4 is a 3.25" bore with 60" Net stroke and a dual piston stop tube of 4" long, for a total gross stroke of 64" (must be used to calculate overall length "LB").

## Linear Alignment Couplers



**Starcyl's linear alignment couplers** extend the bearing and seal life of your cylinders. Our couplers prevent binding and erratic movement that misalignment causes, which eventually wears down your cylinders. Not only do Starcyl couplers work equally well in "push" and "pull" applications, but they allow a greater tolerance between the cylinder center line and the mating member.

\* Use jam nut to lock coupler to rod when used with full diameter threads.

Part #	A	B	C	D	E	F	G	H	MAX PULL AT YIELD
AC-250F	1/4-28	7/8	1 1/4	1/4	5/8	0.245	3/16	13/16	6000
AC-312F	5/16-24	7/8	1 1/4	1/4	5/8	0.308	1/4	13/16	8300
AC-375C	3/8-16	7/8	1 1/4	1/4	5/8	0.369	5/16	13/16	5000
AC-375F	3/8-24	7/8	1 1/4	1/4	5/8	0.370	5/16	13/16	8300
AC-437F	7/16-20	1 1/4	2	1/2	3/4	5/8	9/16	1 1/8	10000
AC-500C	1/2-13	1 1/4	2	1/2	3/4	5/8	9/16	1 1/8	14000
AC-500F	1/2-20	1 1/4	2	1/2	3/4	5/8	9/16	1 1/8	14000
AC-625F	5/8-18	1 1/4	2	1/2	3/4	5/8	1/2	1 1/8	14000
AC-750C	3/4-10	1 3/4	2 5/16	5/16	1 1/8	31/32	7/8	1 1/2	34000
AC-750F	3/4-16	1 3/4	2 5/16	5/16	1 1/8	31/32	7/8	1 1/2	34000
AC-875F	7/8-14	1 3/4	2 5/16	5/16	1 1/8	31/32	7/8	1 1/2	34000
AC-1000C	1-8	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1000F	1-14	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1250F	1 1/4-12	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1375F	1 3/8-12	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1500F	1 1/2-12	3 1/4	4 3/8	13/16	2 1/4	1 3/4	1 1/2	3	134000
AC-1750F	1 3/4-12	3 1/4	4 3/8	13/16	2 1/4	1 3/4	1 1/2	3	134000
AC-1875F	1 7/8-12	3 3/4	5 7/16	11/16	3	2 1/4	1 7/8	3 1/2	240000
AC-200F	2-12	3 3/4	5 7/16	11/16	3	2 1/4	1 7/8	3 1/2	240000



# STAR3 CYLINDERS - Hall Effect & Reed switches

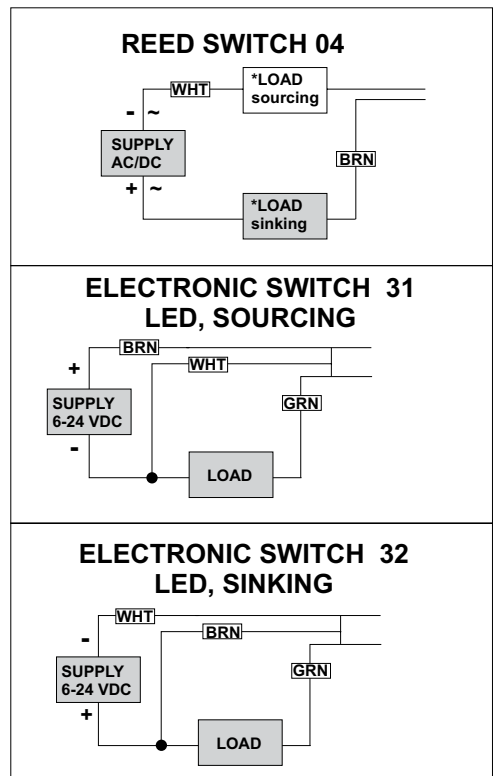
**Reed switches** are constructed of two overlapping ferromagnetic reeds which are sealed in a glass tube with the ends aligned and a small gap between them. When an external magnetic force is applied, the reed assumes opposite polarity, the ends of the reeds attract each other and make contact, completing the circuit. Reed switches are not recommended in sensitive areas since they can introduce electrical noise into the circuit due to bounce and vibration from mechanical closing of the reeds.

