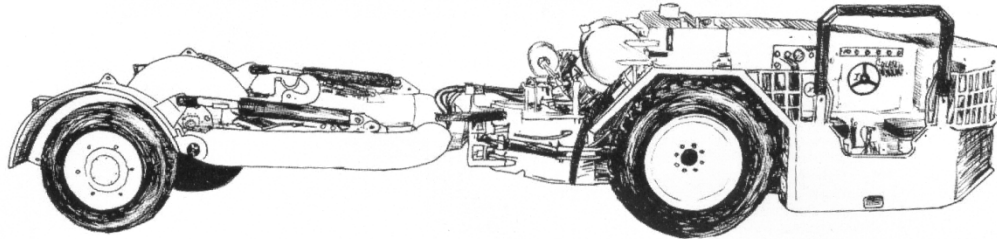




BLACKLINE SERIES HYDRAULIC CYLINDERS

For Mobile and Industrial
Applications . . .

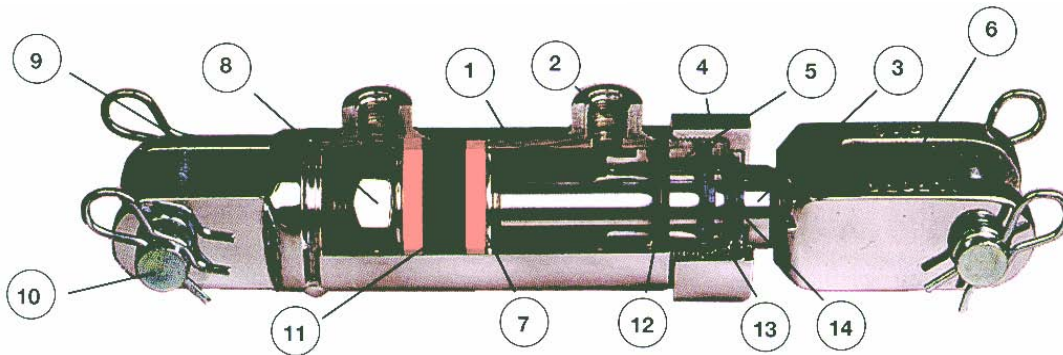


- * Available in 2 1/2", 3", 3 1/2", 4", 4 1/2", 5" and 6" Bore.
- * Standard strokes 4", 6", 8", 10", 12", 14", 16", 18", 20", 22", 24", 26", 28", 30", 36", 42" and 48" depending on Bore size. Others on application.
- * Large diameter Piston Rods for maximum Strength are standard, optional Rod Diameters available.
- * Working pressure up to 3000 p.s.i. [207 bar]. Varies according to Bore Diameter and length of Stroke.
- * Manufactured to ASAE Standard or customised on request.
- * Optional Clevis, Lug, Pin Eye, Trunnion or Flange Mounts.
- * ALFORD Cylinders carry a two year Conditional warranty.



**HYDRAULIC CYLINDERS THAT WORK HARDER
... LONGER**

CONSTRUCTION FEATURES:



- 1. BARREL:** Cold drawn seamless tubing, micro honed for maximum seal life. Heavy wall thickness for high safety factor, A.I.S.I grade 1026. Threaded O.D. for cap nut.
- 2. PORTS:** UN O-ring steel ports are standard. Refer standard and optional chart for sizes.
- 3. PISTON RODS:** Cromax 280 precision ground hard chrome plated, minimum chrome deposit .001" [15um].
- 4. CAP NUT:** Threaded Cap Nut Gland Retainer for ease of maintenance. No special service tools required.
- 5. GLAND:** High strength S.G. [Spheroidal Graphite] Iron having excellent shock and fatigue resistance.
- 6. ROD CLEVIS:** Pearlitic Malleable Iron [S.G.] for high strength with excellent shock resistance. Profiled steel clevis fitted to 6.00" [152.40mm] bore cylinders.
- 7. PISTON:** Steel split O-ring sealed to rod.
- 8. PISTON NUT:** Conelock type retaining nut.
- 9. CLEVIS END:** Fabricated steel.
- 10. CLEVIS PINS:** Zinc plated pins and clips supplied fitted to all standard clevis mount cylinders. Pins and clips not supplied Pin Eye or Lug type mpunts. Standard stock pin is 1" O.D. [25.40mm], optional pin size 1.25" O.D. [31.75mm] depending on bore size.
- 11. PISTON SEAL:** Hallite Type 58 Double Acting Fluid Seal flanked by two Delrin Wear Rings eliminating any metal to metal contact between piston and barrel. Pressure range to 6000 p.s.i. [414 bar] @ 1.50 ft/sec [0.50 mtr/sec] @ temperature range - 30/100°.
- 12. TUBE SEALS:** O-ring and back-up ring, 3/16" section [4.76mm] to seal tube to gland.
- 13. GLAND SEAL:** Single acting Hythane ® fluid seal rated to 6000 psi [414 bar].
- 14. ROD WIPER:** K-type rod wiper, double lip design for maximum internal protection.

