



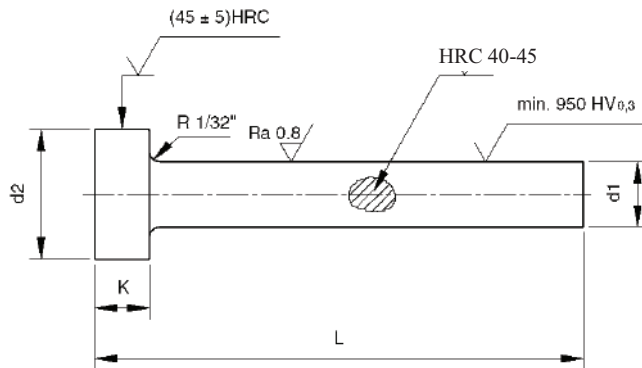
Straight Ejector Pins

MATERIAL: H-13 Hotwork Die Steel

STANDARD: American Imperial

HARDNESS: Surface: Nitrided to \geq HV 950° and Bright polished

Core: Hardened throughout to 40-45 HRC



d1 -.0003" -.0006"	d2 +.000" -.010"	K +.000" -.002"	R	L1 +.375"/-.000"														
				4"	6"	8"	10"	12"	14"	16"	20"	25"	36"					
3/64	1/4	1/8	1/32															
1/16																		
5/64																		
3/32																		
7/64																		
1/8																		
9/64	9/32	5/32																
5/32																		
11/64	11/32	3/16																
3/16	3/8																	
13/64																		
7/32	13/32																	
15/64																		
1/4	7/16	1/4																
17/64																		
9/32																		
19/64	1/2																	
5/16																		
21/64	9/16																	
11/32																		
23/64	5/8																	
3/8																		
13/32	11/16																	
7/16																		
15/32	3/4																	
1/2																		
9/16	13/16																	
5/8	7/8																	
11/16	15/16																	
3/4	1																	
7/8	1 1/8																	
1	1 1/4																	

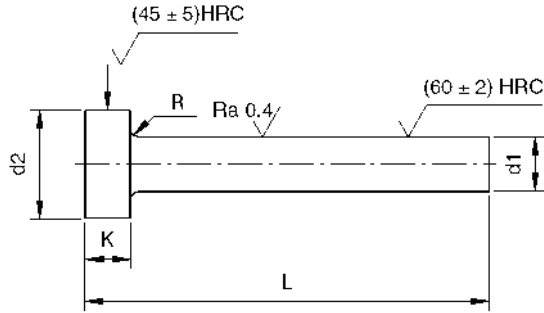


Straight Ejector Pins

MATERIAL: Through Hardened Steel

STANDARD: American Imperial

HARDNESS: Through hardened to 60 ± 2 HRC



d1 -.0003" -.0006"	d2 +.000" -.010"	K +.000" -.002"	R	L +.375"/-.000"																					
				4"	6"	8"	10"	12"	14"	16"	20"	25"	36"												
3/64	1/4	1/8	1/32																						
1/16																									
5/64																									
3/32																									
7/64																									
1/8																									
9/64	9/32	5/32																							
5/32																									
11/64	11/32	3/16																							
3/16	3/8																								
13/64																									
7/32	13/32																								
15/64																									
1/4	7/16			1/4																					
17/64																									
9/32		1/2																							
19/64																									
5/16	9/16																								
21/64																									
11/32	5/8																								
23/64																									
3/8	11/16																								
13/32																									
7/16	3/4																								
15/32																									
1/2	13/16																								
9/16																									
5/8	7/8																								
11/16																									
3/4	1																								
7/8																									
1	1 1/4																								