**Hall Effect switches** are solid state switches with no moving parts. The solid state switches is activated when the silicon chip (Hall) senses a magnetic field. Since there are no moving parts, Hall effect switches can operate in sensitive areas without sending interference or noise into the circuit.

## Switch specifications

Switch part Number	862-100-004	862-100-031	862-100-032
Spec	Reed switch, MOV, LED	Electronic Sensor, LED, Sourcing	Electronic Sensor, LED, Sinking
Cable Length	9 ft PVC Cable		
Switching Voltage	5-120 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	0.5 Amp Max .005 Amp Min	0.5 Amp Max	0.5 Amp Max
Switching Power	10 Watts Max.	12 Watts Max.	12 Watts Max.
Switching Speed	0.5 $\mu$ s operate 0.1 $\mu$ s release	1.5 $\mu$ s operate 0.5 $\mu$ s release	0.5 $\mu$ s operate 0.1 $\mu$ s release
Voltage Drop	3.5 Volts	1.0 Volts	1.0 Volts
Temperature Range	-20' to 80' C -4' to 176' F		
Switch Function	SPST Normally Open	Normally Open PNP output	Normally Open NPN output
Shock	Up to 30G (11 msec.)	-	-
Vibration	Up to 20G (10-55 Hz)	-	-

## Wiring Diagrams



## How To Order

*Order Clamp Separately see below*

**862 - 100 - X XX**

Series	Connections	Type Code
862	0 -9ft PCV wire	02 - Reed switches
762	1 - 8 mm Quick Connect with Pigtail (std)	04 - Reed switches
	3 -8 mm Quick Connect	31 - Hall Effect PNP
		32 - Hall Effect NPN

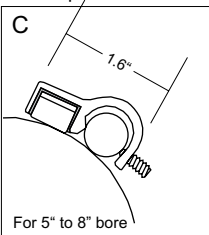
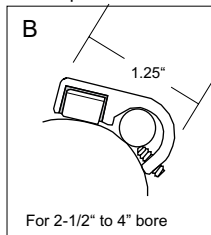
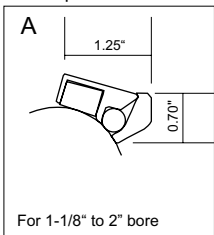
*quick connect switches available*

**To Order Switch Clamp Use:** (no charge when ordered with switches)

A clamp = 800-A00-000

B clamp = 800-B00-000

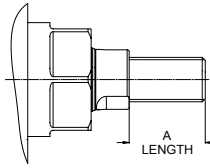
C clamp = 800-C00-000



## Clamp dimensions



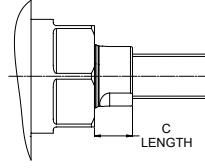
# STAR3 CYLINDERS - Basic Options



## Thread Extension

### Option code A=( )

Piston Rod Thread Extension can be ordered over standard. To order add option code A=( ) and specify "A" length.  
Ex: ST3-3.25X4-A=2 will have an additional 7/8" to the standard 1-1/8" thread length.

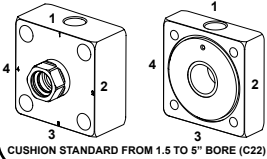


## Rod Extension

### Option code C=( )

Piston Rod Extension can be order over standard. To order add option code C=( ) and specify "C" length  
Ex: ST3-3.25X4-C=1.5 will have an additional 1" to the standard C=1/2".

## Port & Adjustable Cushion Location

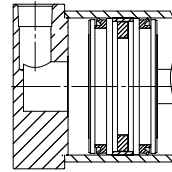


### Option code N( )C( )

Specify optional location, N11C22 default, Non Cushion use C00

For standard head and cap relocation use: Ex N13C24, is Port head in 1, Cap port in 3, Cushion Head in 2, Cushion cap in 4. ex: N1C3 can be use when head & cap are similar.

