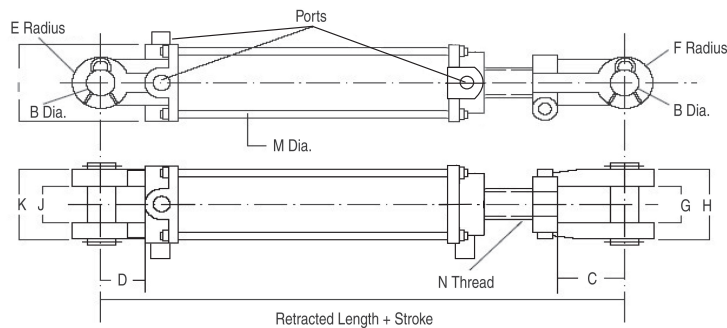


# HTR TIE-ROD CYLINDERS

## Cylinders

### THE HTR LINE

#### 2500 PSI DOUBLE ACTING CYLINDERS



#### FEATURES:

- Ductile iron piston.
- Ductile iron gland, drilled oil passages.
- Honed steel tube, precision finished for extended seal life.
- High tensile, hard chrome plated rod.
- Ductile iron end mounts, female clevises with pins and clips included.
- Tube Seal: O-ring
- Rod Seal: Deep polypak with B lip design; metal canned wiper.
- 2-Piece 93A urethane piston seal, with a 70A nitrile energizer.
- All Seals: Manufactured to US specifications.

BORE (INCH)	B	C	D	E	F	G = J
2.0	1.015	2.125	1.625	1.000	1.000	1.142
2.5	1.015	2.125	1.625	1.000	1.000	1.142
3.0	1.015	2.125	1.625	1.125	1.000	1.142
3.5	1.015	2.125	1.625	1.125	1.125	1.142
4.0	1.015	2.125	1.625	1.125	1.125	1.142
5.0	1.015	2.125	2.250	1.250	1.500	1.260

PART NUMBER	BORE (INCH)	STROKE	ROD DIA (INCH)	H	I	K	M	N	TUBE OD	PORTS (NPT)	PIN CTR RETRACT-ED	WT LBS.
HTR-2004	2.0	4	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	14.25	14.30
HTR-2006	2.0	6	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	16.25	15.84
HTR-2008	2.0	8	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	18.25	17.60
HTR-2008A	2.0	8	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	20.25	17.60
HTR-2010	2.0	10	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	20.25	18.70
HTR-2012	2.0	12	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	22.25	20.24
HTR-2014	2.0	14	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	24.25	22.00
HTR-2016	2.0	16	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	26.25	23.54
HTR-2018	2.0	18	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	28.25	25.08
HTR-2020	2.0	20	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	30.25	26.62
HTR-2024	2.0	24	1-1/8	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	34.25	29.70
HTR-2048	2.0	48	1-1/4	2.520	2.835	2.520	M10	1-1/8-12UNF	2.375	3/8 NPT	58.25	35.00
HTR-2504	2.5	4	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	14.25	16.28
HTR-2506	2.5	6	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	16.25	18.04
HTR-2508	2.5	8	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	18.25	20.24
HTR-2508A	2.5	8	1-1/4	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	20.25	22.00
HTR-2510	2.5	10	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	20.25	21.34
HTR-2512	2.5	12	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	22.25	23.10
HTR-2514	2.5	14	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	24.25	24.86
HTR-2516	2.5	16	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	26.25	26.62
HTR-2518	2.5	18	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	28.25	28.38
HTR-2520	2.5	20	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	30.25	30.14
HTR-2524	2.5	24	1-1/8	2.520	3.150	2.520	M10	1-1/8-12UNF	2.875	3/8 NPT	34.25	33.66
HTR-2536	2.5	36	1-1/4	2.520	3.150	2.520	M10	1-1/4-12UNF	2.875	3/8 NPT	46.25	38.25
HTR-3004	3.0	4	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	14.25	21.56
HTR-3006	3.0	6	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	16.25	23.76
HTR-3008	3.0	8	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	18.25	26.62
HTR-3008A	3.0	8	1-3/8	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	20.25	27.50

# HTR TIE-ROD CYLINDERS

## Cylinders

### THE HTR LINE

2500 PSI DOUBLE ACTING CYLINDERS

CYLINDERS

PART NUMBER	BORE (INCH)	STROKE	ROD DIA (INCH)	H	I	K	M	N	TUBE OD	PORTS (NPTF)	PIN CTR RETRACT-ED	WT LBS.
HTR-3010	3.0	10	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	20.25	28.16
HTR-3012	3.0	12	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	22.25	30.36
HTR-3014	3.0	14	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	24.25	32.56
HTR-3016	3.0	16	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	28.25	34.76
HTR-3016A	3.0	16	1-3/8	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	31.50	42.90
HTR-3018	3.0	18	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	28.25	36.96
HTR-3020	3.0	20	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	30.25	39.16
HTR-3024	3.0	24	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	34.25	43.34
HTR-3030	3.0	30	1-1/4	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	40.25	48.00
HTR-3036	3.0	36	1-1/2	2.600	3.740	2.520	M12	1-1/4-12UNF	3.375	1/2 NPT	46.25	54.55
HTR-3048	3.5	48	1-1/2	2.600	4.130	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	58.25	74.69
HTR-3504	3.5	4	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	14.25	23.32
HTR-3506	3.5	6	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	16.25	25.52
HTR-3508	3.5	8	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	18.25	28.82
HTR-3508A	3.5	8	1-3/8	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	20.25	29.70
HTR-3510	3.5	10	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	20.25	29.92
HTR-3512	3.5	12	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	22.25	32.34
HTR-3514	3.5	14	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	24.25	34.76
HTR-3516	3.5	16	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	28.25	37.18
HTR-3516A	3.5	16	1-3/8	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	31.50	50.60
HTR-3518	3.5	18	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	28.25	39.60
HTR-3520	3.5	20	1-1/4	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	30.25	42.02
HTR-3524	3.5	24	1-1/2	2.600	4.134	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	34.25	51.70
HTR-3530	3.5	30	1-1/2	2.600	4.130	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	40.25	55.00
HTR-3532	3.5	32	1-1/2	2.600	4.130	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	42.25	58.00
HTR-3536	3.5	36	1-1/2	2.600	4.130	2.520	M12	1-1/4-12UNF	3.875	1/2 NPT	46.25	62.00
HTR-3548	3.5	48	1-1/2	2.600	4.130	2.600	M12	1-1/4-12UNF	3.875	1/2 NPT	58.25	74.69
HTR-4004	4.0	4	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	14.25	29.48
HTR-4006	4.0	6	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	16.25	33.60
HTR-4008	4.0	8	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	18.25	35.86
HTR-4008A	4.0	8	1-3/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2NPT	20.25	37.40
HTR-4010	4.0	10	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	20.25	37.84
HTR-4012	4.0	12	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	22.25	40.70
HTR-4014	4.0	14	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	24.25	43.56
HTR-4016	4.0	16	1-1/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	26.25	46.42
HTR-4016A	4.0	16	1-3/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2NPT	31.50	57.20
HTR-4018	4.0	18	1-1/2	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	28.25	50.60
HTR-4020	4.0	20	1-1/2	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	30.25	53.46
HTR-4024	4.0	24	1-1/2	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	32.25	59.18
HTR-4024-2	4.0	24	2	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	34.25	68.00
HTR-4026	4.0	26	1-3/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	36.25	72.00
HTR-4030	4.0	30	1-3/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	40.25	75.00
HTR-4030-2	4.0	30	2	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	40.25	78.00
HTR-4036	4.0	36	1-3/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	46.25	82.00
HTR-4048	4.0	48	1-3/4	2.600	4.724	2.600	M12	1-1/4-12UNF	4.375	1/2 NPT	48.25	98.00
HTR-5004	5.0	4	1-1/2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	16.25	53.46
HTR-5006	5.0	6	1-1/2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	18.25	56.76

# HTR TIE-ROD CYLINDERS

## Cylinders

### THE HTR LINE

2500 PSI DOUBLE ACTING CYLINDERS

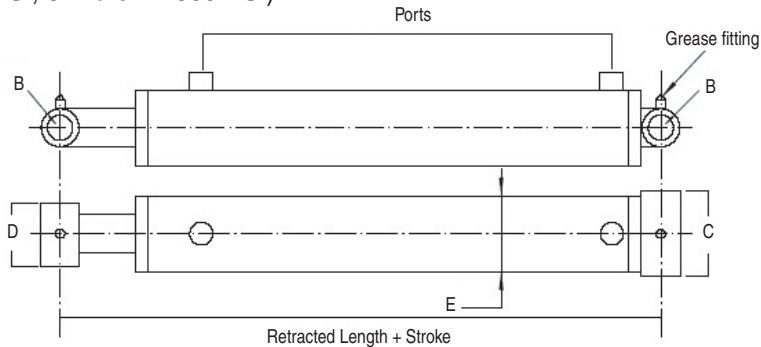
PART NUMBER	BORE (INCH)	STROKE	ROD DIA (INCH)	H	I	K	M	N	TUBE OD	PORTS (NPTF)	PIN CTR RETRACT-ED	WT LBS.
HTR-5008	5.0	8	1-1/2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	20.25	61.16
HTR-5010	5.0	10	1-1/2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	22.25	63.36
HTR-5012	5.0	12	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	24.25	73.04
HTR-5014	5.0	14	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	26.25	77.00
HTR-5016	5.0	16	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	28.25	81.18
HTR-5018	5.0	18	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	30.25	85.14
HTR-5020	5.0	20	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	32.25	89.10
HTR-5024	5.0	24	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	36.25	97.24
HTR-5030	5.0	30	2	2.677	6.000	3.500	M16	1-1/4-12UNF	5.453	1/2 NPT	42.25	109.56

# HMW MECHANICAL WELDED CYLINDERS

## Cylinders

### THE HMW LINE

2500 and 3000 PSI DOUBLE ACTING CYLINDERS (4" Bore = 3000 PSI, 5" Bore = 2500 PSI)



#### FEATURES:

- Honed tubing
- Heavy duty welded construction
- Chromed, ground & polished piston rod
- Cast iron piston & gland
- Pin eye mounting on both ends
- Loaded u-seal & urethane wiper in gland
- O-ring/backup washers & u-seals for piston seals
- Threaded gland retainer
- Standard color is black

Bore	B	C	D	E	Ports(NPT)
1.50	0.77	2.25	2.00	2.0	1/4 NPT
2.00	1.02	2.75	2.25	2.5	3/8 NPT
2.50	1.02	3.25	2.25	3.0	1/2 NPT
3.00	1.02	3.75	2.25	3.5	1/2 NPT
3.50	1.27	4.25	2.25	4.0	1/2 NPT
4.00	1.52	4.75	2.50	4.5	1/2 NPT
5.00	1.77	5.75	3.25	5.5	1/2 NPT

PART NUMBER	BORE	STROKE (INCH)	ROD DIA (INCH)	PIN CENTERS RETRACTED (INCH)	PIN CENTERS EXTENDED (INCH)	WEIGHT LBS
HMW-1504	1.50	4	1"	12.00	16.00	9.04
HMW-1506	1.50	6	1"	14.00	20.00	10.14
HMW-1508	1.50	8	1"	16.00	24.00	11.47
HMW-1510	1.50	10	1"	18.00	28.00	12.79
HMW-2008	2.00	8	1-1/4"	16.00	24.00	13.45
HMW-2010	2.00	10	1-1/4"	18.00	28.00	15.21
HMW-2012	2.00	12	1-1/4"	20.00	32.00	16.98
HMW-2014	2.00	14	1-1/4"	22.00	36.00	18.74
HMW-2016	2.00	16	1-1/4"	24.00	40.00	20.51
HMW-2018	2.00	18	1-1/4"	26.00	44.00	22.27
HMW-2020	2.00	20	1-1/4"	28.00	48.00	24.03
HMW-2024	2.00	24	1-1/4"	32.00	56.00	27.56
HMW-2028	2.00	28	1-1/4"	36.00	64.00	31.09
HMW-2030	2.00	30	1-1/4"	38.00	68.00	32.85
HMW-2032	2.00	32	1-1/4"	40.00	72.00	34.84
HMW-2036	2.00	36	1-1/4"	44.00	80.00	38.37
HMW-2040	2.00	40	1-1/4"	48.00	88.00	41.90
HMW-2048	2.00	48	1-1/4"	56.00	104.00	48.95
HMW-2508	2.50	8	1-1/2"	16.00	24.00	19.85
HMW-2510	2.50	10	1-1/2"	18.00	28.00	21.83
HMW-2512	2.50	12	1-1/2"	20.00	32.00	24.03
HMW-2514	2.50	14	1-1/2"	22.00	36.00	26.24
HMW-2516	2.50	16	1-1/2"	24.00	40.00	28.44

# HMW MECHANICAL WELDED CYLINDERS

## Cylinders

### THE HMW LINE

2500 and 3000 PSI DOUBLE ACTING CYLINDERS (4" Bore = 3000 PSI, 5" Bore = 2500 PSI)

PART NUMBER	BORE	STROKE (INCH)	ROD DIA (INCH)	PIN CENTERS RETRACTED (INCH)	PIN CENTERS EXTENDED (INCH)	WEIGHT LBS
HMW-2518	2.50	18	1-1/2"	26.00	44.00	30.65
HMW-2520	2.50	20	1-1/2"	28.00	48.00	32.85
HMW-2524	2.50	24	1-1/2"	32.00	56.00	37.26
HMW-2528	2.50	28	1-1/2"	36.00	64.00	41.45
HMW-2530	2.50	30	1-1/2"	38.00	68.00	43.66
HMW-2532	2.50	32	1-1/2"	40.00	72.00	45.86
HMW-2536	2.50	36	1-1/2"	44.00	80.00	50.27
HMW-2540	2.50	40	1-1/2"	48.00	88.00	54.68
HMW-2548	2.50	48	1-1/2"	56.00	104.00	63.28
HMW-3008	3.00	8	1-1/2"	16.00	24.00	24.70
HMW-3010	3.00	10	1-1/2"	18.00	28.00	27.12
HMW-3012	3.00	12	1-1/2"	20.00	32.00	29.55
HMW-3014	3.00	14	1-1/2"	22.00	36.00	31.97
HMW-3016	3.00	16	1-1/2"	24.00	40.00	34.40
HMW-3018	3.00	18	1-1/2"	26.00	44.00	36.82
HMW-3020	3.00	20	1-1/2"	28.00	48.00	39.25
HMW-3024	3.00	24	1-1/2"	32.00	56.00	44.10
HMW-3028	3.00	28	1-1/2"	36.00	64.00	48.95
HMW-3030	3.00	30	1-1/2"	38.00	68.00	51.38
HMW-3032	3.00	32	1-1/2"	40.00	72.00	53.58
HMW-3036	3.00	36	1-1/2"	44.00	80.00	58.43
HMW-3040	3.00	40	1-1/2"	48.00	88.00	63.28
HMW-3048	3.00	48	1-1/2"	56.00	104.00	72.99
HMW-3508	3.50	8	1-3/4"	18.00	26.00	32.63
HMW-3510	3.50	10	1-3/4"	20.00	30.00	35.72
HMW-3512	3.50	12	1-3/4"	22.00	34.00	38.81
HMW-3514	3.50	14	1-3/4"	24.00	38.00	41.67
HMW-3516	3.50	16	1-3/4"	26.00	42.00	44.76
HMW-3518	3.50	18	1-3/4"	28.00	46.00	47.63
HMW-3520	3.50	20	1-3/4"	30.00	50.00	50.72
HMW-3524	3.50	24	1-3/4"	34.00	58.00	56.67
HMW-3528	3.50	28	1-3/4"	38.00	66.00	62.62
HMW-3530	3.50	30	1-3/4"	40.00	70.00	65.71
HMW-3532	3.50	32	1-3/4"	42.00	74.00	68.80
HMW-3536	3.50	36	1-3/4"	46.00	82.00	74.75
HMW-3540	3.50	40	1-3/4"	50.00	90.00	80.70
HMW-3548	3.50	48	1-3/4"	58.00	106.00	92.61
HMW-4008	4.00	8	2"	18.00	26.00	40.79
HMW-4010	4.00	10	2"	20.00	30.00	44.54
HMW-4012	4.00	12	2"	22.00	34.00	48.29
HMW-4014	4.00	14	2"	24.00	38.00	51.82
HMW-4016	4.00	16	2"	26.00	42.00	55.57
HMW-4018	4.00	18	2"	28.00	46.00	59.09
HMW-4020	4.00	20	2"	30.00	50.00	62.84
HMW-4024	4.00	24	2"	34.00	58.00	70.12
HMW-4028	4.00	28	2"	38.00	66.00	77.40
HMW-4030	4.00	30	2"	40.00	70.00	81.14

# HMW MECHANICAL WELDED CYLINDERS

## Cylinders

### THE HMW LINE

2500 and 3000 PSI DOUBLE ACTING CYLINDERS (4" Bore = 3000 PSI, 5" Bore = 2500 PSI)

CYLINDERS

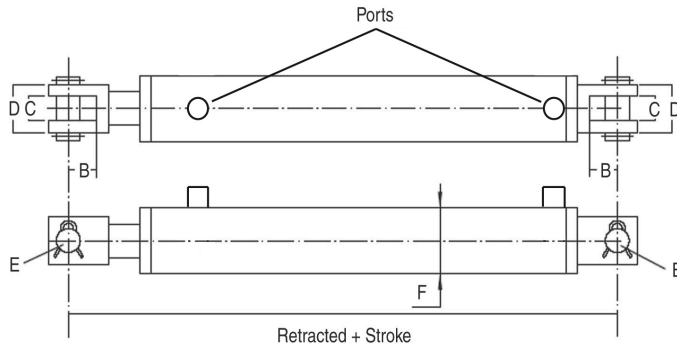
PART NUMBER	BORE	STROKE (INCH)	ROD DIA (INCH)	PIN CENTERS RETRACTED (INCH)	PIN CENTERS EXTENDED (INCH)	WEIGHT LBS
HMW-4032	4.00	32	2"	42.00	74.00	84.67
HMW-4036	4.00	36	2"	46.00	82.00	91.95
HMW-4040	4.00	40	2"	50.00	90.00	99.23
HMW-4048	4.00	48	2"	58.00	106.00	114.00
HMW-5008	5.00	8	2-1/2"	20.00	28.00	71.88
HMW-5010	5.00	10	2-1/2"	22.00	32.00	76.07
HMW-5012	5.00	12	2-1/2"	24.00	36.00	80.48
HMW-5014	5.00	14	2-1/2"	26.00	40.00	84.67
HMW-5016	5.00	16	2-1/2"	28.00	44.00	89.08
HMW-5018	5.00	18	2-1/2"	30.00	48.00	93.49
HMW-5020	5.00	20	2-1/2"	32.00	52.00	97.68
HMW-5024	5.00	24	2-1/2"	36.00	60.00	106.28
HMW-5028	5.00	28	2-1/2"	40.00	68.00	115.10
HMW-5030	5.00	30	2-1/2"	42.00	72.00	119.29
HMW-5032	5.00	32	2-1/2"	44.00	76.00	123.70
HMW-5036	5.00	36	2-1/2"	48.00	84.00	132.30
HMW-5040	5.00	40	2-1/2"	52.00	92.00	140.90
HMW-5048	5.00	48	2-1/2"	60.00	108.00	158.10

# CLEVIS WELDED CYLINDERS

## Cylinders

### THE HCW LINE

2500 and 3000 PSI DOUBLE ACTING CYLINDERS (4" Bore = 3000 PSI, 5" Bore = 2500 PSI)



#### FEATURES:

- Skived, honed tubing
- Heavy duty welded construction
- Chromed, ground & polished piston rod will operate at full pressure through 16" stroke
- Cast iron piston, cast steel butt, gland & clevis
- Loaded u-seal & urethane wiper in gland, u-seal on piston
- Threaded gland
- Pins & clips included
- Standard color is black
- Stroke control may be installed on 8" strokes

Bore	B	C	D	E	F	Ports(NPT)
2.00	2.125	1.125	2.07	1.00	2.5	3/8 NPT
2.50	2.125	1.125	2.07	1.00	3.0	1/2 NPT
3.00	2.125	1.125	2.07	1.00	3.5	1/2 NPT
3.50	2.125	1.125	2.07	1.00	4.0	1/2 NPT
4.00	2.000	1.125	2.07	1.00	4.5	1/2 NPT
5.00	2.000	1.500	2.44	1.00	5.5	1/2 NPT

PART NUMBER	BORE	STROKE (INCH)	ROD DIA (INCH)	PIN CENTERS RE-TRACTED (INCH)	PIN CENTERS EXTENDED (INCH)	WEIGHT LBS
HCW-2004	2.00	4	1-1/4"	14.25	18.25	12.79
HCW-2006	2.00	6	1-1/4"	16.25	22.25	14.55
HCW-2008	2.00	8	1-1/4"	18.25	28.25	16.32
HCW-2010	2.00	10	1-1/4"	20.25	30.25	17.86
HCW-2012	2.00	12	1-1/4"	22.25	34.25	19.40
HCW-2014	2.00	14	1-1/4"	24.25	38.25	21.17
HCW-2016	2.00	16	1-1/4"	26.25	42.25	22.93
HCW-2018	2.00	18	1-1/4"	28.25	46.25	24.48
HCW-2020	2.00	20	1-1/4"	30.25	50.25	26.24
HCW-2024	2.00	24	1-1/4"	34.25	58.25	29.55
HCW-2028	2.00	28	1-1/4"	38.25	66.25	32.85
HCW-2030	2.00	30	1-1/4"	40.25	70.25	34.62
HCW-2032	2.00	32	1-1/4"	42.25	74.25	36.16
HCW-2034	2.00	34	1-1/4"	44.25	78.25	37.93
HCW-2036	2.00	36	1-1/4"	46.25	82.25	39.69
HCW-2504	2.50	4	1-1/2"	14.25	18.25	16.98
HCW-2506	2.50	6	1-1/2"	16.25	22.25	19.18
HCW-2508	2.50	8	1-1/2"	20.25	28.25	21.39
HCW-2510	2.50	10	1-1/2"	20.25	30.25	23.37
HCW-2512	2.50	12	1-1/2"	22.25	34.25	25.58
HCW-2514	2.50	14	1-1/2"	24.25	38.25	27.78
HCW-2516	2.50	16	1-1/2"	26.25	42.25	29.77
HCW-2518	2.50	18	1-1/2"	28.25	46.25	31.97
HCW-2520	2.50	20	1-1/2"	30.25	50.25	34.18
HCW-2524	2.50	24	1-1/2"	34.25	58.25	38.37
HCW-2528	2.50	28	1-1/2"	38.25	66.25	42.56

# CLEVIS WELDED CYLINDERS

## Cylinders

### THE HCW LINE

2500 and 3000 PSI DOUBLE ACTING CYLINDERS (4" Bore = 3000 PSI, 5" Bore = 2500 PSI)

PART NUMBER	BORE	STROKE (INCH)	ROD DIA (INCH)	PIN CENTERS RE-TRACTED (INCH)	PIN CENTERS EXTENDED (INCH)	WEIGHT LBS
HCW-2530	2.50	30	1-1/2"	40.25	70.25	44.76
HCW-2532	2.50	32	1-1/2"	42.25	74.25	46.97
HCW-2534	2.50	34	1-1/2"	44.25	78.25	48.95
HCW-2536	2.50	36	1-1/2"	46.25	82.25	51.16
HCW-3004	3.00	4	1-1/2"	14.25	18.25	21.83
HCW-3006	3.00	6	1-1/2"	16.25	22.25	24.26
HCW-3008	3.00	8	1-1/2"	18.25	28.25	26.90
HCW-3010	3.00	10	1-1/2"	20.25	30.25	29.11
HCW-3012	3.00	12	1-1/2"	22.25	34.25	31.53
HCW-3014	3.00	14	1-1/2"	24.25	38.25	33.96
HCW-3016	3.00	16	1-1/2"	26.25	42.25	36.60
HCW-3018	3.00	18	1-1/2"	28.25	46.25	39.03
HCW-3020	3.00	20	1-1/2"	30.25	50.25	41.45
HCW-3024	3.00	24	1-1/2"	34.25	58.25	46.31
HCW-3028	3.00	28	1-1/2"	38.25	66.25	51.16
HCW-3030	3.00	30	1-1/2"	40.25	70.25	53.58
HCW-3032	3.00	32	1-1/2"	42.25	74.25	56.23
HCW-3034	3.00	34	1-1/2"	44.25	78.25	58.65
HCW-3036	3.00	36	1-1/2"	46.25	82.25	61.08
HCW-3504	3.50	4	1-3/4"	14.25	18.25	26.24
HCW-3506	3.50	6	1-3/4"	16.25	22.25	29.33
HCW-3508	3.50	8	1-3/4"	18.25	28.25	32.41
HCW-3510	3.50	10	1-3/4"	20.25	30.25	35.50
HCW-3512	3.50	12	1-3/4"	22.25	34.25	38.59
HCW-3514	3.50	14	1-3/4"	24.25	38.25	41.67
HCW-3516	3.50	16	1-3/4"	26.25	42.25	44.76
HCW-3518	3.50	18	1-3/4"	28.25	46.25	48.07
HCW-3520	3.50	20	1-3/4"	30.25	50.25	51.16
HCW-3524	3.50	24	1-3/4"	34.25	58.25	57.33
HCW-3528	3.50	28	1-3/4"	38.25	66.25	63.50
HCW-3530	3.50	30	1-3/4"	40.25	70.25	66.59
HCW-3532	3.50	32	1-3/4"	42.25	74.25	69.90
HCW-3534	3.50	34	1-3/4"	44.25	78.25	72.99
HCW-3536	3.50	36	1-3/4"	46.25	82.25	76.07
HCW-4004	4.00	4	2"	14.25	18.25	30.65
HCW-4006	4.00	6	2"	16.25	22.25	34.40
HCW-4008	4.00	8	2"	18.25	28.25	39.25
HCW-4010	4.00	10	2"	20.25	30.25	42.12
HCW-4012	4.00	12	2"	22.25	34.25	46.08
HCW-4014	4.00	14	2"	24.25	38.25	50.05
HCW-4016	4.00	16	2"	26.25	42.25	53.80
HCW-4018	4.00	18	2"	28.25	46.25	57.77
HCW-4020	4.00	20	2"	30.25	50.25	61.52
HCW-4024	4.00	24	2"	34.25	58.25	69.46
HCW-4028	4.00	28	2"	38.25	66.25	77.18
HCW-4030	4.00	30	2"	40.25	70.25	81.14
HCW-4032	4.00	32	2"	42.25	74.25	84.89



# CLEVIS WELDED CYLINDERS

## Cylinders

### THE HCW LINE

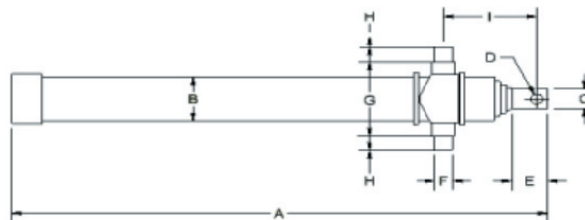
2500 and 3000 PSI DOUBLE ACTING CYLINDERS (4" Bore = 3000 PSI, 5" Bore = 2500 PSI)

PART NUMBER	BORE	STROKE (INCH)	ROD DIA (INCH)	PIN CENTERS RE-TRACTED (INCH)	PIN CENTERS EXTENDED (INCH)	WEIGHT LBS
HCW-4034	4.00	34	2"	44.25	78.25	88.86
HCW-4036	4.00	36	2"	46.25	82.25	92.61
HCW-5004	5.00	4	2-1/2"	16.25	20.25	63.95
HCW-5006	5.00	6	2-1/2"	18.25	24.25	68.36
HCW-5008	5.00	8	2-1/2"	18.25	28.25	72.77
HCW-5010	5.00	10	2-1/2"	22.25	32.25	77.18
HCW-5012	5.00	12	2-1/2"	24.25	36.25	81.59
HCW-5014	5.00	14	2-1/2"	26.25	40.25	86.00
HCW-5016	5.00	16	2-1/2"	28.25	44.25	90.41
HCW-5018	5.00	18	2-1/2"	30.25	48.25	94.82
HCW-5020	5.00	20	2-1/2"	32.25	52.25	99.23
HCW-5024	5.00	24	2-1/2"	36.25	60.25	108.05
HCW-5028	5.00	28	2-1/2"	40.25	68.25	116.87
HCW-5030	5.00	30	2-1/2"	42.25	72.25	121.28
HCW-5032	5.00	32	2-1/2"	44.25	76.25	125.69
HCW-5034	5.00	34	2-1/2"	46.25	80.25	130.10
HCW-5036	5.00	36	2-1/2"	48.25	84.25	134.51

### THE HTC LINE

3000 PSI SINGLE ACTING CYLINDERS

7 Tons and 12 Tons Inverse

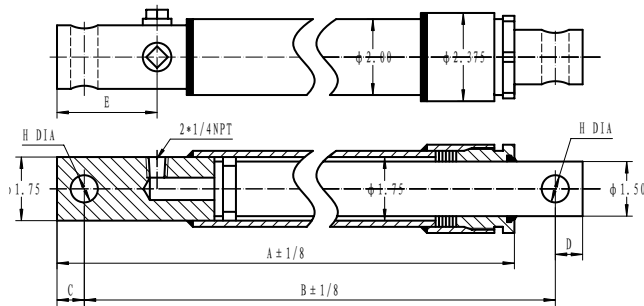


PART NUMBER	CAPACITY	STROKE	CLOSED (A)	B	C	D	E	F	G	H	I	PORT	WEIGHT LBS.
HTC-3378	7 TONS	78"	35.5"	4	2	1.0625	2.25	1.25	6.5	1.25	7	1/2" NPT	108 LBS
HTC-3390	7 TONS	90"	39.5"	4	2	1.0625	2.5	1.25	6.5	1.25	7	1/2" NPT	100 LBS
HTC-33108	7 TONS	108"	45"	4	2	1.0625	2.5	1.25	6.5	1.25	7	1/2" NPT	120 LBS
HTC-4378	12 TONS	78"	34.75"	5	2	1.0625	2.25	1.5	7.5	1.5	7	1/2" NPT	129 LBS
HTC-4390	12 TONS	90"	38.75"	5	2	1.0625	2.25	1.5	7.5	1.5	7	1/2" NPT	129 LBS
HTC-43108	12 TONS	108"	44.75"	5	2	1.0625	2.25	1.5	7.5	1.5	7	1/2" NPT	156 LBS
HTC-43120	12 TONS	120"	48.75"	5	2	1.0625	2.25	1.5	7.5	1.5	7	1/2" NPT	167 LBS

# SNOW PLOW CYLINDERS

## Snow Plow Cylinders

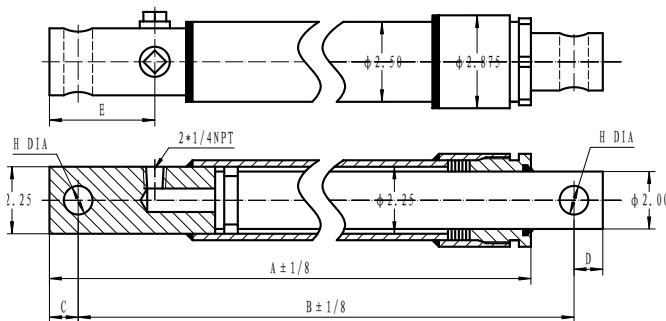
### SNOW PLOW



#### FEATURES:

- Ductile iron piston.
- Ductile iron gland, drilled oil passages.
- Honed steel tube, precision finished for extended seal life.
- High tensile, hard chrome plated rod.
- Ductile iron end mounts, female clevises with pins and clips included.
- Tube Seal: O-ring
- Rod Seal: Deep polypak with B lip design; metal canned wiper.
- 2-Piece 93A urethane piston seal, with a 70A nitrile energizer.
- All Seals: Manufactured to US specifications.