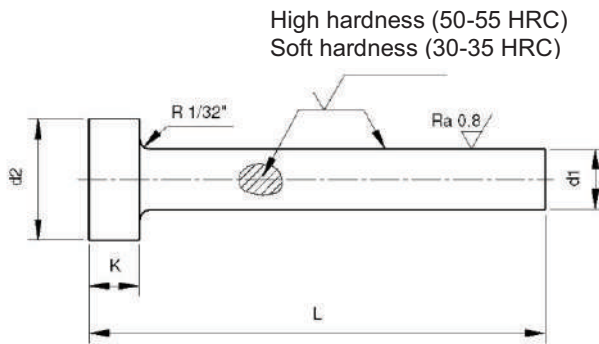
Core Pins

MATERIAL: H-13 Hotwork Die Steel

STANDARD: American Imperial

HARDNESS: high hardness at 50-55 HRC throughout hardened

Soft hardness at 30-35 HRC throughout hardened



d1 -0.0003" -0.0006"	d2 +0.000" -0.010"	K +0.000" -0.002"	R	L +.375"/-.000"					
				3"	4"	6"	8"	10"	
3/64	1/4	1/8	1/32						
1/16									
5/64									
3/32									
7/64									
1/8									
9/64	9/32	5/32							
5/32									
11/64	11/32	3/16							
3/16	3/8								
13/64									
7/32	13/32								
15/64									
1/4	7/16	1/4							
17/64									
9/32									
19/64	1/2								
5/16									
21/64	9/16								
11/32									
23/64	5/8								
3/8									
13/32	11/16								
7/16									
15/32	3/4								
1/2									
9/16	13/16								
5/8	7/8								
11/16	15/16								
3/4	1								
7/8	1 1/8								
1	1 1/4								



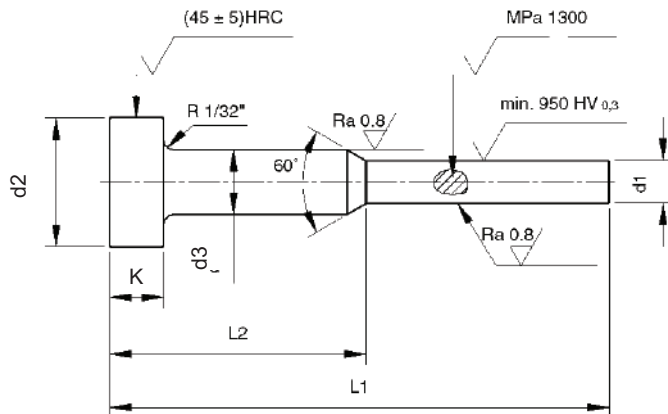
Stepped Ejector Pins

MATERIAL: H-13 Hotwork Die Steel

STANDARD: American Imperial

HARDNESS: Surface: Nitrided to $\geq 950^{\circ}$ HV

Core: Hardened throughout to 40-45 HRC



d1 -.000" -.001"	d3 +.000" -.001"	d2 +.000" -.001"	K +.000" -.002"	L1 +.375" / L2					
				4" / 1"	6" / 2"	8" / 2"	10" / 3"	12" / 3"	14" / 3"
1/32	1/8	1/4	1/8						
3/64									
1/16									
5/64									
3/32									
7/64									

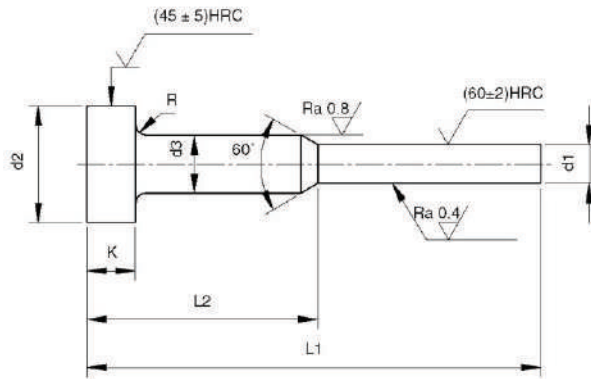


Stepped Ejector Pins

MATERIAL: Through Hardened Steel

STANDARD: American Imperial

HARDNESS: Throughout hardened to 60 ± 2 HRC



d1 -.000" -.001"	d3 +.000" -.001"	d2 +.000" -.001"	K +.000" -.002"	L1 +.375" / L2					
				4" / 1"	6" / 2"	8" / 2"	10" / 3"	12" / 3"	14" / 3"
1/32	1/8	1/4	1/8						
3/64									
1/16									
5/64									
3/32									
7/64									