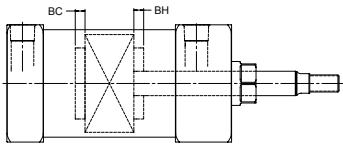
CUSHION STANDARD FROM 1.5 TO 5" BORE (C22)



## Magnetic Piston

### Option Code M

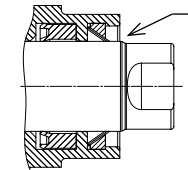
When position sensing of the cylinder is required, a Magnetic Ring Must be added. The Magnetic ring is placed at the center of the piston under the wear band. The magnetic band will create a magnetic field which will actuate the sensor. Option code M



## Bumper

### Option code HB, CB & B

Urethane impact dampening bumpers, used when speeds do not allow for standard cushions. CB=Cap Bumper, HB=Head Bumper, B=Bumper Both ends (note: each bumper reduces 1/8" to cylinder length)



## Metallic Rod Scraper

### Option RS

Aggressively Scrapes the exposed portion of the piston rod free of weld splatter, paint spray, abrasive powders or many other foreign materials that could damage the rod seal.

## Electroless Nickel

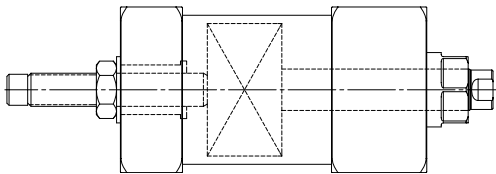
### Option Code EN

The properties of Electroless nickel contribute to the multitude of uses. The coating provides an attractive finish, while exhibiting high abrasion and corrosion resistance. Its ability to uniform coat blind holes, threads, internal surfaces and sharp edges contributes to its effectiveness. It has a very high bonding strength to the base metal. Coating can be done on aluminum, steel, cast iron, etc

## Non Adjustable Cushion

### Option Code CNN

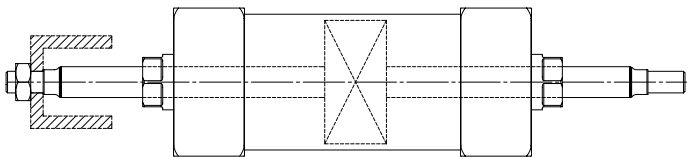
Mostly use with the IR option, this option consists of removing the two needle valves and a bigger orifice for air escaping by the port when piston spud is sealing the cushion seal. (also cost effective)  
Use this option also to avoid people to desajust the needle valve of a cushion that can change the cycle of the machine.



## Adjustable Stroke

### Option Code ASU( )

Provides variable reduction of the retract stroke and serves as a positive stop for the cylinder piston. Consist of a threaded stud located in the cap end of the cylinder. Socket head cap screw loctite at the end of the adjustment stud allow simple yet precise positioning to accommodate varying retract stroke requirements. Must specify adjustment stroke length. Ex: -ASU1.5

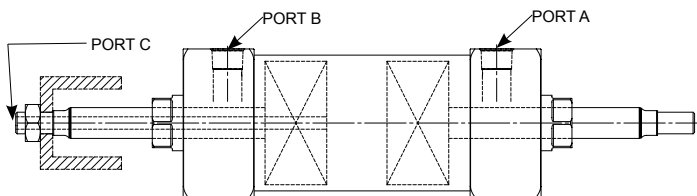


## Double rod Adjustable Stroke (Extend)

### Option Code ASE( )

Consist of a double rod cylinder and a adjustable stop collar. Used to adjust the extend cylinder stroke. Stroke up to 120" available. (Adjustments to 12" available)

To order, Specify ASE and length adjustment.  
Ex: ASE4 = 4" of adjustment



## Adjustable Mid Stroke

### Option Code ASM( )

Design similar to the option ASE, this option consist of a 3 position cylinder with a double piston design that allow adjustment of the mid stroke position. Cylinder with three port and an adjustable collar.

To order, Specify ASM and length adjustment.  
Ex: ASM4 = 4" of adjustment

# STAR3 CYLINDERS - Basic Options

## Low Friction

### Option code LF

Low friction option incorporates the use of round lip, Extremely low friction carboxylated nitrile seals. Round lip seals "hydroplane" on opposed sealing surfaces, and have a lower Running and break away friction 2-3 Psi. (Standard seal will have min operating pressure at 5 Psi)

## Viton Seals

### Option code V

Fluorocarbon will be chosen for higher temperature range from 200°F to 400°F (200°C)

For Chemical resistance our standard Blue Seals will Outstand Viton by far in most chemical Application and wear resistance. Resists most wash down application.

## Steel Tubing

### Option code STU

For applications requiring a cylinder that can withstand higher side loading, resistance to denting. Starcyl has offered Steel Tubing for years in the Lumber, Mine and other industries that typically used 100% all steel Cylinders. (Hydraulic grade steel tubing honed with **StarNite** ID and OD Corrosion Resistant with a hard layer on the ID and OD for wear resistance.