PART NUMBER	DESCRIPTION	A	B	C & D	E	H	WT LBS.
HSPM-1506-0625	MYER 1.5" X 6"	11-7/8	12.00	11/16	2.00	5/8	12
HSPM-1510-0625	MYER 1.5" X 10"	15-7/8	16-1/4	11/16	2.00	5/8	14
HSPM-1512-0625	MYER 1.5" X 12"	17-7/8	18.00	11/16	2.00	5/8	15
HSPW-1506-0750	WESTREN 1.5" X 6"	12-5/8	13.00	11/16	2-3/4	3/4	12
HSPW-1508-0750	WESTREN 1.5" X 8"	14-5/8	15-1/4	11/16	2-3/4	3/4	13
HSPW-1510-0750	WESTREN 1.5" X 10" X 1"	16-5/8	17-1/4	11/16	2-3/4	3/4	14
HSPW-1510-1000	WESTREN 1.5" X 10" X 1"	16-5/8	17-1/2	11/16	2-3/4	1.00	14
HSPA-1510-0750	ARTIC 1.5" X 10"	16-5/8	17.00	3/4	2-3/4	3/4	14
HSPA-1512-0750	ARTIC 1.5" X 12"	16-5/8	19.00	3/4	2-3/4	3/4	15
HSPA-1512-1000	FISHER 1.5" X 12"	18-7/16	19-3/8	3/4	2-5/8	1.00	15
HSPA-1510-1000	FISHER & DIAMOND 1.5" X 10"	16-3/8	17-1/4	3/4	2-11/16	1.00	14

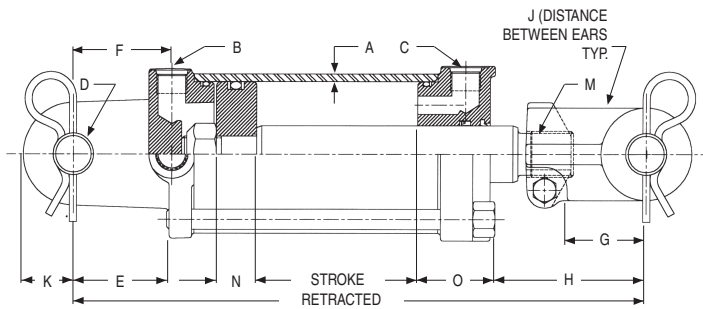


PART NUMBER	DESCRIPTION	A	B	C & D	E	H	WT LBS.
HSPM-2012-0625	MYER 2.0" X 12"	17-1/4	18.00	3/4	2-3/16	5/8	18
HSPW-2016-1000	WESTREN & DIAMOND 2.0" X 16"	22-5/8	23-5/8	11/16	2-3/4	1.00	21
HSPW-2006-0750	WESTREN 2.0" X 6"	12-5/8	13-3/16	3/4	2-3/4	3/4	13
HSPW-2010-1000	WESTREN 2.0" X 10"	16-5/8	17-1/4	11/16	2-3/4	1.00	16
HSPF-2016-125	FISHER 2.0" X 16"	22-1/2	23-1/4	7/8	2-3/4	1-1/4	20

# TIE-ROD CYLINDERS



## THE ROYAL PLATE LINE 3000 PSI DOUBLE ACTING TIE ROD CYLINDERS



**FEATURES:**

- Honed tubing (SAE-9000 & SAE 9100 series have cylinder finish tubing)
- Heavy duty, high strength tie rods
- Chromed, ground & polished piston rod will operate at full pressure through 16" stroke
- Cast iron piston, ductile iron butt, gland & clevis
- Carboxylated nitrile u-cup & urethane wiper in gland
- Pins & clips included
- Standard color is red
- Stroke control may be installed on 8" strokes
- Side ports available on request at no additional cost

CYLINDERS

PTR	MFGR NO.	BORE	STROKE	ROD DIA.	RE-TRACT. DIMEN.	A	B/C PORT SIZE	D	E	F	G	H	J	K	M	N	O	SHIP WT.
PTR-2004	8404	2	4	1	14 1/4	1/8	3/4-16 SAE	1.015	2 5/16	2 7/16	1 13/16	3 1/4	1.06	15/16	1-14	7/8	2 1/4	18
PTR-2006	8406	2	6	1	16 1/4	1/8	3/4-16 SAE	1.015	2 5/16	2 7/16	1 13/16	3 1/4	1.06	15/16	1-14	7/8	2 1/4	19
PTR-2008	8408	2	8	1	20 1/4	1/8	3/4-16 SAE	1.015	2 5/16	2 7/16	1 13/16	3 1/4	1.06	15/16	1-14	7/8	2 1/4	20
PTR-2010	8410	2	10	1	20 1/4	1/8	3/4-16 SAE	1.015	2 5/16	2 7/16	1 13/16	3 1/4	1.06	15/16	1-14	7/8	2 1/4	21
PTR-2012	9012	2	12	1 1/8	22 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	7/8	2 3/8	25
PTR-2014	9014	2	14	1 1/8	24 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	7/8	2 3/8	26
PTR-2016A	9016	2	16	1 1/8	31 1/2	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	8 1/2	1.06	15/16	1 1/8-12	7/8	2 3/8	28
PTR-2018	9018	2	18	1 1/8	28 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	7/8	2 3/8	29
PTR-2020	9020	2	20	1 1/8	30 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	7/8	2 3/8	31
PTR-2024	9024	2	24	1 1/8	34 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	7/8	2 3/8	35
PTR-2030	9030	2	30	1 1/8	40 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	7/8	2 3/8	39
PTR-2506	7006	2 1/2	6	1 1/8	16 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	22
PTR-2508	9108	2 1/2	8	1 1/4	20 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	5 1/4	1.06	15/16	1 1/8-12	1	2 3/8	25
PTR-2510	9110	2 1/2	10	1 1/4	20 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	26
PTR-2512	9112	2 1/2	12	1 1/4	22 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	27
PTR-2514	9114	2 1/2	14	1 1/4	24 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	29
PTR-2516	9116	2 1/2	16	1 1/4	31 1/2	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	8 1/2	1.06	15/16	1 1/8-12	1	2 3/8	33
PTR-2518	9118	2 1/2	18	1 1/4	28 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	34
PTR-2520	9120	2 1/2	20	1 1/4	30 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	36
PTR-2524	9124	2 1/2	24	1 1/4	34 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	39
PTR-2530	9130	2 1/2	30	1 1/4	40 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 3/8	1 13/16	3 1/4	1.06	15/16	1 1/8-12	1	2 3/8	44
PTR-3006	7106	3	6	1 1/8	16 1/4	1/8	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	24
PTR-3008	9208	3	8	1 3/8	20 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	5 3/4	1.06	15/16	1 1/8-12	1	1 15/16	32
PTR-3010	9210	3	10	1 3/8	20 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	33
PTR-3012	9212	3	12	1 3/8	22 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	33
PTR-3014	9214	3	14	1 3/8	24 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/16	1.06	15/16	1 1/8-12	1	1 15/16	35
PTR-3016	10616	3	16	1 3/8	26 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 15/16	29
PTR-3016A	9216	3	16	1 3/8	31 1/2	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	9	1.06	15/16	1 1/8-12	1	1 15/16	39
PTR-3018	9218	3	18	1 3/8	28 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	42
PTR-3020	9220	3	20	1 3/8	30 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	45
PTR-3024	9224	3	24	1 3/8	34 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	47
PTR-3030	9230	3	30	1 3/8	40 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	53
PTR-3036	9236	3	36	1 3/8	46 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	61
PTR-3048	9248	3	48	1 3/8	58 1/4	3/16	3/4-16 SAE	1.015	2 7/16	2 7/16	1 13/16	3 3/4	1.06	15/16	1 1/8-12	1	1 15/16	66
PTR-3508A	9308A	3 1/2	8	1 3/8	20 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	5 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	35

# TIE-ROD CYLINDERS



## THE ROYAL PLATE LINE

3000 PSI DOUBLE ACTING TIE ROD CYLINDERS

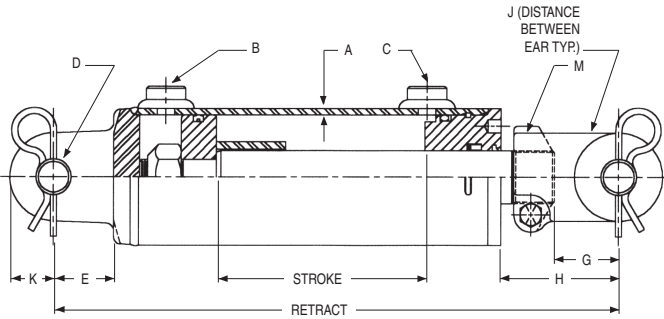
CYLINDERS

PTR	MFGR NO.	BORE	STROKE	ROD DIA.	RE-TRACT. DIMEN.	A	B/C PORT SIZE	D	E	F	G	H	J	K	M	N	O	SHIP WT.
PTR-3510	9310A	3 1/2	10	1 3/8	20 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	36
PTR-3512	9312A	3 1/2	12	1 3/8	22 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	38
PTR-3514	9314A	3 1/2	14	1 3/8	24 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	41
PTR-3516A	9316A	3 1/2	16	1 3/8	31 1/2	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	9	1.06	1 1/4	1 1/8-12	1	1 13/16	46
PTR-3518	9318A	3 1/2	18	1 3/8	28 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	47
PTR-3520	9320A	3 1/2	20	1 3/8	30 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	49
PTR-3524	9324A	3 1/2	24	1 3/8	34 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	54
PTR-3530	9330A	3 1/2	30	1 3/8	40 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	64
PTR-3536	9336A	3 1/2	36	1 3/8	46 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	66
PTR-3548	9348A	3 1/2	48	1 3/8	58 1/4	3/16	3/4-16 SAE	1.015	2 3/8	2 7/16	1 13/16	3 3/4	1.06	1 1/4	1 1/8-12	1	1 13/16	73
PTR-4008	9408	4	8	1 3/4	20 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	5 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	45
PTR-4008-1.5R	8608	4	8	1 1/2	20 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	5 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	42
PTR-4010	9410	4	10	1 3/4	20 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	48
PTR-4012	9412	4	12	1 3/4	22 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	49
PTR-4014	9414	4	14	1 3/4	24 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	51
PTR-4016	108816	4	16	1 3/4	26 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	48
PTR-4016A	9416	4	16	1 3/4	31 1/2	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	8 1/2	1.06	1 1/4	1 1/2-12	1	1 13/16	61
PTR-4018	9418	4	18	1 3/4	28 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	62
PTR-4020	9420	4	20	1 3/4	30 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	72
PTR-4024	9424	4	24	1 3/4	34 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	74
PTR-4030	9430	4	30	1 3/4	40 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	77
PTR-4036	9436	4	36	1 3/4	46 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	83
PTR-4048	9448	4	48	1 3/4	58 1/4	3/16	3/4-16 SAE	1.015	2 5/16	2 7/16	1 7/8	3 1/4	1.06	1 1/4	1 1/2-12	1	1 13/16	109
PTR-5008	9508	5	8	2	20 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	67
PTR-5012	9512	5	12	2	24 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	75
PTR-5014	9514	5	14	2	26 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	80
PTR-5016A	9516	5	16	2	31 1/2	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	7 1/4	1.06	1 1/4	1 1/2-12	1	2 1/2	84
PTR-5018	9518	5	18	2	28 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	90
PTR-5020	9520	5	20	2	32 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	95
PTR-5024	9524	5	24	2	36 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	100
PTR-5030	9530	5	30	2	42 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	108
PTR-5036	9536	5	36	2	48 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	118
PTR-5048	9548	5	48	2	60 1/4	1/4	7/8-16 SAE	1.265	2 3/4	2 5/8	2	4	1.06	1 1/4	1 1/2-12	1	2 1/2	161

# WELDED CYLINDERS



## THE SWORD LINE 3000 PSI DOUBLE ACTING CYLINDERS



### FEATURES:

- Skived, honed tubing
- Heavy duty welded construction
- Chromed, ground & polished piston rod will operate at full pressure through 16" stroke
- Cast iron piston, cast steel butt, gland & clevis
- Carboxylated nitrile u-cup & urethane wiper in gland, crown seal on piston
- Square ring gland retainer provides positive lock
- Pins & clips included
- Standard color is white
- Stroke control may be installed on 8" strokes

CYLINDERS

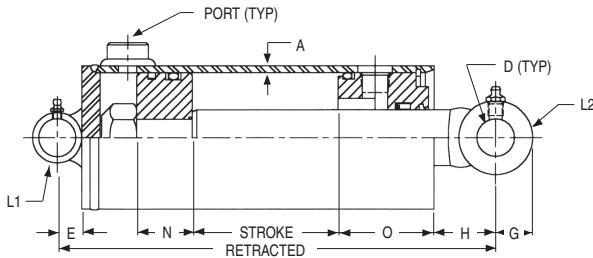
PCW	MFGR. NO.	BORE	STROKE	ROD DIA.	RE-TRACT. DIMEN.	A	B/C PORT SIZE	D	E	G	H	J	K	M	SHIP WT.
PCW-2008	42008	2	8	1 1/8	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	5 9/16	1 1/16	1	1 1/8 12	10
PCW-2010	42010	2	10	1 1/8	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	20
PCW-2012	42012	2	12	1 1/8	22 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	22
PCW-2016A	42016	2	16	1 1/8	31 1/2	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	8 13/16	1 1/16	1	1 1/8 12	25
PCW-2020	42020	2	20	1 1/8	30 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	28
PCW-2024	42024	2	24	1 1/8	34 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	31
PCW-2508	42508	2 1/2	8	1 1/4	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	5 9/16	1 1/16	1	1 1/8 12	21
PCW-2510	42510	2 1/2	10	1 1/4	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	22
PCW-2512	42512	2 1/2	12	1 1/4	22 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	23
PCW-2516	42516	2 1/2	16	1 1/4	31 1/2	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	8 13/16	1 1/16	1	1 1/8 12	27
PCW-2520	42520	2 1/2	20	1 1/4	30 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	31
PCW-2524	42524	2 1/2	24	1 1/4	34 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1	1 1/8 12	35
PCW-3008	43008	3	8	1 3/8	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	5 9/16	1 1/16	1 1/8	1 1/8 12	23
PCW-3010	43010	3	10	1 3/8	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1 1/8	1 1/8 12	26
PCW-3012	43012	3	12	1 3/8	22 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1 1/8	1 1/8 12	28
PCW-3016A	43016	3	16	1 3/8	31 1/2	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	8 13/16	1 1/16	1 1/8	1 1/8 12	33
PCW-3020	43020	3	20	1 3/8	30 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1 1/8	1 1/8 12	39
PCW-3024	43024	3	24	1 3/8	34 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 9/16	1 1/16	1 1/8	1 1/8 12	43
PCW-3508	43508	3 1/2	8	1 1/2	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	5 3/8	1 1/16	1 1/4	1 1/2 12	29
PCW-3510	43510	3 1/2	10	1 1/2	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/16	1 1/4	1 1/2 12	31
PCW-3512	43512	3 1/2	12	1 1/2	22 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/16	1 1/4	1 1/2 12	33
PCW-3516A	43516	3 1/2	16	1 1/2	31 1/2	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	8 3/8	1 1/16	1 1/4	1 1/2 12	38
PCW-3520	43520	3 1/2	20	1 1/2	30 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/16	1 1/4	1 1/2 12	43
PCW-3524	43524	3 1/2	24	1 1/2	34 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/16	1 1/4	1 1/2 12	48
PCW-4008	44008	4	8	1 3/4	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	5 3/8	1 1/8	1 1/4	1 1/2 12	40
PCW-4010	44010	4	10	1 3/4	20 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/8	1 1/4	1 1/2 12	43
PCW-4012	44012	4	12	1 3/4	22 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/8	1 1/4	1 1/2 12	45
PCW-4016A	44016	4	16	1 3/4	31 1/2	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	8 3/8	1 1/8	1 1/4	1 1/2 12	54
PCW-4020	44020	4	20	1 3/4	30 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/8	1 1/4	1 1/2 12	58
PCW-4024	44024	4	24	1 3/4	34 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/8	1 1/4	1 1/2 12	60
PCW-4030	44030	4	30	1 3/4	40 1/4	3/16	1/2 NPTF	1.015	1 3/4	1 13/16	3 3/8	1 1/8	1 1/4	1 1/2 12	65

# WELDED CYLINDERS



## THE ROYAL LINE

2500 PSI DOUBLE ACTING CYLINDERS



### FEATURES:

- Honed tubing
- Heavy duty welded construction
- Chromed, ground & polished piston rod
- Cast iron piston & gland
- Pin eye mounting on both ends
- Quad ring/backup washer & urethane wiper in gland
- O-ring/backup washers & cast iron ring for piston seals
- Truarc type gland retainer
- Standard color is red

CYLINDERS

PMW	MFGR. NO.	BORE	STROKE	ROD DIA.	RE-TRACT. DIMEN.	PORT SIZE	A	D	E	G	H	L1	L2	N	O	SHIP WT.
PMW-2508	5408	2 1/2	8	1 3/8	16	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	17
PMW-2512	5412	2 1/2	12	1 3/8	20	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	20
PMW-2516	5416	2 1/2	16	1 3/8	24	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	23
PMW-2520	5420	2 1/2	20	1 3/8	28	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	27
PMW-2524	5424	2 1/2	24	1 3/8	32	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	30
PMW-2530	5430	2 1/2	30	1 3/8	38	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	35
PMW-2532	5432	2 1/2	32	1 3/8	40	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	41
PMW-2536	5436	2 1/2	36	1 3/8	44	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	44
PMW-2542	5442	2 1/2	42	1 3/8	50	3/8 NPTF	3/16	.760	9/16	3/4	2 9/16	3	1 3/8	1 1/4	2 1/2	47
PMW-3008	8308	3	8	1 1/2	16	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	22
PMW-3012	8312	3	12	1 1/2	20	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	26
PMW-3016	8316	3	16	1 1/2	24	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	31
PMW-3020	8320	3	20	1 1/2	28	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	35
PMW-3024	8324	3	24	1 1/2	32	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	41
PMW-3030	8330	3	30	1 1/2	38	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	46
PMW-3032	8332	3	32	1 1/2	40	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	48
PMW-3036	8336	3	36	1 1/2	44	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	52
PMW-3040	8340	3	40	1 1/2	48	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	56
PMW-3042	8342	3	42	1 1/2	50	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	59
PMW-3048	8348	3	48	1 1/2	56	1/2 NPTF	3/16	1.015	11/16	1	2 5/16	3 1/2	1 1/2	1 1/4	2 5/8	65
PMW-3508	5508	3 1/2	8	1 1/2	16	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	26
PMW-3512	5512	3 1/2	12	1 1/2	20	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	29
PMW-3516	5516	3 1/2	16	1 1/2	24	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	34
PMW-3520	5520	3 1/2	20	1 1/2	28	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	38
PMW-3524	5524	3 1/2	24	1 1/2	32	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	44
PMW-3530	5530	3 1/2	30	1 1/2	38	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	48
PMW-3532	5532	3 1/2	32	1 1/2	40	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	52
PMW-3536	5536	3 1/2	36	1 1/2	44	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	56
PMW-3540	5540	3 1/2	40	1 1/2	48	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	60
PMW-3542	5542	3 1/2	42	1 1/2	50	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	64
PMW-3548	5548	3 1/2	48	1 1/2	56	1/2 NPTF	3/16	1.015	11/16	1	1 11/16	4	1 1/2	1 1/2	2 5/8	70
PMW-4008	5608	4	8	2	17	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	35
PMW-4012	5612	4	12	2	21	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	41
PMW-4016	5616	4	16	2	25	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	48
PMW-4020	5620	4	20	2	29	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	56

# WELDED CYLINDERS



## THE ROYAL LINE 2500 PSI DOUBLE ACTING CYLINDERS

PMW	MFGR. NO.	BORE	STROKE	ROD DIA.	RE-TRACT. DIMEN.	PORT SIZE	A	D	E	G	H	L1	L2	N	O	SHIP WT.
PMW-4024	5624	4	24	2	33	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	62
PMW-4030	5630	4	30	2	39	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	72
PMW-4032	5632	4	32	2	41	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	74
PMW-4036	5636	4	36	2	45	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	80
PMW-4040	5640	4	40	2	49	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	85
PMW-4042	5642	4	42	2	51	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	92
PMW-4048	5648	4	48	2	57	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	100
PMW-4060	5660	4	60	2	69	1/2 NPTF	3/16	1.265	15/16	1 1/4	2	4 1/2	2	1 5/16	2 7/8	120

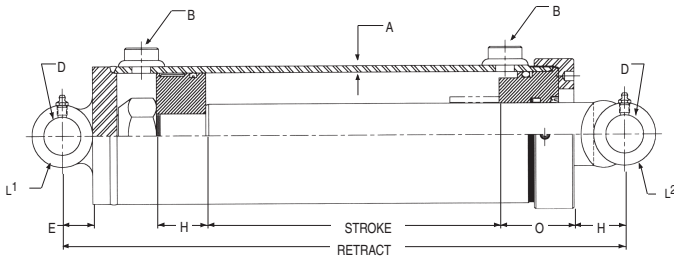
CYLINDERS

# WELDED CYLINDERS



## THE GLADIATOR LINE

3000 PSI DOUBLE ACTING CYLINDERS



### FEATURES:

- Heavy duty welded construction
- 3000 PSI (2:1 safety factor for buckling on 36" stroke and less. Longer stroke consult factory)
- Steel gland cap retainer with lock screw
- 3/4 NPTF full-flow ports
- Standard color is highway yellow
- High grade gray iron piston & gland
- Precision skived tube for long seal life
- All steel spacer tube for bearing length on 48" or more of stroke
- Ground and polished chrome C-1045 steel piston rod for maximum life
- Heavy duty torqued locknut for piston retainer
- Polyurethane "U" cup and heavy duty wiper in gland. Crown seal with bearing rings on piston

CYLINDERS

PMW2	MFGR. NO.	BORE	STROKE	ROD DIA.	RE-TRACT. DIMEN.	A	B PORT SIZE	D	E	H	L1	O	L2	SHIP WT.
PMW-5008	21008	5	8	2 1/2	19	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	75
PMW-5012	21012	5	12	2 1/2	23	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	85
PMW-5016	21016	5	16	2 1/2	27	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	90
PMW-5020	21020	5	20	2 1/2	31	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	105
PMW-5024	21024	5	24	2 1/2	35	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	115
PMW-5030	21030	5	30	2 1/2	41	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	130
PMW-5036	21036	5	36	2 1/2	47	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	145
PMW-5048	21048	5	48	2 1/2	61	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	180
PMW-5054	21054	5	54	2 1/2	68	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	195
PMW-5060	21060	5	60	2 1/2	75	1/4	3/4 NPTF	1.515	1 1/4	1 7/8	5 3/4	2 15/16	4	215
PMW-6008	22008	6	8	3	19	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	100
PMW-6012	22012	6	12	3	23	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	110
PMW-6016	22016	6	16	3	27	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	125
PMW-6024	22024	6	24	3	35	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	150
PMW-6030	22030	6	30	3	41	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	170
PMW-6036	22036	6	36	3	47	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	190
PMW-6048	22048	6	48	3	61	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	240
PMW-6054	22054	6	54	3	68	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	265
PMW-6060	22060	6	60	3	75	1/4	3/4 NPTF	1.515	1 1/4	2	6 3/4	3 1/8	4	290



# SINGLE ACTING TELESCOPIC CYLINDERS



These cylinders are available from Custom Hoists, Commercial, Hyco and SHC. Request the manufacturer you want.



## Features

- Plunger diameters: 2" thru 9-3/4"
- Strokes up to 400"
- One thru six moving stages available
- Maximum pressure to 2,500 PSI
- High-quality V-packing to seal high and low pressures
- Externally threaded head nuts for extra strength, easy seal adjustment
- Special plunger stops assure full shoulder stop
- Easy-access bleeder screw, manual or automatic
- High quality glass-filled nylon or optional bronze bearing rings
- Dual lip wiper to prevent contamination
- Wide range of cylinder mountings, including trunions
- Maximum overlap for stability
- Chromed plungers available

MANUFACTURERS SERVICE MANUALS ARE AVAILABLE.  
CALL FOR DETAILS.

Individual Plunger Lifting Capacities for Single-Acting Telescopic Cylinders

Plunger Dia. (In.)	Cross Section Area (Sq. In.)	Specific Operating Pressures			
		1500 PSI (LBS)	1800 PSI (LBS)	2000 PSI (LBS)	2500PSI (LBS)
2	3.14	4,710	5,672	6,280	7,850
3	7.06	10,590	12,708	14,120	17,650
4	12.56	18,840	22,608	25,120	31,400
5	19.63	29,445	35,334	39,260	49,075
6	28.27	42,405	50,886	56,540	70,675
7	38.48	57,720	69,264	76,960	96,200
8	50.26	75,390	90,468	100,520	125,650
8-1/4	53.50	80,250	96,300	107,000	133,750
9-1/8	65.40	98,100	117,720	130,800	163,500
9-3/4	74.50	111,750	134,100	149,000	186,250

## Cylinder Identification

**85 - 2 - 250**



CYLINDERS

# SINGLE ACTING TELESCOPIC CYLINDERS



These cylinders are available from Custom Hoists, Commercial, Hyco and SHC. Request the manufacturer you want.

## COMMERCIAL FEATURES

- Longer sleeve overlap for improved stability and higher column loading.
- Heavy walled tubing in the first stage offers up to 27% more cross-sectional area providing up to 76% greater tube burst strength than our competition.
- Beveled mating surfaces of the overlap collar and stop ring for greater impact resistance during dumping operations.
- Snap-on, glass-filled bearings that absorb contaminants without damaging the cylinder walls.
- Threaded stop rings for easier servicing and more reliable stopping action.
- External packing nuts to give added support to the tube and make servicing easier.
- Wave springs and chevron packing for positive, self-compensating seals.
- Hytrel rod wipers resist high temperatures without extruding.
- Cast steel pin-eye and rod-end mountings give dependable strength.

MANUFACTURERS SERVICE MANUALS ARE AVAILABLE. CALL FOR DETAILS.

## DOUBLE ACTING CYLINDERS:

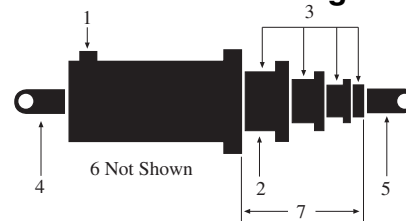
- Operating pressure up to 2000 psi.
- Main cylinder outside diameter from 3-3/4" to 10-13/16".
- Lifting capacity to 153,180 lbs.
- Chrome-plated sleeves are available on special order.
- Pin-eye and trunion mountings are standard. If other types are required, dimensions must be specified.

## SINGLE ACTING CYLINDERS:

- Operating pressure up to 2000 psi.
- Main cylinder outside diameter from 3-3/4" to 11-1/8".
- All cylinders have NPT ports, unless otherwise specified.
- Lifting capacity to 138,060 lbs.
- Chrome-plated sleeves and plungers are available on special order.
- Pin-eye and trunion mountings are standard. If other types are required, dimensions must be specified.

S.A. Cylinder Information			
Sleeve O.D. in inches	Effective Area in sq. inches	Load Capacity lbs. at 2000 p.s.i.	Displacement per in. of stroke in gallons
2.75	5.94	11,880	.026
3.75	11.04	22,080	.048
4.75	17.72	35,440	.077
5.75	25.96	51,920	.112
6.75	35.78	71,560	.155
7.905	48.70	97,400	.210
9.375	69.03	138,060	.299

### Model Number Coding



### Model Number S84DC-40-161

1. S = Single-acting Type Cylinder  
SD = Double-acting telescopic type
2. 8 = 7-7/8" nominal diameter of largest sleeve
3. 4 = 4 stages or sleeves
4. D = Type of mounting on base end
5. C = Type of mounting on rod end
6. -40 = Modification or design variation
7. 161 = Length of stroke (161")

### D.A. Cylinder Information

Sleeve or plunger O.D. (inches)	Bore of Main or Sleeve (inches)	Effective Area extended (sq. inches)	Effective Area retracted (sq. inches)	Load Capacity at 2000 p.s.i. extended (pounds)	Load Capacity at 2000 p.s.i. retracted (pounds)	Displacement per in. of stroke extended (gallons)	Displacement per in. of stroke retracted (gallons)
2.75	3.25	8.295	2.355	16,590	4,710	.036	.010
3.75	4.25	14.186	3.142	28,372	6,284	.061	.014
4.75	5.25	21.648	3.927	43,296	7,854	.094	.017
5.75	6.25	30.680	4.713	61,360	9,426	.133	.020
6.75	7.25	41.282	5.497	82,564	10,994	.179	.024
7.905	8.437	55.680	6.973	111,360	13,946	.242	.030
9.375	9.143	76.590	7.560	153,180	15,120	.331	.038

# SINGLE ACTING TELESCOPIC CYLINDERS



These cylinders are available from Custom Hoists, Commercial, Hycot and SHC. Request the manufacturer you want.



Fluid Capacity: Volume To Fully Extend			
Plunger Dia. (Inches)	Effective Area (Sq. Inches)	Load Capacity (Lbs. @ 2000 PSI)	Displacement (Gal./In. of Stroke)
3	7.07	14,140	.031
4	12.56	25,120	.054
5	19.63	9,260	.085
6	28.27	56,540	.122
7	38.48	76,960	.166
8.12	51.78	103,560	.224
8.25	53.46	106,920	.231
9.38	69.10	138,200	.299

Follow example to determine displacement of the complete cylinder **Example:** Model 824-200  
 8.12 in. plunger .224  
 7 in. plunger .166  
 6 in. plunger .122  
 5 in. plunger .085  
 .597  
 $.597 \times 200 = 29.8$  Gallons to fully extend  
 4

### Features

**GENERAL DATA**  
 Operating pressures to 2000 psi. Plunger diameters range from 2" to 9.375". Lifting capacities to 138,200 lbs. Pin-eye mountings standard—trunion type available. Chrome-plated plungers available.

**AUTOMATIC AIR BLEEDERS**  
 Every standard Hycotel single-acting telescopic cylinder comes equipped with an automatic air bleeder. This completely eliminates time-consuming and potentially hazardous manual air bleeding operation.

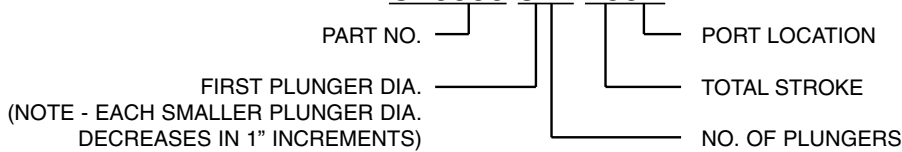
**GUIDE RINGS & RETAINING RINGS**  
 Hycotel® features replaceable plunger guide rings, designed and balanced to be well lubricated and made of specially compounded material for long wearing performance. The retainer rings work in conjunction with the piston design to be positively locked into stop position grooves when the cylinder is fully extended.

**"DUAL-LIP" WIPER**  
 This dual lip design wiper of Hytrel is a more efficient "dirt wiper." The dual lip provides an improved means of keeping dirt out.

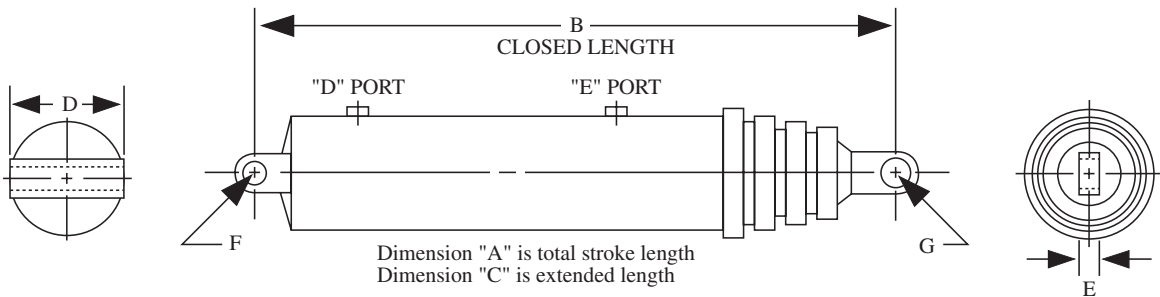
CYLINDERS

**MANUFACTURERS SERVICE MANUALS ARE AVAILABLE. CALL FOR DETAILS.**

### Cylinder Identification C70000-814-200D



NOTE: "D" and "E" suffix in Part No. represents a specific port location.  
 For dimensional data, consult our sales staff.  
 A "T" suffix in Part No. represents Trunion Mount.



# SINGLE ACTING TELESCOPIC CYLINDERS

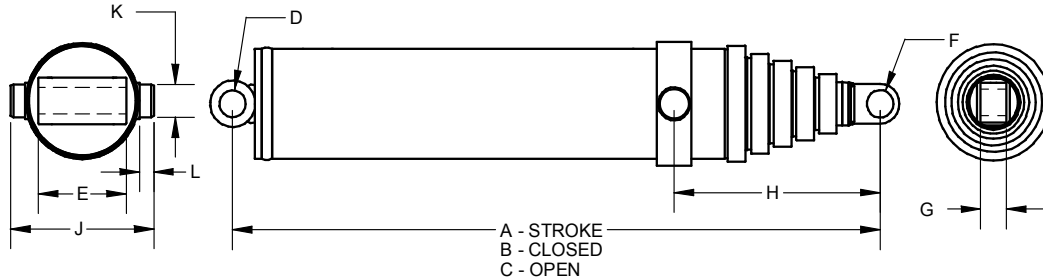
**SOUTHERN** HYDRAULIC CYLINDER, INC.

These cylinders are available from Custom Hoists, Commercial, Hyco and SHC. Request the manufacturer you want.

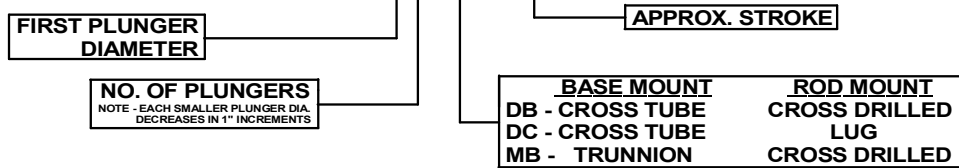
## STANDARD SINGLE ACTING TELESCOPIC CYLINDER SPECIFICATIONS

Model Number	Stroke (A)	Closed (B)	Open (C)	Dia. Body	Stage Dia.			(D)	(E)	(F)	(G)	(H)	(J)	(K)	(L)	Ret Vol (Gal)	Ext Vol (Gal)	Dry Wt. (Lbs)
SHC-M32DB-43	40.38	29.69	70.07	4.00	3	2	-	1.50	4.00	1.25	1.88	-	-	-	-	.58	1.46	60
SHC-M32DB-50	46.67	32.84	79.51	4.00	3	2	-	1.50	4.00	1.25	1.88	-	-	-	-	.66	1.68	66
SHC-M42DB-43	39.50	30.19	69.69	5.00	4	3	-	1.50	5.00	1.50	2.75	-	-	-	-	1.06	2.72	86
SHC-M42DB-50	47.25	33.69	80.94	5.00	4	3	-	1.50	5.00	1.50	2.75	-	-	-	-	1.23	3.23	95
SHC-M42MB-50	51.25	35.07	86.32	5.00	4	3	-	-	1.50	2.75	8.50	8.81	1.75	.88	1.33	3.50	97	
SHC-M42DB-60	57.88	39.07	96.95	5.00	4	3	-	1.50	5.00	1.50	2.75	-	-	-	-	1.48	3.93	109
SHC-M42MB-65	65.00	42.07	107.07	5.00	4	3	-	-	1.50	2.75	8.50	8.81	1.75	.88	1.66	4.41	115	
SHC-M43MB-74	73.88	34.63	108.51	5.00	4	3	2	-	-	1.25	1.88	8.50	8.81	1.75	.88	1.07	3.45	106
SHC-M43DB-75	67.34	33.62	100.96	5.00	4	3	2	1.50	5.00	1.25	1.88	-	-	-	-	.98	3.15	105
SHC-M43MB-75	68.25	32.75	101.00	5.00	4	3	2	-	-	1.25	1.88	8.50	8.81	1.75	.88	.99	3.19	100
SHC-M43DB-98	89.83	41.13	130.96	5.00	4	3	2	1.50	5.00	1.25	1.88	-	-	-	-	1.29	4.19	124
SHC-M43MB-98	96.42	42.19	138.61	5.00	4	3	2	-	-	1.25	2.00	8.69	8.81	1.75	.88	1.37	4.50	128
SHC-M53DB-60	57.11	29.81	86.92	6.00	5	4	3	1.50	6.25	1.50	2.75	-	-	-	-	1.39	4.56	122
SHC-M53DC-72	72.00	35.13	107.13	6.00	5	4	3	2.00	7.00	1.69	1.63	-	-	-	-	1.72	5.73	142
SHC-M53DB-74	69.14	33.82	102.96	6.00	5	4	3	1.50	6.25	1.50	2.75	-	-	-	-	1.65	5.51	137
SHC-M53MB-74	74.00	34.63	108.63	6.00	5	4	3	-	-	1.50	2.75	8.50	8.81	1.75	.88	1.75	5.89	141
SHC-M53DB-90	86.55	39.63	126.18	6.00	5	4	3	1.50	6.25	1.50	2.75	-	-	-	-	2.02	6.87	159
SHC-M53MB-90	86.06	38.63	124.69	6.00	5	4	3	-	-	1.50	2.75	8.50	8.81	1.75	.88	2.01	6.83	156

ALL ITEMS LISTED ARE STOCK ITEMS. ALL LISTED ITEMS ARE MARION STYLE CYLINDERS.  
 PORTS 1/2"-14 NPT ON SERIES 32, 42, 43, & 53 (SHC-M53DC-72, SHC-M53DC-84, & SHC-M53DC-84A USE 3/4"-14 NPT)  
 OTHER SIZES AND OPTIONS ARE AVAILABLE.



### CYLINDER IDENTIFICATION SHC - M 53 DB - 75



### SINGLE ACTING EXTEND LOAD CAPACITY

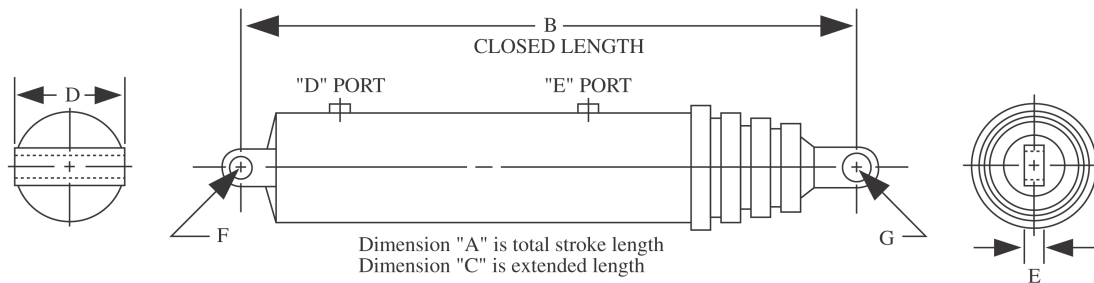
LOAD CAPACITY : LBS @ PSI

\*ALL DIMENSIONS AND CALCULATIONS NOMINAL

PLUNGER DIA.	1500 PSI	2000 PSI	2500 PSI
2	4,700	6,280	7,850
3	10,600	14,130	17,670
4	18,850	25,130	31,410
5	29,450	39,270	49,080
6	42,410	56,540	70,680
7	57,720	76,960	96,210
8.25	80,180	106,910	133,640

# SINGLE ACTING TELESCOPIC CYLINDER STOCK

These cylinders are available from Custom Hoists, Commercial, Hyco and SHC. Request the manufacturer you want. See page 17-20 for specifications.