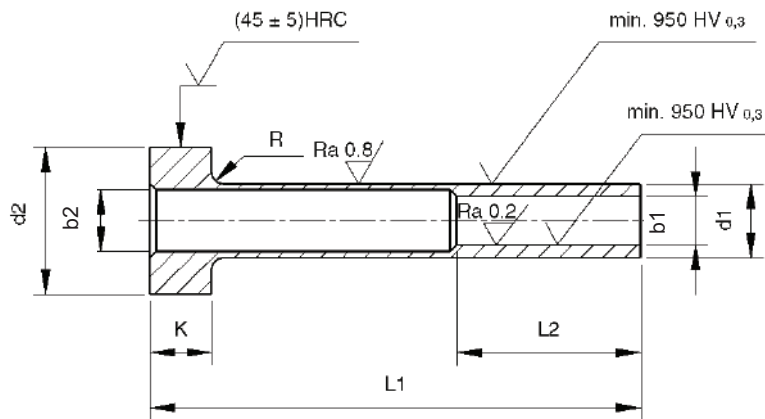


Ejector Sleeves

MATERIAL: H-13 Hotwork Die Steel

STANDARD: American Imperial

HARDNESS: I.D. & O.D. Nitrided to $\geq 950^\circ$ HV 0.3



d1 -.0003" -.0010"	b1 +.0005" -.0000"	d2 +.000" -.010"	K	b2	L2	R	L1 +.0125"/-.000"											
							4"	5"	6"	7"	8"	9"	10"	11"	12"			
3/16	3/32	3/8	3/16	b1+1/64	1+3/4	1/32												
7/32	1/8	13/32																
1/4	5/32	7/16																
5/16	3/16	1/2	1/4															
11/32	7/32	9/16																
3/8	1/4	5/8																
7/16	5/16	11/16																
1/2	3/8	3/4																
5/8	7/16	7/8																
11/16	1/2	15/16																
3/4	9/16	1																
7/8	5/8	1-1/8																
1	3/4	1-1/4																



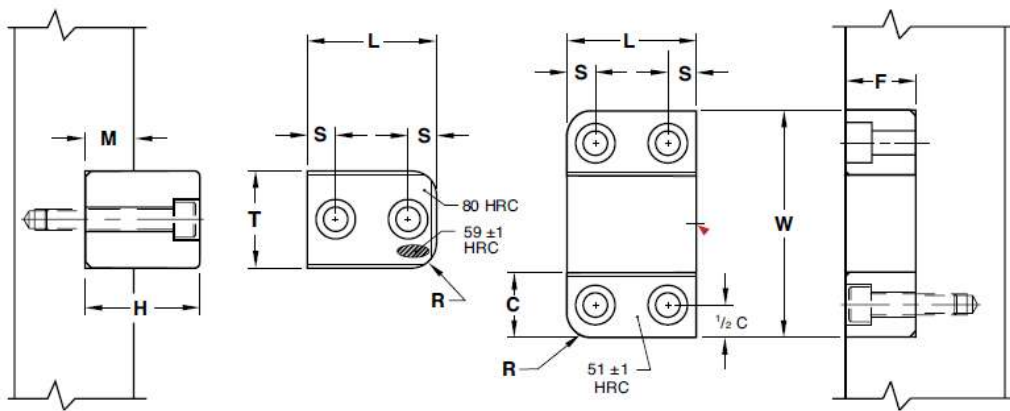
Guide Lock

MATERIAL: Male: A-2

Female: H-13

HARDNESS: 40-44 HRC (Male)

58-60 HRC (Female)



L	W	C	F	T	M	H	S	R	SHCS
+0.000 -0.010		+0.0000 -0.0003	+0.000 -0.005	+0.0000 -0.0003		+0.00 -0.01	+/-0.01	Pocket Radius	
1.000	1.500	.500	.500	.500	.375	.85	.25	.187	M: #10-32 x 1" F: #10-32 x 5/8"
1.500	2.500	.750	.750	1.000	.625	1.35	.31	.250	M: 1/4-20 x 1-1/2" F: 1/4-20 x 7/8"
2.000	3.500	1.000	1.000	1.500	.750	1.73	.44	.375	M: 3/8-16 x 2" F: 3/8-16 x 1-1/4"
2.500	4.500	1.250	1.250	2.000	.875	2.11	.56	.500	M: 1/2-13 x 2-1/4" F: 1/2-13 x 1-1/2"