## Stainless Steel Tie rods and Rod

### Option Code S1, S2, S3 & SSR

SST : Stainless Tie rods, Available in stainless 303/304

S1 303 Chromed, S2: 17-4 PH Chromed, S3 316 rod:

(Please note that our **StarNite** process can be used to replace Stainless in most application that require Corrosion resistance with a better cost, resistant to Caustic WashDown)

## Under Size Port

### Option code N02, N04, N06, N08, N12

N02 = 1/8 Npt, N04 = 1/4 Npt, N06= 3/8 Npt, N08 = 1/2 Npt, N12= 3/4 Npt

You can order cylinder with undersize port, require longer lead time if not in stock. (SPECIFY N021N021 HEAD AND CAP 1/8 NPT IN POSITION 1)

## Chrome Rod Or Nitrotec Rod

### Option Code R1 or NI

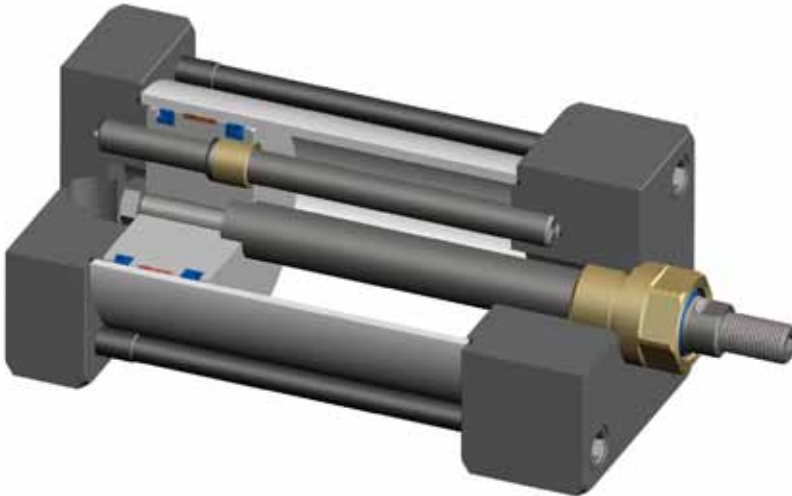
We still can supply old technologie, for that matter you can request Chrome Rod (R1) Or Nitrotec Rod (Ni).

## Non Rotating Internal

### Option code NRI

Available from 2" through 12" bore.

Design with one or two Guide Rods internally, keeps all external dimensions the same. Application like Pick and place, Clamping, Marking, Pressing. (IR option not available with this option)



NRI GUIDE ROD SIZES AND MAX STROKE

BORE	ROD DIA.	CUSHIONS	GUIDE ROD DIA	MAX STROKE
2	5/8 standard	N/A	.250	10"
2.5	5/8 standard	N/A	.312	12"
	1" oversize	N/A	.312	12"
3.25	1" Standard	Available	.375	18"
	1 3/8" Oversize	Cap Only	.375	18"
4	1" Standard	Available	.625	30"
	1 3/8" Oversize	Available	.625	30"
5	1" Standard	Available	.625	30"
	1 3/8" Oversize	Available	.625	30"
6	1 3/8" Standard	Available	.625	30"
	1 3/4" Oversize	Available	.625	30"
8	1 3/8" Standard	Available	1.000	40"
	1 3/4" Oversize	Available	1.000	40"
10	1 3/4" Standard	Available	1.000	40"
	2" Oversize	Available	1.000	40"
12	2" Standard	Available	1.000	40"
	2 1/2" Oversize	Available	1.000	40"

## Combination of Mounting

Combination mount part numbers can be constructed by adding a Slash (/) between the desired mounts in the part number.

Example: 5" Bore with 12" Stroke, Head and Cap Cushions, Magnetic Piston and having an MS2E and MP2 Mount: Part Number: **ST3S2E/P2-5 X 12-M**



# STAR3 CYLINDERS - Basic Options

## Hydraulic 400 PSI Non shock

### Model Code ST3H

By changing some of the seals the Aluminum Construction cylinder will be able to operate in hydraulic low pressure. (Non Cushion Only)

## Your Special Option

Starcyl is well known for their fast response to custom application, so let us quote your special requirements in cylinders. Model Code **SPxxxx**

## END OF STROKE SENSOR

### Option Code **G(\_)** & **GS(\_)**

GO Switches are simple and built to last. With only one moving part and no metal-to-metal contact forcing it to move, there is nothing to wear out!