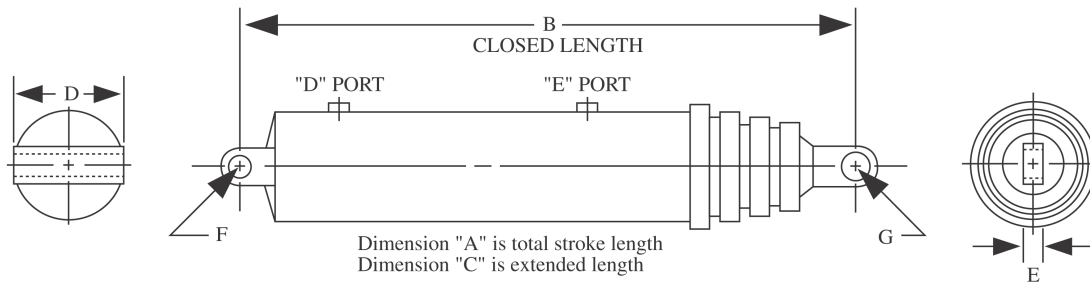


Stroke lengths for Hyco 70,000 series cylinders may be slightly different than those shown in chart. Please call our component group for exact 70,000 series stroke lengths.

CYLINDER NO.	A	B	C	D	E	F	G
5372-SA	72.00	37.12	109.12	8.13	1.50	2.00	1.68
5384-SA	84.00	41.12	125.12	8.12	1.50	2.06	1.56
53104-SA	104.00	47.75	151.75	8.13	1.50	2.00	1.68
6384-SA	84.00	41.00	125.00	7.62	2.00	2.12	2.06
63104-SA	103.87	47.62	151.50	7.62	2.00	2.12	2.06
63108-SA	108.00	49.00	157.00	7.625	2.00	2.12	2.06
63111-SA	111.00	50.00	161.00	7.00	2.00	2.00	2.00
63120-SA	120.00	53.00	173.00	7.625	2.00	2.12	2.06
63120-TSA	120.00	53.375	173.375	TRIUNION MOUNT	4.00	N/A	1.56
63126-SA	126.00	55.00	181.00	7.62	2.00	2.12	2.06
D63128-SA	126.50	54.63	181.13	6.75	2.00	2.00	1.63
63140-TSA	139.87	60.00	199.97	TRIUNION MOUNT	4.00	N/A	1.56
64135-SA	134.88	47.13	182.00	8.00	2.69	1.75	1.50
64156-SA	155.87	52.37	208.12	8.00	2.68	1.87	1.56
73110-SA	110.63	50.06	160.69	8.25	2.00	2.00	2.00
73120-SA	120.00	53.12	173.12	8.625	1.50	2.12	2.06
D73126	125.25	55.12	180.37	6.75	2.00	2.00	1.63
73130-SA	130.12	56.50	186.62	8.625	1.50	2.12	2.06
73140-SA	140.00	60.00	200.00	8.25	2.00	2.00	2.00
D73142-SA	142.13	60.75	202.88	6.75	2.00	2.00	1.63
74120-SA	120.00	44.75	164.75	8.625	2.00	2.12	2.06
74135-SA	135.00	48.25	183.25	8.625	2.00	2.12	2.06
74140-SA	140.25	49.25	189.75	8.625	2.00	2.12	2.06
74156-SA	156.00	53.37	209.37	8.625	2.00	2.12	2.06
74161-SA	161.00	54.62	215.62	8.62	2.00	2.12	2.06
74167-SA	167.25	56.25	223.50	8.62	2.00	2.12	2.06
84148-SA	147.75	51.50	199.25	9.50	2.00	2.12	2.06
84156-SA	155.75	53.50	209.25	9.50	2.00	2.12	2.06
84170-SA	169.75	57.00	226.75	9.50	2.00	2.12	2.06
84180-SA	179.75	59.50	239.25	9.50	2.00	2.12	2.06
85170-SA	170.00	49.87	219.87	9.50	2.00	2.12	2.06
85190-SA	190.00	54.00	244.00	9.50	2.00	2.12	2.06
85197-SA	196.13	55.25	251.38	9.50	2.00	2.00	2.00
85220-SA	220.00	60.00	280.00	9.50	2.00	2.12	2.06
85220-TSA	218.25	60.38	278.63	TR	2.00	TR	2.00
85235-SA	235.00	65.00	300.00	9.50	2.00	2.12	2.06
85235-TSA	233.25	63.38	296.33	TR	2.00	TR	2.00
85250-SA	250.00	68.00	318.00	9.50	2.00	2.12	2.06
85250-TSA	248.25	68.38	316.63	TR	2.00	TR	2.00
85265-SA	265.00	71.00	336.00	9.50	2.00	2.12	2.06
85265-TSA	264.25	74.88	339.13	TR	2.00	TR	2.00

# SINGLE ACTING TELESCOPIC CYLINDER STOCK

These cylinders are available from Custom Hoists, Commercial, Hyco and SHC. Request the manufacturer you want. See page 17-20 for specifications.

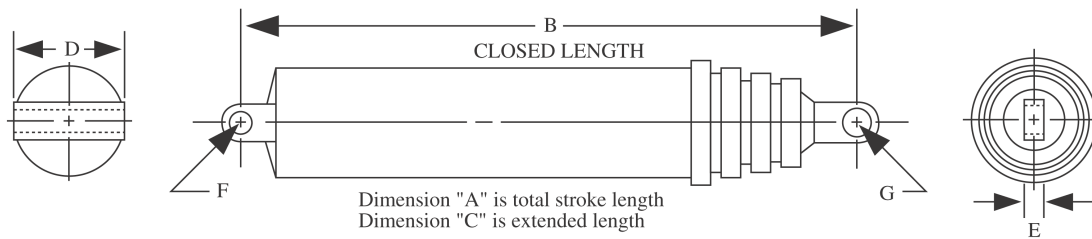


Stroke lengths for Hyco 70,000 series cylinders may be slightly different than those shown in chart. Please call our component group for exact 70,000 series stroke lengths.

CYLINDER NO.	A	B	C	D	E	F	G
825190-SA	190.00	54.00	244.00	10.25	2.00	2.12	2.06
825220-SA	220.00	60.00	280.00	10.25	2.00	2.12	2.06
825235-SA	235.00	65.00	300.00	10.25	2.00	2.12	2.06
825250-SA	250.00	68.00	318.00	10.25	2.00	2.12	2.06
825265-SA	264.62	74.50	339.12	10.25	2.00	2.12	2.06
825280-SA	279.62	77.62	357.25	10.25	2.00	2.12	2.06
95220-SA	219.75	60.12	279.87	10.75	2.00	2.12	2.06
95235-SA	234.75	65.00	299.75	10.75	2.00	2.12	2.06
95250-SA	249.75	72.62	322.37	10.75	2.00	2.12	2.06
95265-SA	264.75	75.62	340.37	10.75	2.00	2.12	2.06
975220-SA	219.75	60.00	280.00	12.00	2.00	2.12	2.06
975235-SA	234.75	65.25	300.00	12.00	2.00	2.12	2.06
975250-SA	249.75	72.62	322.37	12.00	2.00	2.12	2.06
HPT53100	99.12	46.25	145.37	7.75	1.50	2.06	1.78
HPT53110	105.12	47.87	153.00	7.75	1.50	2.06	1.78
HPT53120	122.37	54.00	176.37	7.75	1.50	2.06	1.78
HPT53130	127.62	54.50	182.12	7.75	1.50	2.06	1.78
HPT63120	120.75	54.00	174.75	8.00	2.00	2.50	2.25
HPT63130	125.25	55.50	180.75	8.00	2.00	2.50	2.25
HPT63140	138.75	60.00	198.75	8.00	2.00	2.50	2.25
HPT63160	160.12	69.12	229.25	8.00	2.00	2.50	2.25
475	43.12	31.68	74.81	1.50	2.50	3.37	1.81
495	64.75	31.75	96.50	1.50	2.50	3.37	1.81
498	89.50	41.87	131.37	1.50	2.50	3.37	1.81
SHC-M32DB-43	40.13	29.69	69.82	4.00	2.00	1.50	1.25
SHC-M32DB-50	47.94	33.47	81.41	4.00	2.00	1.50	1.25
SHC-M42DB-43	39.50	30.19	69.90	5.00	3.00	1.50	1.50
SHC-M42DB-50	51.25	36.13	87.38	5.00	3.00	1.50	1.50
SHC-M42MB-50	51.25	35.07	86.32	TR	3.00	TR	1.50
SHC-M42DB-60	60.00	40.63	100.63	5.00	3.00	1.50	1.50
SHC-M42MB-65	65.00	42.07	107.07	TR	3.00	TR	1.50
SHC-M43DB-75	68.62	33.69	102.31	5.00	2.00	1.50	1.25
SHC-M43MB-75	68.25	32.50	100.75	TR	2.00	TR	1.25
SHC-M53DB-60	57.75	30.00	87.75	6.00	3.00	1.50	1.50
SHC-M53DB-74	74.00	35.44	109.44	6.00	3.00	1.50	1.50
SHC-M53MB-74	74.00	34.38	108.38	TR	3.00	TR	1.50
SHC-M53MB-90	86.06	38.63	124.69	TR	3.00	TR	1.50

## DOUBLE ACTING TELESCOPIC CYLINDERS

These cylinders are available from Custom Hoists, Commercial, and Hyco. Request the manufacturer you want. See page 18, 23 & 24 for specifications.



CYLINDER NO.	A	B	C	D	E	F	G
52112-DA	111.75	75.50	187.25	2.00	2.00	2.01	2.01
53110-DA	109.62	56.75	166.37	2.00	2.00	3.03	1.56
53155-DA	155.75	75.50	231.25	2.00	2.00	2.00	1.50
53182-DA	182.00	81.00	263.00	3.87	6.50	2.00	2.00
6282-DA	82.00	56.50	138.50	2.25	2.25	3.03	3.03
6397-DA	97.12	52.37	149.50	1.50	1.50	1.28	1.28
63108-DA	107.62	50.75	158.37	7.12	3.87	1.78	1.78
63118-DA	118.00	58.50	176.50	3.00	4.00	2.50	2.50
63124-DA	124.50	76.87	201.48	2.00	2.00	2.031	2.06
63132-DA	131.62	62.37	194.00	7.12	3.87	1.78	1.78
63167-DA	167.00	85.25	252.25	4.00	3.69	2.00	2.00
64118-DA	118.13	49.38	167.50	2.25	2.25	1.50	1.50
64136-DA	135.62	49.37	185.00	2.00	2.25	1.56	1.56
64150-DA	150.00	56.56	206.56	2.25	2.25	1.50	1.50
72156-DA	156.12	96.00	252.12	N/A	2.00	N/A	2.06
74131-DA	131.50	53.37	184.87	1.50	1.50	1.28	1.28
74171-DA	171.12	62.37	233.50	7.00	4.00	1.78	1.78
83126-DA	126.00	72.00	198.00	3.00	3.00	2.51	2.51
84176-TD2	176.25	69.00	245.25	TRIUNION MOUNT	2.00	TRIUNION MOUNT	1.75
84176-TD3	176.25	69.00	245.25	TRIUNION MOUNT	2.00	N/A	1.76
84178-DA	178.25	69.00	247.25	2.00	2.00	1.78	1.78
85125-DA	125.00	49.75	174.75	2.50	2.50	2.00	2.00
85156-DA	155.625	55.50	211.125	2.00	2.00	2.00	2.00
85195-DA	195.00	69.37	264.87	2.00	2.00	2.03	2.03
85220-TD2	220.00	69.25	289.25	TRIUNION MOUNT	2.00	N/A	1.76
85220-TD3	220.25	69.25	289.50	TRIUNION MOUNT	2.00	N/A	1.76
85300-DA	300.25	87.37	387.62	1.75	2.00	2.00	2.18
85348-DA	347.87	100.00	447.87	2.00	2.00	2.06	2.18
85378-DA	378.00	104.75	482.75	2.00	2.00	2.12	2.06
86177-DA	176.75	53.37	230.12	1.50	1.50	1.28	1.28
915125-DA	125.00	49.75	174.75	2.50	2.50	2.00	2.00
95160-DA	159.75	61.00	220.75	2.00	2.00	2.02	2.02
96170-DA	169.75	50.625	220.37	2.50	2.50	2.00	2.00
96199-DA	199.12	57.87	257.00	2.00	2.00	2.03	2.03
96412-DA	412.25	99.62	511.87	TRIUNION MOUNT	2.00	TRIUNION MOUNT	2.06
96456-DA	456.50	107.00	563.50	TRIUNION MOUNT	2.00	TRIUNION MOUNT	2.06
974176-DA	176.12	69.12	245.25	3.00	3.00	2.52	2.52
974190-DA	189.62	71.00	260.62	2.25	2.00	2.25	2.02
976199-DA	199.12	57.87	257.00	2.00	2.00	2.03	2.03

## DOUBLE ACTING TELESCOPIC CYLINDERS

These cylinders weights are average weights for Custom Hoists and Hyco manufactured cylinders. Cylinders manufactured by Commercial Intertech are usually 50-70 pounds heavier than weights listed.

CYLINDER #	WT. (LBS.)	CYLINDER #	WT. (LBS.)	CYLINDER #	WT. (LBS.)	CYLINDER #	WT. (LBS.)
5360-SA	134	825235-SA	725	85220-TD3	764	HL-1-4106	67
5372-SA	160	825250-SA	765	85300-DA	848	HL-1-4108	90
5384-SA	175	825265-SA	795	85348-DA	875	HL-1-4110	105
53104-SA	200	825280-SA	835	85378-DA	952	HL-1-4272	68
6384-SA	215	95220-SA	780	86177-DA	485	HL-1-4305	50
63104-SA	249	95235-SA	825	915125-DA	528	HL-1-4328	185
63108-SA	256	95250-SA	868	95160-DA	740	HL-1-4330	192
63111-SA	260	95265-SA	890	96170-DA	568	HL-1-4339	104
63120-SA	279	975220-SA	858	96199-DA	795	HL-1-4340	175
63120-TSA	279	975235-SA	967	96412-DA	1350	HL-1-4341	85
63126-SA	286	975250-SA	1076	96456-DA	1408	HL-1-4348	170
D63128-SA	278	HPT53100	190	974176-DA	978	HL-1-4884	150
63140-TSA	330	HPT53110	193	974190-DA	995	HL-1-4887	121
64135-SA	260	HPT53120	230	976199-DA	864	LCH-15527	97
64156-SA	310	HPT53130	214	475	102	LCH-2R1006A	168
73110-SA	350	HPT63120	267	495	102	LCH-PO-1166	190
73120-SA	336	HPT63130	270	498	132	LCH-PO-265	102
D73126	355	HPT63140	288	D3021GDA	55	MX-401222	260
73130-SA	358	HPT63160	328	D3526GDA	70	MX-401282	105
73140-SA	404	52112-DA	318	D4021EDA	96	MX-401826	51
D73142-SA	383	53110-DA	246	D4028EDA	105	MX-404614	176
74120-SA	311	53155-DA	307	D4030FDA	96	PG-3128C	67
74135-SA	335	53182-DA	357	D4035HDA	125	PG-6042BDA	239
74140-SA	347	6282-DA	253	D4128EDA	91	PG-7078DA	442
74156-SA	370	6397-DA	275	D4522JDA	84	PKM-1341-LM	61
74161-SA	390	63108-DA	283	D4522EDA	100	PKM-1351-LM	214
74167-SA	390	63118-DA	317	D4526BDA	104	PKM-2162-LM	24
84148-SA	451	63124-DA	383	D4548BDA	165	SHC-M32DB-43	57
84156-SA	455	63132-DA	332	D5532EDA	135	SHC-M32DB-50	63
84170-SA	494	63167-DA	320	DD-BB8133-1	188	SHC-M42DB-43	81
84180-SA	524	64118-DA	280	DD-BB8134-1	150	SHC-M42DB-50	91
85170-SA	450	64136-DA	271	DD-BB8281-1	114	SHC-M42MB-50	100
85190-SA	506	64150-DA	305	DD-BB8374-1	174	SHC-M42DB-60	115
85197-SA	525	72156-DA	630	DD-BB8379-1	110	SHC-M42MB-65	116
85220-SA	567	74131-DA	334	DD-BB8748-1	85	SHC-M43DB-75	98
85220-TSA	585	74171-DA	575	DD-AB19461	368	SHC-M43MB-75	107
85235-SA	619	83126-DA	555	DD-AB19774	110	SHC-M53DB-60	115
85235-TSA	637	84176-TD2	700	DD-AB19775	175	SHC-M53DB-74	137
85250-SA	654	84176-TD3	550	HL-1-4070	83	SHC-M53MB-74	140
85250-TSA	672	84178-DA	560	HL-1-4093	150	SHC-M53MB-90	154
85265-SA	674	85125-DA	510	HL-1-4094	125		
85265-TSA	692	85156-DA	495	HL-1-4100	73		
825190-SA	595	85195-DA	620	HL-1-4101	100		
825220-SA	667	85220-TD2	764	HL-1-4103	119		

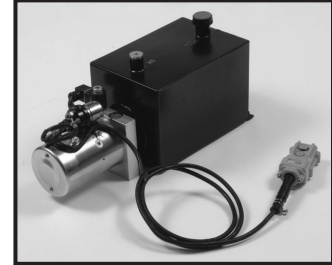


# POWER UNITS

## POWER UNITS

<b>Part Number:</b> HPU12VCHEFVDO2-RC <b>1 - 9 Pcs:</b> \$386.10 Net Each <b>10+ Pcs:</b> \$343.20 Net Each 12 VDC 2.5 GPM Pump 3 Gallon Steel Tank Two Button Remote Control 3 Meter Cable Power Up, Gravity Down Adjustable relief valve pre set at 2900 psi	<b>Part Number:</b> HPU12VCHCFVD02-RC <b>1 - 9 Pcs:</b> \$386.10 Net Each <b>10+ Pcs:</b> \$343.20 Net Each 12 VDC 1.6 GPM Pump 3 Gallon Steel Tank Two Button Control 3 Meter Cable Power Up, Gravity Down Adjustable relief valve pre set at 2900 psi
---	--

**Reservoir size accommodates HTC 7-Ton Cylinders (Page 9) or equivalent size cylinder**



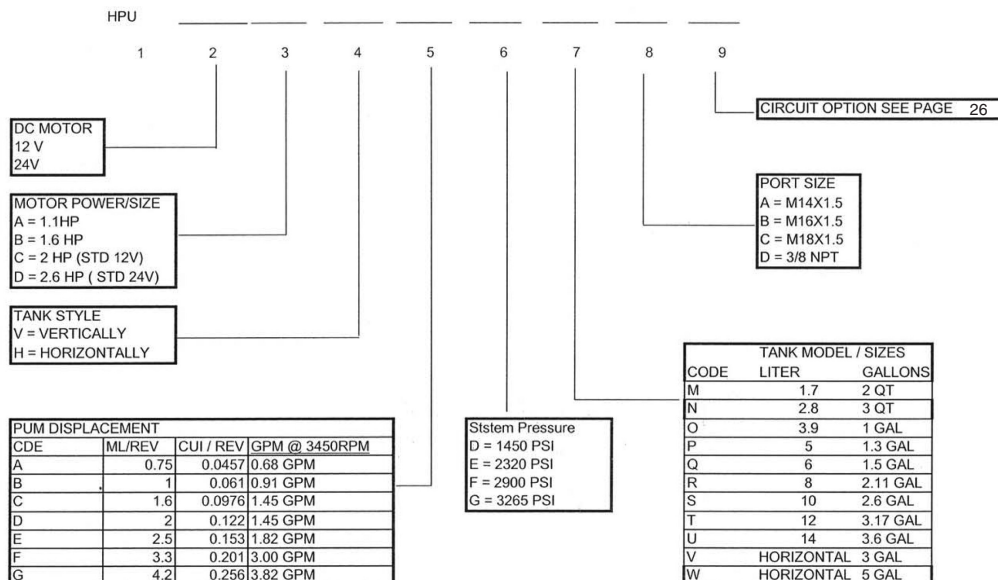
<b>Part Number:</b> HPU12VCHCFWD02-RC <b>1 - 9 Pcs:</b> \$386.10 Net Each <b>10+ Pcs:</b> \$343.20 Net Each 12 VDC 1.6 GPM Pump 5 Gallon Steel Tank Two Button Remote Control 3 Meter Cable Power Up, Gravity Down Adjustable relief valve pre set at 2900 psi	<b>Part Number:</b> HPU12VCHEFWD02-RC <b>1 - 9 Pcs:</b> \$383.09 Net Each <b>10+ Pcs:</b> \$340.52 Net Each 12 VDC 2.5 GPM Pump 5 Gallon Steel Tank Two Button Control 3 Meter Cable Power Up, Gravity Down Adjustable relief valve pre set at 2900 psi
---	--

**Reservoir size accommodates HTC 12-Ton Cylinders (Page 9) or equivalent size cylinder**

<b>Part Number:</b> HPU12VCHCFSD02-RC <b>1 - 9 Pcs:</b> \$328.82 Net Each <b>10+ Pcs:</b> \$292.28 Net Each Circuit 3 way power up gravity down 12 vdc power source required Steel tank 2.6 gallon capacity Two button remote control Flow rate is 1.45 gpm @ 3450 rpm Adjustable relief valve pre set at 2900 psi	<b>Part Number:</b> HPU12VCHCFSD12-RC <b>1 - 9 Pcs:</b> \$400.33 Net Each <b>10+ Pcs:</b> \$355.85 Net Each Circuit 4way three position valve power out & power in 12vdc power source required Steel tank 2.6 gallon capacity Two button remote control Flow rate is 1.45 gpm @3450 rpm Adjustable relief valve pre set at 2900 psi
--	---

<b>Part Number:</b> MTE-D202T-4850-16-25 <b>1 - 9 Pcs:</b> \$341.64 Each <b>10+ Pcs:</b> \$303.68 Each Specifications are relief valve set at 2000 psi. 1.6 gpm @ 1500 psi 1.8 gallon reservoir Runs on 12 volt DC power Includes 15 ft corded remote control cable Excellent use for truck tailgate, boat lifts, and tow behind dump trailers	<b>Part Number:</b> MTE-D202T-4851-16-25 <b>1 - 9 Pcs:</b> \$410.87 Each <b>10+ Pcs:</b> \$365.22 Each Specifications are relief valve set at 2000 psi. 1.6 gpm @ 1500 psi 1.8 gallon reservoir Runs on 12 volt DC power Includes 15 ft corded remote control cable Solenoid operation allow for lift, hold, and reverse double acting circuit Motor is reversible, eliminating the use of a troublesome cartridge valve
--	---

### HOW TO CREATE A POWER UNIT PART #

















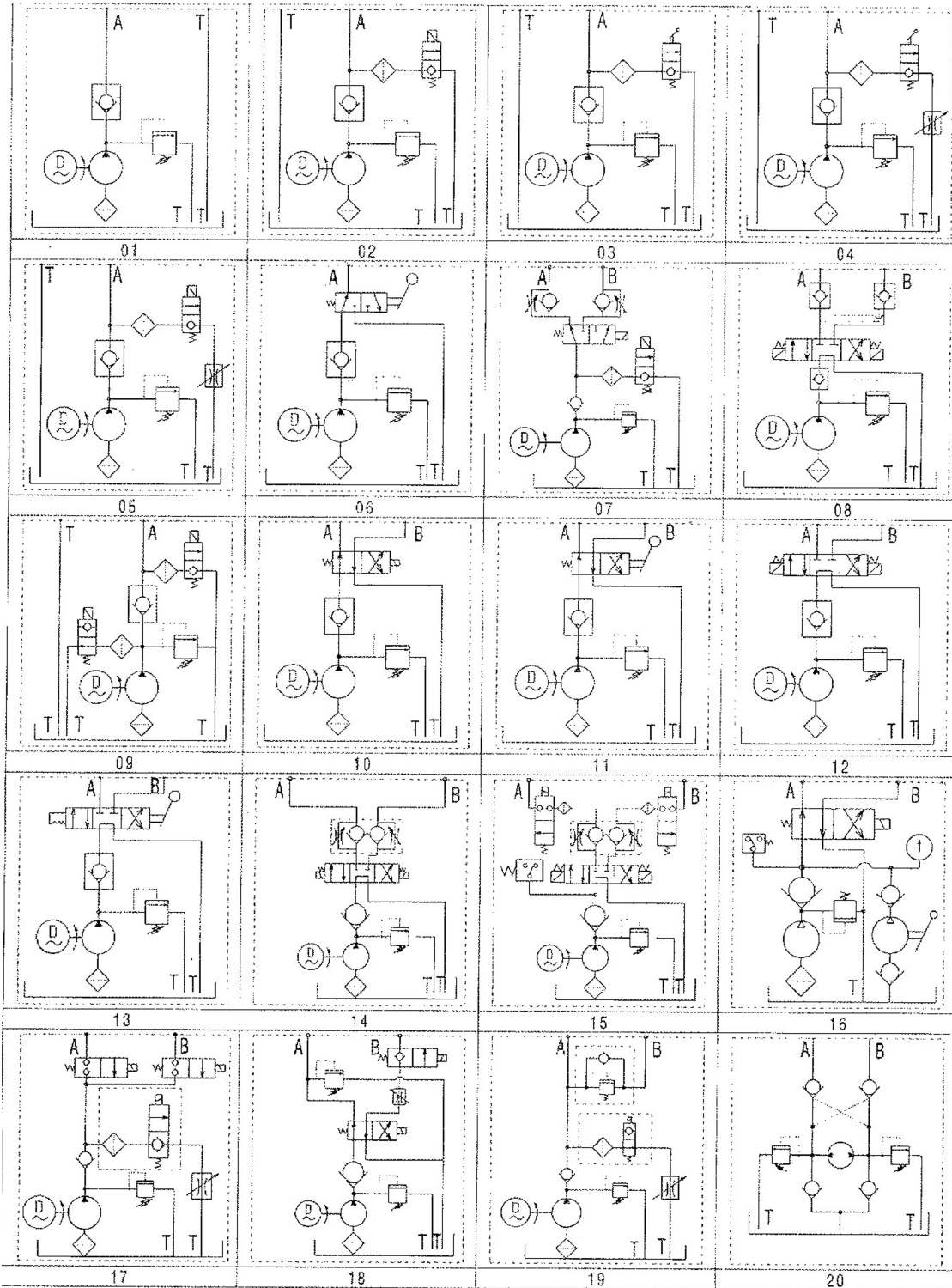
# POWER UNITS

## Drawing of Circuits - Power Unit Hydraulic Schematic Diagram

POWER UNITS

### Key

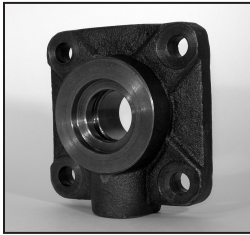
-  Two Position Manual Valve Spring Centered
-  Check Valve
-  Flow Control Adjustable
-  Two Position Solenoid Valve
-  Pilot Operated Check Valve
-  4 Way 3 Position Solenoid Spring Centered Valve
-  Relief Valve
-  Hydraulic Pump
-  Filter
-  12 VDC Electric Motor
-  Two Position 3 Way Spring Centered Manual Valve
-  Two Position 4 Way Spring Centered Manual Valve
-  Two Position 4 Way Spring Centered Solenoid Valve
-  Pressure Switch



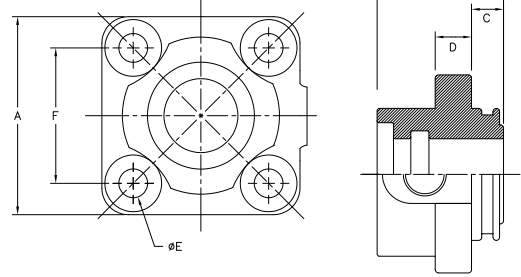
# CYLINDER GLANDS AND CAPS

## Component Parts

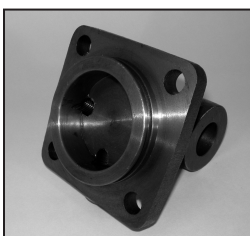
### THE HTR LINE



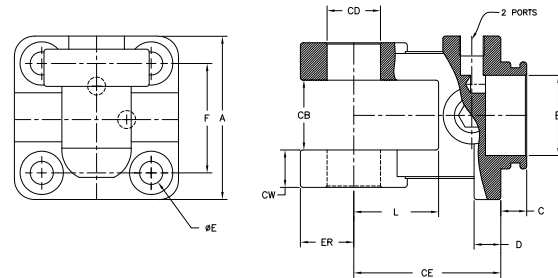
#### HTR GLANDS



Part Number	Rod	Bore	A	B	C	D	E	F	Port
HTR-2.0X1.125-GLAND	1.125	2.0	3.07	1.92	0.50	0.52	0.43	2.05	3/8" NPT
HTR-2.5X1.125-GLAND	1.125	2.5	3.35	1.92	0.50	0.62	0.43	2.36	3/8" NPT
HTR-3.0X1.250-GLAND	1.250	3.0	4.05	1.96	0.50	0.73	0.51	2.87	1/2" NPT
HTR-3.5X1.250-GLAND	1.250	3.5	4.33	1.95	0.50	0.74	0.51	3.19	1/2" NPT
HTR-3.5X1.500-GLAND	1.500	3.5	4.33	1.95	0.50	0.74	0.51	3.19	1/2" NPT
HTR-4.0X1.250-GLAND	1.250	4.0	4.72	1.89	0.51	0.98	0.51	3.62	1/2" NPT
HTR-4.0X1.500-GLAND	1.500	4.0	4.72	1.89	0.51	0.98	0.51	3.62	1/2" NPT
HTR-4.0X1.750-GLAND	1.750	4.0	4.72	1.89	0.51	0.98	0.51	3.62	1/2" NPT
HTR-5.0X1.500-GLAND	1.500	5.0	6.30	2.24	0.68	1.18	0.67	4.45	1/2" NPT
HTR-5.0X2.000-GLAND	2.000	5.0	6.30	2.24	0.68	1.18	0.67	4.45	1/2" NPT



#### HTR CAPS

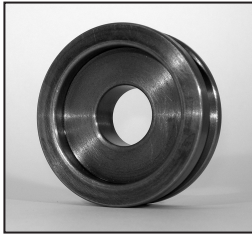


Part Number	Bore	A	B	C	D	E	F	Ports	CB	CD	CE	CW	L	ER
HTR-2.0 CAP	2.0	3.07	1.50	0.50	0.50	0.43	2.05	3/8" NPT	1.14	1.01	2.84	0.69	1.63	1.00
HTR-2.5 CAP	2.5	3.35	1.77	0.50	0.50	0.43	2.36	3/8" NPT	1.14	1.01	2.84	0.69	1.63	1.00
HTR-3.0 CAP	3.0	4.05	2.28	0.50	0.50	0.51	2.87	1/2" NPT	1.14	1.01	2.84	0.69	1.63	1.00
HTR-3.5 CAP	3.5	4.33	2.56	0.50	0.69	0.51	3.19	1/2" NPT	1.14	1.01	2.84	0.69	1.63	1.00
HTR-4.0 CAP	4.0	4.72	3.00	0.51	0.75	0.51	3.62	1/2" NPT	1.14	1.01	2.88	0.73	1.63	1.13
HTR-5.0 CAP	5.0	6.30	3.94	0.69	0.75	0.67	4.45	1/2" NPT	1.26	1.01	3.95	1.12	2.25	1.50

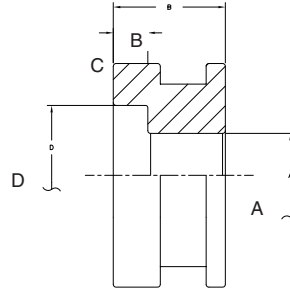
# CYLINDER PISTONS/CLEVIS/STROKE ADJUSTERS

## Component Parts

### THE HTR LINE



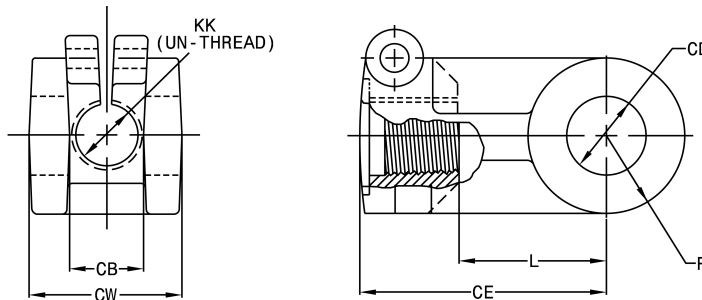
HTR PISTON



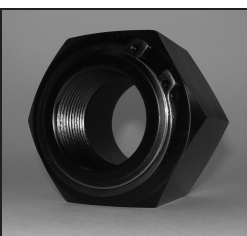
Part Number	Bore	A	B	C	D
HTR-2.0 PISTON	2.0	0.75	1.00	0.32	1.38
HTR-2.5 PISTON	2.5	0.75	1.00	0.32	1.50
HTR-3.0 PISTON	3.0	1.00	1.00	0.32	2.25
HTR-3.5 PISTON	3.5	1.00	1.00	0.32	2.76
HTR-4.0 PISTON	4.0	1.00	1.00	0.32	2.76
HTR-5.0 PISTON	5.0	1.25	1.89	0.63	3.54



HTR MOBILE SPLIT CLEVIS



Part Number	Bore	CB	CD	CE	CW	KK	L	R
HTR-2.0-CLEVIS	2.0	1.12	1.00	3.25	2.62	1-1/8"-12	2.12	1.00
HTR-2.5-CLEVIS	2.5	1.12	1.00	3.25	2.62	1-1/8"-12	2.12	1.00
HTR-3.0-CLEVIS	3.0	1.12	1.00	3.25	2.62	1-1/4"-12	2.12	1.00
HTR-3.5-CLEVIS	3.5	1.12	1.00	3.25	2.62	1-1/4"-12	2.12	1.00
HTR-4.0-CLEVIS	4.0	1.12	1.00	3.25	2.62	1-1/4"-12	2.12	1.00
HTR-5.0-CLEVIS	5.0	1.12	1.89	3.25	2.62	1-1/4"-12	2.12	1.25



## Stroke Adjusters

PART NUMBER	DESCRIPTION
HB-SA-1125	1-1/8" STROKE ADJUSTER
HB-SA-1250	1-1/4" STROKE ADJUSTER
HB-SA-1500	1-1/2" STROKE ADJUSTER

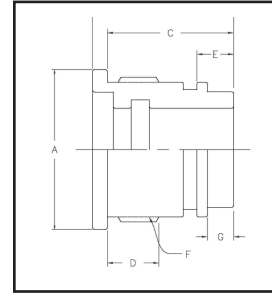
# HMW & HCW GLANDS AND PISTONS

## Component Parts

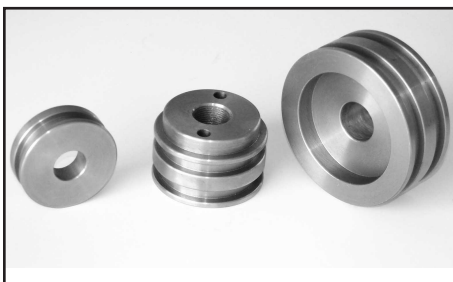
### THE HMW & HCW LINE



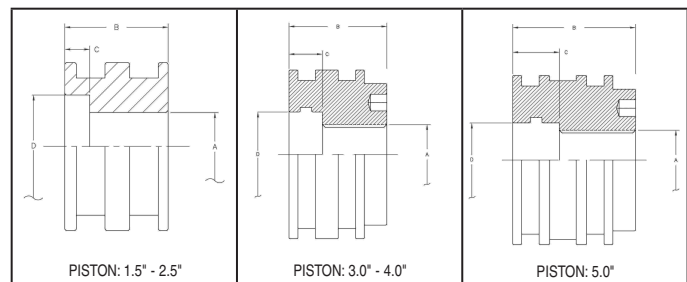
HMW & HCW  
FOR GLANDS



Part Number	Rod	Bore	A	B	C	D	E	F	G
HMW-1.5-GLAND	1	1.5	1.97	2.40	1.93	0.79	0.54	M43-2	0.40
HMW-2.0-GLAND	1-1/4	2.0	2.44	2.17	1.93	0.79	0.54	M55-2	0.40
HMW-2.5-GLAND	1-1/2	2.5	2.95	2.17	1.93	0.79	0.54	M68-2	0.40
HMW-3.0-GLAND	1-1/2	3.0	3.45	2.40	1.93	0.83	0.54	M81-2	0.40
HMW-3.5-GLAND	1-3/4	3.5	3.94	2.17	1.93	0.83	0.54	M94-2	0.40
HMW-4.0-GLAND	2	4.0	4.45	2.44	2.20	1.10	0.54	M106-2	0.40
HMW-5.0-GLAND	2-1/2	5.0	5.45	2.68	2.20	1.10	0.54	M132-2	0.40



