

Fittings and Tubing

Low Pressure

Pressures to 15,000 psi (1034 bar)

Since 1945 Autoclave Engineers has designed and built premium quality valves, fittings and tubing. This commitment to engineering and manufacturing excellence has earned Autoclave a reputation for reliable, efficient product performance. Autoclave Engineers has long been established as the world leader in high pressure fluid handling components for the chemical/petrochemical, research, and oil and gas industries.

Low Pressure Fittings and Tubing Features:

- Single-ferrule compression sleeve.
- Fast easy make-up of connection.
- Available sizes are 1/16", 1/8", 1/4", 3/8", & 1/2".
- Fittings manufactured from cold worked 316 stainless steel.
- Tubing is manufactured from annealed stainless steel.
- All items available in special materials.
- Operating temperatures from 0°F (-17.8°C) to 650°F (343°C).
- Molybdenum disulfide-coated gland nuts to prevent galling.

The Low Pressure Series uses Autoclave's SpeedBite connection. This single-ferrule compression sleeve connection delivers fast, easy make-up and reliable bubble-tight performance, in liquid or gas service.



Fittings and Tubing - Low Pressure Fittings

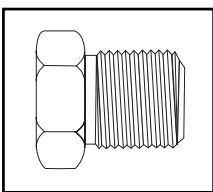
Pressures to 15,000 psi (1034 bar)

Autoclave Engineers Low Pressure Fittings are designed for use with low pressure valves and tubing. These fittings feature improved SpeedBite compression connections with larger orifices for excellent flow capabilities. Autoclave fittings and components are manufactured of cold-worked type 316 stainless steel. Optional materials are available upon request.

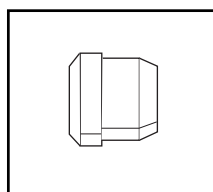


Connection Components

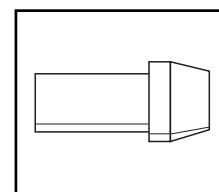
All valves and fittings are supplied complete with appropriate glands and compression sleeves. To order these components separately, use order numbers listed. When using plug, sleeve is not required.



Gland
SMN ()



Sleeve
SSL ()



Plug
SP ()

Add tube size ()

- 1/8" - 20
- 1/4" - 40
- 3/8" - 60
- 1/2" - 80

Example:

1/4" Gland - SMN 40

Note: Special material glands may be supplied with four flats in place of standard hex.

† When ordering glands separately for 10V Series 1/4" and 3/8" valves, substitute 10N for SMN.

1/16" tubing system components are available in the mini-fitting series. 1/16" tubing components can be used in 10V Series valves and fittings if required. Consult factory for information on 1/16" tubing assembly in 1/8" tubing components.

To ensure proper fit use Autoclave Engineers tubing. For mounting hole option add suffix PM to catalog number. Consult factory for mounting hole dimensions.

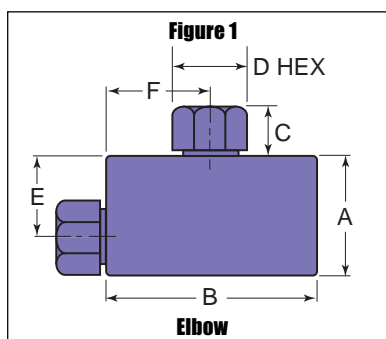
Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F	G Thickness		

Elbow

SL2200	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	1.00 (25.40)	1.50 (38.10)	0.31 (7.87)	0.50 (12.70)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Figure 1
SL4400	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	1.38 (35.05)	2.00 (50.80)	0.44 (11.18)	0.63 (15.88)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SL6600	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	1.38 (35.05)	2.00 (50.80)	0.53 (13.46)	0.75 (19.05)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SL8800	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.75 (44.45)	2.50 (63.50)	0.53 (13.46)	0.93 (23.62)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	

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Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F	G Thickness		

Tee

ST2220	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	1.00 (25.40)	1.50 (38.10)	0.31 (7.87)	0.50 (12.70)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Figure 2
ST4440	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	1.38 (35.05)	2.00 (50.80)	0.44 (11.18)	0.63 (15.88)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
ST6660	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	1.38 (35.05)	2.00 (50.80)	0.53 (13.46)	0.75 (19.05)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
ST8880	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.75 (44.45)	2.50 (63.50)	0.53 (13.46)	0.93 (23.62)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	