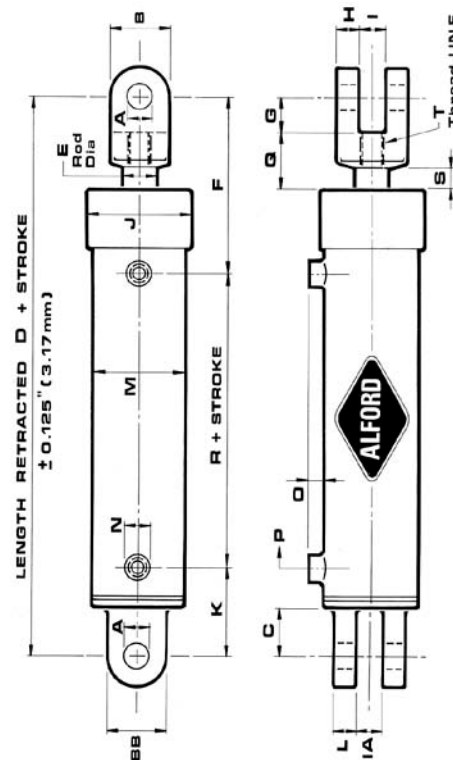
MOUNT OPTIONS

- PIN EYE:** Material to A.I.S.I. grade 1518.
- SINGLE LUGS:** Lug material mild steel to grade A.S. 1204-250 (new A.S. 3678-250), grade 350 on request.
- FLANGES:** Material mild steel to grade A.S. 1204-250 (new A.S. 3678-250), grade 350 on request.
- TRUNNIONS:** Material mild steel to grade A.S. 1204-250 (new A.S. 3678-250), grade 350 on request.

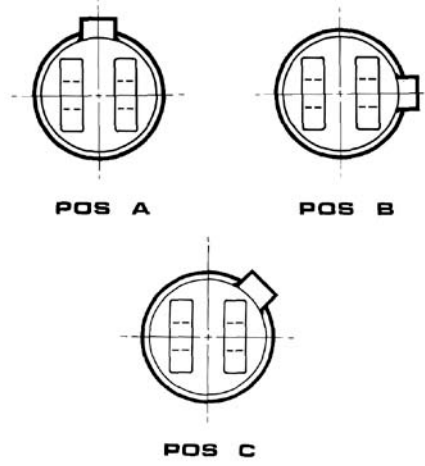
**ALFORD CYLINDER COMPONENTS ARE MACHINED ON
MODERN CNC MACHINES TO ENSURE ABSOLUTE PRECISION.**