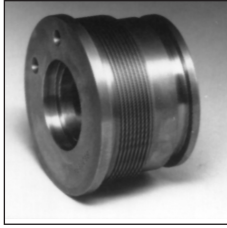
HMW & HCW  
FOR PISTONS



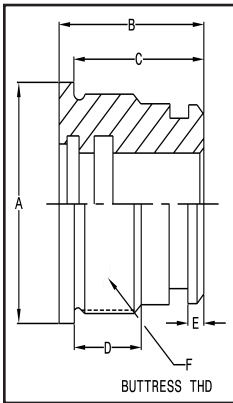
Part Number	Bore	A	B	C	D
HMW-1.5-PISTON	1.5	0.634	1.22	0.16	0.906
HMW-2.0-PISTON	2.0	0.807	1.22	0.30	1.220
HMW-2.5-PISTON	2.5	0.948	1.38	0.38	1.375
HMW-3.0-PISTON	3.0	M24-2	2.09	0.71	1.504
HMW-3.5-PISTON	3.5	M30-2	2.28	0.79	1.755
HMW-4.0 PISTON	4.0	M36-2	2.28	0.79	2.005
HMW-5.0 PISTON	5.0	M48-2	2.88	0.98	2.505

These replacement parts are for HMW & HCW cylinders found on page 3 - 8

# MOBILE CYLINDER HEADS



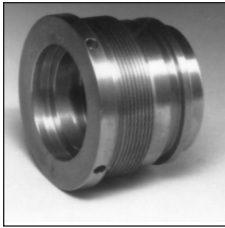
Material: 65-45-12  
Ductile Iron



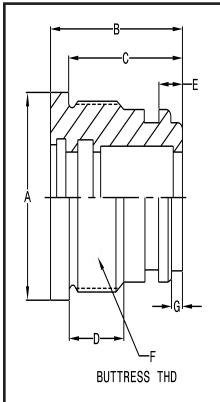
## IT Head

PART NUMBER	BORE +.003" -.003"	ROD +.003" -.003"	A	B	C	D	E	F (BUT- TRESS)	SEAL KIT NUMBER
CM-H107277	1.500	1.000	2.00	2.00	1.50	0.75	0.28	1-3/4"-12	SK-H107277
CM-H107597	2.000	1.000	2.50	2.12	1.94	1.00	0.12	2-1/4"-12	SK-H107597
CM-H107598	2.000	1.125	2.50	2.00	1.75	0.75	0.19	2-1/4"-12	SK-H107598
CM-H107595	2.000	1.250	2.50	2.25	2.00	1.00	0.19	2-1/4"-12	SK-H107595
CM-H107193	2.500	1.125	3.00	2.00	1.75	0.75	0.19	2-3/4"-12	SK-H107193
CM-H107194	2.500	1.250	3.00	2.00	1.75	0.75	0.19	2-3/4"-12	SK-H107194
CM-H107463	2.500	1.500	3.00	2.38	2.00	1.00	0.19	2-3/4"-12	SK-H107463
CM-H107673	2.500	1.750	3.00	2.25	1.88	0.88	0.28	2-3/4"-12	SK-H107673
CM-H107157	3.000	1.000	3.50	2.25	2.00	1.00	0.19	3-1/4"-12	SK-H107157
CM-H107196	3.000	1.250	3.50	2.25	2.00	1.00	0.19	3-1/4"-12	SK-H107196
CM-H107131	3.000	1.500	3.50	2.25	2.00	1.00	0.19	3-1/4"-12	SK-H107131
CM-H107189	3.000	1.750	3.50	2.25	2.00	1.00	0.19	3-1/4"-12	SK-H107189
CM-H107359	3.000	2.000	3.50	2.50	2.00	1.00	0.19	3-1/4"-12	SK-H107359
CM-H107591	3.250	1.500	3.75	2.25	2.00	1.00	0.19	3-1/2"-12	SK-H107591
CM-H107592	3.250	1.750	3.75	2.25	2.00	1.00	0.19	3-1/2"-12	SK-H107592
CM-H107197	3.500	1.250	4.00	2.25	2.00	1.00	0.19	3-3/4"-12	SK-H107197
CM-H107198	3.500	1.500	4.00	2.25	2.00	1.00	0.19	3-3/4"-12	SK-H107198
CM-H107108	3.500	1.750	4.00	2.25	2.00	1.00	0.19	3-3/4"-12	SK-H107108
CM-H107112	3.500	2.000	4.00	2.25	2.00	1.00	0.19	3-3/4"-12	SK-H107112
CM-H107462	3.500	2.500	4.00	2.50	2.12	1.00	0.25	3-3/4"-12	SK-H107462
CM-H107130	4.000	1.500	4.50	2.25	2.00	1.00	0.19	4-1/4"-12	SK-H107130
CM-H107124	4.000	1.750	4.50	2.25	2.00	1.00	0.19	4-1/4"-12	SK-H107124
CM-H107311	4.000	2.000	4.50	2.25	2.00	1.00	0.19	4-1/4"-12	SK-H107311
CM-H107331	4.000	2.250	4.50	2.25	2.00	1.00	0.19	4-1/4"-12	SK-H107331
CM-H107386	4.000	2.500	4.50	2.50	2.12	1.12	0.19	4-1/4"-12	SK-H107386
CM-H107525	4.000	3.000	4.50	2.50	2.12	1.00	0.25	4-1/4"-12	SK-H107525
CM-H107199	4.500	1.750	5.00	2.25	2.00	1.00	0.19	4-3/4"-12	SK-H107199
CM-H107200	4.500	2.000	5.00	2.25	2.00	1.00	0.19	4-3/4"-12	SK-H107200
CM-H107201	4.500	2.250	5.00	2.25	2.00	1.00	0.19	4-3/4"-12	SK-H107201
CM-H107528	4.500	3.500	5.00	2.38	2.00	1.00	0.19	4-3/4"-12	SK-H107528
CM-H107234	5.000	1.750	5.50	2.25	2.00	1.00	0.19	5-1/4"-12	SK-H107234
CM-H107212	5.000	2.000	5.50	2.25	2.00	1.00	0.19	5-1/4"-12	SK-H107212
CM-H107204	5.000	2.500	5.50	2.50	2.12	1.12	0.19	5-1/4"-12	SK-H107204
CM-H107205	5.000	3.000	5.50	2.50	2.12	1.12	0.19	5-1/4"-12	SK-H107205
CM-H107345	6.000	2.000	6.50	2.50	2.12	1.12	0.19	6-1/4"-12	SK-H107345
CM-H107206	6.000	2.500	6.50	2.50	2.12	1.12	0.19	6-1/4"-12	SK-H107206
CM-H107207	6.000	3.000	6.50	2.50	2.12	1.12	0.19	6-1/4"-12	SK-H107207
CM-H107178	6.000	3.500	6.50	2.50	2.12	1.12	0.19	6-1/4"-12	SK-H107178
CM-H107328	7.000	3.000	7.50	2.88	2.50	1.12	0.59	7-1/4"-10	SK-H107328
CM-H107493	7.000	3.500	7.50	2.88	2.50	1.12	0.59	7-1/4"-10	SK-H107493
CM-H107467	7.000	4.000	7.50	2.88	2.50	1.12	0.59	7-1/4"-10	SK-H107467
CM-H107466	8.000	4.000	9.00	3.75	3.25	1.50	0.88	8-1/4"-10	SK-H107466
CM-H107494	8.000	4.500	9.00	3.75	3.25	1.50	0.88	8-1/4"-10	SK-H107494
CM-H107475	8.000	5.000	9.00	3.75	3.25	1.50	0.88	8-1/4"-10	SK-H107475

# MOBILE CYLINDER HEADS



Material: 65-45-12  
Ductile Iron



## ITW Head

PART NUMBER	BORE +.003" -.003"	ROD +.003" -.003"	A	B	C	D	E	F (BUT- TRESS)	G	SEAL KIT NUMBER
CM-H107729	3.000	1.750	3.50	2.62	2.25	1.00	0.56	3-1/4"-12	0.38	SK-H107729
CM-H107548	3.000	2.000	3.50	2.62	2.25	1.00	0.56	3-1/4"-12	0.38	SK-H107548
CM-H107791	3.500	1.750	4.00	2.62	2.25	1.00	0.56	3-3/4"-12	0.38	SK-H107791
CM-H107549	3.500	2.000	4.00	2.62	2.25	1.00	0.56	3-3/4"-12	0.38	SK-H107549
CM-H107550	4.000	2.000	4.50	3.25	2.75	1.25	0.56	4-1/4"-12	0.38	SK-H107550
CM-H107551	4.000	2.500	4.50	3.25	2.75	1.25	0.56	4-1/4"-12	0.38	SK-H107551
CM-H107640	4.000	3.000	4.50	3.62	3.12	1.38	0.19	4-1/4"-12	N/A	SK-H107640
CM-H107716	4.500	2.000	5.00	3.25	2.75	1.25	0.56	4-3/4"-12	0.38	SK-H107716
CM-H107552	4.500	2.500	5.00	3.25	2.75	1.25	0.56	4-3/4"-12	0.38	SK-H107552
CM-H107553	4.500	3.000	5.00	3.25	2.75	1.25	0.56	4-3/4"-12	0.38	SK-H107553
CM-H107630	4.500	3.500	5.00	3.62	3.12	1.38	0.19	4-3/4"-12	N/A	SK-H107630
CM-H107679	5.000	2.000	5.50	3.00	2.50	1.12	0.56	5-1/4"-12	0.38	SK-H107679
CM-H107554	5.000	2.500	5.50	3.62	3.12	1.38	0.81	5-1/4"-12	0.56	SK-H107554
CM-H107555	5.000	3.000	5.50	3.62	3.12	1.38	0.81	5-1/4"-12	0.56	SK-H107555
CM-H107651	5.000	3.500	5.50	3.62	3.12	1.38	0.81	5-1/4"-12	0.56	SK-H107651
CM-H107606	5.000	4.000	5.50	3.62	3.12	1.38	0.19	5-1/4"-12	N/A	SK-H107606
CM-H107611	5.500	2.500	6.00	3.62	3.12	1.38	0.81	5-3/4"-12	0.56	SK-H107611
CM-H107612	5.500	3.000	6.00	3.62	3.12	1.38	0.81	5-3/4"-12	0.56	SK-H107612
CM-H107706	5.500	3.500	6.00	3.62	3.12	1.38	0.81	5-3/4"-12	0.56	SK-H107706
CM-H107583	5.500	4.000	6.00	3.62	3.12	1.38	0.81	5-3/4"-12	0.56	SK-H107583
CM-H107608	5.500	4.500	6.12	3.62	3.12	1.38	0.19	5-3/4"-12	N/A	SK-H107608
CM-H107556	6.000	2.500	6.50	3.62	3.12	1.38	0.81	6-1/4"-12	0.56	SK-H107556
CM-H107557	6.000	3.000	6.50	3.62	3.12	1.38	0.81	6-1/4"-12	0.56	SK-H107557
CM-H107558	6.000	3.500	6.50	3.62	3.12	1.38	0.81	6-1/4"-12	0.56	SK-H107558
CM-H107570	6.000	4.000	6.50	3.62	3.12	1.38	0.81	6-1/4"-12	0.56	SK-H107570
CM-H107584	6.000	4.500	6.50	3.38	2.88	1.25	0.81	6-1/4"-12	0.62	SK-H107584
CM-H107721	7.000	2.500	7.50	4.25	3.75	1.50	1.03	7-1/4"-10	0.75	SK-H107721
CM-H107559	7.000	3.000	7.50	4.25	3.75	1.50	1.03	7-1/4"-10	0.75	SK-H107559
CM-H107560	7.000	3.500	7.50	4.25	3.75	1.50	1.03	7-1/4"-10	0.75	SK-H107560
CM-H107561	7.000	4.000	7.50	4.25	3.75	1.50	1.03	7-1/4"-10	0.75	SK-H107561
CM-H107607	8.000	3.500	8.50	4.50	3.75	1.50	1.03	8-1/4"-10	0.75	SK-H107607
CM-H107562	8.000	4.000	8.50	4.50	3.75	1.50	1.03	8-1/4"-10	0.75	SK-H107562
CM-H107563	8.000	4.500	8.50	4.50	3.75	1.50	1.03	8-1/4"-10	0.75	SK-H107563
CM-H107722	8.000	5.000	8.50	4.50	3.75	1.50	1.03	8-1/4"-10	0.075	SK-H107722
CM-H107605	10.000	4.000	10.50	5.00	4.25	1.50	1.25	10-1/4"-10	1.00	SK-H107605
CM-H107604	10.000	5.000	10.50	5.00	4.25	1.50	1.25	10-1/4"-10	1.00	SK-H107604

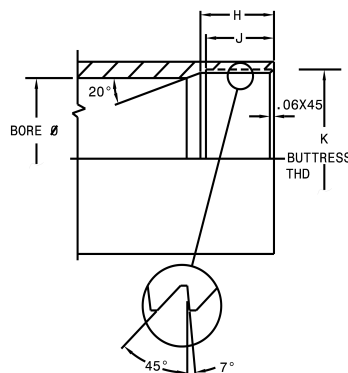
## IT & ITW Technical Information

Basic information for Internal Buttress Threads (52 degrees)

"H" = Length of Thread on Head plus 1/8"

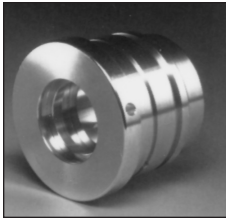
"J" = Length of Thread on Head plus 1/16"

"K" = Buttress Thread as determined by Head

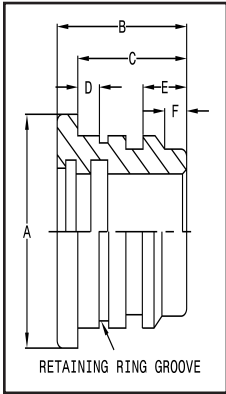


Basic Thread Size	Min. Major Diameter	Pitch Diameter	Minor Diameter
2-1/4"-12	2.2604	2.2000/2.2075	2.1500/2.1575
2-3/4"-12	2.7604	2.7000/2.7080	2.6500/2.6580
3-1/4"-12	3.2604	3.2000/3.2080	3.1500/3.1580
3-1/2"-12	3.5104	3.4500/3.4580	3.4000/3.4080
3-3/4"-12	3.7604	3.7000/3.7080	3.6500/3.6580
4-1/4"-12	4.2604	4.2000/4.2084	4.1500/4.1584
4-3/4"-12	4.7604	4.7000/4.7084	4.6500/4.6584
5-1/4"-12	5.2604	5.2000/5.2084	5.1500/5.1584
5-3/4"-12	5.7604	5.7000/5.7084	5.6500/5.6584
6-1/4"-12	6.2604	6.2000/6.2084	6.1500/6.1584
7-1/4"-10	7.2626	7.1900/7.1995	7.1300/7.1395
8-1/4"-10	8.2626	8.1900/8.1995	8.1300/8.1395
10-1/4"-10	10.2626	10.1900/10.1995	10.1300/10.1395

# MOBILE CYLINDER HEADS

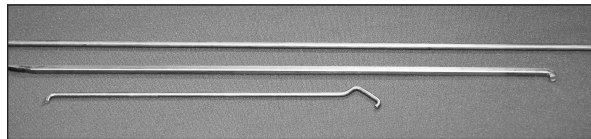


Material: Ductile Iron



## TK Head

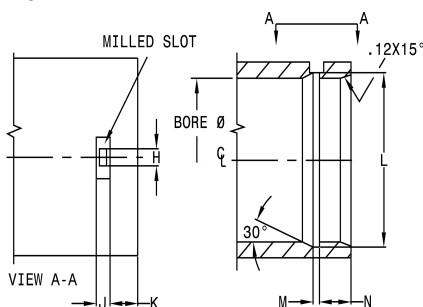
TK HEAD	BORE +.003" -.003"	ROD +.003" -.003"	A	B	C	D	E	F	SEAL KIT NUMBER	LOCK WIRE NUMBER
CM-H70181	1.500	0.750	1.88	2.00	1.63	0.38	0.63	0.38	SK-H70181	RR20030
CM-H70184	1.500	1.000	1.88	2.00	1.12	0.31	0.19	N/A	SK-H70184	RR20030
CM-H70093	2.000	1.000	2.38	2.25	1.88	0.44	0.75	0.50	SK-H70093	RR20029
CM-H70159	2.000	1.125	2.38	2.50	1.88	0.44	0.75	0.44	SK-H70159	RR20029
CM-H70160	2.000	1.250	2.38	2.50	1.88	0.44	0.75	0.44	SK-H70160	RR20029
CM-H70161	2.500	1.125	2.88	2.25	1.88	0.44	0.75	0.44	SK-H70161	RR20031
CM-H70162	2.500	1.250	2.88	2.25	1.88	0.44	0.75	0.38	SK-H70162	RR20031
CM-H70163	2.500	1.500	2.88	2.25	1.88	0.44	0.75	0.62	SK-H70163	RR20031
CM-H70861	2.500	1.750	2.88	2.50	1.88	0.44	0.75	0.38	SK-H70861	RR20031
CM-H70164	3.000	1.250	3.38	2.75	2.25	0.51	0.88	0.50	SK-H70164	RR20027
CM-H70130	3.000	1.500	3.38	2.75	2.25	0.51	0.88	0.50	SK-H70130	RR20027
CM-H70560	3.000	1.750	3.38	2.75	2.25	0.51	0.88	0.44	SK-H70560	RR20027
CM-H70165	3.000	2.000	3.38	2.75	2.25	0.51	0.88	0.44	SK-H70165	RR20027
CM-H70166	3.500	1.250	3.88	2.75	2.25	0.51	0.88	0.50	SK-H70166	RR20032
CM-H70089	3.500	1.500	3.88	2.75	2.25	0.51	0.88	0.50	SK-H70089	RR20032
CM-H70862	3.500	1.750	3.88	2.75	2.25	0.51	0.88	0.50	SK-H70862	RR20032
CM-H70167	3.500	2.000	3.88	2.75	2.25	0.51	0.88	0.50	SK-H70167	RR20032
CM-H70115	4.000	1.500	4.50	2.75	2.25	0.44	0.88	0.44	SK-H70115	RR20033
CM-H70576	4.000	1.750	4.50	2.75	2.25	0.44	0.88	0.44	SK-H70576	RR20033
CM-H70116	4.000	2.000	4.50	2.75	2.25	0.44	0.88	0.44	SK-H70116	RR20033
CM-H70168	4.000	2.500	4.50	2.75	2.25	0.44	0.88	0.44	SK-H70168	RR20033
CM-H70367	4.500	2.000	5.00	2.75	2.25	0.44	0.88	0.44	SK-H70367	RR20087
CM-H70378	4.500	2.500	5.00	2.75	2.25	0.44	0.88	0.44	SK-H70378	RR20087
CM-H70379	4.500	3.000	5.00	2.75	2.25	0.44	0.88	0.44	SK-H70379	RR20087
CM-H70114	5.000	2.000	5.50	3.00	2.50	0.56	0.94	0.50	SK-H70114	RR20039
CM-H70113	5.000	2.500	5.50	3.00	2.50	0.56	0.94	0.50	SK-H70113	RR20039
CM-H70107	5.000	3.000	5.50	3.00	2.50	0.56	0.94	0.50	SK-H70107	RR20039
CM-H70389	5.500	2.000	6.00	3.00	2.50	0.56	0.94	0.50	SK-H70389	RR20089
CM-H70390	5.500	2.500	6.00	3.00	2.50	0.56	0.94	0.50	SK-H70390	RR20089
CM-H70391	5.500	3.000	6.00	3.00	2.50	0.56	0.94	0.50	SK-H70391	RR20089
CM-H70112	6.000	2.000	6.50	3.00	2.50	0.56	0.94	0.50	SK-H70112	RR20040
CM-H70111	6.000	2.500	6.50	3.00	2.50	0.56	0.94	0.50	SK-H70111	RR20040
CM-H70108	6.000	3.000	6.50	3.00	2.50	0.56	0.94	0.50	SK-H70108	RR20040



LOCK WIRES

## TK Technical Information

Retaining Groove Information



BORE +.003" -.003"	H	J	K	L +.010" -.000"	M +.005" -.000"	N +.000" -.005"
1.500	0.25	0.25	0.28	1.625	0.125	0.375
2.000	0.25	0.25	0.34	2.125	0.125	0.438
2.500	0.25	0.25	0.34	2.625	0.125	0.438
3.000	0.25	0.25	0.41	3.125	0.125	0.500
3.500	0.25	0.25	0.41	3.625	0.125	0.500
4.000	0.38	0.25	0.41	4.188	0.188	0.438
4.500	0.38	0.25	0.41	4.688	0.188	0.438
5.000	0.38	0.25	0.53	5.188	0.188	0.562
5.500	0.38	0.25	0.53	5.688	0.188	0.562
6.000	0.38	0.25	0.53	6.188	0.188	0.562

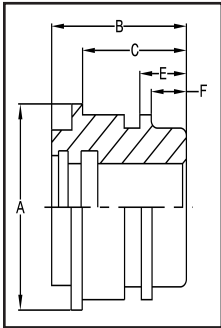
\*0.312 For 1" Rod



# MOBILE CYLINDER HEADS



Material: Ductile Iron

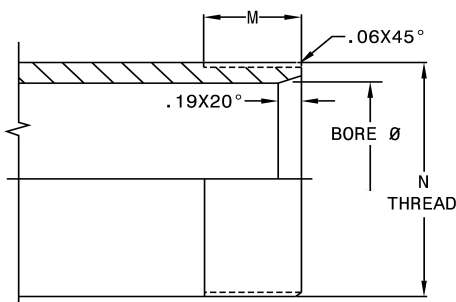


## TH Head

PART NUMBER	BORE +.003"-.003"	ROD +.003"-.003"	A	B	C	E	F	SEAL KIT NUMBER
CM-H70154	2.000	1.000	2.25	2.38	1.94	0.81	0.62	SK-H70154
CM-H70155	2.000	1.125	2.25	2.38	1.94	0.81	0.62	SK-H70155
CM-H70156	2.000	1.250	2.25	2.38	1.94	0.81	0.62	SK-H70156
CM-H70157	2.500	1.125	2.75	2.38	1.94	0.81	0.62	SK-H70157
CM-H70076	2.500	1.250	2.75	2.38	1.94	0.81	0.62	SK-H70076
CM-H70158	2.500	1.500	2.75	2.38	1.94	0.81	0.62	SK-H70158
CM-H70462	2.500	1.750	2.75	2.38	2.19	0.81	0.62	SK-H70462
CM-H70029	3.000	1.250	3.25	2.75	2.19	0.94	0.75	SK-H70029
CM-H70011	3.000	1.500	3.25	2.75	2.19	0.94	0.75	SK-H70011
CM-H70814	3.000	1.750	3.25	2.75	2.19	0.94	0.75	SK-H70814
CM-H70012	3.000	2.000	3.25	2.75	2.56	0.94	0.69	SK-H70012
CM-H70013	3.500	1.500	3.75	2.75	2.19	0.94	0.75	SK-H70013
CM-H70504	3.500	1.750	3.75	2.75	2.19	0.94	0.75	SK-H70504
CM-H70030	3.500	2.000	3.75	2.75	2.19	0.94	0.75	SK-H70030
CM-H70031	3.500	2.500	3.75	2.75	2.56	0.94	0.75	SK-H70031
CM-H70014	4.000	1.500	4.25	2.75	2.19	0.94	0.75	SK-H70014
CM-H70488	4.000	1.750	4.25	2.75	2.19	0.94	0.75	SK-H70488
CM-H70015	4.000	2.000	4.25	2.75	2.19	0.94	0.75	SK-H70015
CM-H70032	4.000	2.500	4.25	2.75	2.19	0.94	0.75	SK-H70032
CM-H70033	4.000	3.000	4.25	2.75	2.56	0.94	0.75	SK-H70033
CM-H70276	4.500	2.000	4.75	2.75	2.19	0.94	0.75	SK-H70276
CM-H70310	4.500	2.500	4.75	2.75	2.19	0.94	0.75	SK-H70310
CM-H70377	4.500	3.000	4.75	2.75	2.19	0.94	0.69	SK-H70377
CM-H70037	5.000	2.000	5.38	3.00	2.44	1.13	0.88	SK-H70037
CM-H70038	5.000	2.500	5.38	3.00	2.44	1.13	0.88	SK-H70038
CM-H70039	5.000	3.000	5.38	3.00	2.44	1.13	0.88	SK-H70039
CM-H70153	5.500	2.000	5.88	3.00	2.44	1.13	0.88	SK-H70153
CM-H70142	5.500	2.500	5.88	3.00	2.44	1.13	0.88	SK-H70142
CM-H70143	5.500	3.000	5.88	3.00	2.44	1.13	0.88	SK-H70143
CM-H70041	6.000	2.000	6.38	3.00	2.44	1.13	0.88	SK-H70041
CM-H70042	6.000	2.500	6.38	3.00	2.44	1.13	0.88	SK-H70042
CM-H70043	6.000	3.000	6.38	3.00	2.44	1.13	0.88	SK-H70043
CM-H70180	7.000	2.500	7.50	4.00	3.13	1.75	1.50	SK-H70180
CM-H70176	7.000	3.000	7.50	4.00	3.13	1.75	1.50	SK-H70176
CM-H70186	7.000	3.500	7.50	4.00	3.13	1.75	1.50	SK-H70186
CM-H70133	8.000	3.000	8.50	4.00	3.13	1.75	1.50	SK-H70133
CM-H70195	8.000	3.500	8.50	4.00	3.13	1.75	1.50	SK-H70195
CM-H70217	8.000	4.000	8.50	4.00	3.13	1.75	1.50	SK-H70217

MOBILE CYLINDER HEADS

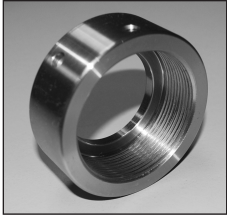
## TH Head Technical Information



Bores +.003" -.003"	M	N	Thread Major Diameter	Thread Pitch Diameter
2.000	0.81	2-3/8"-12 UN-2A	2.3731/2.3617	2.3191/2.3128
2.500	0.81	2-7/8"-12 UN-2A	2.8731/2.8617	2.8191/2.8127
3.000	1.00	3-1/2"-12 UN-2A	3.4981/3.4867	3.4440/3.4376
3.500	1.00	4"-12 UN-2A	3.9980/3.9866	3.9439/3.9374
4.000	1.00	4-1/2"-12 UN-2A	4.4980/4.4866	4.4439/4.4374
4.500	1.00	5"-12 UN-2A	4.9980/4.9866	4.9439/4.9372
5.000	1.00	5-1/2"-12 UN-2A	5.4980/5.4866	5.4439/5.4372
5.500	1.00	6"-12 UN-2A	5.9979/5.9865	5.9438/5.9369
6.000	1.00	6-5/8"-12 UN-2A	6.6229/6.6115	6.5688/6.5619
7.000	1.25	7-7/8"-12 UN-2A	7.8729/7.8615	7.8188/7.8119
8.000	1.25	8-7/8"-12 UN-2A	8.8729/8.8615	8.8188/8.8119

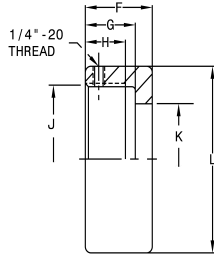
LOCK WIRE - PAGE REFERENCE TO 30

# MOBILE CYLINDER CAPS

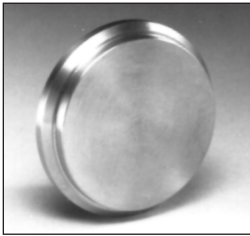


Material: 1026 CDS Tubing

## TH Cap



PART NUMBER	BORE +.003"-.003"	F	G	H	J	K	L
CM-HC70074	2.000	1.13	0.88	0.69	2-3/8"-12 UN-2B	1.81	3.00
CM-HC70075	2.500	1.13	0.88	0.69	2-7/8"-12 UN-2B	2.31	3.50
CM-HC70008	3.000	1.38	1.00	0.75	3-1/2"-12 UN-2B	2.63	4.00
CM-HC70009	3.500	1.38	1.00	0.75	4"-12 UN-2B	3.13	4.50
CM-HC70034	4.000	1.38	1.00	0.75	4-1/2"-12 UN-2B	3.63	5.00
CM-HC70277	4.500	1.38	1.00	0.75	5"-12 UN-2B	4.13	5.50
CM-HC70040	5.000	1.38	1.00	0.75	5-1/2"-12 UN-2B	4.63	6.25
CM-HC70140	5.500	1.38	1.00	0.75	6"-12 UN-2B	5.13	6.75
CM-HC70044	6.000	1.38	1.00	0.75	6-5/8"-12 UN-2B	5.63	7.50
CM-HC70174	7.000	2.00	1.38	1.13	7-7/8"-12 UN-2B	6.13	9.00
CM-HC70132	8.000	2.00	1.38	1.13	8-7/8"-12 UN-2B	7.13	10.00

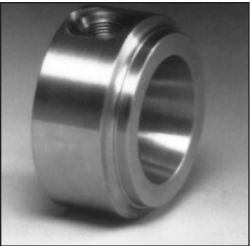


Material: A-36 Plate

## Base Plate (medium duty)

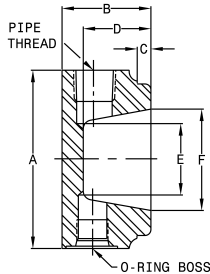


PART NUMBER	BORE +.003"-.003"	A	B	C
CM-BP60056	1.500	1.88	0.50	0.25
CM-BP60010	2.000	2.38	0.50	0.25
CM-BP60011	2.500	2.88	0.50	0.25
CM-BP60012	3.000	3.38	0.59	0.25
CM-BP60013	3.500	3.88	0.69	0.38
CM-BP60014	4.000	4.50	0.75	0.38
CM-BP60437	4.500	5.00	0.88	0.38
CM-BP60015	5.000	5.56	0.88	0.38
CM-BP60124	5.500	6.00	0.88	0.38
CM-BP60016	6.000	6.75	1.00	0.38
CM-BP60157	7.000	8.00	1.00	0.38
CM-BP60107	8.000	9.00	1.00	0.38



Material: A-36 Plate

## Base End (ported)

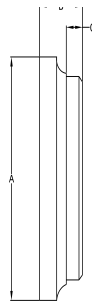


PART NUMBER	BORE +.003"-.003"	NPT	SAE	A	B	C	D	E	F
CM-BEP112380	2.000	3/8"	#6	2.50	1.56	0.25	1.00	1.25	1.45
CM-BEP112381	2.500	3/8"	#6	3.00	1.56	0.25	1.00	1.25	1.75
CM-BEP112382	3.000	1/2"	#8	3.50	1.69	0.25	1.12	1.75	2.19
CM-BEP112383	3.500	1/2"	#8	4.00	1.69	0.25	1.12	2.00	2.19
CM-BEP112384	4.000	1/2"	#8	4.50	1.81	0.25	1.35	2.12	2.62
CM-BEP112385	4.500	1/2"	#8	5.12	1.81	0.25	1.35	2.12	2.62
CM-BEP112386	5.000	3/4"	#12	5.62	1.94	0.25	1.35	2.38	3.03
CM-BEP112398	5.500	3/4"	#12	6.25	2.19	0.25	1.50	3.29	4.06
CM-BEP112387	6.000	3/4"	#12	6.75	2.19	0.25	1.50	3.29	4.06



Material: A-36 Plate

## Base Plate (heavy duty)



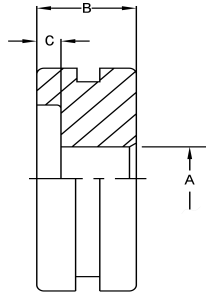
PART NUMBER	BORE +.003"-.003"	A	B	C
CM-BP112527	1.500	2.000	0.50	0.19
CM-BP112292	2.000	2.500	0.50	0.12
CM-BP112209	2.500	3.000	0.62	0.25
CM-BP112210	3.000	3.500	0.75	0.25
CM-BP112461	3.250	3.750	0.88	0.25
CM-BP112211	3.500	4.000	0.88	0.25
CM-BP112212	4.000	4.500	1.00	0.25
CM-BP112414	4.000	4.620	1.00	0.25
CM-BP112213	4.500	5.000	1.12	0.25
CM-BP112234	5.000	5.500	1.25	0.25
CM-BP112459	5.000	5.620	1.25	0.25
CM-BP112214	5.000	5.750	1.25	0.25
CM-BP112426	5.500	6.120	1.31	0.25
CM-BP112236	6.000	6.500	1.38	0.25
CM-BP112512	6.000	6.620	1.38	0.25
CM-BP112215	6.000	6.750	1.38	0.25
CM-BP112569	6.500	7.250	1.25	0.25
CM-BP112364	7.000	8.000	1.44	0.25
CM-BP112373	8.000	9.000	1.50	0.25
CM-BP112496	9.000	10.000	1.50	0.38
CM-BP112467	10.000	11.000	1.50	0.38

# MOBILE PISTONS



Material: Ductile Iron

## TM Piston

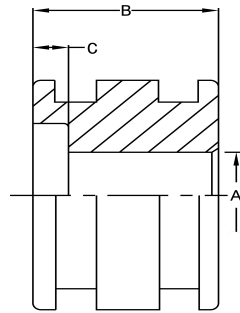


PART NUMBER	BORE +.003" -.003"	A +.002" -.000"	B	C	SEAL KIT NUMBER
CM-P70079	1.50	0.626	0.88	N/A	SK-P70079
CM-P70055	2.00	0.751	1.00	N/A	SK-P70055
CM-P70065	2.50	0.751	1.00	N/A	SK-P70065
CM-P70841	3.00	0.751	1.00	0.25	SK-P70841
CM-P70872	3.50	1.001	1.00	0.38	SK-P70872
CM-P70067	4.00	1.001	1.00	N/A	SK-P70067
CM-P70384	4.50	1.251	1.50	N/A	SK-P70384
CM-P70090	5.00	1.251	1.50	N/A	SK-P70090
CM-P70385	5.50	1.501	1.50	N/A	SK-P70385
CM-P70139	6.00	1.501	1.50	N/A	SK-P70139



Material: Ductile Iron

## TH Piston

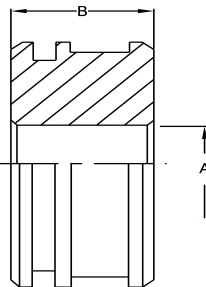


PART NUMBER	BORE +.003" -.003"	A +.002" -.000"	B	C	SEAL KIT NUMBER
CM-P70020	1.50	0.626	1.13	N/A	SK-P70020
CM-P70005	2.00	0.751	1.50	N/A	SK-P70005
CM-P70017	2.50	0.751	1.50	N/A	SK-P70017
CM-P70006	3.00	1.001	1.75	N/A	SK-P70006
CM-P70007	3.50	1.126	1.75	N/A	SK-P70007
CM-P70010	4.00	1.251	1.75	N/A	SK-P70010
CM-P70275	4.50	1.251	1.75	N/A	SK-P70275
CM-P70018	5.00	1.251	2.00	N/A	SK-P70018
CM-P70141	5.50	1.501	2.00	N/A	SK-P70141
CM-P70019	6.00	1.501	2.00	N/A	SK-P70019
CM-P70175	7.00	1.751	3.00	0.75	SK-P70175
CM-P70134	8.00	2.001	3.00	0.75	SK-P70134



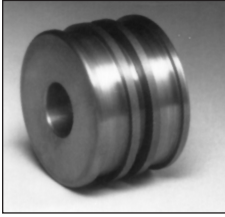
Material: 65-45-12  
Ductile Iron

## IT (narrow) Piston

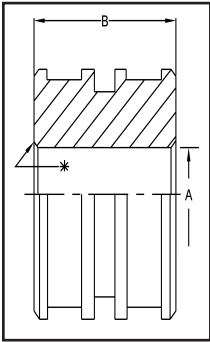


PART NUMBER	BORE +.003" -.003"	A +.002" -.000"	B	SEAL KIT NUMBER
CM-P110629	1.500	0.626	1.12	SK-P110629
CM-P110238	2.000	0.751	1.25	SK-P110238
CM-P110239	2.500	0.751	1.25	SK-P110239
CM-P110240	3.000	0.876	1.25	SK-P110240
CM-P110608	3.250	1.001	1.25	SK-P110608
CM-P110241	3.500	1.001	1.25	SK-P110241
CM-P110242	4.000	1.001	1.25	SK-P110242
CM-P110384	4.500	1.126	1.50	SK-P110384
CM-P110212	5.000	1.126	1.50	SK-P110212

# MOBILE PISTONS



Material: 65-45-12  
Ductile Iron

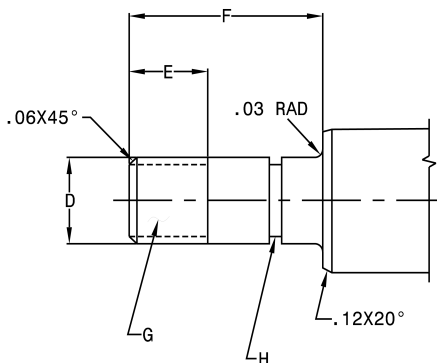


## IT (wide) Piston

IT (WIDE) PISTON	BORE $+.003''-.003''$	A $+.002''-.000''$	B	SEAL KIT NUMBER
CM-P110548	2.000	1.001	2.00	SK-P110548
CM-P110596	2.500	0.751	1.88	SK-P110596
CM-P110121	3.000	1.001	2.00	SK-P110121
CM-P110288	3.500	1.126	2.00	SK-P110288
CM-P110287	4.000	1.126	2.00	SK-P110287
CM-P110537	4.500	1.251	2.00	SK-P110537
CM-P110248	5.000	1.251	2.00	SK-P110248
CM-P110511	5.500	1.251	2.12	SK-P110511
CM-P110249	6.000	1.251	2.12	SK-P110249
CM-P110607	6.000	1.501	2.12	SK-P110607
CM-P110312	7.000	1.751	2.12	SK-P110312
CM-P110479	8.000	2.001	3.12	SK-P110479
CM-P110683	9.000	2.501	4.38	SK-P110683
CM-P110634	10.000	2.500	4.38	SK-P110634

\*NOTE: P110479 is counter bored for a (-226) Stub O-ring.  
P110634 is counter bored for a (-230) Stub O-ring.  
P110683 is counter bored for a (-230) Stub O-ring.