Cross

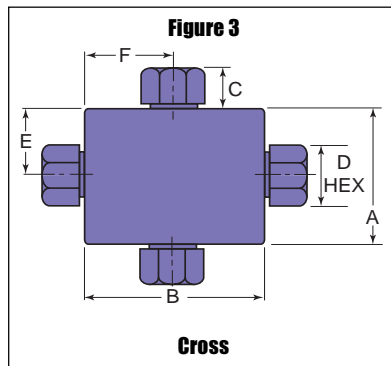
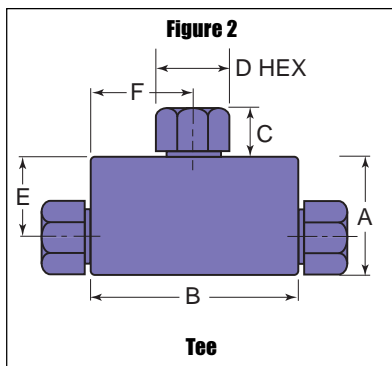
SX2222	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	1.50 (38.10)	1.50 (38.10)	0.31 (7.87)	0.50 (12.70)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Figure 3
SX4444	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	2.00 (50.80)	2.00 (50.80)	0.44 (11.18)	0.63 (15.88)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SX6666	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	2.00 (50.80)	2.00 (50.80)	0.53 (13.46)	0.75 (19.05)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SX8888	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	2.50 (63.50)	2.50 (63.50)	0.53 (13.46)	0.93 (23.62)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	

Straight Coupling

15F2211	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	0.50 (12.70)	1.25 (31.75)	0.31 (7.87)	0.50 (12.70)					See Figure 4
6F4422	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	0.62 (15.75)	1.62 (41.15)	0.44 (11.18)	0.63 (15.88)					
6F6622	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	0.75 (19.05)	1.75 (44.45)	0.53 (13.46)	0.75 (19.05)					
4F8822	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.00 (25.40)	2.00 (50.80)	0.53 (13.46)	0.93 (23.62)					

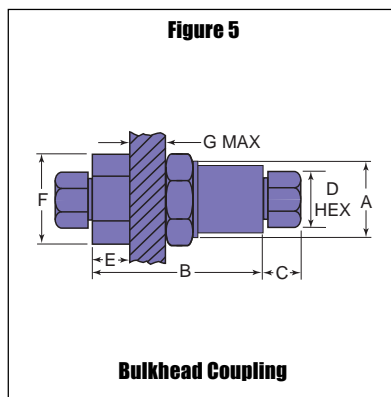
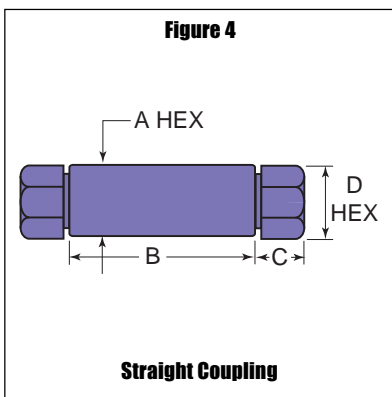
Bulkhead Coupling

15BF2211	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	0.690 (17.53)	1.75 (44.45)	0.31 (7.87)	0.50 (12.70)	0.38 (9.65)	0.75 (19.05)	0.38 (9.65)		See Figure 5
6BF4422	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	0.940 (23.88)	1.88 (47.75)	0.44 (11.18)	0.63 (15.88)	0.50 (12.70)	1.00 (25.40)	0.38 (9.65)		
6BF6622	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	0.940 (23.88)	1.88 (47.75)	0.53 (13.46)	0.75 (19.05)	0.50 (12.70)	1.00 (25.40)	0.38 (9.65)		
4BF8822	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.120 (28.45)	2.38 (60.45)	0.53 (13.46)	0.93 (23.62)	0.78 (19.81)	1.38 (35.05)	0.38 (9.65)		



*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

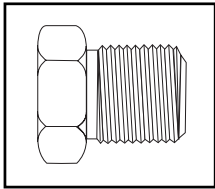
All dimensions for reference only and subject to change.
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Fittings and Tubing - Mini Series Fittings

Pressure to 15,000 psi (1034 bar)

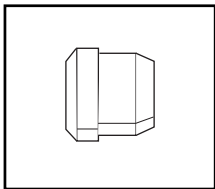
All Autoclave Engineers valves and fittings are supplied complete with appropriate glands and compression sleeves. To order these components separately, use order numbers listed. When using plug, sleeve is not required.