ALFORD BLACKLINE CYLINDER DIMENSIONAL DATA

BORE DIA.	2.50" (63.50)	3.00" (76.20)	3.00" (HD) (76.20)	3.50" (88.90)	4.00" (101.60)	5.00" ASAE (127.00)	5.00" (HD) (127.00)	6.00" (152.40)
A +0.006" +0.008"	1.00" (25.40)	1.00" (25.40)	1.00" (25.40)	1.00" (25.40)	1.00" (25.40)	1.00" (25.40)	1.25" (31.75)	2.00" (50.80)
B	2.00" (50.80)	2.00" (50.80)	2.75" (69.85)	2.75" (69.85)	2.75" (69.85)	2.75" (69.85)	2.75" (69.85)	4.72" (120.00)
BB	1.97" (50.00)	1.97" (50.00)	1.97" (50.00)	2.56" (65.00)	2.56" (65.00)	2.56" (65.00)	2.56" (65.00)	4.72" (120.00)
C	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	3.50" (88.90)
D	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	14.25" (316.95)	19.25" (488.95)
E	1.50" (38.10)	1.50" (38.10)	1.75" (44.45)	1.75" (44.45)	1.75" (44.45)	2.00" (50.80)	2.00" (50.80)	3.00" (76.20)
F	6.50" (165.10)	6.50" (165.10)	6.50" (165.10)	6.50" (165.10)	6.50" (165.10)	6.50" (165.10)	7.25" (184.15)	10.375" (263.52)
G	2.25" (57.15)	2.25" (57.15)	2.25" (57.15)	2.25" (57.15)	2.25" (57.15)	2.25" (57.15)	2.25" (57.15)	3.50" (88.90)
H	0.6875" (17.46)	0.6875" (17.46)	0.787" (20.00)	0.787" (20.00)	0.787" (20.00)	0.787" (20.00)	0.787" (20.00)	1.30" (33.00)
I	1.1875" (30.16)	1.1875" (30.16)	1.125" (28.57)	1.125" (28.57)	1.125" (28.57)	1.125" (28.57)	1.125" (28.57)	2.125" (54.00)
IA	1.125" (28.58)	1.125" (28.58)	1.125" (28.58)	1.125" (28.58)	1.125" (28.58)	1.125" (28.58)	1.125" (28.58)	2.125" (54.00)
J	3.300" (83.82)	3.930" (99.82)	3.930" (99.82)	4.600" (116.84)	5.150" (130.81)	6.200" (157.48)	6.200" (157.48)	7.450" (189.23)
K	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	5.49" (139.5)
L	0.472" (12.00)	0.625" (16.00)	0.625" (16.00)	0.787" (20.00)	0.787" (20.00)	0.787" (20.00)	0.787" (20.00)	1.25" (31.75)
M	2.875" (73.02)	3.500" (88.90)	3.500" (88.90)	4.000" (101.60)	4.500" (114.30)	5.500" (139.70)	5.500" (139.70)	6.750" (171.45)
N	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.500" (38.10)	1.500" (38.10)
O	0.750" (19.05)	0.750" (19.05)	0.750" (19.05)	0.750" (19.05)	0.750" (19.05)	0.750" (19.05)	1.000" (25.40)	1.000" (25.40)
P	3/4" UN (SAE #8)	3/4" UN (SAE #8)	3/4" UN (SAE #8)	3/4" UN (SAE #8)	3/4" UN (SAE #8)	3/4" UN (SAE #8)	1 1/16" UN (SAE #8)	1 1/16" UN (SAE #8)
Q	1.720" (43.69)	1.720" (43.69)	1.720" (43.69)	1.720" (43.69)	1.720" (43.69)	1.720" (43.69)	1.720" (43.69)	3.125" (79.37)
R	2.285" (58.04)	2.285" (58.04)	2.285" (58.04)	2.285" (58.04)	2.285" (58.04)	2.285" (58.04)	3.26" (82.8)	3.385" (86.00)
S	0.470" (11.94)	0.470" (11.94)	0.470" (11.94)	0.470" (11.94)	0.470" (11.94)	0.470" (11.94)	0.500" (12.70)	1.00" (25.40)
T	1.125" 12tpi	1.125" 12tpi	1.500" 12tpi	1.500" 12tpi	1.500" 12tpi	1.500" 12tpi	1.500" 12tpi	2.00" 12tpi