Must Indicate Position. Ex : G3 switch will be in position 3

#### Options Available

- Explosion Proof
- SPDT or DPDT
- HiTemp™ to 400°F
- SubSea™ Submersible
- Hermetically Sealed
- High Pressure to 10,000 psi

#### How it Works

When the ferrous cushion of a cylinder enters the sensing area of the switch, it attracts the primary magnet, which pulls the connecting rod forward. As a result, the common contact snaps to its operated position, closing the other contact circuit. When the target is removed the common contact automatically returns to its original unoperated position.



Option Code **G**



Option Code **GS**

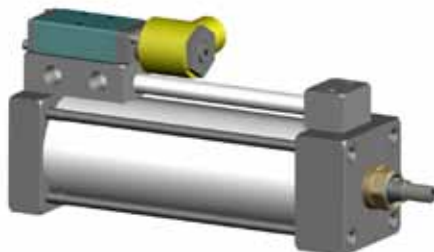
## OVER OVERSIZE ROD OPTION



4" bore, 2" rod diameter, triple oversize Rod, with a one pcs steel head trunnion with cushion.  
ST3O3T1X-4X8-#2

ROD SIZE AVAILABLE PER BORE

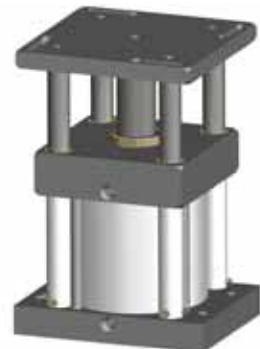
BORE	5/8	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4	4 1/2	5
1.5	✓	✓									
2	✓	✓	✓								
2.5	✓	✓	✓	✓							
3.25		✓	✓	✓	✓						
4		✓	✓	✓	✓	✓					
5		✓	✓	✓	✓	✓	✓	✓			
6			✓	✓	✓	✓	✓	✓	✓		
7			✓	✓	✓	✓	✓	✓	✓	✓	
8			✓	✓	✓	✓	✓	✓	✓	✓	✓
10				✓	✓	✓	✓	✓	✓	✓	✓
12					✓	✓	✓	✓	✓	✓	✓



Cylinder with Manifold Cap Mount for the valve and including pipe to the head end with a small manifold. (Explosion Proof Valve Shown)



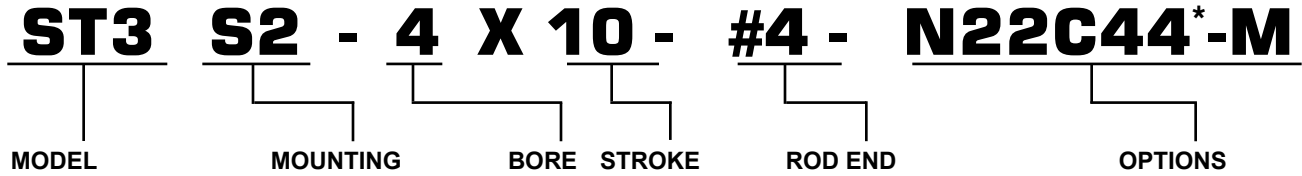
High Speed Cycling Cylinder with a single Manifold porting the cap as well as the head. (Narrow Namur Valve Shown)



**Lifter 4 Post.** Ex: 5" bore, 4" stroke, main rod 1.75" dia and the 4 post at 1" dia. The post are garded by thin wall tubing.