Gland
SMN ()

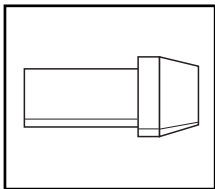
Add gland size () Example: SMN - 10-38
 1/16" - 10-38
 1/16" - 10-10mm
 1/8" - 20-38
 1/8" - 20-10mm

Note: Gland sizes differ as follows:
 38 is 3/8 hex
 10 mm is 10 millimeter hex



Sleeve
SSL ()

Add tube size for sleeve and plug () Example: 1/8" Sleeve SSL20
 1/16" - 10
 1/8" - 20



Plug
SP ()

Note: Special material glands may be supplied with four flats in place of standard hex.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			

Elbow

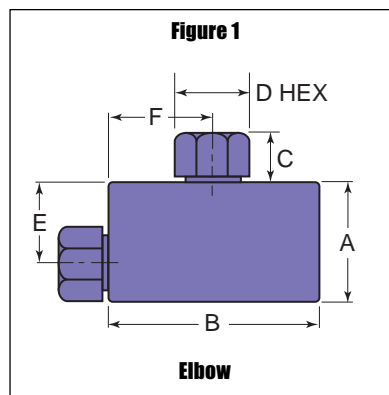
3/8 inch hex glands													See Figure 1
MLE1100	W062	1/16	15,000	0.055	1.00	1.00	0.31	0.38	0.69	0.69		0.56	
		(1.59)	(1034.20)	(1.40)	(25.40)	(25.40)	(7.87)	(9.65)	(17.45)	(17.45)		(14.27)	
MLE2200	W125	1/8	15,000	0.093	1.00	1.00	0.31	0.38	0.69	0.69		0.56	
		(3.18)	(1034.20)	(2.36)	(25.40)	(25.40)	(7.87)	(9.65)	(17.45)	(17.45)		(14.27)	
10 millimeter hex glands													See Figure 1
ML1100	W062	1/16	15,000	0.055	1.00	1.00	0.31	0.39	0.69	0.69		0.56	
		(1.59)	(1034.20)	(1.40)	(25.40)	(25.40)	(7.87)	(10.00)	(17.45)	(17.45)		(14.27)	
ML2200	W125	1/8	15,000	0.093	1.00	1.00	0.31	0.39	0.69	0.69		0.56	
		(3.18)	(1034.20)	(2.36)	(25.40)	(25.40)	(7.87)	(10.00)	(17.45)	(17.45)		(14.27)	

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Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			

Tee

3/8 inch hex glands												
MTE1110	W062	1/16	15,000	0.055	1.00	1.38	0.31	0.38	0.69	0.69		0.56
		(1.59)	(1034.20)	(1.40)	(25.40)	(34.93)	(7.87)	(9.65)	(17.45)	(17.45)		(14.27)
MTE2220	W125	1/8	15,000	0.093	1.00	1.38	0.31	0.38	0.69	0.69		0.56
		(3.18)	(1034.20)	(2.36)	(25.40)	(34.93)	(7.87)	(9.65)	(17.45)	(17.45)		(14.27)
10 millimeter hex glands												
MT1110	W062	1/16	15,000	0.055	1.00	1.38	0.31	0.39	0.69	0.69		0.56
		(1.59)	(1034.20)	(1.40)	(25.40)	(34.93)	(7.87)	(10.00)	(17.45)	(17.45)		(14.27)
MT2220	W125	1/8	15,000	0.093	1.00	1.38	0.31	0.39	0.69	0.69		0.56
		(3.18)	(1034.20)	(2.36)	(25.40)	(34.93)	(7.87)	(10.00)	(17.45)	(17.45)		(14.27)

See Figure 2

Cross

3/8 inch hex glands												
MXE1111	W062	1/16	15,000	0.055	1.38	1.38	0.31	0.38	0.69	0.69		0.56
		(1.59)	(1034.20)	(1.40)	(34.93)	(34.93)	(7.87)	(9.65)	(17.45)	(17.45)		(14.27)
MXE2222	W125	1/8	15,000	0.093	1.38	1.38	0.31	0.38	0.69	0.69		0.56
		(3.18)	(1034.20)	(2.36)	(34.93)	(34.93)	(7.87)	(9.65)	(17.45)	(17.45)		(14.27)
10 millimeter hex glands												
MX1111	W062	1/16	15,000	0.055	1.38	1.38	0.31	0.39	0.69	0.69		0.56
		(1.59)	(1034.20)	(1.40)	(34.93)	(34.93)	(7.87)	(10.00)	(17.45)	(17.45)		(14.27)
MX2222	W125	1/8	15,000	0.093	1.38	1.38	0.31	0.39	0.69	0.69		0.56
		(3.18)	(1034.20)	(2.36)	(34.93)	(34.93)	(7.87)	(10.00)	(17.45)	(17.45)		(14.27)