PORT LOCATION

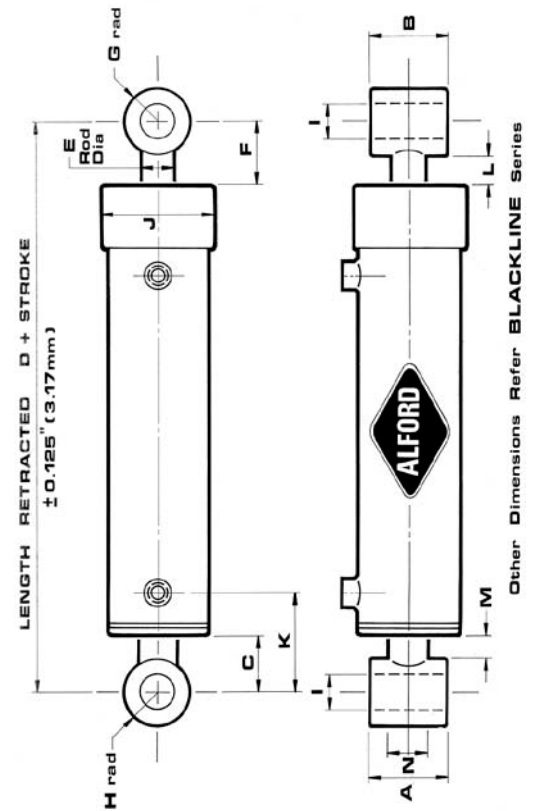


BORE		ROD DIAMETER		CYLINDER AREA		ANNULAR AREA***		CYLINDER FORCE* - EXTENSION**											
								500 psi (34.5 bar)		1000 psi (69.0 bar)		1500 psi (103.40 bar)		2000 psi (138.0 bar)		2500 psi (172.40 bar)		3000 psi (207 bar)	
in	mm	in	mm	in ²	mm ²	in ²	mm ²	lbf	kgf	lbf	kgf	lbf	kgf	lbf	kgf	lbf	kgf	lbf	kgf
2.50	63.50	1.50	38.10	4.908	3167	3.141	2027	2454	1113	4908	2226	7362	3339	9816	4451	12270	5564	14724	6678
3.00	76.02	1.50 1.75	38.10 44.45	7.068 7.068	4560 4560	5.301 4.663	3420 3008	3534	1603	7068	3206	10602	4809	14136	6412	17670	8015	21204	9617
3.50	88.90	1.75	44.45	9.621	6207	7.216	4655	4810	2182	9621	4364	14431	6546	19242	8728	24052	10910	28863	13090
4.00	101.60	1.75	44.45	12.566	8107	10.161	6555	6283	2850	12566	5700	18849	8550	25132	11400	31415	14250	37698	17097
4.50	114.30	2.00	50.80	15.904	10260	12.758	8233	7952	3607	15904	7214	23856	10821	31808	14428	39760	18035	47712	21639
5.00	127.00	2.00	50.80	19.635	12668	16.493	10641	9817	4453	19635	8906	29452	13359	39270	17813	49807	22266	58905	26716
6.00	152.40	3.00	50.80	28.274	18241	21.205	13680	14137	6411	28274	12823	42411	19235	56548	25647	70685	32058	84822	38470

* Actual forces will be approximately 90% of given features due to friction and leakage.
 ** For retraction (pull) force multiply Annular area x Pressure.
 *** To calculate annular area for optional rod diameters use formulae:
 Rod diameter in² or mm² x .7854 then deduct from cylinder area.

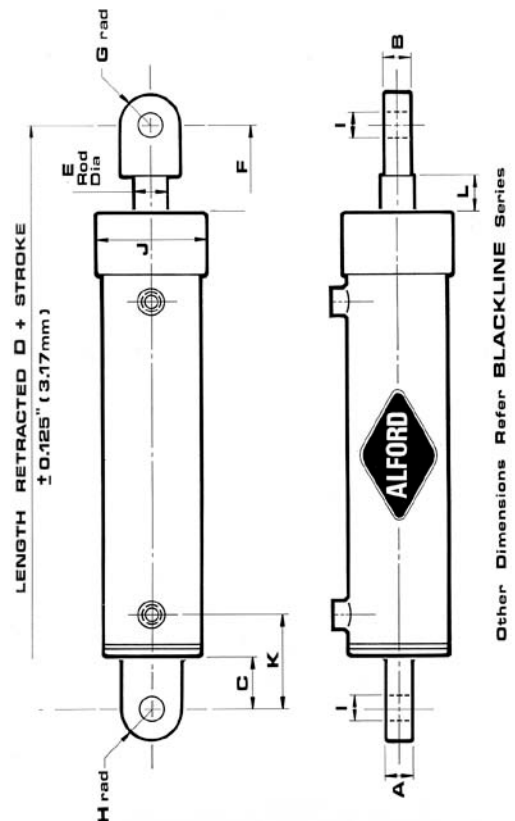
ALFORD PIN EYE CYLINDER DIMENSIONAL DATA