# STAR3 CYLINDERS - How to Order

*\* Leave it blank if it's a standard option*

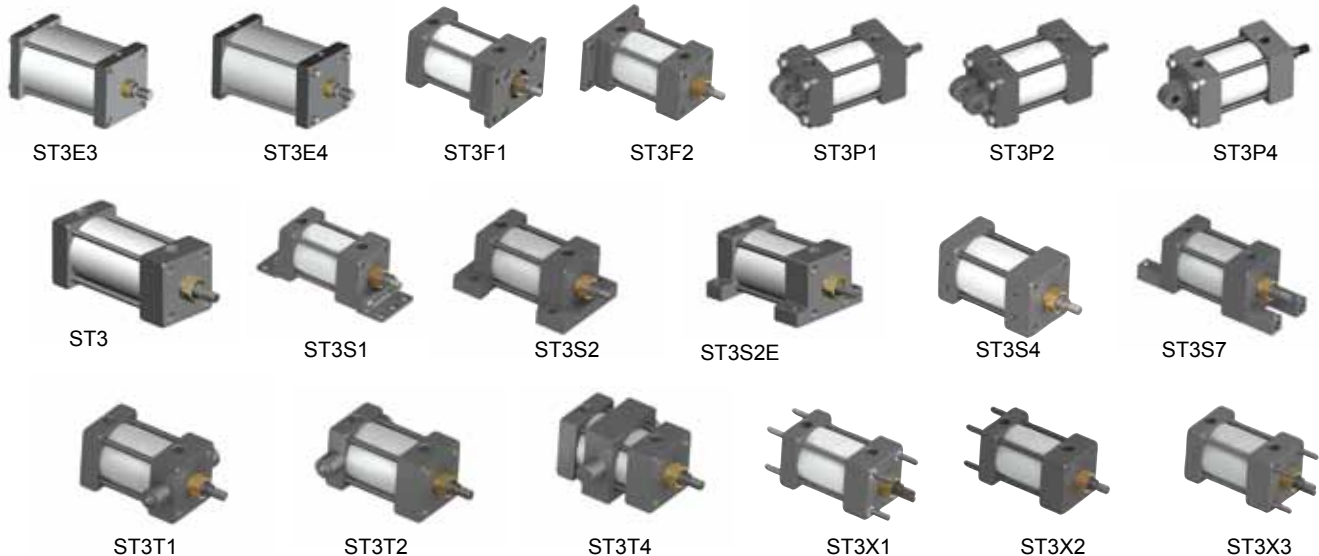


<b>ST3</b>	BASIC MODEL	BASIC MOUNT	1.5	1	<b>#1</b>	MALE, large	<b>N( )</b>	PORT POSITION (N11* standard)
<b>ST3O</b>	OVERSIZE ROD	<b>E3</b>	2	2	<b>#1F</b>	MALE, full	<b>C( )</b>	CUSHION POSITION (C22* Standard)
		<b>E4</b>	2.5	3	<b>#2</b>	MALE, small	<b>CNN</b>	NON ADJUSTABLE CUSHION
<b>ST3IR</b>	IMPACT REDUCTION	<b>F1</b>	3.25	4	<b>#2S</b>	MALE, studded	<b>C=( )</b>	ROD EXTENSION (specify C dim)
		<b>F2</b>	4	5	<b>#4</b>	FEMALE	<b>A=( )</b>	THREAD EXTENSION (specify A dim)
<b>ST3D</b>	DOUBLE ROD	<b>P1</b>	5	6	<b>#5</b>	FLANGE COUPLING	<b>RS</b>	ROD SCAPER
<b>ST3H</b>	HYDRAULICS 250 PSI	<b>P2</b>	6	7	<b>#6</b>	FLUSH/CHAMFER	<b>M</b>	MAGNET
		<b>P4</b>	7	8	<b>#X</b>	SPECIAL ROD END	<b>V</b>	VITON**
<b>ST3BB</b>	BACK TO BACK		8	10			<b>AS( )</b>	ADJUSTABLE STROKE UP
<b>ST3TD</b>	TANDEM	<b>S1</b>	10	12			<b>NRE</b>	NON ROTATING EXTERNAL
<b>ST3MP</b>	MULTI POSITION	<b>S2E</b>	12	ETC			<b>NRED</b>	NON ROTATING EXT .DOUBLE
		<b>S2</b>					<b>NRI</b>	NON ROTATING INTERNAL
<b>ST3T</b>	TRUCK APPLICATION	<b>S4</b>					<b>S/T( )</b>	STOP TUBE
		<b>S7</b>					<b>R1</b>	CHROMED ROD
							<b>R2</b>	INDUCTION HARD CHROMED
		<b>T1</b>					<b>S1</b>	STAINLESS 303 CHROMED
		<b>T2</b>					<b>S2</b>	17-4 PH-STAINLESS CHROMED
		<b>T4</b>					<b>S3</b>	316 CHROMED
		<b>X1</b>					<b>STU</b>	STEEL TUBING
		<b>X2</b>					<b>SST</b>	STAINLESS STEEL TIE RODS
		<b>X3</b>						

*\* Leave it blank if it's a standard option*

Example : is a STAR3 series, 4" Bore, 10" Stroke, Side Lug Mount, Female rod End, Port Position 2, Cushion Position 4 and with a magnet on the piston.