See Figure 3

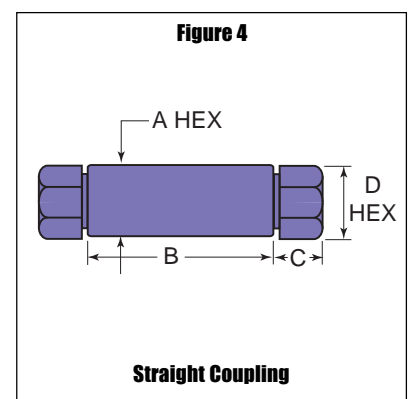
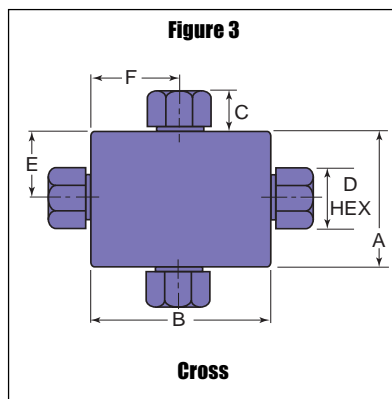
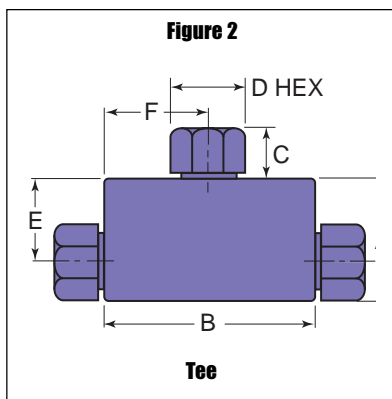
Straight Couplings

3/8 inch hex glands												
MCE1100	W062	1/16	15,000	0.055	0.63	1.38	0.31	0.38				
		(1.59)	(1034.20)	(1.40)	(15.88)	(34.93)	(7.87)	(9.65)				
MCE2200	W125	1/8	15,000	0.093	0.63	1.38	0.31	0.38				
		(3.18)	(1034.20)	(2.36)	(15.88)	(34.93)	(7.87)	(9.65)				
10 millimeter hex glands												
MC1100	W062	1/16	15,000	0.055	0.63	1.38	0.31	0.39				
		(1.59)	(1034.20)	(1.40)	(15.88)	(34.93)	(7.87)	(10.00)				
MC2200	W125	1/8	15,000	0.093	0.63	1.38	0.31	0.39				
		(3.18)	(1034.20)	(2.36)	(15.88)	(34.93)	(7.87)	(10.00)				

See Figure 4

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Pressures to 15,000 psi (1034 bar)



Autoclave Engineers offers a complete selection of annealed, seamless stainless steel tubing designed to match the performance standards of Autoclave low pressure valves and fittings. Autoclave low pressure tubing is furnished in random lengths between 20 feet (6 meters) and 27 feet (8.2 meters). The average is 24 feet (7.3 meters). The tubing is available in five sizes and a variety of materials. In order to ensure proper sleeve “bite” into tubing, Autoclave Engineers specifies and controls the strength levels of both the tube and sleeve materials.

Inspection and Testing

Autoclave Engineers low pressure tubing is inspected for compliance with specified defect restrictions as well as carburization or intergranular carbide precipitation. The tubing outside diameter and wall thickness is controlled within close tolerance to assure proper fit. Sample pieces of tube (for each lot) are tested to confirm mechanical properties for proper compression sleeve “bite” and pressure capability. Furthermore, the sample tubes are pressure tested as a final check.

Special Materials

In addition to the type 316 and 304 stainless steel tubing listed in this section, Autoclave has a limited stock of hard-to-obtain shorter lengths of the following tubing materials:

*Monel 400**, *Inconel 600**, *Titanium Grade 2**, *Nickel 200**, *Hastelloy C276** - (* Trademark names)

Please consult factory for stock availability.