## Piston Stub Technical Information



"D" = "A" Diameter of Piston, minus 0.001"/0.003"

"E" = Nut Length + 0.25"

"F" = Piston Width "B" minus Counterbore Depth "C" + Nut Length + 0.12"

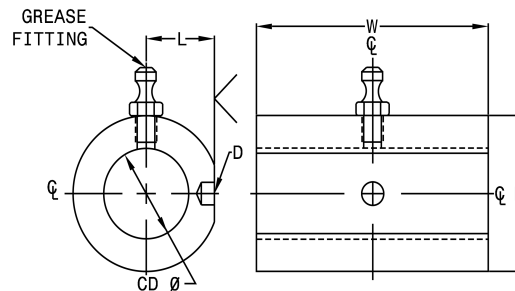
"G" = Thread Size to be determined by nut used

"H" = Located under middle of Piston, 0.098"/0.093" Wide X 0.050"/0.052" Deep for 1/16 cross section O-ring (000 Series)

Note: Good rule of thumb is to size the stub diameter at least one half the diameter of the rod.

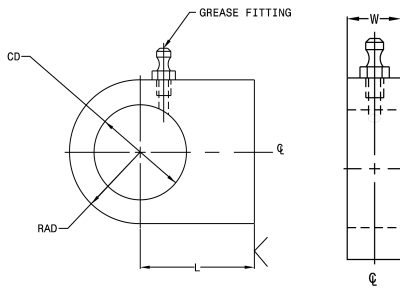
# MOBILE MOUNTS

## Cross Tube Mount



PART NUMBER	CD	W	B	L	D
CM-CT251015	1.00	2.50	1.50	0.69	.250 x .09
CM-CT301015	1.00	3.00	1.50	0.69	.250 x .09
CM-CT351015	1.00	3.50	1.50	0.69	.250 x .09
CM-CT401015	1.00	4.00	1.50	0.69	.250 x .09
CM-CT451015	1.00	4.50	1.50	0.69	.250 x .09
CM-CT271017	1.00	2.75	1.75	0.81	.250 x .15
CM-CT321017	1.00	3.25	1.75	0.81	.250 x .15
CM-CT371017	1.00	3.75	1.75	0.81	.250 x .15
CM-CT421017	1.00	4.25	1.75	0.81	.250 x .15
CM-CT471017	1.00	4.75	1.75	0.81	.250 x .15
CM-CT521017	1.00	5.25	1.75	0.81	.250 x .15
CM-CT271220	1.25	2.75	2.00	0.88	.250 x .15
CM-CT321220	1.25	3.25	2.00	0.88	.250 x .15
CM-CT371220	1.25	3.75	2.00	0.88	.250 x .15
CM-CT421220	1.25	4.25	2.00	0.88	.250 x .15
CM-CT471220	1.25	4.75	2.00	0.88	.250 x .15
CM-CT521220	1.25	5.25	2.00	0.88	.250 x .15
CM-CT601220	1.25	6.00	2.00	0.88	.250 x .15
CM-CT701220	1.25	7.00	2.00	0.88	.250 x .15
CM-CT301525	1.50	3.00	2.50	1.13	.250 x .19
CM-CT421525	1.50	4.25	2.50	1.13	.250 x .19
CM-CT471525	1.50	4.75	2.50	1.13	.250 x .19
CM-CT551525	1.50	5.50	2.50	1.13	.250 x .19
CM-CT601525	1.50	6.00	2.50	1.13	.250 x .19
CM-CT701525	1.50	7.00	2.50	1.13	.250 x .19
CM-CT321727	1.75	3.25	2.75	1.25	.250 x .19
CM-CT471727	1.75	4.75	2.75	1.25	.250 x .19
CM-CT551727	1.75	5.50	2.75	1.25	.250 x .19
CM-CT601727	1.75	6.00	2.75	1.25	.250 x .19
CM-CT701727	1.75	7.00	2.75	1.25	.250 x .19
CM-CT352030	2.00	3.50	3.00	1.38	.250 x .19
CM-CT472030	2.00	4.75	3.00	1.38	.250 x .19
CM-CT552030	2.00	5.50	3.00	1.38	.250 x .19
CM-CT602030	2.00	6.00	3.00	1.38	.250 x .19
CM-CT702030	2.00	7.00	3.00	1.38	.250 x .19

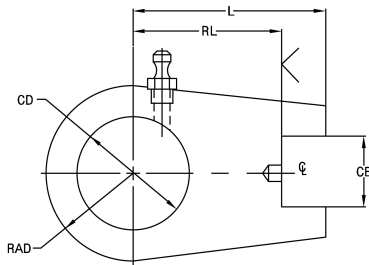
# MOBILE WELDED MOUNTS



Material: 50K Min. Yield Plate

## Welded Base End Spherical Mount

PART NUMBER	CD	L	RAD	W	PIN DIAMETER	DESIGNED SPHERICAL #	MAX PULL AT YEILD
CM-WBES-10	1.625	2.00	1.25	0.75	1.00	SB99100	15,000#
CM-WBES-12	2.000	2.00	1.50	0.94	1.25	SB99125	20,000#
CM-WBES-15	2.437	2.50	1.88	1.12	1.50	SB99150	35,000#
CM-WBES-17	2.812	2.50	2.00	1.31	1.75	SB99175	35,000#
CM-WBES-20	3.187	2.75	2.38	1.50	2.00	SB99200	55,000#
CM-WBES-25	3.937	3.25	3.00	1.88	2.50	SB99250	95,000#

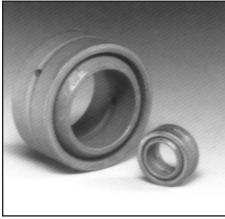


Material: 50K Min. Yield Plate

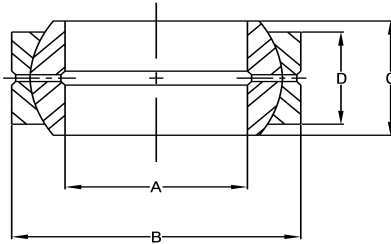
## Welded Rod End Spherical Mount

PART NUMBER	CD	L	RAD	W	D	CB	RL	PIN DIAMETER	DESIGNED SPHERICAL #
CM-WRES-10	1.625	2.750	1.25	0.75	.250 X .19	1.015	2.12	1.00	SB99100
CM-WRES-12	2.000	3.000	1.50	0.94	.250 X .19	1.265	2.25	1.25	SB99125
CM-WRES-15	2.437	3.250	1.88	1.12	.250 X .19	1.515	2.50	1.50	SB99150
CM-WRES-17	2.812	3.750	2.00	1.31	.250 X .19	1.515	2.75	1.75	SB99175
CM-WRES-20	3.187	4.000	2.38	1.50	.250 X .19	2.015	3.00	2.00	SB99200
CM-WRES-25	3.937	4.750	3.00	1.88	.250 X .19	2.515	3.50	2.50	SB99250

# MOBILE SPHERICAL BEARINGS



## Spherical Bearing

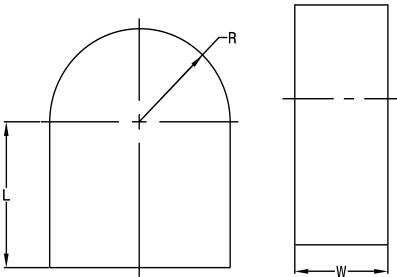


PART NUMBER	A	B	C	D	HOUSING DIAMETER
CM-SB99062	0.6245/0.6250	1.0625/1.0620	0.547/0.542	0.469/0.464	1.0614/1.0622
CM-SB99075	0.7495/0.7500	1.2495/1.2500	0.656/0.651	0.562/0.557	1.2487/1.2497
CM-SB99100	0.9995/1.0000	1.6250/1.6245	0.875/0.870	0.750/0.745	1.6237/1.6247
CM-SB99125	1.2495/1.2500	2.0000/1.9995	1.093/1.087	0.937/0.932	1.9985/1.9997
CM-SB99137	1.3745/1.3750	2.1875/2.1869	1.187/1.182	1.031/1.026	2.1860/2.1872
CM-SB99150	1.4995/1.5000	2.4375/2.4369	1.312/1.307	1.125/1.120	2.4360/2.4372
CM-SB99175	1.7495/1.7500	2.8125/2.8119	1.531/1.526	1.312/1.307	2.8110/2.8122
CM-SB99200	1.9995/2.0000	3.1875/3.1869	1.750/1.745	1.500/1.495	3.1858/3.1871
CM-SB99225	2.2495/2.2500	3.5625/3.5617	1.969/1.964	1.687/1.682	3.5607/3.5621
CM-SB99250	2.4994/2.5000	3.9375/3.9367	2.187/2.182	1.875/1.870	3.9357/3.9371

# MOBILE WELDED MOUNTS



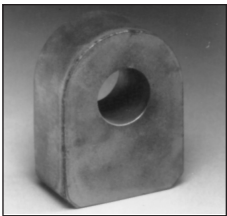
Material: A-36 Plate



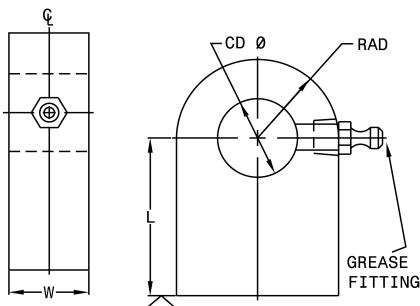
## Mounting Lug

PART NUMBER	L	R	W
CM-ML296	1.50	1.00	0.50
CM-ML297	1.50	1.00	0.62
CM-ML298	1.50	1.00	0.75
CM-ML299	1.75	1.25	1.00
CM-ML301	2.00	1.50	1.00
CM-ML302	2.50	2.00	1.00
CM-ML303	1.50	1.00	1.25
CM-ML304	1.50	1.12	1.50
CM-ML305	2.00	1.25	1.50
CM-ML306	1.75	1.50	1.50
CM-ML307	2.75	1.50	1.50
CM-ML308	1.75	1.25	2.00
CM-ML309	2.00	1.50	2.00
CM-ML310	2.12	1.50	2.00
CM-ML311	2.25	1.50	2.00
CM-ML312	3.00	1.50	2.00
CM-ML313	1.75	1.75	2.00
CM-ML314	1.88	1.75	2.00
CM-ML315	2.12	1.75	2.00
CM-ML316	2.50	1.75	2.00
CM-ML317	2.75	1.75	2.00
CM-ML318	3.00	2.00	2.00
CM-ML319	3.00	2.12	2.00
CM-ML320	3.12	2.50	2.00
CM-ML321	2.00	1.12	2.25
CM-ML322	2.25	1.75	2.25
CM-ML323	3.00	2.50	2.25
CM-ML324	3.00	2.50	2.50
CM-ML325	3.00	2.25	3.00
CM-ML326	3.00	2.00	3.25

MOBILE WELDED MOUNTS



Material: A-36 Plate



## Mounting Lug

PART NUMBER	CD	L	RAD	W	GREASE FITTING
CM-ML050100	1.00	2.00	1.00	0.50	N/A
CM-ML062100	1.00	2.00	1.00	0.62	N/A
CM-ML060333	1.00	2.12	1.00	0.75	N/A
CM-ML100100	1.00	2.00	1.00	1.00	N/A
CM-ML125100	1.00	2.00	1.00	1.25	1/8" NPT
CM-ML062125	1.25	2.50	1.25	0.62	N/A
CM-ML075125	1.25	2.50	1.25	0.75	N/A
CM-ML100125	1.25	2.50	1.25	1.00	N/A
CM-ML150125	1.25	2.50	1.25	1.50	1/8" NPT
CM-ML200125	1.25	2.50	1.25	2.00	1/8" NPT
CM-ML062150	1.50	2.50	1.50	0.62	N/A
CM-ML075150	1.50	2.50	1.50	0.75	N/A
CM-ML150150	1.50	2.50	1.50	1.50	1/8" NPT
CM-ML200150	1.50	2.50	1.50	2.00	1/8" NPT
CM-ML250150	1.50	2.50	1.50	2.50	1/8" NPT
CM-ML200200	2.00	3.00	2.00	2.00	1/8" NPT
CM-ML250200	2.00	3.00	2.00	2.50	1/8" NPT

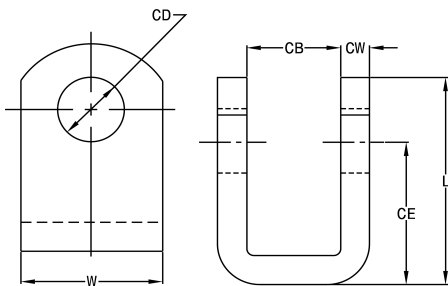


# MOBILE WELDED MOUNTS



## Formed Clevis

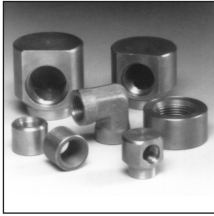
Material: 1040 HF Bar



PART NUMBER	CB	CD	CE	CW	L	W
CM-CL3011	0.75	0.50	1.50	0.38	2.25	1.25
CM-CL7337	1.06	0.75	2.00	0.38	3.12	1.75
CM-CL6547	1.25	1.00	2.50	0.50	3.62	2.00
CM-CL8278	0.88	1.00	2.93	0.50	4.06	2.00
CM-CL323	1.25	1.00	5.06	0.38	6.06	1.75
CM-B120753	1.50	1.12	2.12	0.50	3.25	2.25
CM-B120625	1.62	1.25	2.75	0.75	4.00	2.50
CM-80003	0.50	N/A	N/A	0.38	2.38	1.00
CM-80010	1.12	N/A	N/A	0.38	3.50	2.00
CM-B120829	1.50	N/A	N/A	0.50	3.25	2.50
CM-80001	1.12	N/A	N/A	0.50	4.00	2.00
CM-B120672	1.50	N/A	N/A	0.50	4.00	3.00
CM-B120760	1.12	1.00	2.12	0.62	3.38	2.50
CM-B120756	1.12	N/A	N/A	0.62	4.25	3.00
CM-80015	1.25	N/A	N/A	0.62	4.62	2.50
CM-B120613	1.62	N/A	N/A	0.75	4.00	2.50
CM-B120614	2.12	N/A	N/A	1.00	5.00	3.00

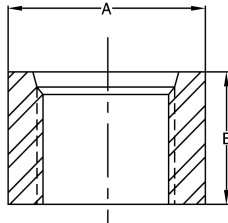
MOBILE WELDED MOUNTS

# PORTS/LOCK NUTS



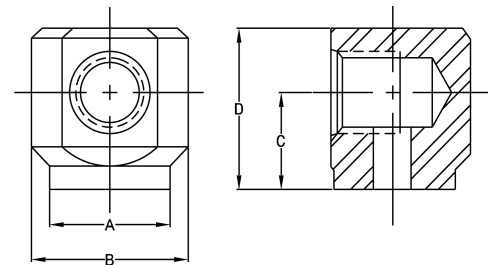
## Ports

### O-ring Boss Half Coupling Port



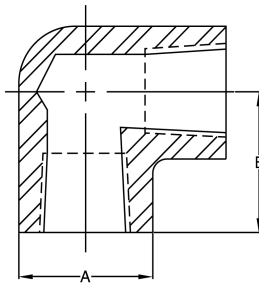
PART NUMBER	PORT SIZE	A	B
CM-PO65304	#4 SAE	0.88	1.00
CM-PO65305	#5 SAE	0.88	0.75
CM-PO65306	#6 SAE	1.00	1.00
CM-PO65308	#8 SAE	1.25	1.06
CM-PO65310	#10 SAE	1.38	1.06
CM-PO65312	#12 SAE	1.50	1.28
CM-PO65314	#14 SAE	1.63	1.25
CM-PO65316	#16 SAE	1.75	1.28
CM-PO65320	#20 SAE	2.25	1.28
CM-PO65324	#24 SAE	2.50	1.00

### 90 Degree O-ring Boss Port



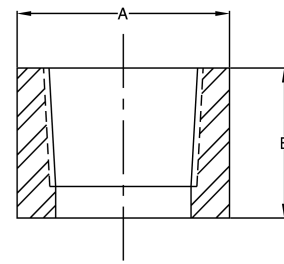
PART NUMBER	BAR SIZE	A	B	C	D
CM-PO65604	#4 SAE	0.75	1.12	0.75	1.12
CM-PO65606	#6 SAE	0.87	1.25	0.81	1.25
CM-PO65608	#8 SAE	1.25	1.62	1.00	1.62
CM-PO65610	#10 SAE	1.25	1.75	1.12	1.88
CM-PO65612	#12 SAE	1.50	2.12	1.19	2.00
CM-PO65616	#16 SAE	1.50	2.25	1.25	2.38

### 90 Degree Pipe Thread Port



PART NUMBER	PORT SIZE	A	B
CM-PO65225	1/4" NPT	0.75	1.00
CM-PO65237	3/8" NPT	0.88	1.00
CM-PO65250	1/2" NPT	1.12	1.25
CM-PO65275	3/4" NPT	1.38	1.38
CM-PO652751	1" NPT	1.75	1.62

### Pipe Thread Half Coupling



PART NUMBER	PORT SIZE	A	B
CM-PO65025	1/4" NPT	0.88	1.06
CM-PO65037	3/8" NPT	1.00	1.00
CM-PO65050	1/2" NPT	1.25	1.06
CM-PO65075	3/4" NPT	1.50	1.28
CM-PO65100	1" NPT	1.75	1.28
CM-PO65125	1-1/4" NPT	2.25	1.28
CM-PO65150	1-1/2" NPT	2.75	1.28

# MOBILE MOUNTS

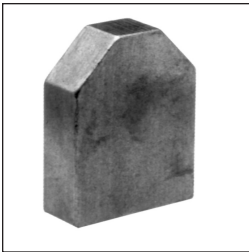
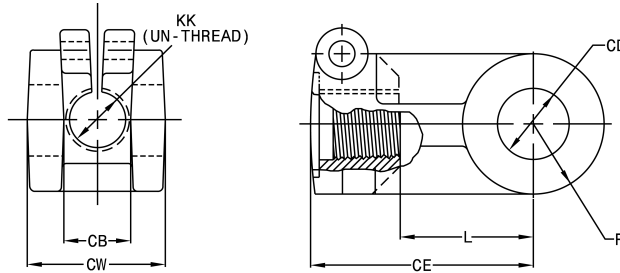


## Mobile Split Clevis

PART NUMBER	CB	CD	CE	CW	KK	L	R
CM-RC10033	1.12	1.00	3.25	2.62	1-1/16"-12	2.12	1.00
CM-RC10034	1.12	1.00	3.25	2.62	1-1/8"-12	2.12	1.00
CM-RC10035	1.12	1.00	3.25	2.62	1-1/4"-12	2.12	1.00
CM-RC11312	1.25	1.25	3.25	2.75	1-1/4"-12	2.12	1.25
CM-RC11412	1.25	1.25	4.00	2.75	1-1/4"-12	2.75	1.25

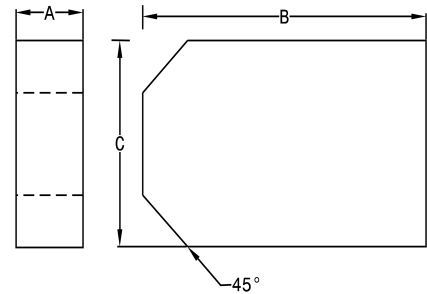
Material: Ductile Iron

Can be used on HTR Cylinders (page 11) or equivalent size cylinders.



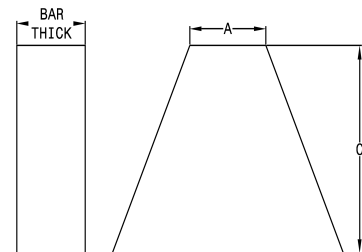
## Mounting Ear

PART NUMBER	BAR SIZE	A	B	C
CM-ME-100	1/2 x 1-1/4	1/2	1-1/4	1
CM-ME-200	5/8 x 2	5/8	2	1-1/2
CM-ME-300	3/4 x 2-1/2	3/4	2-1/2	2
CM-ME-400	1 x 3-1/2	1	3-1/2	2-3/4
CM-ME-500	1-1/4 x 4	1-1/4	4	3-1/2
CM-ME-600	1-1/4 x 4	1-1/4	4-1/2	4



## Mounting Ear

PART NUMBER	BAR SIZE	A	B	C
CM-MEA-100	1/2 x 1-1/4	9/16	1-3/4	1-1/4
CM-MEA-200	5/8 x 2	7/8	2-3/4	2
CM-MEA-300	3/4 x 2-1/2	1-3/8	3-3/4	2-1/2
CM-MEA-400	1 x 3-1/2	1-3/4	5	3-1/2
CM-MEA-500	1-1/4 x 4	1-1/4	4	3-1/2
CM-MEA-600	1-1/4 x 4	1-1/4	6-3/4	4-1/2



MOBILE MOUNTS

# INDUSTRIAL MOUNTS

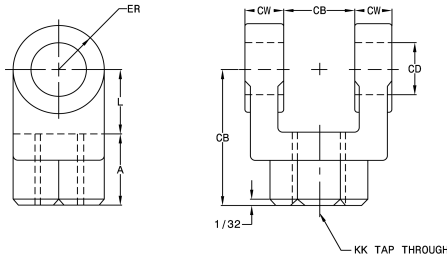
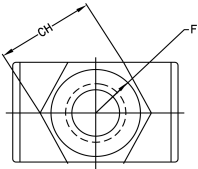


## Rod Clevis

Material: 05, 07, 10  
Forging 13 & Up Ductile  
Iron Casting

PART NUMBER	CB	CD	CE	CH	CW	F	L	A	KK	ER
CM-RC0500	0.765	1/2	1-1/2	1	1/2	1	3/4	3/4	7/16"-20	1/2
CM-RC0750	1.265	3/4	2-3/8	1-1/4	5/8	1-1/4	1-1/4	1-1/8	3/4"-16	3/4
CM-RC1000	1.515	1	3-1/8	1-1/2	3/4	1-1/2	1-1/2	1-5/8	1"-14	1
CM-RC1375	2.032	1-3/8	4-1/8	2	1	2	2-1/8	2	1-1/4"-12	1-3/8
CM-RC1750	2.531	1-3/4	4-1/2	2-3/8	1-1/4	2-3/8	2-1/4	2-1/4	1-1/2"-12	1-3/4
CM-RC2000	2.531	2	5-1/2	2-15/16	1-1/4	2-15/16	2-1/2	3	1-7/8"-12	2
CM-RC2500	3.032	2-1/2	6-1/2	3-1/2	1-1/2	3-1/2	3	3-1/2	2-1/4"-12	2-1/2
CM-RC3000	3.032	3	6-3/4	3-7/8	1-1/2	3-7/8	3-1/4	3-1/2	2-1/2"-12	2-3/4
CM-RC3500	4.032	3-1/2	8-1/2	5	2	5	4	4-1/2	3-1/4"-12	3-1/2
CM-RC4000	4.532	4	10	6-1/8	2-1/4	6-1/8	4-1/2	5-1/2	4"-12	4

\* = Other Thread Sizes Available



INDUSTRIAL MOUNTS

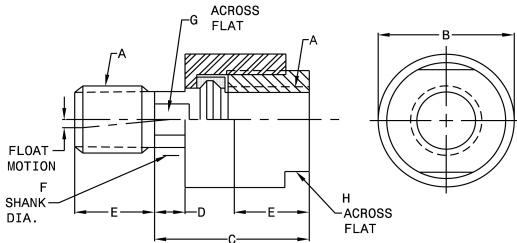


## Alignment Coupler

1/16 Radial Float 2°  
Spherical Motion

ALIGNMENT COUPLER	A	B	C	D	E	F	G	H	MAX PULL YIELD
CM-BD-437	7/16"-20	1-1/4	2	1/2	3/4	5/8	1/2	1	10,000
CM-BD-500	1/2"-20	1-1/4	2	1/2	3/4	5/8	1/2	1	14,000
CM-BD-625	5/8"-18	1-1/4	2	1/2	3/4	5/8	1/2	1	19,000
CM-BD-750	3/4"-16	1-3/4	2-5/16	1/2	1-1/8	31/32	13/16	1-1/2	34,000
CM-BD-875	7/8"-14	1-3/4	2-5/16	1/2	1-1/8	31/32	13/16	1-1/2	39,000
CM-BD-1000	1"-14	2-1/2	2-15/16	1/2	1-5/8	1-3/8	1-5/32	2-1/4	64,000
CM-BD-1250	1-1/4"-12	2-1/2	2-15/16	1/2	1-5/8	1-3/8	1-5/32	2-1/4	78,000
CM-BD-1500	1-1/2"-12	3-1/4	4-3/8	13/16	2-1/4	1-3/4	1-1/2	3	134,000
CM-BD-1750	1-3/4"-12	3-1/4	4-3/8	13/16	2-1/4	1-3/4	1-1/2	3	134,000
CM-BD-1875	1-7/8"-12	3-3/4	5-7/16	7/8	3	2	1-7/8	3-1/2	240,000

NOTE: Metric Thread Sizes Also Available



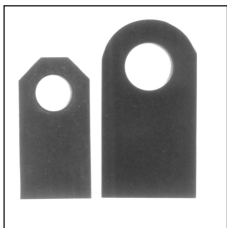
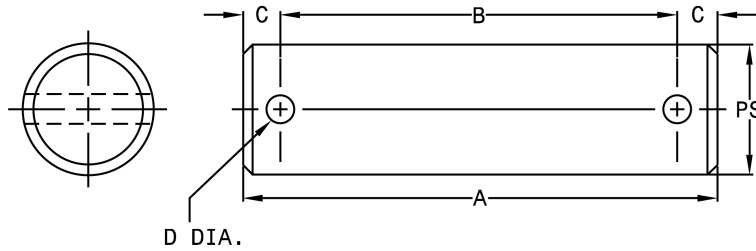
# INDUSTRIAL MOUNTS



Material: 1144 Steel Nitrotec Treated Surface

## Pivot Pin

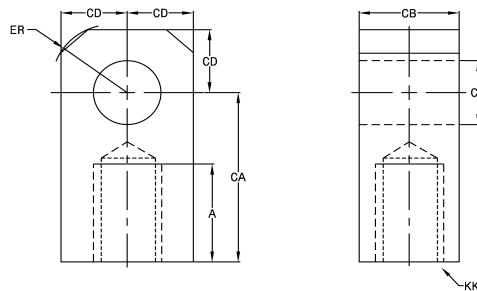
PART NUMBER	PIN SIZE	A	B	C	D
CM-PP0500	0.500	2.281	1.938	0.172	0.106
CM-PP0750	0.750	3.094	2.719	0.188	0.140
CM-PP1000	1.000	3.594	3.219	0.188	0.140
CM-PP1375	1.375	4.656	4.250	0.203	0.173
CM-PP1750	1.750	5.656	5.250	0.203	0.173
CM-PP2000	2.000	5.719	5.281	0.219	0.204
CM-PP2500	2.500	6.781	6.313	0.234	0.219



Material: 05 thru 13, C.F. Bar  
Material: 17 thru 40, Steel Plate

## Rod Eyes

PART NUMBER	A	CA	CB	CD	ER	KK
CM-RE0500	3/4	1-1/2	3/4	1/2	5/8	7/16"-20
CM-RE0750	1-1/8	2-1/16	1-1/4	3/4	7/8	3/4"-16
CM-RE1000	1-5/8	2-13/16	1-1/2	1	1-3/16	1"-14
CM-RE1375	2	3-7/16	2	1-3/8	1-9/16	1-1/4"-12
CM-RE1750	2-1/4	4	2-1/2	1-3/4	2	1-1/2"-12
CM-RE2000	3	5	2-1/2	2	2-1/2	1-7/8"-12
CM-RE2500	3-1/2	5-13/16	3	2-1/2	2-13/16	2-1/4"-12



INDUSTRIAL MOUNTS

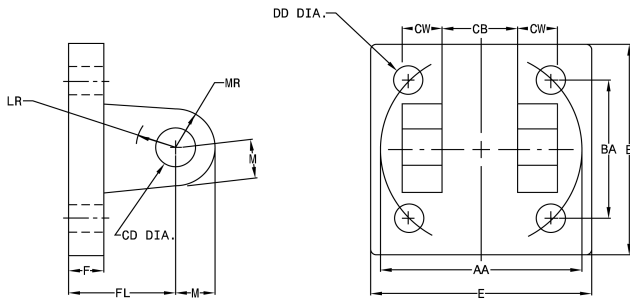
# INDUSTRIAL MOUNTS



## Clevis Bracket

PART NUMBER	AA	BA	CB	CD	CW	DD	E	F	FL	LR	M	MR
CM-BDCB-07	3.6	2-9/16	1.265	3/4	5/8	1/2"-20	3-1/2	5/8	1-7/8	1-1/16	3/4	1-1/16
CM-BDCB-10	4.6	3-1/4	1.515	1	3/4	5/8"-18	4-1/2	3/4	2-1/4	1-1/4	1	1-1/8
CM-BDCB-13	5.4	3-13/16	2.032	1-3/8	1	5/8"-18	5	7/8	3	7/8	1-3/8	1-3/4
CM-BDCB-20	8.2	5-3/4	2.531	2	1-1/4	1"-14	7-1/2	1	3-12	2-1/8	2	2-1/8

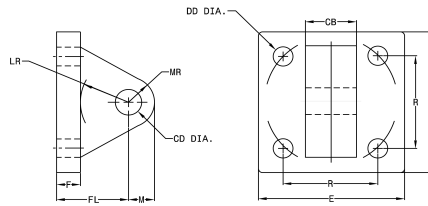
Material: Forging, Weldment, or Ductile Iron



INDUSTRIAL MOUNTS



## Eye Bracket



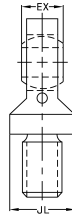
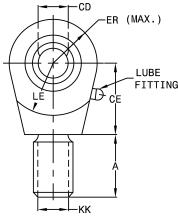
Material: Forging, Weldment, or Ductile Iron

PART NUMBER	CB	CD	DD	E	F	FL	LR	M	MR	R
CM-BDEB-05	3/4	1/2	13/32	2-1/2	3/8	1-1/8	3/4	1/2	9/16	1.63
CM-BDEB-07	1-1/4	3/4	17/32	3-1/2	5/8	1-7/8	1-1/4	3/4	7/8	2.56
CM-BDEB-10	1-1/2	1	21/33	4-1/2	3/4	2-1/4	1-1/2	1	1-1/4	3.25
CM-BDEB-13	2	1-3/8	21/32	5	7/8	3	2-1/8	1-3/8	1-5/8	3.81
CM-BDEB-17	2-1/2	1-3/4	29/32	6-1/2	7/8	3-1/8	2-1/4	1-3/4	2-1/8	4.95
CM-BDEB-20	2-1/2	2	1-1/16	7-1/2	1	3-1/2	2-1/2	2	2-7/16	5.75
CM-BDEB-25	3	2-1/2	1-3/16	8-1/2	1	4	3	2-1/2	3	6.59
CM-BDEB-30	3	3	1-5/16	9-1/2	1	4-1/4	3-1/4	3	3-1/4	7.50
CM-BDEB-35	4	3-1/2	1-13/16	12-5/8	1-11/16	5-11/16	4	3-1/2	4-1/8	9.62
CM-BDEB-40	4-1/2	4	2-1/16	14-7/8	1-15/16	6-7/16	4-1/2	4	5-1/4	11.50

# INDUSTRIAL MOUNTS



## Spherical Rod Eye

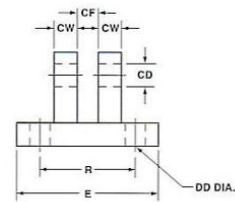
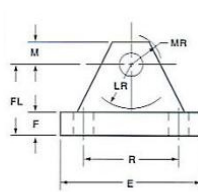


Material: Forging, Weldment, or Ductile Iron

PART NUMBER	CD	A	CE	EX	ER	LE	KK	JL REF	LOAD CAP	SPACER WIDTH
CM-RES-05	0.500	11/16	7/8	7/16	7/8	3/4	7/16"-20	7/8	2,600	0.150
CM-RES-07	0.750	1	1-1/4	21/32	1-1/4	1-1/16	3/4"-16	1-5/16	9,400	0.250
CM-RES-10	1.000	1-1/2	1-7/8	7/8	1-3/8	1-7/16	1"-14	1-1/2	16,800	0.250
CM-RES-13	1.375	2	2-1/8	1-3/16	1-13/16	1-7/8	1-1/4"-12	2	28,600	0.375
CM-RES-17	1.750	2-1/8	2-1/2	1-17/32	2-3/16	2-1/8	1-1/2"-12	2-1/4	43,000	0.416
CM-RES-20	2.000	2-7/8	2-3/4	1-3/4	2-5/8	2-1/2	1-7/8"-12	2-3/4	70,000	0.375