BORE DIA.	2.50" (63.50)	3.00" (76.20)	3.00" (HD) (76.20)	3.50" (88.90)	4.00" (101.60)	5.00" ASAE (127.00)	5.00" (HD) (127.00)	6.00" (152.40)
A	2.75" (70.00)	2.75" (70.00)	2.75" (70.00)	2.75" (70.00)	2.75" (70.00)	5.70" (145.00)	5.70" (145.00)	6.89" (175.00)
B	2.75" (70.00)	2.75" (70.00)	2.75" (70.00)	2.75" (70.00)	2.75" (70.00)	3.94" (100.00)	3.94" (100.00)	5.90" (150.00)
C	2.08" (52.83)	2.08" (52.83)	2.08" (52.83)	2.08" (52.83)	2.08" (52.83)	1.75" (44.45)	1.75" (44.45)	2.24" (57.00)
D	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	14.25" (361.95)	15.605" (396.37)
E	1.50" (38.10)	1.50" (38.10)	1.75" (44.45)	1.75" (44.45)	1.75" (44.45)	2.00" (50.80)	2.00" (50.80)	3.00" (76.20)
F	3.89" (98.80)	3.89" (98.80)	3.89" (98.80)	3.89" (98.80)	3.89" (98.80)	4.225" (107.32)	4.250" (107.95)	4.24" (107.70)
G	0.985" (25.00)	0.985" (25.00)	0.985" (25.00)	0.985" (25.00)	0.985" (25.00)	1.75" (44.45)	1.75" (44.45)	2.24" (57.00)
H	0.985" (25.00)	0.985" (25.00)	0.985" (25.00)	0.985" (25.00)	0.985" (25.00)	1.75" (44.45)	1.75" (44.45)	2.24" (57.00)
I +0.006" +0.008"	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.50" (38.10)	1.500" (38.10)	2.000" (50.80)
J	3.300" (83.82)	3.930" (99.82)	3.930" (99.82)	4.600" (116.84)	5.150" (130.81)	6.20" (157.48)	6.20" (157.48)	7.450" (189.23)
K	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.49" (88.65)	4.12" (104.65)
L	2.905" (73.79)	2.905" (73.79)	2.905" (73.79)	2.905" (73.79)	2.905" (73.79)	2.475" (62.86)	2.50" (63.50)	2.000" (50.80)
M	1.100" (27.94)	1.100" (27.94)	1.100" (27.94)	1.100" (27.94)	1.100" (27.94)	0.000" (0.000)	0.000" (0.000)	0.000" (0.000)
N	1.500" (38.10)	1.500" (38.10)	1.500" (38.10)	1.500" (38.10)	1.750" (44.45)	1.750" (44.45)	0.000" (0.000)	0.000" (0.000)



ALFORD SINGLE LUG CYLINDER DIMENSIONAL DATA

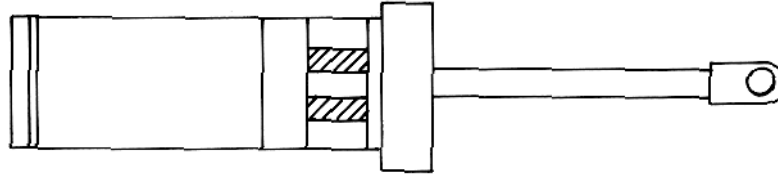
BORE DIA.	2.50" (63.50)	3.00" (76.20)	3.50" (88.90)	4.00" (101.60)	5.00" ASAE (127.00)	5.00" (HD) (127.00)	6.00" (152.40)
A	0.78" (20.00)	0.78" (20.00)	0.98" (25.00)	1.26" (32.00)	1.97" (50.00)	1.97" (50.00)	2.36" (60.00)
B	0.78" (20.00)	0.78" (20.00)	0.98" (25.00)	1.26" (32.00)	1.97" (50.00)	1.97" (50.00)	2.36" (60.00)
C	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	2.00" (50.80)	3.50" (88.90)
D	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	12.25" (311.15)	14.25" (361.95)	17.125" (434.98)
E	1.50" (38.10)	1.50" (38.10)	1.75" (44.45)	1.75" (44.45)	2.00" (50.80)	2.00" (50.80)	3.00" (76.20)
F	3.975" (100.96)	3.975" (100.96)	3.975" (100.96)	3.975" (100.96)	3.975" (100.96)	4.00" (101.60)	4.50" (114.30)
G	1.280" (32.50)	1.280" (32.50)	1.280" (32.50)	1.280" (32.50)	1.97" (50.00)	1.97" (50.00)	2.50" (63.50)
H	1.280" (32.50)	1.280" (32.50)	1.280" (32.50)	1.280" (32.50)	1.97" (50.00)	1.97" (50.00)	2.50" (63.50)
I +0.006" +0.008"	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.250" (31.75)	1.500" (38.10)	1.50" (38.10)	2.00" (50.80)
J	3.300" (83.82)	3.930" (99.82)	4.600" (116.84)	5.150" (130.81)	6.200" (157.48)	6.200" (157.48)	7.450" (189.23)
K	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.47" (88.14)	3.72" (94.49)	5.47" (138.94)
L	1.975" (50.17)	1.975" (50.17)	1.975" (50.17)	1.975" (50.17)	1.975" (50.17)	2.00" (50.80)	1.00" (25.40)