To order seal kits add the prefix ST3SK to the bore and the rod size ex: ST3SK-4000-1000 (for viton seals add suffix -V).  
For Gland Bushing kit add the prefix ST3BK to the rod dia. ex: ST3BK-1000







# STARCYL CYLINDERS

**STARCYL CYLINDERS**  
SPACE SAVER AIR CYLINDERS

**SINGLE OR MULTI-STAGE**  
THE ONLY CYLINDER UPGRADABLE!

**Not Enough Force  
Don't Change The Design  
Add A Stage!**

**STAR 1 SERIES**

**STAR1 - Multistage  
Upgradable air cylinders**

**STARCYL CYLINDERS**  
SPACE SAVER

- Bore size from 1/2" to 10"
- Stroke up to 40"
- Save Space up to 35% based on 1 inch bore
- 250 PSI AIR, OIL
- Two-Year Warranty
- Economic design

**STAR2 SERIES**

**NEMA STYLE MOUNT**

**STAR2 - NFA style  
Mount spacesaver air  
cylinders**

**STARCYL AIR CYLINDERS**  
**SPACE ONE**  
Space. The Final Frontier.

**Space Saver  
Air Cylinders**

**SO - Space One,  
Spacesaver Air Cylinder**

**STARCYL AIR CYLINDERS**  
**NFA  
ROD LOCK  
CYLINDER**

**ST3RL  
option**

FEATURES	BENEFITS
No Rod Displacement on Engagement	Maintains Accurate Positioning
Large Clamping Surface	Consistent Clamping Force
PET Based (replaces NEMA key)	Suitable for Wash-Down Areas
Fast Response Time	High Cycle Rates, Accuracy
Extremely Low Backlash	Precision Holding
Spring Engaged Units	Hold Load During Power/Pressure Loss
Stroke up to 200,000 Cycles	Long Maintenance-Free Life
4 bar (60 psi) Release Pressure	Compact Unit, Easy Integration
	Broad Application

**ST3RL - NFA Rod  
Lock for STAR3 air cylin-  
ders**

**STARCYL CYLINDERS**  
MEDIUM DUTY HYDRAULICS

**MEDIUM DUTY SERVICES  
INDUSTRIAL TIE ROD CONSTRUCTION**

**STAR5 SERIES**

STANDARD BORE SIZES 1.5" THROUGH 8"  
PISTON ROD DIAMETERS 3/8" THROUGH 5.12"  
20 STANDARD MOUNTING STYLES  
STANNITE AVAILABLE ON EVERY STEEL PARTS

**STAR4 - Heavy Duty  
NFA interchangeable  
air cylinders  
Steel Construction**  
**STAR5 - Medium Duty  
NFA interchangeable  
Hydraulic cylinders  
Steel Construction**

**STARCYL CYLINDERS**  
HEAVY DUTY  
Hydraulic Cylinders

**HEAVY DUTY SERVICE  
INDUSTRIAL TIE ROD CONSTRUCTION**

**STAR6 SERIES**

NOMINAL PRESSURE: 3000 PSI  
STANDARD BORE SIZES 1.5" THROUGH 6"  
PISTON ROD DIAMETERS 5/8" THROUGH 4"  
13 STANDARD MOUNTING STYLES  
STANNITE™ AVAILABLE ON ALL STEEL PARTS

**STAR6 - Heavy Duty  
NFA interchangeable  
Hydraulic cylinders,  
3000 psi**

**STARCYL AIR CYLINDERS**  
MULTI-STAGES

**M3 SERIES**

MULTI-STAGES NFA STYLE MOUNT  
HEAVY DUTY - HIGH FLOW  
NOMINAL PRESSURE: AIR 250 PSI  
STANDARD BORE SIZES 1.5" THROUGH 10"  
STROKE UP TO 12"  
NFA STYLE MOUNT  
TWO-YEAR WARRANTY

**M3 - Heavy Duty NFA  
Multi-stages air cylinders  
High Flow**

**STARCYL CYLINDERS**

**ISOMETRIC  
SERIES**  
AIR CYLINDER ISO VDMA  
ISO 6032 & 15552

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**STMM - Isometric series  
ISO 6432 & 15552  
Air Cylinder**

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**ST3-JUNE 11**