## Spherical Clevis Brackets



Material: Steel Weldment

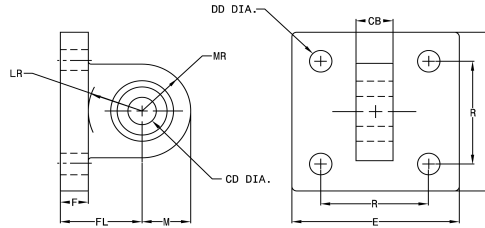
PART NUMBER	E	F	M	R	CD	CF	CW	DD	FL	LR	MR
CM-CBS-0500	3.00	.50	.50	2.05	.500	.44	.50	.41	1.50	.94	.62
CM-CBS-0750	3.75	.62	.88	2.76	.750	.66	.62	.53	2.00	1.38	1.00
CM-CBS-1000	5.50	.75	1.00	4.10	1.000	.88	.75	.53	2.50	1.69	1.19
CM-CBS-1375	6.50	.88	1.38	4.95	1.375	1.19	1.00	.66	3.50	2.44	1.62
CM-CBS-1750	8.50	1.25	1.75	6.58	1.750	1.53	1.25	.91	4.50	2.88	2.06
CM-CBS-2000	10.62	1.50	2.00	7.92	2.000	1.75	1.50	.91	5.00	3.31	2.38

# INDUSTRIAL MOUNTS



Material: Forging,  
Weldment, or Ductile Iron

## Spherical Eye Bracket

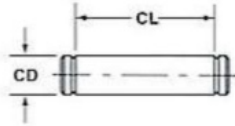


PART NUMBER	CB	CD	DD	E	F	FL	LR	M	MR	R
CM-BDS-07	3/4	3/4	17/32	3-1/2	5/8	1-7/8	1-1/4	1-3/16	1-3/16	2.56
CM-BDS-10	1	1	21/32	4-1/2	3/4	2-1/4	1-1/2	1-3/8	1-3/8	3.25
CM-BDS-13	1-3/8	1-3/8	21/32	5	7/8	3	2-1/8	2	2	3.81



Material: CD1144

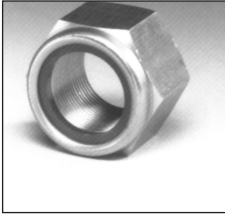
## Pivot Pins for Spherical Clevis Brackets



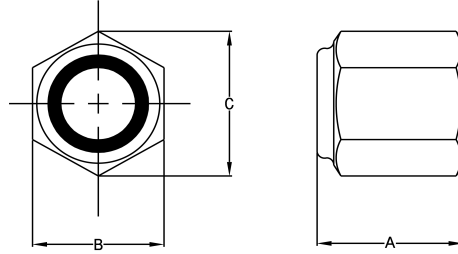
PART NUMBER	CD	CL
CM-PPS0500	.4997-.0004	1 9/16
CM-PPS0750	.7497-.0005	2.1/32
CM-PPS1000	.9997-.0005	2 1/2
CM-PPS1375	1.3746-.0006	3 5/16
CM-PPS1750	1.7496-.0006	4 7/32
CM-PPS2000	1.9996-.0007	4 15/16



# INDUSTRIAL COUPLINGS AND NUTS



Nylon Insert Lock Nut

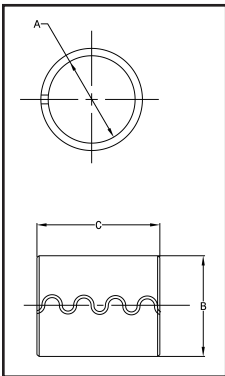


PART NUMBER	BAR SIZE	A	B	C
CM-LN45050	1/2"-20	0.60	0.75	0.84
CM-LN45062	5/8"-18	0.75	0.94	1.06
CM-LN45075	3/4"-16	0.88	1.06	1.19
CM-LN45087	7/8"-14	1.00	1.25	1.40
CM-LN45100	1"-14	1.06	1.44	1.62
CM-LN45101	1"-14	0.88	1.62	1.83
CM-LN45112	1-1/8"-12	1.19	1.62	1.83
CM-LN45126	1-1/4"-12	1.38	1.81	2.06
CM-LN45151	1-1/2"-12	1.62	2.19	2.44
CM-LN45152	1-1/2"-12	0.81	2.19	2.44
CM-LN45175	1-3/4"-12	1.50	2.75	3.06
CM-LN45200	2"-12	1.62	3.12	3.50
CM-LN45225	2-1/4"-12	1.94	3.50	3.94
CM-LN45226	2-1/4"-12	2.81	3.50	3.94
CM-LN45250	2-1/2"-12	2.25	4.00	4.60

# SPLIT TENSION BUSHINGS/PLUGS/VENTS



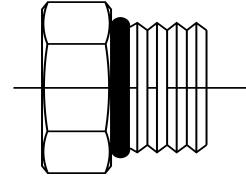
Material: Hardened Spring Steel



## Split Tension Bushing

PART NUMBER	A	B	C	HOUSING DIAMETER
CM-99507	0.75	1.00	2.00	1.002/1.006
CM-99508	0.88	1.00	2.00	1.002/1.006
CM-99510	1.00	1.25	0.75	1.252/1.256
CM-99514	1.00	1.25	0.88	1.252/1.256
CM-99511	1.00	1.25	1.00	1.252/1.256
CM-99513	1.00	1.25	1.25	1.252/1.256
CM-99512	1.00	1.25	1.50	1.252/1.256
CM-99519	1.25	1.50	1.25	1.502/1.506
CM-99522	1.25	1.50	1.50	1.502/1.506
CM-99521	1.25	1.50	2.00	1.502/1.506
CM-99531	1.50	1.75	1.50	1.752/1.756
CM-99533	1.50	1.75	2.00	1.752/1.756
CM-99535	1.50	1.75	3.00	1.752/1.756
CM-99534	1.50	1.88	2.00	1.877/1.881
CM-995335	1.50	1.75	2.50	1.752/1.756
CM-99537	1.50	2.00	1.25	2.002/2.006
CM-995371	1.50	2.00	2.00	2.002/2.006
CM-99540	1.75	2.00	1.25	2.002/2.006
CM-995375	1.75	2.00	1.50	2.002/2.006
CM-99538	1.75	2.00	2.00	2.002/2.006
CM-99539	1.75	2.00	2.25	2.002/2.006
CM-995410	1.75	2.00	3.00	2.002/2.006
CM-99541	1.75	2.25	2.00	2.252/2.256
CM-99546	2.00	2.38	3.00	2.377/2.381
CM-99549	2.00	2.25	1.50	2.252/2.256
CM-99550	2.00	2.25	2.50	2.252/2.256
CM-99547	2.00	2.50	2.00	2.502/2.506
CM-99545	2.00	2.50	2.50	2.502/2.506
CM-99556	2.50	3.00	2.00	3.002/3.006
CM-99557	2.50	3.00	3.00	3.002/3.006
CM-99565	3.00	3.50	2.50	3.502/3.506

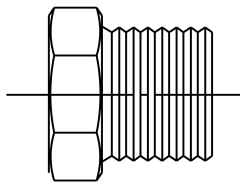
## Steel Plug (O-Ring Boss)



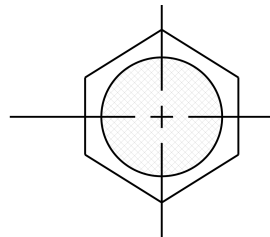
PART NUMBER	PORT SIZE
CM-74004	#4 SAE
CM-74005	#5 SAE
CM-74006	#6 SAE
CM-74008	#8 SAE
CM-74010	#10 SAE
CM-74012	#12 SAE
CM-74014	#14 SAE
CM-74016	#16 SAE
CM-74020	#20 SAE

SPLIT TENSION BUSHING/PLUGS/VENTS

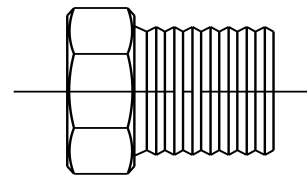
## NPT Air Vent



PART NUMBER	PORT SIZE
CM-77002	1/8" NPT
CM-77004	1/4" NPT
CM-77006	3/8" NPT
CM-77008	1/2" NPT
CM-77010	3/4" NPT



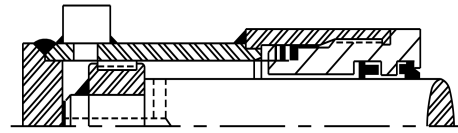
## NPT Steel Plug



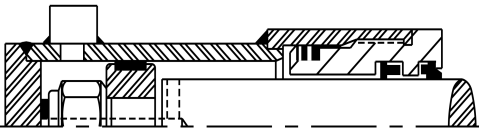
PART NUMBER	PORT SIZE
CM-74112	1/8" NPT
CM-74125	1/4" NPT
CM-74137	3/8" NPT
CM-74150	1/2" NPT
CM-74175	3/4" NPT
CM-74199	1" NPT
CM-74200	1-1/4" NPT

# DISPLACEMENT CYLINDER COMPONENTS

## Displacement Cylinder Components



WELDED STYLE PISTON

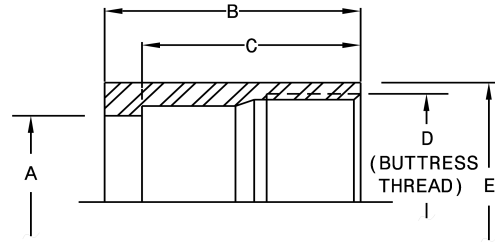


LOCK NUT STYLE PISTON

PISTON DIA.	ROD DIA.	HEAD NUMBER	COLLAR NUMBER	PISTON NUMBER
2.0	1.5	H107463	C132392	P110539
2.5	2.0	H107359	C132463	P110540
3.0	2.5	H107462	C132464	P110541
3.5	3.0	H107525	C132454	P110542
4.0	3.5	H107528	C132465	P110543

NOTE:  
SEE IT MOBILE HEADS PAGE

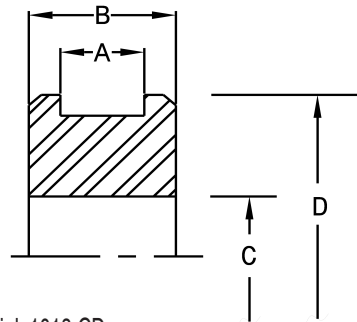
## Collar



Material: 1026 DOM

PART NUMBER	A	B	C	D	E
CM-C132392	2.311	2.44	2.06	2-3/4"-12	3.00
CM-C132463	2.940	2.38	2.12	3-1/4"-12	3.50
CM-C132464	3.436	2.50	2.25	3-3/4"-12	4.00
CM-C132454	3.940	2.50	2.25	4-1/4"-12	4.50

## Piston



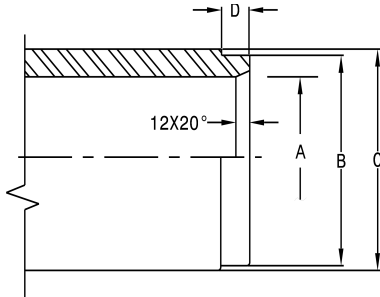
Material: 1018 CD

PART NUMBER	A	B	C	D	E
CM-P110539	0.50	0.75	0.876	1.95	SK-P110539
CM-P110540	0.50	0.75	1.126	2.45	SK-P110540
CM-P110541	0.75	1.12	1.501	2.95	SK-P110541
CM-P110542	0.75	1.12	1.751	3.45	SK-P110542
CM-P110543	0.75	1.12	2.501	3.95	SK-P110543

DISPLACEMENT CYLINDER COMPONENTS

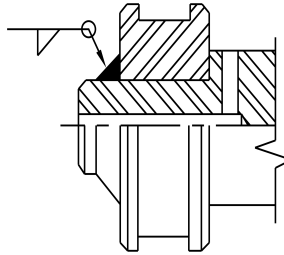
# DISPLACEMENT CYLINDER TECHNICAL INFORMATION

## Barrel Machining



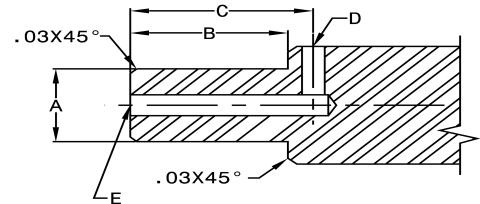
COLLAR NUMBER	A +.003" -.003	B +.001" -.001	C	D
C132392	2.000	2.308	2.50	0.38
C132463	2.500	2.937	3.00	0.25
C132464	3.000	3.433	3.50	0.25
C132454	3.500	3.937	4.00	0.25
C132465	4.000	4.433	4.50	0.25

## Piston Welding



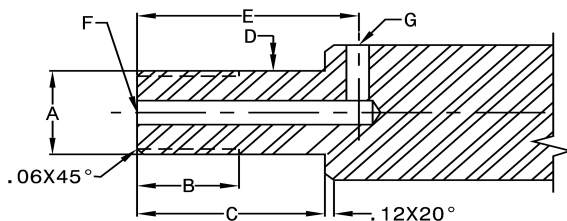
PISTON NUMBER	WELD SIZE
P110539	1/4"
P110540	1/4"
C110541	5/16"
C110542	3/8"
C110543	3/8"

## Stub (Welded Style)



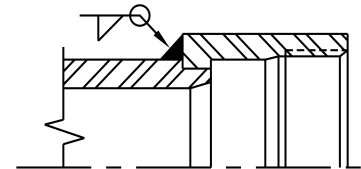
PISTON NUMBER	A +.001" -.001	B	C	D Dia. Drill x Depth	E Dia. Drill x Depth
P110539	0.874	1.12	1.31	0.25 x 0.75	0.25 x 1.44
P110540	1.124	1.12	1.38	0.31 x 1.00	0.31 x 1.50
C110541	1.499	1.56	1.81	0.31 x 1.25	0.31 x 2.00
C110542	1.749	1.62	1.88	0.38 x 1.50	0.38 x 2.00
C110543	2.499	1.62	1.88	0.38 x 1.75	0.38 x 2.00

## Stub (Lock Nut Style)



PISTON NUMBER	A UN-THD	B	C	D +.001 -.001	E	F Dia. Drill x Depth	G Dia. Drill x Depth	LOCK NUT NUMBER
P110539	7/8"-14	1.25	1.88	0.874	2.12	0.25 x 2.25	0.25 x 0.75	LN45087
P110540	1-1/8"-12	1.44	2.06	1.124	2.38	0.31 x 2.56	0.31 x 1.00	LN45112
C110541	1-1/2"-12	1.88	2.88	1.499	3.19	0.31 x 3.38	0.31 x 1.25	LN45151
C110542	1-3/4"-12	1.75	2.75	1.749	3.06	0.38 x 3.31	0.31 x 1.50	LN45175

## Collar Welding

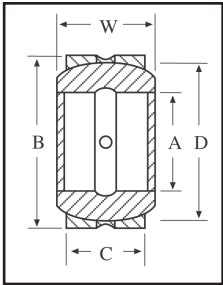


COLLAR NUMBER	WELD SIZE
C132392	1/4"
C132463	1/4"
C132464	1/4"
C132454	1/4"
C132465	5/16"

# ACCESSORIES

## Self Aligning Bearings

Inch



PART NUMBER	A	B	W	C	D
HH008ES	1/2	.875	.437	.375	.709
HH010ES	5/8	1.062	.547	.469	.899
HH012ES	3/4	1.250	.656	.562	1.803
HH014ES	7/8	1.438	.765	.656	1.260
HH100ES	1	1.625	.875	.750	1.417
HH104ES	1-1/4	2.000	1.093	.937	1.772
HH106ES	1-3/8	2.187	1.187	1.031	1.929
HH108ES	1-1/2	2.438	1.312	1.125	2.165
HH108ES2RS	1-1/2	2.438	1.312	1.125	2.165
HH112ES	1-3/4	2.812	1.531	1.312	2.520
HH112ES2RS	1-3/4	2.812	1.531	1.312	2.520
HH200ES	2	3.187	1.750	1.500	2.874
HH200ES2RS	2	3.187	1.750	1.500	2.874
HH204ES	2-1/4	3.562	1.969	1.687	3.228
HH204ES2RS	2-1/4	3.562	1.969	1.687	3.228
HH208ES	2-1/2	3.937	2.187	1.875	3.583
HH208ES2RS	2-1/2	3.937	2.187	1.875	3.583
HH212ES	2-3/4	4.375	2.406	2.062	3.937
HH212ES2RS	2-3/4	4.375	2.406	2.062	3.937
HH300ES	3	4.750	2.625	2.250	4.331
HH300ES2RS	3	4.750	2.625	2.250	4.331
HH304ES	3-1/4	5.125	2.844	2.437	4.685
HH308ES	3-1/2	5.500	3.062	2.625	5.039
HH308ES2RS	3-1/2	5.500	3.062	2.625	5.039
HH312ES	3-3/4	5.875	3.281	2.812	5.394
HH400ES	4	6.250	3.500	3.000	5.748
HH400ES2RS	4	6.250	3.500	3.000	5.748
HH408ES	4-1/2	7.000	3.937	3.375	6.457
HH500ES	5	7.750	4.375	3.750	7.205
HH600ES	6	8.750	4.750	4.125	8.150

Metric

Part Number	A	B	W	C	D
MHH20ES	20	35	16	12	29
MHH20ES2RS	20	35	16	12	29
MHH25ES	25	42	20	16	35.5
MHH25ES2RS	25	42	20	16	35.5
MHH30ES	30	47	22	18	40.7
MHH30ES2RS	30	47	22	18	40.7
MHH35ES	35	55	25	20	47
MHH35ES2RS	35	55	25	20	47
MHH40ES	40	62	28	22	53
MHH40ES2RS	40	62	28	22	53
MHH45ES2RS	45	68	32	25	60
MHH50ES	50	75	35	28	66
MHH50ES2RS	50	75	35	28	66
MHH60ES	60	90	44	36	80
MHH70ES	70	105	49	40	92
MHH70ES2RS	70	105	49	30	92
MHH80ES	80	120	55	45	105

ACCESSORIES

# ACCESSORIES



## SPECIFICATIONS:

- Black epox coated metal shroud with Polyamid sight tube
- Suitable for use with Mineral and Petroleum based hydraulic fluids, lubricants and gasoline
- Maximum operating temperature 194°F (90°C)
- Thermometer Calibration from -20°F to 180°F (-10°C to 80°C)
- SNA 076 has M10 bolts as standard
- SNA 127, SNA 254 has M12 bolts as standard
- Tightening Torque 70<sup>7</sup>/lb (7.9Nm)

## Fluid Level Gauges



PART NUMBER	DESCRIPTION
STF-SNA076BS0-10	FLUID LEVEL GAUGE 3" long without thermometer
STF-SNA076BST-10	FLUID LEVEL GAUGE 3" long with thermometer
STF-SNA127BST-12	FLUID LEVEL GAUGE 5" long with thermometer
STF-SNA127BN012	FLUID LEVEL GAUGE 5" long without thermometer

## SPECIFICATIONS:

- Chrome-Plated Metal Cap
- 30 Mesh Metal Basket
- Cork Gaskets
- Air Flow to 25cfm

## Filler Breather



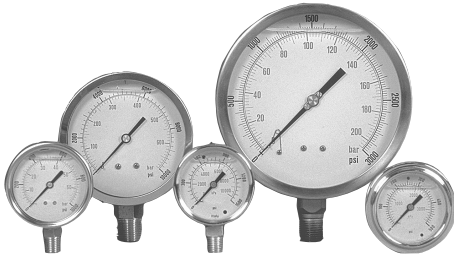
PART NUMBER	DESCRIPTION	
STF-SES6-P-40-N06	FILLER BREATHER	WEATHER PROOFED MINI 40 MICRON 3/8" NPT
STF-SES3-P-40-S80	FILLER BREATHER	WEATHER PROOFED 40 MICRON 80MM LONG BASKET
STF-SES3-40-S80	FILLER BREATHER	40 MICRON 80MM LONG BASKET
STF-SES3L-40-S80	FILLER BREATHER	LOCKING TAB 40 MICRON 80MM LONG BASKET
STF-SES3-40-S150	FILLER BREATHER	40 MICRON 150MM LONG BASKET
STF-SES6-40-N04	FILLER BREATHER	MINI 40 MICRON 1/4" NPT
STF-SES6-40-N06	FILLER BREATHER	MINI 40 MICRON 3/8" NPT
STF-SES5-40-N12	FILLER BREATHER	40 MICRON 3/4" NPT

NOTE\*(ABOVE FILLER BREATHERS ARE CHROME PLATED THAT ARE NOT WEATHER PROOFED)

## ACCESSORIES



### Pressure Gauges



#### SPECIFICATIONS:

- Copper alloy bourden tube
- Dual scales
- Built in relief valve
- Operating temperatures  
Ambient - 4°F to 140°F (-20°C to 60°C)  
Media 150°F (+60°C)
- Acrylic lens
- Accuracy = 1.5% of full scale
- Built in snubber

PART NUMBER	DESCRIPTION	
STF-SPG-63-3030S	PRESSURE GAUGE 2.5"	30" HG - 30 PSI BOTTOM MOUNT
STF-SPG-63-100S	PRESSURE GAUGE 2.5"	100 PSI BOTTOM MOUNT
STF-SPG-63-160S	PRESSURE GAUGE 2.5"	160 PSI BOTTOM MOUNT
STF-SPG-63-500S	PRESSURE GAUGE 2.5"	500 PSI BOTTOM MOUNT
STF-SPG-63-600S	PRESSURE GAUGE 2.5"	600 PSI BOTTOM MOUNT
STF-SPG-63-1000S	PRESSURE GAUGE 2.5"	1,000 PSI BOTTOM MOUNT
STF-SPG-63-1500S	PRESSURE GAUGE 2.5"	1,500 PSI BOTTOM MOUNT
STF-SPG-63-2000S	PRESSURE GAUGE 2.5"	2,000 PSI BOTTOM MOUNT
STF-SPG-63-3000S	PRESSURE GAUGE 2.5"	3,000 PSI BOTTOM MOUNT
STF-SPG-63-5000S	PRESSURE GAUGE 2.5"	5,000 PSI BOTTOM MOUNT
STF-SPG-63-6000S	PRESSURE GAUGE 2.5"	6,000 PSI BOTTOM MOUNT
STF-SPG-63-10000S	PRESSURE GAUGE 2.5"	10,000 PSI BOTTOM MOUNT
STF-SPG-63-3000P-U	PRESSURE GAUGE 2.5"	3,000 PSI PANEL MOUNT
STF-SPG-63-300S	PRESSURE GAUGE 2.5"	300 PSI BOTTOM MOUNT
STF-SPG-63-5000P-U	PRESSURE GAUGE 2.5"	5,000 PSI PANEL MOUNT
STF-SPG-100-300P-U	PRESSURE GAUGE 4"	300 PSI PANEL MOUNT
STF-SPG-100-10000S	PRESSURE GAUGE 4"	10,000 PSI BOTTOM MOUNT

\* 1/4" NPT

## O-RING KITS

### O-RING KIT

Part Number: 568 Kit-A

PART NUMBER	QTY	PART NUMBER	QTY
006-012	20	210-222	10
110-116	13	325-327	7

This kit contains a total of 382 O-Rings in 30 different sizes, providing an extremely low cost per size value.



### O-RING METRIC KIT

Part Number: Metric O Kit-J-A

I.D X C.S. (mm)	QTY	I.D X C.S. (mm)	QTY
3 X 2.0	16	20 X 3.0	12
4 X 2.0	16	22 X 3.0	12
5 X 2.0	16	24 X 3.0	12
6 X 2.0	16	25 X 3.0	12
7 X 2.0	16	27 X 3.0	12
8 X 2.0	16	28 X 3.0	12
10 X 2.0	16	30 X 3.0	12
10 X 2.5	16	32 X 3.0	12
11 X 2.5	13	33 X 3.0	12
12 X 2.5	13	35 X 3.0	12
14 X 2.5	13	36 X 3.0	12
16 X 2.5	13	38 X 3.0	12
17 X 2.5	13	38 X 4.0	9
19 X 2.5	13	41 X 4.0	9
19 X 3.0	12	44 X 4.0	9

The Metric O-Kit J-A contains a total of 389 O-Rings in 30 different sizes, another extremely low cost per size value.





# O-RING KITS

## U.S. INDUSTRIAL O-RING KIT

**Part Number: 568 Kit**

PART NUMBER	QTY	PART NUMBER	QTY
005-011	25	111-116	10
012	15	117-121	7
013-018	10	210-211	10
110	15	212-219	7

This kit contains a total of 436 70 Durometer O-Rings in 36 different sizes, providing an extremely low cost per size value.



## QUAD WAREHOUSE KIT

**Part Number: Quad-Ring WH Kit**

PART NUMBER	QTY	PART NUMBER	QTY
QR-4004-012	10	QR-4125-135	3
QR-4013-030	5	QR-4136-154	2
QR-4031-038	3	QR-4204-216	5
QR-4039-048	2	QR-4217-229	3
QR-4108-116	10	QR-4230-338	2
QR-4117-124	5		

Similar to the O-Ring Warehouse kit, the Quad Seal Warehouse kit contains a total of 583 four-lobed seals in 145 different sizes. This kit is ideal for the small distributor who wishes to have a comprehensive on-hand inventory of Quad seals for counter sales.



ASSORTMENT KITS AND TOOLS

## O-RING KITS

### O-RING WAREHOUSE KIT

Part Number: 568 WH Kit

PART NUMBER	QTY	PART NUMBER	QTY
001-016	20	217-229	5
017-024	10	230-232	3
025-031	7	233-237	2
032-043	5	325-328	5
044-046	2	329-330	4
110-116	15	331-338	2
117-124	10	901-914	5
125-142	5	916, 918	5
143-146	3	920, 924	5
147-151	2	928, 932	5
210-216	10		

Our O-ring Warehouse kit is ideally suited for the repair shop that needs a large on-hand selection of O-rings to insure quick repair of all machine types. 1,110 O-Rings in 150 different sizes are included in this kit. Each size is individually packaged in heavy duty ziploc bags to protect against environmental exposure and contamination. All packages are then stored in a sturdy styrene cabinet with pull-out drawers for easy access to parts. Included card shows size, dimensions, and drawer location for each ring.



### 90 DUROMETER O-RING WAREHOUSE KIT

Part Number: 568 WH Kit-90D

PART NUMBER	QTY	PART NUMBER	QTY
001-016-90D	20	217-229-90D	5
017-024-90D	10	230-232-90D	3
025-031-90D	7	233-237-90D	2
032-043-90D	5	325-328-90D	5
044-046-90D	2	329-330-90D	4
110-116-90D	15	331-338-90D	2
117-124-90D	10	901-914-90D	5
125-142-90D	5	916, 918-90D	5
143-146-90D	3	920, 924-90D	5
147-151-90D	2	928, 932-90D	5
210-216-90D	10		

Our 90 Durometer O-ring Warehouse kit is ideally suited for the repair shop that needs a large on-hand selection of O-Rings to insure quick repair of all machine types. 1,110 O-Rings in 150 different sizes are included in this kit.



# O-RING KITS

## 90 DUROMETER O-RING KIT

Part Number: 568 90D Kit

PART NUMBER	QTY	PART NUMBER	QTY
005-011-90D	25	111-116-90D	10
012-90D	15	117-121-90D	7
013-018-90D	10	210-211-90D	10
110-90D	15	212-219-90D	7

This kit contains a total of 436 90 Durometer O-Rings in 36 different sizes, providing an extremely low cost per size value.



## SAE 900 O-RING BOSS KIT

Part Number: 900 Boss Kit

PART NUMBER	QTY	SAE PORT SIZE	PART NUMBER	QTY	SAE PORT SIZE
568-904	35	-4	568-910	20	-10
568-905	30	-5	568-911	15	-11
568-906	30	-6	568-912	15	-12
568-907	20	-7	568-913	15	-13
568-908	20	-8	568-914	15	-14
568-909	20	-9	568-916	15	-16

This 250 piece assortment contains the most popular size 90 Durometer Boss O-rings in 12 different fitting sizes, individually separated, which will supply your shop, service truck, or parts counter with the sizes you need!

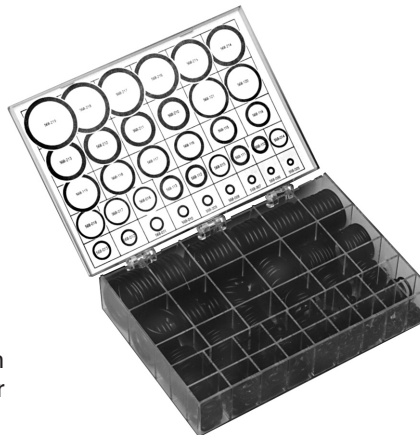


## FLUOROCARBON O-RING KIT

Part Number: 568 FC Kit

PART NUMBER	QTY	PART NUMBER	QTY
005-011V	25	111-116V	10
012V	15	117-121V	7
013-018V	10	210-211V	10
110V	15	212-219V	7

This kit contains a total of 436 75 Durometer Fluorocarbon O-Rings in 36 different sizes, providing an extremely low cost per size value.



ASSORTMENT KITS AND TOOLS

## O-RING KITS

### MAX O-RING KIT

**Part Number:**  
**MAX 1381 Kit**

**Part Number:**  
**MAX 1381 Kit-90D**

These sturdy kits, packaged in a heavy duty box, contains 1415 O-Rings in the most popular sizes. Every service truck should have one of these. Five internal boxes contain 1/16" C/S, 3/32" C/S, 1/8" C/S, Boss and Flange fitting o-rings. Contents and quantities are listed below.



#### Flange Seals

FLANGE NUMBER	QTY	FLANGE NUMBER	QTY
8	10	20	5
12	10	24	5
16	10	32	5

#### Boss O-Rings

BOSS NUMBER	QTY	BOSS NUMBER	QTY
903	15	907	25
904	25	910	25
906	15	912	15
908	25	916	10

#### 1/16" C/S O-Rings

O-RING NUMBER	QTY	O-RING NUMBER	QTY
006 - 118	25	028	15
019 - 021	20	029	10
022 - 026	15	030	10

#### 3/32" C/S O-Rings

O-RING NUMBER	QTY	O-RING NUMBER	QTY
109 - 118	25	129	10
119 - 120	20	131	10
121 - 127	15	133	10
128	10	135	5

#### 1/8" C/S O-Rings

O-RING NUMBER	QTY	O-RING NUMBER	QTY
210 - 214	20	228	10
215 - 222	15	232	10
223 - 224	10	236	10
226	10		

## O-RING KITS

### SAE 900 O-RING BOSS FLUOROCARBON KIT

Part Number: 900 Boss FC

PART NUMBER	QTY	SAE PORT SIZE	PART NUMBER	QTY	SAE PORT SIZE
568-904V	35	-4	568-910V	20	-10
568-905V	30	-5	568-911V	15	-11
568-906V	30	-6	568-912V	15	-12
568-907V	20	-7	568-913V	15	-13
568-908V	20	-8	568-914V	15	-14
568-909V	20	-9	568-916V	15	-16



This 250 piece assortment contains the most popular size 90 Durometer Viton™ Boss O-rings in 12 different fitting sizes, individually separated, which will supply your shop, service truck, or parts counter with the sizes you need!

### PTFE O-RING KIT

Part Number: 568 PTFE Kit

This kit contains a total of 325 PTFE O-Rings ( 55 - 58 Shore D) in 36 different sizes. PTFE O-Rings can withstand temperatures up to 500° F and are impervious to a wide range of chemicals.

PART NUMBER	QTY
005-012T	15
013-018T	10
110-116T	10
117-121T	5
210-219T	5



### QUAD RING KIT

Part Number: Quad-Ring Kit

PART NUMBER	QTY	PART NUMBER	QTY
4005-4012	10	4110-4116	6
4013-4016	6	4117-4121	4
4017-4018	5	4210-4219	5

This kit contains a total of 226 Quad Seals in 36 different sizes, providing an extremely low cost per size value.



## O-RING KITS

### O-RING FACE KIT

Part Number: 568 Face Kit

PART NUMBER	QTY	PART NUMBER	QTY
011-90D	25	018-90D	20
012-90D	25	021-90D	15
014-90D	25	025-90D	10
016-90D	25	029-90D	10

This kit contains a total of 155 90 Durometer O-Rings in 8 different sizes, providing an extremely low cost per size value.



### O-RING FLANGE KIT

Part Number: 568 Flange Kit

PART NUMBER	QTY	PART NUMBER	QTY
210-90D	10	225-90D	10
214-90D	10	228-90D	10
219-90D	10	232-90D	10
222-90D	10		

This kit contains a total of 70, 90 Durometer O-Rings, in 7 different sizes, providing an extremely low cost per size value.



### SPLIT FLANGE SEAL KIT

Part Number: SFS Kit

PART NUMBER	QTY	PART NUMBER	QTY
SFS-8	5	SFS-24	5
SFS-12	5	SFS-32	5
SFS-16	5	SFS-40	5
SFS-20	5		

This kit contains 35 Split Flange Seals in 7 popular sizes.

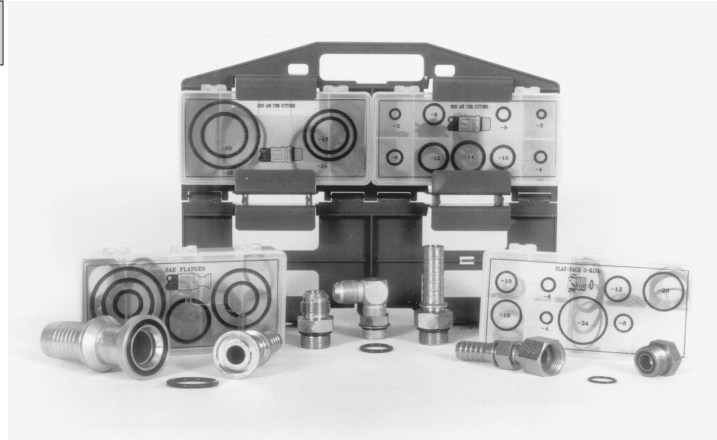


## O-RING KITS

### HOSE END & ADAPTER KIT

**Part Number: O-R Fitting Kit**

This handy kit contains 27 sizes and 216 pieces of 90A Durometer O-rings for boss, split flange and flat face hose end fittings and adapters. Each box has a graphic label identifying the type of application and dash number for the seal. A chart on the back of the box lists popular OEM part number matches for each O-ring. Due to popular demand, these kits are now available individually.



### HOSE END & ADAPTER KIT PARTS

#### SAE FLANGE SEALS

**Part Number: SAE Flange Seals**

SAE PORT SIZE	PART NUMBER	QTY
-8	568-210-90D	8
-12	568-214-90D	8
-16	568-219-90D	8
-20	568-222-90D	8
-24	568-225-90D	8
-32	568-228-90D	8

#### FLAT FACE SEALS

**Part Number: Flat Face O-Rings**

PORT SIZE	PART NUMBER	QTY
-4	568-011-90D	8
-6	568-012-90D	8
-8	568-014-90D	8
-10	568-016-90D	8
-12	568-018-90D	8
-16	568-021-90D	8
-20	568-025-90D	8
-24	568-029-90D	8

#### SAE O-RING BOSS & TUBE SEALS

**Part Number: Boss & Tube Fittings-1**

**Part Number: Boss & Tube Fittings-2**

SAE PORT SIZE	PART NUMBER	QTY	SAE PORT SIZE	PART NUMBER	QTY
-2	568-902	8	-12	568-912	8
-3	568-903	8	-14	568-914	8
-4	568-904	8	-16	568-916	8
-5	568-905	8	-20	568-920	8
-6	568-906	8	-24	568-924	8
-8	568-908	8	-32	568-932	8
-10	568-910	8			

## O-RING KITS

### COMMON JAPANESE SIZES O-RINGS IN 70 DUROMETER

Part Number: **Metric O Kit-J**



This 380 piece kit contains the most popular Japanese Industrial metric O-ring sizes.