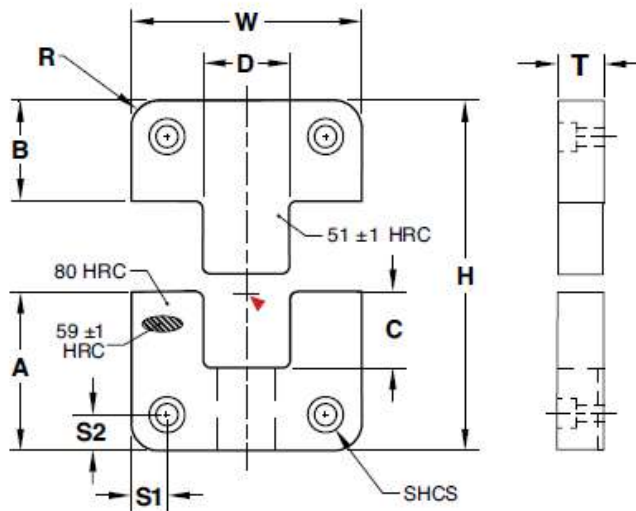


Side Lock

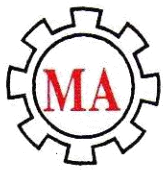
MATERIAL: Male: O-2

Female: A-2

HARDNESS: 58-62 HRC



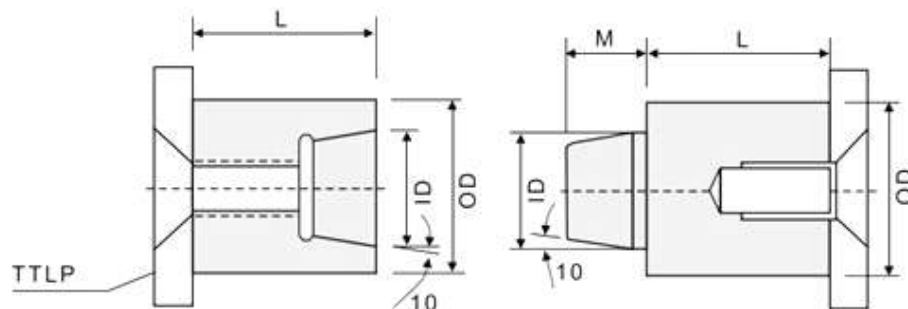
T	W	A	B	C	D	H	R	S1/S2	SHCS
+0.000 -0.002	+0.0000 -0.0004	+0.000 -0.002	+0.000 -0.002		.0001/.0002	+0.000 -0.004	Pocket Radius	+/-0.1	
.375	1.000	1.125	.875	.53	.500	2.000	.187	.250	#10-32x1/2"
.490	1.250	1.125	.875	.66	.500	2.000	.187	.250	#8-32x 5/8"
.500	1.500	.875	.875	.56	.563	1.750	.187	.250	#8-32x5/8"
.500	2.000	1.375	.875	.66	.750	2.250	.187	.312	#10-32x5/8"
.750	3.000	1.875	.875	1.13	1.250	2.750	.250	.375	1/4-20x3/4"
1.000	4.000	2.375	1.375	1.25	1.500	3.750	.500	.500	3/8-16x1"
1.250	5.000	2.875	1.375	1.63	2.000	4.250	.500	.625	1/2-13x1-1/4"
1.500	6.000	2.875	1.375	1.75	2.500	4.250	.500	.625	1/2-13x1-1/2"



Round Taper Locks

MATERIAL: AISI 52100

HARDNESS: 58-62 HRC



O.D +.0000 -.0003	I.D.	M	Tap Size	L +.004 +.008
1/2	.312	.250	#10-24	11/16
				7/8
				1-3/16
				1-3/8
3/4	.500	.281	1/4-20	11/16
				7/8
				1-3/16
				1-3/8
1	.625	.343	1/4-20	11/16
				7/8
				1-3/16
				1-3/8
1-1/2	1.000	.500	5/16-18	1-1/8
				1-3/8
				1-5/8
				1-1/8
				1-3/8
				1-5/8

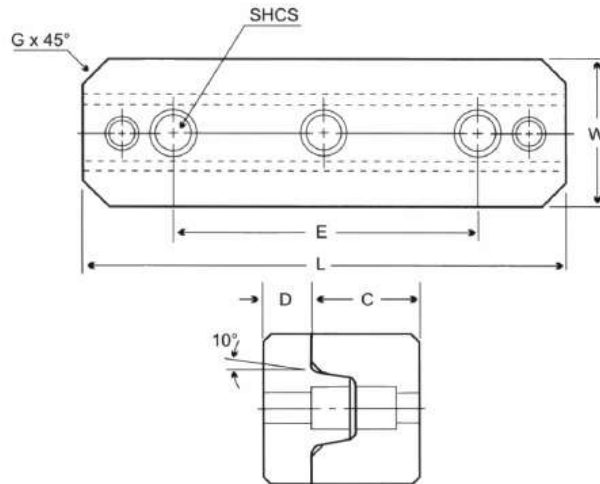


Inside Tapered Locks

MATERIAL: Male: O-2

Female: A-2

HARDNESS: 58-60 HRC



E	L	W	D	C	G	SHCS
+0.005 -0.005	+0.01 -0.01	+0.000 -0.001	+0.005 -0.005	+0.005 -0.005		
2.500	1.980	0.999	.312	.69	.20	3/16-24
2.500	3.980	1.249	.375	.87	.20	1/4-20
4.000	5.980	1.499	.500	1.00	.20	5/16-18