Note: Dimensions A & B are minimum sizes, larger sizes on Request. Spherical bearings, hardened, bronze or self-Lubricating bushes can be supplied on request. Grease nipple provision optional.

STOP TUBES

On applications where it is necessary to allow the piston to fully extend on the Gland End, Cylinders should be fitted with a Stop Tube. This should be considered on long stroke push Cylinders if the length between supports exceeds ten (10) times the Rod Diameter, if maximum thrust is required at full extension, and particularly if Cylinder has rear Clevis, Trunnion, Flange or Lug Type mounting.



Stop Tube fitment results in greater strength, less bearing wear and increased support against side loads for the Rod. If basic length (refer diameter load chart) exceed 30" (762mm), 1" (25.40mm) of stop tube should be used for each additional 10" (254mm) of stroke. **Any addition of Stop Tube will increase overall length of cylinder.**

CYLINDER PORTS, PINS AND ROD OPTIONS

BORE DIAM.	PORT		PORT		PORT	
	STANDARD	OPTIONAL	STANDARD	OPTIONAL	STANDARD	OPTIONAL
2.50" (63.50)	3/4"-16 SAE	7/8"-14 SAE 1/2" BSPT	1.00" (25.40)	NONE	1.50" (38.10)	** 1.25" (31.75) 1.75" (44.45)
3.00" (76.20)	3/4"-16 SAE	7/8"-14 SAE 1/2" BSPT	1.00" (25.40)	NONE	1.50" (38.10)	1.25" (31.75) 1.37" (34.925)
3.00" HD (76.20)	3/4"-16 SAE	7/8"-14 SAE 1/2" BSPT	1.00" (25.40)	1.25" (31.75)	1.75" (44.45)	2.00" (50.80)
3.50" (88.90)	3/4"-16 SAE	7/8"-14 SAE 1 1/16"-12 SAE 3/4" BSPT	1.00" (25.40)	1.25" (31.75)	1.75" (44.45)	2.00" (50.80) 2.25" (57.15) 2.50" (63.50)
4.00" (101.60)	3/4"-16 SAE	7/8"-14 SAE 1 1/16"-12 SAE 3/4" BSPT	1.00" (25.40)	1.25" (31.75)	1.75" (44.45)	2.00" (50.80) 2.25" (57.15) 2.50" (63.50)
4.50" (114.30)	3/4"-16 SAE	7/8"-14 SAE 1 1/16"-12 SAE 3/4" BSPT	1.00" (25.40)	1.25" (31.75)	2.00" (50.80)	2.25" (57.15) 2.50" (63.50) 3.00" (76.20)
5.00" ASAE (127.00)	3/4"-16 SAE	7/8"-14 SAE 1/2" BSPT	1.00" (25.40)	1.25" (31.75)	2.00" (50.80)	2.25" (57.15) 2.50" (63.50) 3.00" (76.20)
5.00" HD (127.00)	1 1/16"-12 SAE	1 5/16"-12 SAE	1.25" (31.75)	NONE	2.00" (50.80)	2.25" (57.15) 2.50" (63.50) 3.00" (76.20)
6.00" (152.40)	1 1/16"-12 SAE	1 5/16"-12 SAE	2.00" (50.80)	2.50" (63.50) 3.00" (50.80)	3.00" (76.20)	3.50" (88.90) 4.00" (101.60)

* Larger than Standard Port Sizes may alter Cylinder Dimension "D" - Refer Alford Sales Office.

** Requires Internal Gland.

CUSHIONS

Non-adjustable Cushions can be fitted to this Cylinder Range. Addition of Cushions will alter dimension "D" - for Information contact your nearest Alford Sales Office.

Alford reserves the right to change specifications contained herein, in the interest of product improvement, without prior notification. Alford gives you Australia wide distribution. Working through our Branch Offices and Dealer Network we are able to bring Alford quality and service to far away places, Call or Fax:

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