I.D.	C.S	QTY	I.D.	C.S	QTY
2.8	1.9	25	20.8	2.4	8
3.8	1.9	20	21.8	2.4	8
4.8	1.9	20	24.4	3.1	6
5.8	1.9	20	29.4	3.1	7
6.8	1.9	15	21.7	3.5	5
7.8	1.9	15	22.1	3.5	5
8.8	1.9	15	23.7	3.5	7
9.8	1.9	15	24.7	3.5	7
9.8	2.4	15	25.2	3.5	7
10.8	2.4	15	25.7	3.5	7
11.0	2.4	15	27.7	3.5	7
11.8	2.4	12	28.7	3.5	6
12.8	2.4	12	29.2	3.5	6
13.8	2.4	12	29.7	3.5	6
14.8	2.4	12	30.7	3.5	6
15.8	2.4	12	31.2	3.5	6
17.8	2.4	8	14.5	4.0	4
19.8	2.4	8	23.5	4.0	6

### COMMON JAPANESE SIZES O-RINGS IN 90 DUROMETER

Part Number: **Metric O Kit-J-90D**



This 380 piece kit contains the most popular Japanese Industrial metric O-ring sizes in 90 durometer NBR.

I.D.	C.S	QTY	I.D.	C.S	QTY
2.8	1.9	25	20.8	2.4	8
3.8	1.9	20	21.8	2.4	8
4.8	1.9	20	24.4	3.1	6
5.8	1.9	20	29.4	3.1	7
6.8	1.9	15	21.7	3.5	5
7.8	1.9	15	22.1	3.5	5
8.8	1.9	15	23.7	3.5	7
9.8	1.9	15	24.7	3.5	7
9.8	2.4	15	25.2	3.5	7
10.8	2.4	15	25.7	3.5	7
11.0	2.4	15	27.7	3.5	7
11.8	2.4	12	28.7	3.5	6
12.8	2.4	12	29.2	3.5	6
13.8	2.4	12	29.7	3.5	6
14.8	2.4	12	30.7	3.5	6
15.8	2.4	12	31.2	3.5	6
17.8	2.4	8	14.5	4.0	4
19.8	2.4	8	23.5	4.0	6



# O-RING KITS

## COMMON EUROPEAN SIZES O-RINGS IN 70 DUROMETER

Part Number: Metric O Kit-E

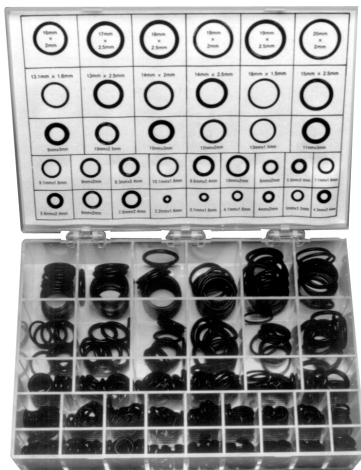


This 500 piece kit contains the most popular European metric O-ring sizes.

I.D.	C.S.	QTY	I.D.	C.S.	QTY
5.0	1.5	20	19.0	2.0	10
13.0	1.5	15	20.0	2.0	10
16.0	1.5	10	4.3	2.4	15
2.2	1.6	20	5.3	2.4	15
3.1	1.6	20	5.6	2.4	15
4.1	1.6	20	7.6	2.4	15
7.1	1.6	20	8.3	2.4	15
9.1	1.6	15	8.6	2.4	15
10.1	1.6	15	10.0	2.5	10
13.1	1.6	15	13.0	2.5	10
4.0	2.0	20	14.0	2.5	10
6.0	2.0	20	15.0	2.5	10
8.0	2.0	15	17.0	2.5	10
9.0	2.0	15	18.0	2.5	10
10.0	2.0	15	19.0	2.5	10
12.0	2.0	15	9.0	3.0	10
14.0	2.0	10	10.0	3.0	10
16.0	2.0	10	11.0	3.0	10

## COMMON EUROPEAN SIZES O-RINGS IN 90 DUROMETER

Part Number: Metric O Kit-E-90D



This 500 piece kit contains the most popular European metric O-ring sizes.

I.D.	C.S.	QTY	I.D.	C.S.	QTY
5.0	1.5	20	19.0	2.0	10
13.0	1.5	15	20.0	2.0	10
16.0	1.5	10	4.3	2.4	15
2.2	1.6	20	5.3	2.4	15
3.1	1.6	20	5.6	2.4	15
4.1	1.6	20	7.6	2.4	15
7.1	1.6	20	8.3	2.4	15
9.1	1.6	15	8.6	2.4	15
10.1	1.6	15	10.0	2.5	10
13.1	1.6	15	13.0	2.5	10
4.0	2.0	20	14.0	2.5	10
6.0	2.0	20	15.0	2.5	10
8.0	2.0	15	17.0	2.5	10
9.0	2.0	15	18.0	2.5	10
10.0	2.0	15	19.0	2.5	10
12.0	2.0	15	9.0	3.0	10
14.0	2.0	10	10.0	3.0	10
16.0	2.0	10	11.0	3.0	10

## O-RING SPLICE KITS

### O-RING SPLICE KIT INCH SIZES

Part Number: 568 Splice Kit

#### Kit Contains:

1. Stock of 70 Durometer Buna O-ring Cord
2. Razor Blade
3. Splicing tool
4. Tube of Adhesive

#### Replacement Parts

#### Parts:

#568 Splice Tool  
#568 Adhesive  
70 Duro. Cord



### O-RING SPLICE KIT INCH & METRIC SIZES

Part Number: Met/Inch Splice Kit

This kit can produce O-Rings of any standard inch size cross-section plus a wide variety of metric sizes. Each kit contains quick drying adhesive, cutting and splicing jig, razor blade and 14 lengths of 70 Durometer Buna-N cord stock as follows:

#### Inch cross-sections: (inch)

1/16" (.070), 3/32" (.103), 1/8" (.139),  
3/16" (.210), 1/4" (.275)

#### Metric cross-sections: (mm)

1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0, 5.7, 8.4



These kits can produce O-Rings of any circumference. The 568 kit contains the most popular inch cross sectional sized O-ring cord. The Metric and Inch Kit has both standard inch size cross sectional cord plus a wide variety of metric sized cord. Both kits contain quick drying adhesive, a cutting and splicing jig, a razor blade and 70 Durometer Buna-N cord.

### FLUOROCARBON O-RING SPLICE KIT INCH SIZES

Part Number: 568 FC Splice Kit

#### Kit Contains:

1. Stock of 75 Durometer Fluorocarbon Cord
2. Razor Blade
3. Splicing tool
4. Tube of Adhesive

#### Replacement Parts

#### Parts:

#568 Splice Tool  
#568 Adhesive  
75 Duro. Fluorocarbon Cord



## BACK-UP RING KITS

### 574 BACK-UP RING KIT

Part Number: 574 Kit

PART NUMBER	QTY	PART NUMBER	QTY
574-005	10	574-114	10
574-006	10	574-115	10
574-007	10	574-116	10
574-008	10	574-117	5
574-009	10	574-118	5
574-010	10	574-119	5
574-011	10	574-120	5
574-012	10	574-121	5
574-013	10	574-210	7
574-014	10	574-211	7
574-015	10	574-212	7
574-016	10	574-213	7
574-017	10	574-214	5
574-018	10	574-215	5
574-110	10	574-216	5
574-111	10	574-217	5
574-112	10	574-218	5
574-113	10	574-219	5



This 293 piece kit contains 36 of the most popular size "Parback®" Style Dished Cross Section back-up rings. Molded of 90A Durometer Buna-N Rubber, they stretch for installation and return quickly to their original size. SIZES CORRESPOND TO O-RING NUMBERS. Your shop and service truck should not be without this handy kit.

### 575 BACK-UP RING KIT

Part Number: 575 Kit

PART NUMBER	QTY	PART NUMBER	QTY
575-111	25	575-216	25
575-112	25	575-217	15
575-113	25	575-218	15
575-114	25	575-219	15
575-115	25	575-220	15
575-116	25	575-221	15
575-210	25	575-222	15
575-211	25	575-223	15
575-212	25	575-224	15
575-213	25	575-325	10
575-214	25	575-326	10
575-215	25	575-327	10



This 475 piece kit contains 24 of the most popular size Urethane Back-up Rings. This assortment is essential for parts counters, shop use, and service trucks.

# BACK-UP RING KITS

## PTFE BACK-UP RING KIT

Part Number: 575 PTFE Kit S

PART NUMBER	QTY	PART NUMBER	QTY
575-005ST	15	575-114ST	10
575-006ST	15	575-115ST	10
575-007ST	15	575-116ST	10
575-008ST	15	575-117ST	5
575-009ST	15	575-118ST	5
575-010ST	15	575-119ST	5
575-011ST	15	575-120ST	5
575-012ST	15	575-121ST	5
575-013ST	10	575-210ST	5
575-014ST	10	575-211ST	5
575-015ST	10	575-212ST	5
575-016ST	10	575-213ST	5
575-017ST	10	575-214ST	5
575-018ST	10	575-215ST	5
575-110ST	10	575-216ST	5
575-111ST	10	575-217ST	5
575-112ST	10	575-218ST	5
575-113ST	10	575-219ST	5



This 325 piece kit contains 36 of the most popular size PTFE Back-up Rings. These rings are compatible with all hydraulic fluids, since they are virtually chemically inert, and can be used in applications involving elevated operating temperatures. These rings are scarf cut to facilitate installation.

## STYLE 870 KIT

Part Number: 870 TRI-Kit

The 870 Tri-Kit is packaged in three sturdy cases that contain 180 U-Cups. The U-Cups conform to AN-6226 size standards in 36 popular sizes ranging from 1/8" to 1-1/8" inside diameter. All of the seals are molded from 70A Durometer Buna-N rubber.



# RETAINER RING KITS

Each kit has an assortment of retainer rings (Tru-arc, Eaton, or spiral wound style) packed in a reusable plastic box. All rings are made in the USA from carbon spring steel.

**Each kit contains:** 18 sizes - 9 internal, 9 external • 216 rings per box • 12 rings per size

## TRU-ARC

**Part Number: 300-310 Kit**

PART NUMBER	QTY.	PART NUMBER	QTY.
300-050	12	310-050	12
300-062	12	310-062	12
300-075	12	310-075	12
300-087	12	310-087	12
300-100	12	310-100	12
300-112	12	310-112	12
300-125	12	310-125	12
300-137	12	310-137	12
300-150	12	310-150	12



## SPIRAL WOUND

**Part Number: SRR Kit**

PART NUMBER	QTY.	PART NUMBER	QTY.
WHM-050	12	WSM-050	12
WHM-062	12	WSM-062	12
WHM-075	12	WSM-075	12
WHM-087	12	WSM-087	12
WHM-100	12	WSM-100	12
WHM-112	12	WSM-112	12
WHM-125	12	WSM-125	12
WHM-137	12	WSM-137	12
WHM-150	12	WSM-150	12



## EATON

**Part Number: ERR Kit**

PART NUMBER	QTY.	PART NUMBER	QTY.
NAN-050	12	XAN-050	12
NAN-062	12	XAN-062	12
NAN-075	12	XAN-075	12
NAN-087	12	XAN-087	12
NAN-100	12	XAN-100	12
NAN-112	12	XAN-112	12
NAN-125	12	XAN-125	12
NAN-137	12	XAN-137	12
NAN-150	12	XAN-150	12



## RETAINER RING KITS



### ROTOR PACK KIT

**Part Number: RPK 4 Kit**

Packaged in four plastic cases with a handy carrying case, our rotor pack kit contains approximately 50 each of 20 common internal/external retaining ring sizes. The internal rings fit housings or bores from 3/8" internal diameter to 1-1/8". External rings accommodate shaft sizes from 1/4" internal diameter to 1-1/8". Two retainer ring installation pliers are also included.

### EXTERNAL RETAINER RINGS

**Part Number: 310 Kit**

PART NUMBER	SHAFT SIZE	QTY.	PART NUMBER	SHAFT SIZE	QTY.
310-100	1.000	5	310-200	2.000	5
310-125	1.250	5	310-225	2.250	5
310-137	1.375	5	310-250	2.500	5
310-150	1.500	5	310-275	2.750	3
310-175	1.750	5	310-300	3.000	3

These assortments contain the most popular size retainer rings, boxed in a handy storage and display case, which will supply your shop, service truck, or parts counter with the sizes you need!



### INTERNAL RETAINER RINGS

**Part Number: 300 Kit**

PART NUMBER	BORE SIZE	QTY.	PART NUMBER	BORE SIZE	QTY.
300-075	0.750	10	300-200	2.000	10
300-087	0.875	10	300-225	2.250	5
300-100	1.000	10	300-250	2.500	5
300-112	1.125	10	300-275	2.750	5
300-125	1.250	10	300-300	3.000	5
300-137	1.375	10	300-350	3.500	5
300-150	1.500	10	300-400	4.000	5
300-162	1.625	10	300-450	4.500	2
300-175	1.750	10	300-500	5.000	2



# ASSORTMENT KITS

## CAP PLUG KIT

Part Number: **Cap Plug Kit**



This sturdy kit, packaged in an unbreakable box, contains 553 cap plugs in the most popular sizes.

Cap Plug Number	QTY	Cap Plug Number	QTY	Cap Plug Number	QTY
CAP-2-X	50	CAP-PD-100	15	CAP-G-22	10
CAP-4	50	CAP-PD-120	10	CAP-G-25	12
CAP-6-X	50	CAP-PD-140	5	CAP-G-27	16
CAP-9	40	CAP-PD-160	10	CAP-P-28	25
CAP-12-X	25	CAP-G-2	20	CAP-P-38	25
CAP-14	20	CAP-G-8	20	CAP-P-48	25
CAP-PD-60	25	CAP-G-14	20	CAP-P-68-H	25
CAP-PD-80	25	CAP-G-18	20	CAP-P-88-H	10

## CAT® SILICONE O-RING KIT

Part Number: **CTC-4C8253**

This handy kit, in an unbreakable box, contains 149 silicone o-rings in the 32 most popular sizes used on Caterpillar® equipment.



## CAT® O-RING KIT

This handy kit, in an unbreakable box, contains the 9 most popular sized D-Rings used on Caterpillar® equipment.

Part Number: **CTC-4C4784**



## CAT® NITRILE O-RING KIT

This handy kit, in an unbreakable box, contains 570 nitrile o-rings in the 32 most popular sizes used on Caterpillar® equipment.

Part Number: **CTC-4C4782**




ASSORTMENT KITS AND TOOLS

# ASSORTMENT KITS

## COTTER PIN KIT

Part Number: Cotter Pin Kit




	1/16" X 1" 150 pcs.	3/32" X 1" 150 pcs.
	1/8" X 1 1/4" 75 pcs.	3/32" X 1 1/2" 100 pcs.
	1/8" X 2" 50 pcs.	5/32" X 2 1/2" 30 pcs.
555 Pieces		

## WOODRUFF KEY KIT

Part Number: Woodruff Keys Kit




	1/8" X 1/2" No. 3 16 pcs.	1/8" X 5/8" No. 5 15 pcs.
	3/32" X 5/8" No. 6 15 pcs.	3/16" X 3/4" No. 9 10 pcs.
	1/4" X 7/8" No. A 5 pcs.	1/4" X 1" No. 15 4 pcs.
65 Pieces		

## GREASE FITTING KIT

Part Number: Grease Fitting Kit



	1/8" NPT Straight 6 pcs.	1/4" - 28 Straight 6 pcs.
	3/16" Drive Straight 4 pcs.	1/8" NPT 45 1/8" NPT 90 3 pcs. ea.
	1/4" - 28 45 1/4" - 28 90 3 pc. ea.	5/16" Drive Straight 4 pcs.
32 Pieces		



# TESTING TOOLS

## FasTest® WEH 17 SERIES



### Your Ergonomic Solution to Eliminate Wrenches and Bottle-Necks

**FasTest®** WEH 17 connectors provide leak tight connections for filling, charging, evacuation and pressure testing. The WEH 17 automatically seals when pressurized. Available in lever or pneumatically activated versions to grip and seal to female threads. Test pressures to 3500 psi.

#### How to Operate

**To Connect:** Collapse split collets in accordance with the operating method you have selected. Insert collets into female thread of the component to be tested. Expand collet to grip and seal. Activate test media through connector side port.

**To Disconnect:** Deactivate test pressure. Collapse split collets in accordance with the operating method you have selected. Remove connector from test piece.  
**Caution:** WEH Series 17 connectors are not internally valved. Disconnecting while pressurized will cause leakage of test media.

#### Technical Data

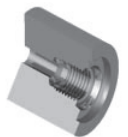
Seals: Nitrile  
 Materials: Stainless steel  
 Temperature: -40° to +250°F  
 Pressure Ranges: 0 to 5000 psi. (static)  
 Pneumatic Operation: Requires a minimum air supply of 75 psi.  
 Rated Pressure: Based on test results using threaded ports manufactured to the referenced specifications and steel material. Other materials or deviations from those specifications may reduce the safe working pressure and should be verified by test. For dynamic pressure cycles or heavy side-load applications please see **FasMate®** Series.

#### NPTF Pipe Thread



PART NUMBER	CONNECTS TO FEMALE THREAD	RATED PRESSURE	MAIN SEAL SET 5/PKG
HH17H-40204041-1BB1	1/4" NPTF	5000	S17-041B
HH17H-40206061-1BB1*	3/8" NPTF	5000	S17-061B
HH17H-40208081-1BB1	1/2" NPTF	5000	S17-081B
HH17H-40212121-1BB1	3/4" NPTF	3500	S17-121B

#### SAE O-Ring



PART NUMBER	CONNECTS TO FEMALE THREAD	RATED PRESSURE	MAIN SEAL SET 5/PKG
HH17H-044021-1BB1	-4 (7/16-20)	5000	S17-042B
HH17H-064041-1BB1	-6 (9/16-18)	5000	S17-062B
HH17H-084061-1BB1*	-8 (3/4-16)	5000	S17-082B
HH17H-104081-1BB1	-10 (7/8-14)	5000	S17-102B
HH17H-124121-1BB1	-12 (1 1/16-12)	3500	S17-122B

\* In-stock. Additional sizes available for order.

# TESTING TOOLS

## TwistMate® MIT SERIES

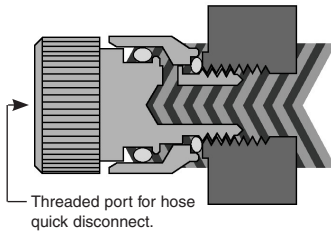


### No Wrenches Needed • Hand Tighten Your Port Adapters • Shortens Testing Time

**Twistmate®** MIT mechanical internal thread connectors and plugs provide fast leak tight threaded connections for testing, filling, flushing, plugging, calibrating or venting applications. The patented pressure assisted sealing eliminates wrench tightening and thread sealants for safe secure connections up to 10,000 psi. With sizes up to 4" NPTF, and high flow design, the MIT is ideal for large unit run testing. Fast and reliable sealing reduces test time and production losses from scrap, rework and re-testing. Full flow design for shortest filling and test times.

Spin Twistmate® finger-tight onto thread until face seal contacts test piece. They seal automatically when the system is pressurized. Air, gas or hydraulic pressure in the system provides a sealing force that presses the urethane main seal against the face of the threads. This automatic internal piston action maintains the seal with minimum pressure.

#### Piston Action



#### Operation

- Step 1. Spin **Twistmate®** into the threaded port until the seal makes contact.
- Step 2. Introduce the media and pressure. The external sleeve automatically moves toward the test port enhancing the seal squeeze. Vacuum applications will require finger-tightening.

#### Technical Data

Seals: Urethane and Nitrile  
 Materials: Steel with QPQ or Stainless Steel  
 Temperature: -40° to +200°F  
 Pressure: Vacuum to 10,000 psi  
 Rated Pressure: Based on test results using threaded ports manufactured to the referenced specifications and steel material. Other materials or deviations from those specifications may reduce the safe working pressure and should be verified by test.

#### NPTF Pipe Thread



PART NUMBER	CONNECTS TO FEMALE THREAD	RATED PRESSURE	CONNECTOR TYPE	MAIN SEAL SET 5/PKG
HHMIT-022021	1/8" NPTF	5000	SWIVEL	S1109-U70
HHMIT-042041	1/4" NPTF	5000	SWIVEL	S1111-U70
HHMIT-062061	3/8" NPTF	5000	SWIVEL	S1113-U70
HHMIT-082081	1/2" NPTF	5000	SWIVEL	S1209-U70
HHMIT-122121X	3/4" NPTF	5000	CONNECTOR	S1213-U70
HHMIT-162161X	1" NPTF	5000	CONNECTOR	S1216-U70
HHMIT-202201X	1-1/2" NPTF	5000	CONNECTOR	S1222-U70
HHMIT-242241X	2" NPTF	5000	CONNECTOR	S1327-U70

#### SAE O-Ring



PART NUMBER	CONNECTS TO FEMALE THREAD	RATED PRESSURE	CONNECTOR TYPE	MAIN SEAL SET 5/PKG
HHMIT-044021X	-04 (7/16-20)	5000	CONNECTOR	S1109-U70
HHMIT-064041X	-06 (9/16-18)	5000	CONNECTOR	S1111-U70
HHMIT-084081X	-08 (3/4-16)	4000	CONNECTOR	S1209-U70
HHMIT-104081X	-10 (7/8-14)	4000	CONNECTOR	S1209-U70
HHMIT-124121X	-12 (1 1/16-12)	4000	CONNECTOR	S1213-U70
HHMIT-164161X	-16 (1 5/16-12)	4000	CONNECTOR	S1217-U70
HHMIT-204201X	-20 (1 5/8-12)	4000	CONNECTOR	S1222-U70

## INSTALLATION TOOLS

### ROD U-SEAL INSTALLATION TOOLS

Part Number	Seal ID Range
IT 100	3/4" to 1-1/4"
IT 150	1-3/8" to 1-7/8"
IT 200	2" to 3"
IT 100-NN	3/4" to 1-1/4"
IT 150-NN	1-3/8" to 1-7/8"
IT 200-NN	2" to 3"



These tools aid U-seal installation, eliminating the risk of damaging the seal lip.

## REMOVAL TOOLS

**We have the packing removal tools to fit your needs.  
Try out these high quality tools in your shop.**

Proper tools make the job of servicing cylinders easier and faster and reduce the possibility of damaging the finely machined surfaces. The handy tools listed on this page aid in the repair of telescopic cylinders and make it easier to do a quality job.

### O-RING PICK SET 1

**Part Number: O-Ring Pick**

These Bronze O-ring Picks, w/ black vinyl case, aid in the installation and extraction of O-rings.



### O-RING PICK SET 2

**Part Number: ORP-B**  
**Part Number: ORP-SS**

Available in brass (ORP-B) or stainless steel (ORP-SS), these tools have been specifically engineered to enhance o-ring removal and replacement. Coated handles increase the tools performance in less than perfect environments.



### O-RING PICK SET 3

**Part Number: O Pick Set**

Packaged in a clear vinyl pouch, kit contains a knurled handle and four screw-in picks with different hook configurations. Set includes straight tip, o-ring 90° tip, hook tip, and angle tip.



### O-RING PICK SET 4

**Part Number: Maxi Pick Set**

Packaged in a plastic pouch, these highly visible picks feature screwdriver-type colored handles. Set includes awl, hook tip, 45° bent tip tool, and 90° bent tip tool.



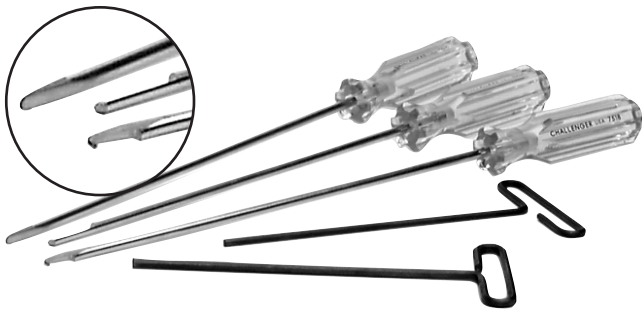
# REMOVAL TOOLS

**We have the packing removal tools to fit your needs.  
Try out these high quality tools in your shop.**

Proper tools make the job of servicing cylinders easier and faster and reduce the possibility of damaging the finely machined surfaces. The handy tools listed on this page aid in the repair of telescopic cylinders and make it easier to do a quality job.

## 5 PIECE TOOL KIT SET

**Part Number: CH-TK-1**



## CHEVRON ASSEMBLY TOOL

**Part Number: CM-376-9067-001**



## FLEXIBLE PACKING HOOKS

Part Number	Packing Space	Length
FPH-187	3/16"-up	6-1/2"
FPH-312R	5/16"-up	7-1/2"
FPH-437R	7/16"-up	10-1/2"
FPH-500R	1/2"-up	14-1/2"

With a tempered tool steel corkscrew tip and a woven strand steel flexible shaft, this tool makes hard to reach packing easy to pull out. Works best by using two hooks at diametrically opposed points (180°).



ASSORTMENT KITS AND TOOLS

## REMOVAL TOOLS

**We have the packing removal tools to fit your needs.  
Try out these high quality tools in your shop.**

Proper tools make the job of servicing cylinders easier and faster and reduce the possibility of damaging the finely machined surfaces. The handy tools listed on this page aid in the repair of telescopic cylinders and make it easier to do a quality job.

### REPLACEABLE WOODSCREW TIPS

Part Number	Packing Space
FPH-RTW312	5/16"-up
FPH-RTW437	7/16"-up



### REPLACEABLE CORKSCREW TIPS

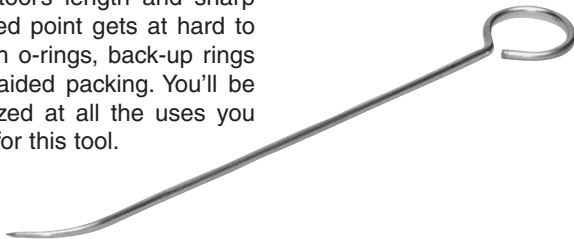
Part Number	Packing Space
FPH-RTC312	5/16"-up
FPH-RTC437	7/16"-up
FPH-RTC500	1/2"-up



### SOLID SHAFT PICKS

Part Number	Packing Space	Length
SSP-125		9-1/2"
SSP-312	5/16"-up	10"

Formed from hardened steel, this tool's length and sharp angled point gets at hard to reach o-rings, back-up rings & braided packing. You'll be amazed at all the uses you find for this tool.



# REMOVAL TOOLS

**We have the packing removal tools to fit your needs.  
Try out these high quality tools in your shop.**

Proper tools make the job of servicing cylinders easier and faster and reduce the possibility of damaging the finely machined surfaces. The handy tools listed on this page aid in the repair of telescopic cylinders and make it easier to do a quality job.

## 11 PIECE PACKING TOOL KIT

**Part Number: Pack Tool Set-11**

PART NUMBER	QTY	PART NUMBER	QTY
FPH-312R	2	FPH-RTC312	1
FPH-437R	2	FPH-RTC437	1
SSP-125	1	WRENCH	1
SSP-187	1	BOX	1
SSP-312	1		



## 17 PIECE PACKING TOOL KIT

**Part Number: Pack Tool Set-17**

PART NUMBER	QTY	PART NUMBER	QTY
FPH-312R	2	FPH-RTC437	1
FPH-437R	2	FPH-RTC500	1
FPH-500R	2	FPH-RTW312	1
SSP-125	1	FPH-RTW437	1
SSP-187	1	FPH-RTW500	1
SSP-312	1	WRENCH	1
FPH-RTC312	1	BOX	1



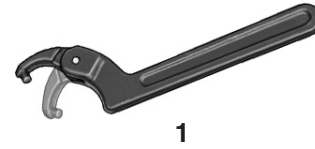
ASSORTMENT KITS AND TOOLS

# DISMANTLING TOOLS

## SPANNER WRENCHES

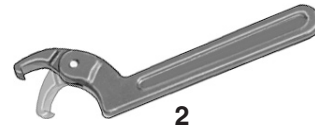
### (1) ADJUSTABLE HEAD — PIN STYLE

PART NUMBER	PART OD RANGE	PIN DIA.	PIN LGTH.
SPAP-2.00X0.13	3/4" to 2" (19mm to 50mm)	1/8"	1/8"
SPAP-2.00X0.19	3/4" to 2" (19mm to 50mm)	3/16"	5/32"
SPAP-3.00X0.19	1-1/4" to 3" (32mm to 76mm)	3/16"	3/16"
SPAP-3.00X0.25	1-1/4" to 3" (32mm to 76mm)	1/4"	7/32"
SPAP-4.75X0.25	2" to 4-3/4" (51mm to 120mm)	1/4"	1/4"
SPAP-6.25X0.38	4-1/2" to 6-1/4" (115mm to 159mm)	3/8"	1/4"



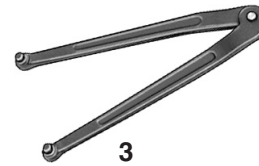
### (2) ADJUSTABLE HEAD — HOOK STYLE

PART NUMBER	PART OD RANGE	HOOK WD.	HOOK DP.
SPAH-2.00	3/4" to 2" (19mm to 50mm)	11/32"	1/8"
SPAH-3.00	1-1/4" to 3" (32mm to 76mm)	13/32"	5/32"
SPAH-4.75	2" to 4-3/4" (51mm to 120mm)	15/32"	3/16"
SPAH-6.25	4-1/2" to 6-1/4" (115mm to 159mm)	15/32"	1/4"
SPAH-8.75	6-1/8" to 8-3/4" (155mm to 222mm)	15/32"	5/16"

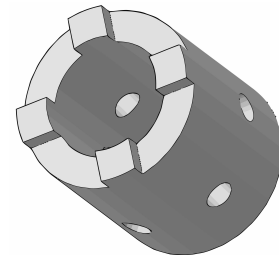
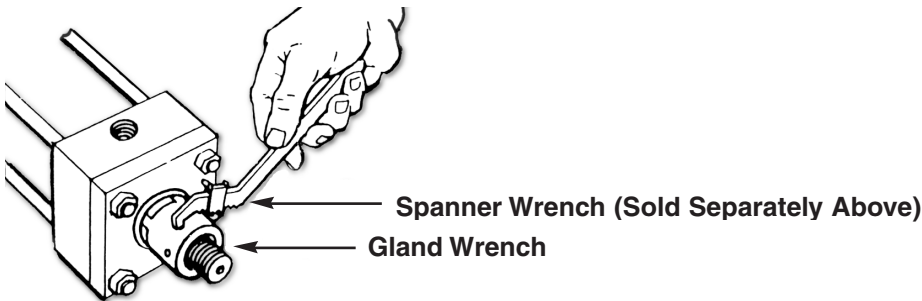


### (3) ADJUSTABLE FACE — PIN STYLE

PART NUMBER	DIA. RANGE (CENTER TO CENTER)	PIN DIA.	PIN LGTH.
SPAPF-2.00X0.19	5/8" to 2" (16mm to 50mm)	3/16"	1/8"
SPAPF-3.00X0.25	5/8" to 3" (16mm to 76mm)	1/4"	3/16"
SPAPF-4.00X0.31	5/8" to 4" (16mm to 101mm)	5/16"	1/4"



## PARKER GLAND WRENCHES



Rod Dia.	Kit #	ID X OD X HT	Spanner (Sold Separately Above)
1/2", 5/8", 12mm & 14mm	PKH-069590	11/16" X 1-1/8" X 1-3/8"	SPAP-2.00X0.19
18mm	PKH-084765	13/16" X 1-1/4" X 1-7/16"	SPAP-2.00X0.19 or SWP-3.00X0.19
1" & 22mm	PKH-069591	1-1/16" X 1-5/8" X 1-1/2"	SPAP-2.00X0.19 or SWP-3.00X0.19
28mm	PKH-084766	1-1/4" X 1-11/16" X 9/16"	SPAP-2.00X0.19 or SWP-3.00X0.19
1-3/8" & 36mm	PKH-069592	1-7/16" X 1-7/8" X 1-5/8"	SPAP-2.00X0.19 or SWP-3.00X0.19
1-3/4" & 45mm	PKH-069593	1-13/16" X 2-1/4" X 1-5/8"	SPAP-3.00X0.25 or SWP-4.75X0.25
2"	PKH-069594	2-1/16" X 2-1/2" X 2"	SPAP-3.00X0.25 or SWP-4.75X0.25
2-1/2" & 56mm	PKH-069595	2-9/16" X 3" X 2-1/8"	SPAP-3.00X0.25 or SWP-4.75X0.25
70mm	PKH-069596	2-15/16" X 3-1/2" X 2-3/8"	SPAP-4.75X0.25



## MEASURING TOOLS

### O-RING MEASURING CONE

**Part Number:** O-Ring Cone-Inch

Handy cone provides o-ring dash numbers instantly. Measures 184 of the most widely used sizes in 5 standard widths, 1/4" ID to 5-5/8" ID. Made of high density polyurethane, the cone stands 17-1/2" high.



### PI TAPES

Part Number	Size
PI-212	2" - 12"

This handy tool allows for quick accurate measuring of the outside diameters (OD) of vee packing, large U-Seals, Piston Rings, and metal parts such as cylinder stages, rams and rods. This tape comes with certificate of calibration. Accurate to .001".



### DIGITAL CALIPERS

**Part Number**

HH-Caliper-6-P  
HH-Caliper-12-P

A high quality instrument, able to measure up to 150mm or 6". A push of a button changes from inches to metric. A clear LCD display shows a reading with a resolution of 0.0005" (0.01mm) that is accurate to  $\pm 0.03\text{mm}$ . These calipers come in a sturdy, padded plastic case with instructions and a spare battery.



### O-RING GAUGE

**Part Number:** OR- GAUGE

Slide gauge for measuring standard cross-section o-rings with an inside diameter up to 13".



## MEASURING TOOLS

### POWER PUNCH MAXI SET

Part Number: Maxi Punch Set

PART NUMBER	PUNCH RANGE
Punch Set	1/4, 5/16, 3/8, 7/16, 1/2, 16,5/8, 1/16, 3/4, 3/16, 7/8, 5/16, 1

This extremely high quality punch set includes 13 punches, power punch, centering pin, punch pad and carrying case. Durable cutting heads cut washers and bolt holes effortlessly. Guaranteed 100% satisfaction.



### O-RING CHART

Part Number: O-Ring Chart NN

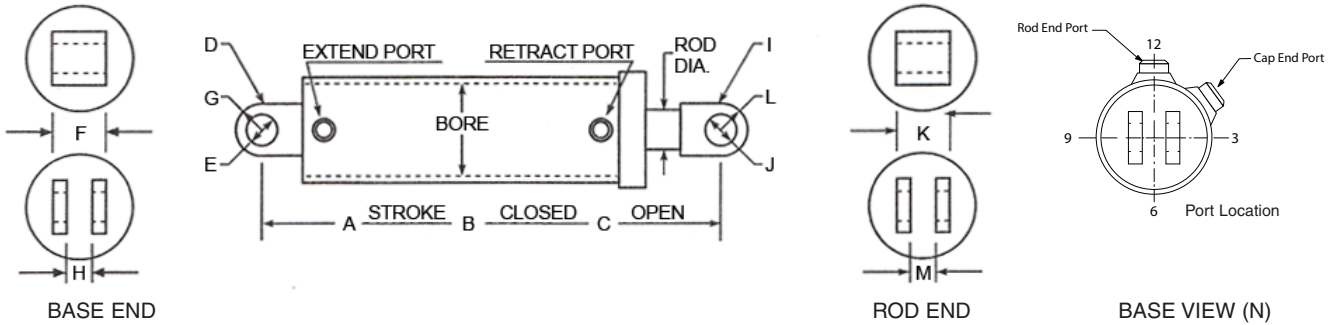
Durable, Accurate, and Fast, these charts allow for easy Standard O-ring size identification. No shop should be without one!