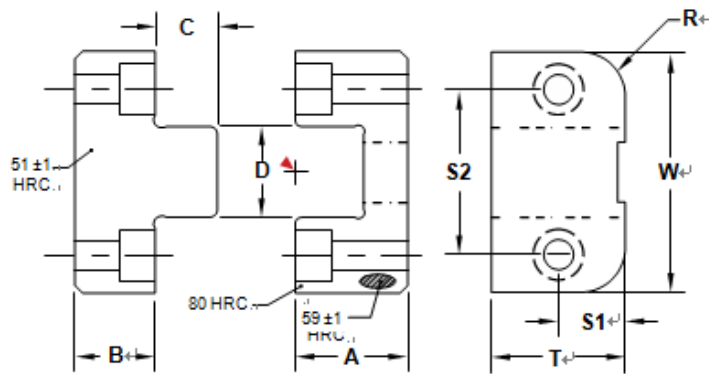
Top Lock

MATERIAL: Male: H-13

Female: A-2

HARDNESS: 40-44 HRC (Male)

58-62 HRC (Female)



T	W	A	B	C	D	S1	S2	R	SHCS
+0.000 -0.002	+0.0000 -0.0004	+0.000 -0.002	+0.000 -0.002	+/-0.1	.0001/.0002	+/-0.1	+/-0.1	Pocket Radius	
.625	1.250	.625	.500	.41	.438	.312	.875	.250	M: #6-32 x 5/8" F: #6-32 x 3/4"
.750	1.250	.625	.500	.38	.438	.375	.875	.250	M: #8-32 x 5/8" F: #8-32 x 3/4"
.875	1.500	.875	.750	.53	.500	.437	1.000	.250	M: #8-32 x 7/8" F: #8-32 x 1"
1.000	1.500	.875	.375	.50	.500	.500	1.000	.250	M: #10-32 x 1/2" F: #10-32 x 1"
1.000	2.000	1.125	.750	.66	.750	.500	1.375	.375	M: #10-32 x 1" F: #10-32 x 1-1/8"
1.125	2.000	.875	.625	.50	.750	.563	1.375	.375	M: 1/4-20 x 3/4" F: 1/4-20 x 1"
1.125	3.000	1.500	.750	.78	1.125	.562	2.250	.500	M: 1/4-20 x 7/8" F: 1/4-20 x 1-5/8"
1.500	2.500	1.375	.625	.75	1.000	.750	1.750	.375	M: 1/4-20 x 3/4" F: 1/4-20 x 1-1/2"
1.750	3.000	1.250	.875	.75	1.125	.875	2.250	.500	M: 5/16-18 x 1" F: 5/16-18 x 1-1/4"
2.000	3.500	1.750	.750	1.00	1.500	1.000	2.500	.500	M: 3/8-16 x 7/8" F: 3/8-16 x 2"

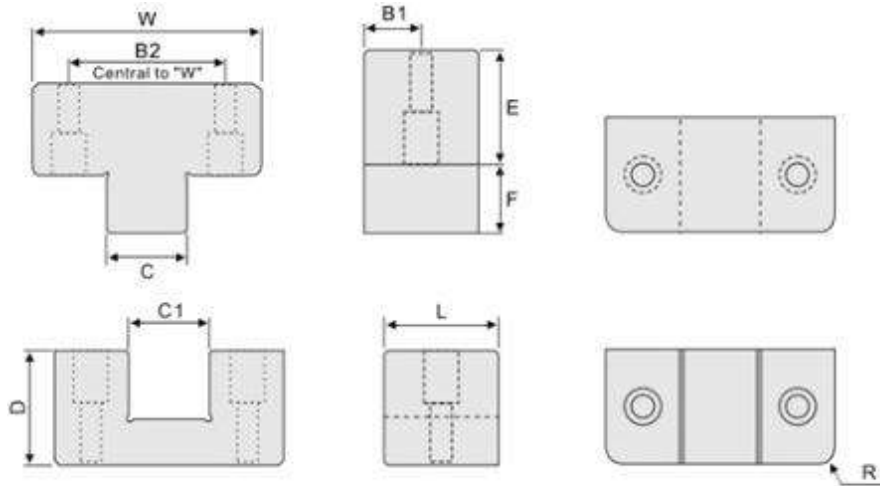


Tops Locks

MATERIAL: Male: O-2

Female: A-2

HARDNESS: 58-60 HRC



W	L	F	Total Length	C	B1	B2	D	R	E	SHCS (Male)	SHCS (Female)
+0.000 -0.005	+0.0000 -0.0002	+0.0000 -0.010		.002 Total	+0.010 -0.010	+0.010 -0.010	-0.002	Pocket Radius	+0.0000 -0.0002		
1.250	.625	.375	1.125	.438	.312	.875	.625	.26	.500	6-32x5/8	6-32x5/8
1.500	.875	.500	1.625	.500	.437	1.000	.875	.26	.750	8-32x3/4	8-32x3/4
2.000	1.000	.625	1.875	.750	.500	1.375	1.125	.38	.750	10-32x3/4	10-32x1
3.000	1.125	.750	2.250	1.125	.562	2.250	1.500	.51	.750	1/4-20x3/4	1/4-20x11/2