Tubing Tolerance

Nominal Tubing Size inches (mm)	Tolerance/Outside Diameter inches (mm)
1/16 (1.59)	.064/.062 (1.62/1.57)
1/8 (3.18)	.128/.125 (3.25/3.18)
1/4 (6.35)	.254/.250 (6.45/6.35)
3/8 (9.53)	.379/.375 (9.74/9.53)
1/2 (12.70)	.505/.500 (12.83/12.70)

Catalog Number	Tube Materials	Fits Connection Type	Tube Size Inches (mm)			Flow Area in. ² (mm ²)	Working Pressure psi (bar)*						
			Outside Diameter	Inside Diameter	Wall Thickness		0 - 100°F -17.8 to -37.8°C	200°F 93°C	400°F 204°C	600°F 316°C	650°F 343°C		
MS15-070	316SS	W125	1/16 (1.59)	0.026 (0.66)	0.018 (0.46)	0.0005 (0.32)	15,000 (1034.20)	15,000 (1034.20)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)		
MS15-200	316SS	W125	1/8 (3.18)	0.052 (1.32)	0.050 (1.27)	0.002 (1.29)	15,000 (1034.20)	15,000 (1034.20)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)		
MS15-151	304SS			0.062 (1.57)	0.032 (0.81)	0.003 (1.94)	11,650 (803.23)	11,050 (751.85)	10,050 (692.91)	9,900 (682.57)	9,850 (679.12)		
MS15-051	316SS			0.062 (1.57)	0.032 (0.81)	0.003 (1.94)	11,650 (803.23)	11,650 (803.23)	11,250 (775.65)	10,600 (730.83)	9,850 (679.12)		
MS15-166	304SS			0.069 (1.75)	0.028 (0.71)	0.004 (2.58)	9,950 (686.02)	9,400 (648.10)	8,550 (589.49)	8,450 (582.60)	8,000 (551.57)		
MS15-150	304SS			0.085 (2.16)	0.020 (0.51)	0.006 (3.87)	6,850 (472.28)	6,500 (448.15)	5,900 (406.78)	5,800 (399.89)	5,500 (379.21)		
MS15-154	304SS			W250 or SW250	1/4 (6.35)	0.125 (3.18)	0.062 (1.57)	0.012 (7.74)	11,650 (803.23)	11,650 (761.86)	10,050 (692.91)	9,900 (682.57)	9,850 (679.12)
MS15-055	316SS	0.125 (3.18)	0.062 (1.57)			0.012 (7.74)	11,650 (803.23)	11,650 (761.86)	11,250 (775.65)	10,600 (730.83)	9,850 (679.12)		
MS15-161	304SS	0.180 (4.57)	0.035 (0.89)			0.026 (16.77)	5,450 (375.76)	5,150 (355.07)	4,700 (324.05)	4,600 (317.15)	4,400 (303.36)		
MS15-069	316SS	0.180 (4.57)	0.035 (0.89)			0.026 (16.77)	5,450 (375.76)	5,450 (375.76)	5,250 (361.97)	4,950 (341.29)	4,600 (317.15)		
MS15-158	304SS	0.194 (4.93)	0.028 (0.71)			0.029 (18.71)	4,600 (317.15)	4,350 (299.92)	3,950 (272.34)	3,900 (272.34)	3,700 (255.10)		
MS15-203	316SS	0.084 (2.13)	0.083 (2.11)			0.029 (18.71)	15,000 (1034.16)	15,000 (1034.16)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)		
MS15-206	304SS	0.084 (2.13)	0.083 (2.11)			0.029 (18.71)	15,000 (1034.16)	14,225 (980.76)	12,940 (892.17)	12,745 (877.82)	12,680 (874.24)		
MS15-084	316SS	W375 or SW375	3/8 (9.53)			0.195 (4.95)	0.090 (2.29)	0.030 (19.35)	10,000 (689.46)	10,000 (689.46)	9,650 (665.33)	9,000 (620.52)	8,400 (579.15)
MS15-184	304SS					0.195 (4.95)	0.090 (2.29)	0.030 (19.35)	10,000 (689.46)	10,000 (648.10)	8,600 (592.94)	8,500 (586.05)	8,450 (582.60)
MS15-155	304SS					0.250 (6.35)	0.062 (1.57)	0.049 (31.61)	7,500 (517.10)	7,100 (489.52)	6,450 (444.70)	6,350 (437.81)	6,050 (417.13)
MS15-062	316SS			0.250 (6.35)	0.062 (1.57)	0.049 (31.61)	7,500 (517.10)	7,500 (517.10)	7,200 (496.41)	6,800 (468.84)	6,300 (434.36)		