# Technical Information

<b>Contents</b>	<b>Page</b>
Cylinder Application Data Form	84
Telescopic Cylinder Application Data Form	85
Cylinder Push and Pull Forces	86
Hydraulic Cylinder Speeds	87
Electric Motor HorsePower	88
Fluid Power Formulas	89 - 90
Tech Tip - Surface Finish	91
Front Mount Dump Body	92

# CUSTOM CYLINDER APPLICATION DATA FORM



Cylinder application \_\_\_\_\_

Single - or Double-acting \_\_\_\_\_ System operating pressure Normal \_\_\_\_ Max. \_\_\_\_

Bore \_\_\_\_\_ Is there a relief valve in system \_\_\_\_ Setting \_\_\_\_

Rod diameter \_\_\_\_\_ System flow in G.P.M Min. \_\_\_\_ Max. \_\_\_\_

Head & gland design \_\_\_\_\_ System operating temp. Normal \_\_\_\_ Max. \_\_\_\_

Piston design \_\_\_\_\_ Fluid type \_\_\_\_\_

Mounting conditions \_\_\_Vert.\_\_\_Horz.\_\_\_Incline angle Load holding requirements \_\_\_\_\_

Any side or eccentric loading possible \_\_\_\_\_ Environmental condition \_\_\_\_\_

A : Total stroke \_\_\_\_\_

B : Closed length \_\_\_\_\_

C : Open length \_\_\_\_\_

D : Base mount type or code \_\_\_\_\_

E : Base pin diameter \_\_\_\_\_

F : Base mount width \_\_\_\_\_

G : Base mount radius \_\_\_\_\_

H : Base Clevis Gap (if applicable) \_\_\_\_\_

I : Rod mount type or code \_\_\_\_\_

J : Rod pin diameter \_\_\_\_\_

K : Rod mount width \_\_\_\_\_

L : Rod mount radius \_\_\_\_\_

M : Rod clevis gap (if applicable) \_\_\_\_\_

N : Base End Port Location \_\_\_\_\_

Rod End Port Location \_\_\_\_\_

Special mounting (if applicable) \_\_\_\_\_

Extend port size and type \_\_\_\_\_ Extend port location \_\_\_\_\_

Retract port size and type \_\_\_\_\_ Retract port location \_\_\_\_\_

Special features or comments \_\_\_\_\_

Requested by: Firm \_\_\_\_\_ Current Quan. \_\_\_\_\_

Address \_\_\_\_\_ Future Quan. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

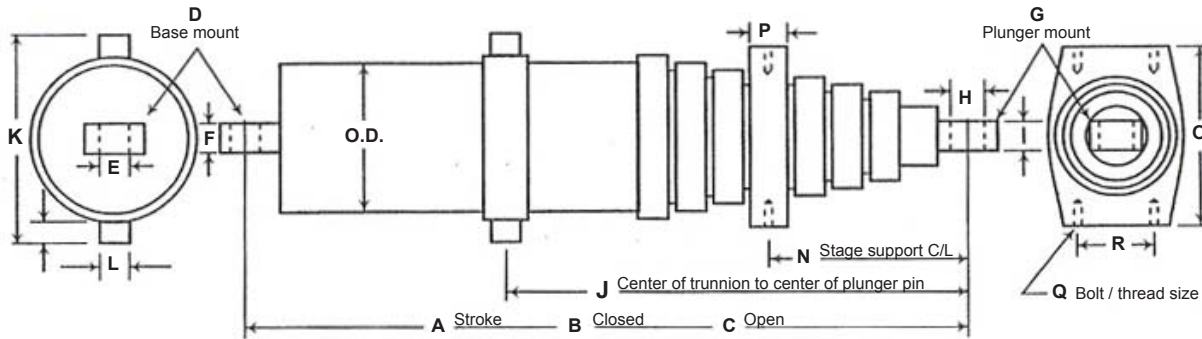
Contact \_\_\_\_\_

**Phone (800) 777-5617 Fax (800) 759-6391**



**Hercules Sealing Products**  
 1016 N. Belcher Rd  
 Clearwater, FL 33765

# TELESCOPIC CYLINDER APPLICATION DATA FORM



Cylinder application \_\_\_\_\_

Single - or Double-acting \_\_\_\_\_ System operating pressure Normal \_\_\_\_ Max. \_\_\_\_

O.D. of body \_\_\_\_\_ Is there a relief valve in system \_\_\_\_ Setting \_\_\_\_

O.D. largest moving stage \_\_\_\_\_ System flow in G.P.M Min. \_\_\_\_ Max. \_\_\_\_

Number of moving stages \_\_\_\_\_ System operating temp. Normal \_\_\_\_ Max. \_\_\_\_

Chrome or non-chrome stages \_\_\_\_\_ Fluid type \_\_\_\_\_

Mounting conditions \_\_\_Vert.\_\_\_Horz.\_\_\_Incline angle Load holding requirements \_\_\_\_\_

Any side or eccentric loading possible \_\_\_\_\_ Environmental condition \_\_\_\_\_

A : Total stroke \_\_\_\_\_ J : Plunger pin to trunnion C/L (if applicable) \_\_\_\_\_

B : Closed length \_\_\_\_\_ K : Trunnion overall width \_\_\_\_\_

C : Open length \_\_\_\_\_ L : Trunnion lug diameters \_\_\_\_\_

D : Base mount type or code \_\_\_\_\_ M : Trunnion lug lengths \_\_\_\_\_

E : Base pin diameter \_\_\_\_\_ N : Plunger pin to stage support (if applicable) \_\_\_\_\_

F : Base mount width \_\_\_\_\_ O : Stage support width \_\_\_\_\_

G : Plunger mount type or code \_\_\_\_\_ P : Stage support thickness \_\_\_\_\_

H : Plunger pin diameter \_\_\_\_\_ Q : Stage support bolt & thread size \_\_\_\_\_

I : Plunger mount width \_\_\_\_\_ R : Stage support bolt locations & C/L's \_\_\_\_\_

Special mounting (if applicable) \_\_\_\_\_

Extend port size and type \_\_\_\_\_ Extend port location \_\_\_\_\_

Retract port size and type \_\_\_\_\_ Retract port location \_\_\_\_\_

Special features or comments \_\_\_\_\_

Requested by: Firm \_\_\_\_\_ Current Quan. \_\_\_\_\_

Address \_\_\_\_\_ Future Quan. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Contact \_\_\_\_\_

**Phone (800) 777-5617 Fax (800) 759-6391**



**Hercules Sealing Products**  
 1016 N. Belcher Rd  
 Clearwater, FL 33765

TECHNICAL INFORMATION

## CYLINDER PUSH AND PULL FORCES

### Square Head "High Pressure" Cylinders

Working Pressure of Hydraulic Fluid P.S.I.

BORE	AREA	ROD	SIZE	50	100	250	500	1000	1500	2000	3000	5000
1-1/2	PUSH	—		88	177	443	885	1,770	2,655	3,540	5,310	8,850
	PULL	STD	5/8	73	146	365	730	1,460	2,190	2,920	4,380	7,300
	PULL	2:1	1	49	98	245	490	980	1,470	1,960	2,940	4,900
2	PUSH	—		157	314	785	1,570	3,140	4,710	6,280	9,420	15,700
	PULL	STD	1	118	236	590	1,180	2,360	3,540	4,720	7,080	11,800
	PULL	2:1	1-3/8	83	166	415	830	1,660	2,490	3,320	4,980	8,300
2-1/2	PUSH	—		246	491	1,228	2,455	4,910	7,265	9,820	14,730	24,550
	PULL	STD	1	206	412	1,030	2,060	4,120	6,180	8,240	12,360	20,600
	PULL	2:1	1-3/4	125	250	625	1,250	2,500	3,750	5,000	7,500	12,500
3-1/2	PUSH	—		415	830	2,075	4,150	8,300	12,450	16,600	24,900	41,500
	PULL	STD	1-3/8	341	681	1,703	3,405	6,810	10,215	13,620	20,430	34,050
	PULL	2:1	2	258	515	1,288	2,575	5,150	7,725	10,300	15,450	25,750
4	PUSH	—		628	1,257	3,143	6,285	12,570	18,855	25,140	37,710	62,850
	PULL	STD	1-3/4	508	1,016	2,540	5,080	10,160	15,240	20,320	30,480	50,800
	PULL	2:1	2-1/2	383	766	1,916	3,830	7,660	11,490	15,320	22,980	38,300
5	PUSH	—		982	1,964	4,910	9,820	19,640	29,460	39,280	58,920	98,200
	PULL	STD	2	825	1,649	4,123	8,245	16,490	24,735	32,980	49,470	82,450
	PULL	2:1	3-1/2	500	1,001	2,503	5,005	10,010	15,015	20,020	30,030	50,050
6	PUSH	—		1,413	2,827	7,068	14,135	28,270	42,405	56,540	84,810	141,350
	PULL	STD	2-1/2	1,168	2,336	5,840	11,680	23,360	35,040	46,720	70,080	116,800
	PULL	2:1	4	786	1,571	3,928	7,855	15,710	23,565	31,420	47,130	78,550
7	PUSH	—		1,924	3,849	9,623	19,245	38,490	57,735	76,980	115,470	192,450
	PULL	STD	3	1,571	3,142	7,855	15,710	31,420	47,130	62,840	94,260	157,100
	PULL	2:1	5	942	1,885	4,713	9,425	18,850	28,275	37,700	56,550	94,250
8	PUSH	—		2,514	5,027	12,568	25,135	50,270	75,405	100,540	150,810	251,350
	PULL	STD	3-1/2	2,032	4,064	10,160	20,320	40,640	60,960	81,280	121,920	203,200
	PULL	2:1	5-1/2	1,326	2,651	6,628	13,255	26,510	39,765	53,020	79,530	132,550
10	PUSH	—		3,927	7,854	19,635	39,270	78,540	117,810	157,080	235,620	392,700
	PULL	STD	4-1/2	3,132	6,264	15,660	31,320	62,640	93,960	125,280	187,920	313,200
	PULL	2:1	7	2,003	4,006	10,015	20,030	40,060	60,090	80,120	120,180	200,300

This table is a ready reference of forces available from either end from various cylinder and rod sizes at a range of pressures. For pressures intermediate between those shown, add force values from two or more pressures whose sum equals the given operating pressure.

# HYDRAULIC CYLINDER SPEEDS

Inches / Minute

PISTON DIAMETER	ROD DIAMETER	FLOW - GPM										
		1	2	3	5	10	12	15	20	25	50	75
1	—	298	596	894	1490							
	1/2	392	784	1176	1960							
1-1/2	—	130	260	392	654	1308						
	5/8	158	316	476	792	1584						
	1	235	470	706	1176	2352						
2	—	73	146	221	368	736	883	1120				
	3/4	85	170	257	428	956	1025	1283				
	1	97	184	294	490	980	1175	1465				
	1-3/8	139	278	418	697	1394	1673	2090				
2-1/2	—	47	94	141	235	470	565	675	940	1175		
	1	56	112	168	280	560	672	840	1120	1400		
	1-3/8	67	134	203	339	678	813	1015	1355	1695		
	1-3/4	92	184	277	463	926	1110	1385	1850	2310		
3	—	32	64	98	163	326	392	490	653	817		
	1	36	72	110	184	368	440	551	735	920		
	1-1/2	43	86	131	218	436	523	655	872	1090		
3-1/2	2	58	116	176	294	588	705	882	1175	1470		
	—	24	48	72	120	240	288	360	480	600	1200	
	1-1/4	27	54	82	137	274	330	411	548	685	1370	
	1-3/4	32	64	96	160	320	384	480	640	800	1600	
4	2	35	70	107	178	356	428	534	712	890	1780	
	—	18	36	55	92	184	220	276	368	460	920	
	1-1/4	20	40	61	102	204	244	306	408	510	1020	
	1-3/4	22	44	68	113	226	273	339	452	565	1130	
	2	24	48	73	122	244	294	366	488	610	1220	
5	2-1/2	30	60	90	150	300	362	450	600	750	1500	
	—	12	24	35	58	116	141	174	232	290	580	870
	1-1/2	13	26	39	64	128	155	193	258	320	640	960
	2	14	28	42	70	140	168	210	280	350	700	1050
	2-1/2	16	32	47	78	156	188	235	315	390	780	1170
	3	18	36	55	92	184	220	275	365	460	920	1380
6	3-1/2	22	44	66	111	222	266	333	444	555	1110	1665
	—	8	16	24	41	82	98	123	162	202	404	606
	1-3/4	9	18	27	45	90	107	135	180	225	450	675
	2-1/2	10	20	30	50	100	118	150	200	250	500	750
	3	11	22	33	54	108	130	165	206	270	540	810
	3-1/2	12	24	37	62	124	148	185	245	310	620	930
8	4	15	30	44	73	146	176	220	295	365	730	1095
	—	4	8	14	23	46	55	69	92	115	230	345
	3-1/2	5-1/2	11	17	28	56	68	85	115	140	280	420
	4	6	12	18	30	60	73	90	122	150	300	450
	5	7-1/2	15	22	38	76	90	114	150	185	375	555
10	5-1/2	8-1/2	17	26	43	86	104	129	172	215	430	645
	—	3	6	9	15	30	35	44	60	73	146	220
	4-1/2	3-1/2	7	11	18	36	44	55	75	92	184	275
	5	4	8	12	20	40	47	60	80	100	200	300
	5-1/2	4-1/2	9	13	21	42	50	63	84	105	210	315
10	7	5-1/2	11	17	29	58	69	87	115	145	290	435

This chart is based on the formula

$$V = \frac{231 \times \text{GPM}}{\text{EFF. CYL. AREA (Sq. Inches)}}$$

# ELECTRIC MOTOR HORSEPOWER

Required to Drive a Hydraulic Pump

GPM	PUMP PRESSURE PSI										
	100	200	250	300	400	500	750	1000	1250	1500	2000
1/2	.04	.07	.09	.10	.14	.17	.26	.34	.43	.52	.69
1	.07	.14	.17	.21	.28	.34	.52	.69	.86	1.03	1.37
1 1/2	.10	.21	.26	.31	.41	.52	.77	1.03	1.29	1.54	2.06
2	.14	.28	.34	.41	.55	.69	1.03	1.37	1.72	2.06	2.75
2 1/2	.17	.34	.43	.52	.69	.86	1.29	1.72	2.15	2.58	3.43
3	.21	.41	.52	.62	.83	1.03	1.54	2.06	2.57	3.09	4.12
3 1/2	.24	.48	.60	.72	.96	1.20	1.80	2.40	3.00	3.60	4.81
4	.28	.55	.69	.82	1.10	1.37	2.06	2.75	3.43	4.12	5.49
5	.34	.69	.86	1.03	1.32	1.72	2.57	3.43	4.29	5.15	6.86
6	.41	.82	1.03	1.24	1.65	2.06	3.09	4.12	5.15	6.18	8.24
7	.48	.96	1.20	1.44	1.92	2.40	3.60	4.81	6.01	7.21	9.61
8	.55	1.10	1.37	1.65	2.20	2.75	4.12	5.49	6.86	8.24	11.0
9	.62	1.24	1.55	1.85	2.47	3.09	4.63	6.18	7.72	9.27	12.4
10	.69	1.37	1.62	2.06	2.75	3.43	5.15	6.86	8.58	10.3	13.8
11	.76	1.51	1.89	2.27	3.02	3.78	5.66	7.55	9.44	11.3	15.1
12	.83	1.65	2.06	2.47	3.30	4.12	6.18	8.24	10.3	12.4	16.5
13	.89	1.79	2.23	2.68	3.57	4.46	6.69	8.92	11.2	13.4	17.8
14	.96	1.92	2.40	2.88	3.84	4.81	7.21	9.61	12.0	14.4	19.2
15	1.03	2.06	2.57	3.09	4.12	5.15	7.72	10.3	12.9	15.4	20.6
16	1.10	2.20	2.75	3.30	4.39	5.49	8.24	11.0	13.7	16.5	22.0
17	1.17	2.33	2.92	3.50	4.68	5.83	8.75	11.7	14.6	17.5	23.3
18	1.24	2.47	3.09	3.71	4.94	6.18	9.27	12.4	15.4	18.5	24.7
19	1.30	2.61	3.26	3.91	5.22	6.52	9.78	13.0	16.3	19.6	26.1
20	1.37	2.75	3.43	4.12	5.49	6.86	10.3	13.7	17.2	21.6	27.5
25	1.72	3.43	4.29	5.15	6.86	8.58	12.9	17.2	21.5	25.8	34.3
30	2.06	4.12	5.15	6.18	8.24	10.3	15.4	20.6	25.7	30.9	41.2
35	2.40	4.81	6.01	7.21	9.61	12.0	18.0	24.0	30.0	36.0	48.0
40	2.75	5.49	6.86	8.24	11.0	13.7	20.6	27.5	34.3	41.2	54.9
45	3.09	6.18	7.72	9.27	12.4	15.4	23.2	31.0	38.6	46.3	61.8
50	3.43	6.86	8.58	10.3	13.7	17.2	25.7	34.3	42.9	51.5	68.6
55	3.78	7.55	9.44	11.3	15.1	18.9	28.3	37.8	47.2	56.6	75.5
60	4.12	8.24	10.3	12.4	16.5	20.6	30.9	41.2	51.5	61.8	83.4
65	4.46	8.92	11.2	13.4	17.8	22.3	33.5	44.6	55.8	66.9	89.2
70	4.81	9.61	12.0	14.4	19.2	24.0	36.0	48.0	60.1	72.1	96.1
75	5.15	10.3	12.9	15.4	20.6	25.7	38.6	51.4	64.3	77.2	103.0
80	5.49	11.0	13.7	16.5	22.0	27.5	41.2	54.9	68.6	82.4	109.8
90	6.18	12.4	15.4	18.5	24.7	30.9	46.3	61.8	77.2	92.7	123.6
100	6.86	13.7	17.2	20.6	27.5	34.4	51.5	68.6	85.8	103.0	137.3

This chart is based on the formula

$$HP = \frac{GPM \times PSI}{1714 \times \text{EFFICIENCY}}$$

For the purposes of this chart, pump efficiency was assumed to be 85%.

As horsepower varies directly with flow or pressure, multiply proportionately to determine values not shown. For instance, at 4000 PSI multiply 2000 PSI values by 2.



# FLUID POWER FORMULAS

<b>BASIC FORMULAS</b>		
FORMULA FOR:	WORD FORMULA	LETTER FORMULA
<b>FLUID PRESSURE</b> In Pounds/Square Inch	PRESSURE = $\frac{\text{FORCE (pounds)}}{\text{UNIT AREA (Square Inches)}}$	$P = \frac{F}{A}$ or $\text{psi} = \frac{F}{A}$
<b>FLUID FLOW RATE</b> In Gallons/Minute	FLOW RATE = $\frac{\text{VOLUME (Gallons)}}{\text{UNIT TIME (Minutes)}}$	$Q = \frac{V}{T}$
<b>FLUID POWER</b> In Horsepower	HORSEPOWER = $\frac{\text{PRESSURE (PSI)} \times \text{FLOW (GPM)}}{1714}$	$HP = \frac{PQ}{1714}$
<b>FLUID FORMULAS</b>		
<b>VELOCITY THROUGH PIPING</b> In Feet/Second Velocity	VELOCITY = $\frac{.3208 \times \text{FLOW RATE THROUGH I.D. (GPM)}}{\text{INTERNAL AREA (Square Inches)}}$	$V = \frac{.3208Q}{A}$
<b>COMPRESSIBILITY OF OIL</b> In Additional Required Oil To Reach Pressure	ADDITIONAL VOLUME = $\frac{\text{PRESSURE (PSI)} \times \text{VOLUME OF OIL UNDER PRESSURE}}{250,000 \text{ (Approx.)}}$	$VA = \frac{PV^*}{250,000}$ * Approximately 1/2% per 1000 psi
<b>COMPRESSIBILITY OF A FLUID</b>	COMPRESSIBILITY = $\frac{1}{\text{BULK MODULUS OF THE FLUID}}$	$C(\beta) = \frac{1}{BM}$
<b>SPECIFIC GRAVITY OF A FLUID</b>	SPECIFIC GRAVITY = $\frac{\text{WEIGHT OF ONE CUBIC FOOT OF FLUID}}{\text{WEIGHT OF ONE CUBIC FOOT OF WATER}}$	$SG = \frac{W}{62.4283}$
<b>VALVE (CV) FLOW FACTOR</b>	VALVE FACTOR (CV) = $\frac{\text{FLOW RATE (GPM)} \times \sqrt{\text{SPECIFIC GRAVITY}}}{\text{PRESSURE DROP (PSI)}}$	$CV = \frac{Q \sqrt{SG}}{P \Delta}$
<b>VISCOSITY IN CENTISTOKES</b>	For Viscosities of 32 to 100 Saybolt Universal Seconds: CENTISTOKES = $.2253 \times \text{SUS} - \frac{194.4}{\text{SUS}}$	$CS = .2253 \text{ SUS} - \frac{194.4}{\text{SUS}}$
<b>VISCOSITY IN CENTISTOKES</b>	For Viscosities of 100 to 240 Saybolt Universal Seconds: CENTISTOKES = $.2193 \times \text{SUS} - \frac{134.6}{\text{SUS}}$	$CS = .2193 \text{ SUS} - \frac{134.6}{\text{SUS}}$
<b>VISCOSITY IN CENTISTOKES</b>	For Viscosities Greater Than 240 Saybolt Universal Seconds: CENTISTOKES = $\frac{\text{SUS}}{4.635}$	$CS = \frac{\text{SUS}}{4.635}$

**NOTE:** Saybolt Universal Seconds is often abbreviated SSU.

<b>PUMP FORMULAS</b>		
<b>PUMP OUTLET FLOW</b> In Gallons/Minute	FLOW = $\frac{\text{RPM} \times \text{PUMP DISPLACEMENT (Cu. In./Rev.)}}{231}$	$Q = \frac{nd}{231}$
<b>PUMP INPUT POWER</b> In Horsepower Required	HORSEPOWER INPUT = $\frac{\text{FLOW RATE OUTPUT (GPM)} \times \text{PRESSURE (psi)}}{1714 \times \text{EFFICIENCY (Overall)}}$	$HP_{IN} = \frac{QP}{1714 \text{ Eff}}$ or $\frac{\text{GPM} \times \text{psi}}{1714 \text{ Eff}}$
<b>PUMP EFFICIENCY</b> Overall in Percent	OVERALL EFFICIENCY = $\frac{\text{OUTPUT HORSEPOWER}}{\text{INPUT HORSEPOWER}} \times 100$	$E_{f-ov} = \frac{HP_{OUT}}{HP_{IN}} \times 100$
	OVERALL EFFICIENCY = $\text{VOLUMETRIC Eff.} \times \text{MECHANICAL Eff.}$	$E_{f-ov} = \text{Eff}_{VOL.} \times \text{Eff}_{MECH.}$
<b>PUMP EFFICIENCY</b> Overall in Percent	VOLUMETRIC EFFICIENCY = $\frac{\text{ACTUAL FLOW RATE OUTPUT (GPM)}}{\text{THEORETICAL FLOW RATE OUTPUT (GPM)}} \times 100$	$E_{f-vol} = \frac{O_{ACT}}{O_{THEO.}} \times 100$
<b>PUMP EFFICIENCY</b> Mechanical in Percent	MECHANICAL EFFICIENCY = $\frac{\text{THEORETICAL TORQUE TO DRIVE}}{\text{ACTUAL TORQUE TO DRIVE}} \times 100$	$E_{f-mec} = \frac{T_{THEO.}}{T_{ACT.}} \times 100$
<b>PUMP LIFE</b> B <sub>10</sub> BEARING LIFE	B <sub>10</sub> HOURS OF BEARING LIFE = $\text{RATED LIFE HOURS} \times \frac{\text{RATED SPEED (RPM)}}{\text{NEW SPEED (RPM)}} \times \left( \frac{\text{RATED PRESSURE (PSI)}}{\text{NEW PRESSURE (PSI)}} \right)^3$	$B_{10} = \text{RATED HRS.} \times \frac{\text{RPM}_R}{\text{RPM}_N} \times \left( \frac{P}{PN} \right)^3$

# FLUID POWER FORMULAS

ACTUATOR FORMULAS		
FORMULA FOR:	WORD FORMULA	LETTER FORMULA
<b>CYLINDER AREA</b> In Square Inches	AREA = $\pi \times \text{RADIUS}^2$ (Inches)	A = $\pi r^2$
	= $\frac{\pi \times \text{DIAMETER}^2}{4}$ (Inches)	A = $\frac{\pi D^2}{4}$ or A = $.785D^2$
<b>CYLINDER FORCE</b> In Pounds, Push or Pull	FORCE = PRESSURE (psi) X NET AREA (Square Inches)	F = psi X A or F = PA
<b>CYLINDER VELOCITY or SPEED</b> In Feet/Second	VELOCITY = $\frac{231 \times \text{FLOW RATE (GPM)}}{12 \times 60 \times \text{NET AREA (Square Inches)}}$	F = $\frac{231Q}{720A}$ or V = $\frac{.3208Q}{A}$
<b>CYLINDER VOLUME CAPACITY</b> In Gallons of Fluid	VELOCITY = $\frac{\pi \times \text{RADIUS}^2 \text{ (Inches)} \times \text{STROKE (Inches)}}{231}$	V = $\frac{\pi r^2 l}{231}$
	= $\frac{\text{NET AREA (Square Inches)} \times \text{STROKE (Inches)}}{231}$	V = $\frac{A l}{231}$ l = Length of Stroke
<b>CYLINDER FLOW RATE</b> In Gallons Per Minute	FLOW RATE = $\frac{12 \times 60 \times \text{VELOCITY (Feet/Sec.)} \times \text{NET AREA (Sq. Inches)}}{231}$	Q = $\frac{720vA}{231}$ or Q = $3.117vA$
<b>FLUID MOTOR TORQUE</b> In Inch Pounds	TORQUE = $\frac{\text{PRESSURE (psi)} \times \text{F.M. DISPLACEMENT (Cu. In./Rev.)}}{2\pi}$	T = $\frac{\text{psi } d}{2\pi}$ or T = $\frac{Pd}{2\pi}$
	= $\frac{\text{HORSEPOWER} \times 63025}{\text{RPM}}$	T = $\frac{63025 \text{ HP}}{n}$
	= $\frac{\text{FLOW RATE (GPM)} \times \text{PRESSURE (psi)} \times 36.77}{\text{RPM}}$	T = $\frac{36.77QP}{n}$ or T = $\frac{36.77Q\text{psi}}{n}$
<b>FLUID MOTOR TORQUE/100 psi</b> In Inch Pounds	TORQUE/100 psi = $\frac{\text{F.M. DISPLACEMENT (Cu. Inches/Revolution)}}{.0628}$	T <sub>100psi</sub> = $\frac{d}{.0628}$
<b>FLUID MOTOR SPEED</b> In Revolutions/Minute	SPEED = $\frac{231 \times \text{FLOW RATE (GPM)}}{\text{F.M. DISPLACEMENT (Cu. Inches/Revolution)}}$	n = $\frac{231Q}{d}$
<b>FLUID MOTOR POWER</b> In Horsepower Output	HORSEPOWER = $\frac{\text{TORQUE OUTPUT (Inch Pounds)} \times \text{RPM}}{63025}$	HP = $\frac{Tn}{63025}$
THERMAL FORMULAS <span style="float: right;">Δ</span>		
<b>RESERVOIR COOLING CAPACITY</b> Based on Adequate Air Circulation	HEAT (BTU/HR) = $2 \times \text{TEMPERATURE DIFFERENCE BETWEEN RESERVOIR WALLS AND AIR (°F)} \times \text{AREA OF RESERVOIR (Sq. Ft.)}$	BTU/HR = $2.0 \times T \times A \times \Delta$
<b>HEAT IN HYDRAULIC OIL (approx.)</b> Due to System Inefficiency (SG=.89-.92)	HEAT (BTU/HR) = FLOW RATE (GPM) X 210 X TEMPERATURE DIFFERENCE (°F)	BTU/HR = $Q \times 210 \times T \times \Delta$
<b>HEAT IN FRESH WATER (approx.)</b>	HEAT (BTU/HR) = FLOW RATE (GPM) X 500 X TEMPERATURE DIFFERENCE (°F)	BTU/HR = $Q \times 500 \times T$
<b>NOTE:</b> One British Thermal Unit (BTU) is the amount of heat required to raise the temperature of one pound of water one degree. One Horsepower = 2545 BTU/HR.		

## VOLUME & CAPACITY EQUIVALENTS

	Cubic Inches	Cubic Feet	Cubic Yards	Liters	U.S. Gallons	Imperial Gallons	Water at Max. Density 39.2°F 4°C	
							Pounds of Water	Kilograms of Water
Cu Inches	1	.0005787	.00002143	.016384	.004329	.0036065	.0361275	.0163872
Cu Feet	1728	1	.037037	28.317	7.48052	6.23210	62.4283	28.3170
Cu Yards	46,656	27	1	764.56	201.974	168.266	1685.56	764.559
Liters	61.0234	.0353145	.001308	1	.264170	.220083	2.20462	1
U.S. Gallons	231	.133681	.004951	3.78543	1	.833111	8.34545	3.78543
Imp. Gallons	277.274	.160459	.0059429	4.54374	1.20032	1	10.0172	4.54373
Lbs Water	27.6798	.0160184	.0005929	.453592	.119825	.0998281	1	.453593

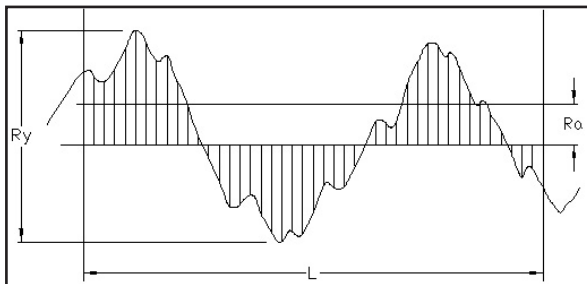
## TECH TIP - SURFACE FINISH

The surface finish has a critical influence on excellent sealing performance, low friction and long seal life. A finish that is either too rough or very smooth will cause a negative result. The surface microstructures allow pockets of fluid in very small volumes to pass under the seal with each cycle. This lubricating fluid lowers friction and extends seal life. Seal interface lubrication is reduced with a very fine surface finish and the seal will suffer increased friction and wear. In the case of rod sealing, a rougher finish may result in leakage if the fluid passes under the seal, is removed from the rod and not returned back into the cylinder. The wear rate is a major factor in the life of a dynamic application, and depends on the quality of the rod and the cylinder bore surface finish.

### DEFINITIONS

The most frequently specified parameters in the fluid power industry are Ra, Ry, Rt, Rz, Rq, and Rsk which are defined in ISO 4287 and ISO 4288.

Ra is defined as the arithmetical mean deviation of the assessed profile. The inch equivalent parameter is CLA (centre line average). A surface finish of  $0.4 \mu\text{m}$  Ra is equivalent to  $16 \mu\text{in}$  CLA. The “checkmark” symbol used on drawings to specify a surface texture control requirement is an Ra specification.



Ry (also Rmax) is the maximum roughness height in one cutoff length (L) of the profile.

Rt is the maximum roughness height in five cutoff lengths of the roughness profile.

Rz is the average of the five greatest peak-to-valley separations crossing the mean line in a single cutoff length.

Rq is the root mean square deviation of the assessed profile. The equivalent term in inches is RMS (Root Mean Square). The Rq (RMS) of a surface is approximately 10% greater than the Ra (CLA) value.

Rsk is the assessed profile skewness or the measure of symmetry about the mean. A negative Rsk indicates greater valleys than peaks and imparts a better seal mating surface.

### RECOMMENDATIONS

A single parameter rating is not sufficient in assessing the surface irregularities. Several parameters should be specified to accurately evaluate the surface depth, shape and orientation and their affect on sealing performance, friction and wear.

Reciprocating Cylinder Rod  
Hydraulic and Low Pressure Pneumatic

Ra = 4 to  $12 \mu\text{in}$  [ $0.1$  to  $0.3 \mu\text{m}$ ]  
Rz  $50 \mu\text{in}$  [ $1.3 \mu\text{m}$ ]  
Rsk =  $-1.0$  to  $-4.0$

Reciprocating Cylinder Bore and Slow Rotary Rod  
Hydraulic and Low Pressure Pneumatic

Ra = 4 to  $20 \mu\text{in}$  [ $0.1$  to  $0.5 \mu\text{m}$ ]  
Rz  $80 \mu\text{in}$  [ $2.0 \mu\text{m}$ ]  
Rsk =  $-1.0$  to  $-4.0$

### SURFACE FINISHING

The surface roughness is dependent on the machining process employed. Scores, scratches, voids, concentric or linear machining marks are not permitted. Common production methods result in a metal surface finish of between  $1 \mu\text{in}$  to  $140 \mu\text{in}$  [ $0.02 \mu\text{m}$  to  $3.5 \mu\text{m}$ ] Ra roughness as shown in the table below.

### PROCESS ROUGHNESS Ra ( $\mu\text{in}$ [ $\mu\text{m}$ ])

Turning	40 - 140 [ $1.0 - 3.5$ ]
Boring	24 - 95 [ $0.6 - 2.4$ ]
Broaching	16 - 63 [ $0.4 - 1.6$ ]
Precision Rolling	8 - 48 [ $0.2 - 1.2$ ]
Grinding	8 - 40 [ $0.2 - 1.0$ ]
Smooth	3 - 12 [ $0.08 - 0.3$ ]
Super Fine	0.5 - 3 [ $0.012 - 0.08$ ]
Polished	0.5 - 3 [ $0.012 - 0.08$ ]

# FRONT MOUNT DUMP BODY

## Stroke & Lifting Calculations Mounting

NOTE: This guide is for use to determine approximate stroke and lifting requirements for a front mount dump body. Final dimensions should be determined by an engineering drawing.

### Formula for Calculating Initial Required Cylinder Force to Lift a Load

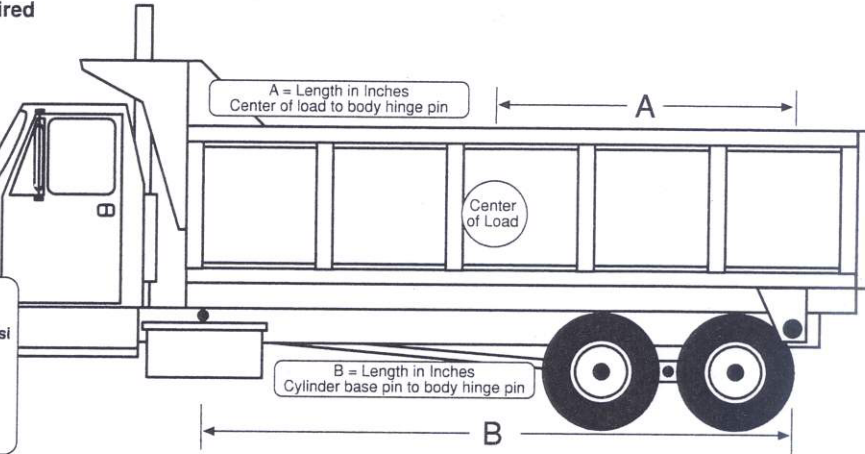
$$\frac{\text{Load (lbs)} \times \text{"A"}}{\text{"B"}} = \text{Initial required cylinder force}$$

**Example**

$$\frac{50,000\# \times 85"}{166"} = 25,603\# \text{ of force to start the lift}$$

Note: For a good design, initial pressure should not exceed 800 psi at start of lift

Stage O.D. in inches	System operating pressure			
	800 psi	1000 psi	1500 psi	2000 psi
2.75"	4752	5940	8909	11879
3.75"	8836	11045	16567	22089
4.75"	14176	17721	26581	35441
5.75"	20774	25967	38951	51935
6.75"	28628	35785	53677	71570
7.90"	39213	49017	73525	98034
9.37"	55165	68956	103434	137911



### Formula for Calculating the Required Cylinder Stroke for a Dump Angle

$$\text{"B"} \times \text{"D"} = \text{Approximate Stroke}$$

**Example**

$$166" (\text{B}) \times .845 (\text{D}) = 140" \text{ Stroke}$$

"D" = Dump Angle	Dump Angle
.715	42 deg
.733	43 deg
.750	44 deg
.765	45 deg
.780	46 deg
.797	47 deg
.813	48 deg
.830	49 deg
.845	50 deg
.861	51 deg
.877	52 deg
.892	53 deg
.903	54 deg
.923	55 deg
.939	56 deg
.954	57 deg

Normal minimum dump angle is 45 degrees  
Normal maximum dump angle is 57 degrees