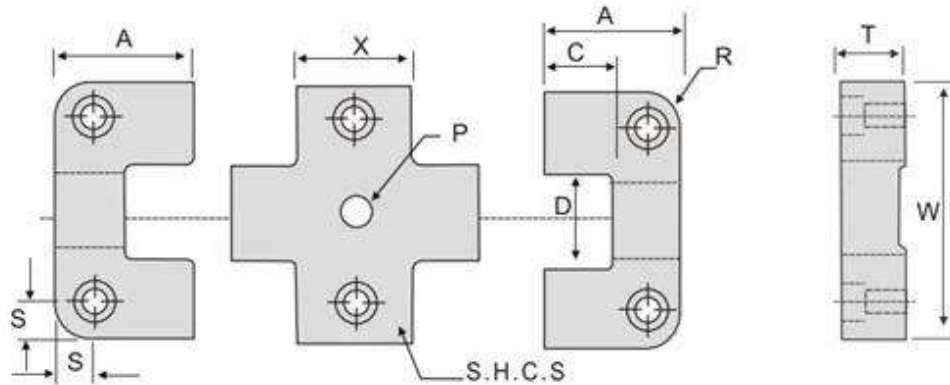


X-Series Locks

MATERIAL: Male: O-2

Female: A-2

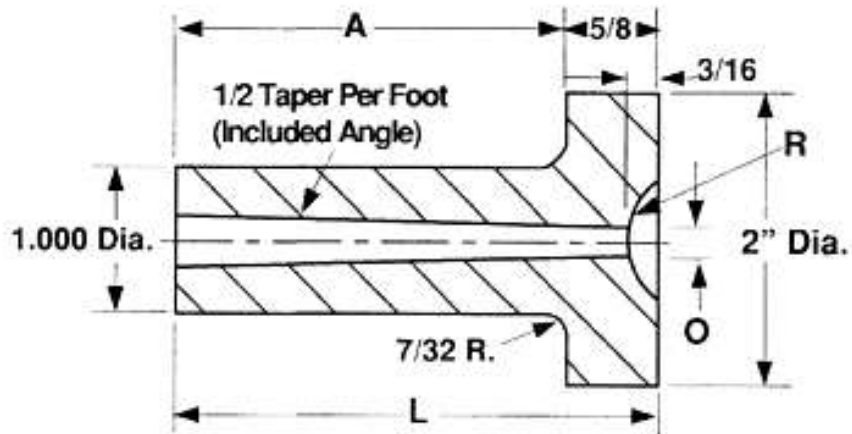
HARDNESS: 50-52 HRC



T	W	X	A	C	D	R	S	P	SHCS
+0.000 -0.002	+0.0000 -0.0004	+0.000 -0.001	+0.005 -0.005	+/-0.1	.0001/.0002	Pocket Radius	+/-0.1	+0.001 -0.000	
.500	2.000	.875	1.375	.65	.750	.187	.312	.250	#10-32x5/8
.750	3.000	1.375	1.875	1.12	1.250	.250	.375	.313	1/4-20x3/4
.750	3.000	1.875	1.875	1.12	1.250	.250	.375	.313	1/4-20x3/4
1.000	4.000	1.375	2.375	1.12	1.500	.250	.500	.375	3/8-16x1



Sprue Bushings – A Series

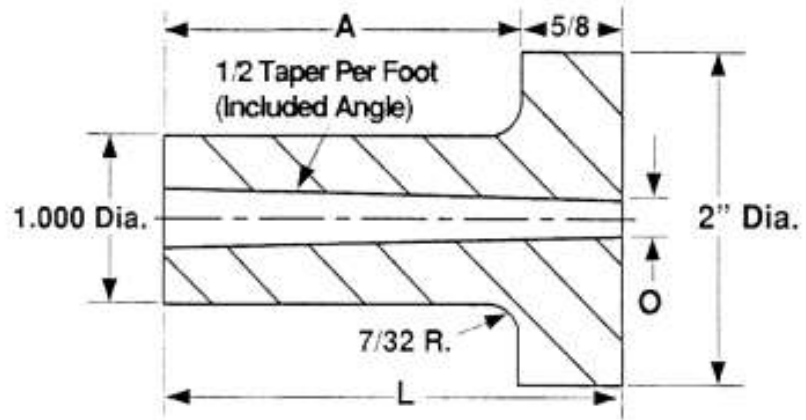


A	L	O=5/32 R=1/2	O=5/32 R=3/4	O=7/32 R=1/2	O=7/32 R=3/4	O=9/32 R=1/2	O=9/32 R=3/4	O=11/32 R=1/2	O=11/32 R=3/4
1-3/16	1-13/16								
1-11/16	2-5/16								
2-3/16	2-13/16								
2-11/16	3-5/16								
3-3/16	3-13/16								
3-11/16	4-5/16								
4-3/16	4-13/16								

O = 5/32, 7/32, or 9/32. R = 1/2 or 3/4



Sprue Bushings – AR Series

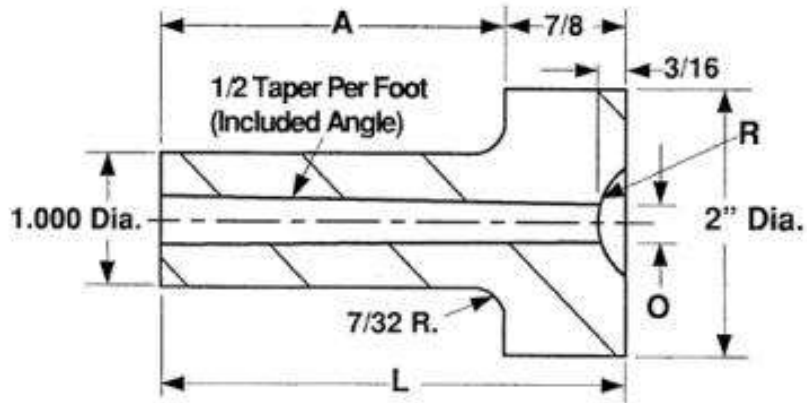


A	L	O=5/32	O=7/32
1-3/16	1-13/16		
1-11/16	2-5/16		
2-3/16	2-13/16		

O = 5/32 or 7/32. R = No Spherical Radius.



Sprue Bushings – B Series

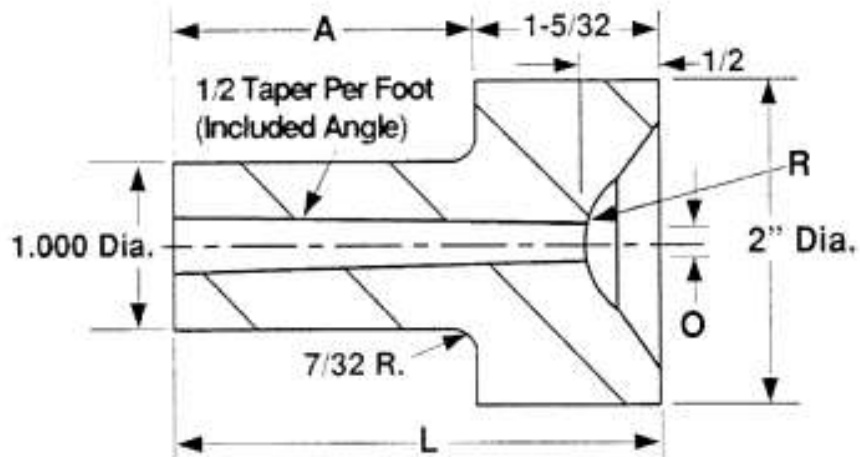


A	L	O=5/32 R=1/2	O=5/32 R=3/4	O=7/32 R=1/2	O=7/32 R=3/4	O=9/32 R=1/2	O=9/32 R=3/4	O=11/32 R=1/2	O=11/32 R=3/4
29/32	1-25/32								
1-13/32	2-9/32								
1-29/32	2-25/32								
2-13/32	3-9/32								
2-29/32	3-25/32								
3-13/32	4-9/32								
3-29/32	4-25/32								
4-13/32	5-9/32								
4-29/32	5-25/32								
5-29/32	6-25/32								
6-29/32	7-25/32								

O = 5/32, 7/32, or 9/32. R = 1/2.



Sprue Bushings – L Series

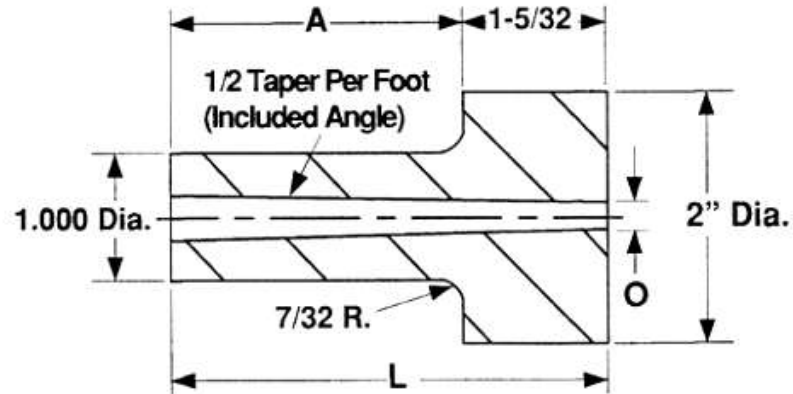


A	L	O=5/32	O=7/32	O=9/32
29/32	2-1/16			
1-13/32	2-9/16			
1-29/32	3-1/16			
2-29/32	4-1/16			
3-29/32	5-1/16			
6-29/32	8-1/16			

O = 5/32, 7/32, or 9/32. R = 1/2.

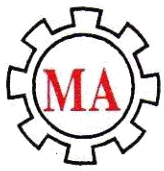


Sprue Bushings – LN Series

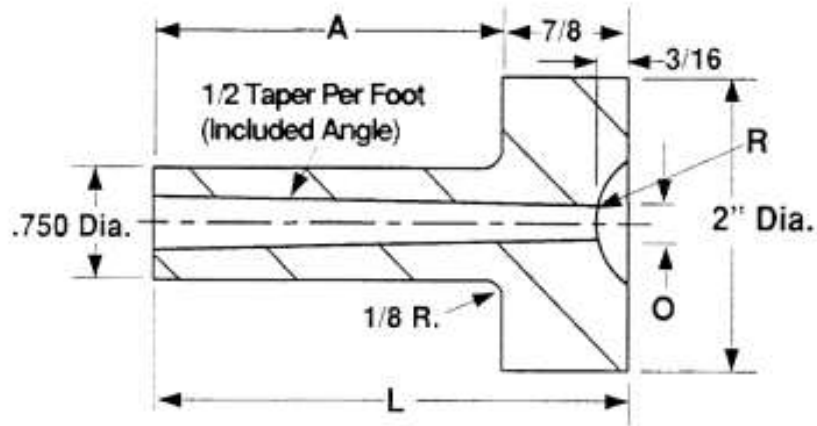


A	L	O=5/32	O=7/32	O=9/32
29/32	2-1/16			
1-13/32	2-9/16			
1-29/32	3-1/16			
2-13/32	3-9/16			
2-29/32	4-1/16			
3-13/32	4-9/16			

O = 5/32, 7/32, or 9/32. R = No Spherical Radius.



Sprue Bushings – U Series

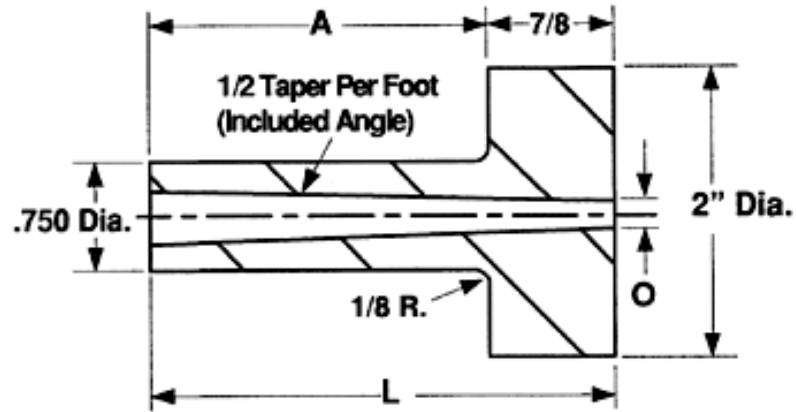


A	L	O=5/32 R=1/2	O=5/32 R=3/4	O=7/32 R=1/2	O=7/32 R=3/4	O=9/32 R=1/2	O=9/32 R=3/4
29/32	1-25/32						
1-13/32	2-9/32						
1-29/32	2-25/32						
2-13/32	3-9/32						
2-29/32	3-25/32						

O = 5/32, 7/32, or 9/32. R = 1/2 or 3/4



Sprue Bushings – UR Series

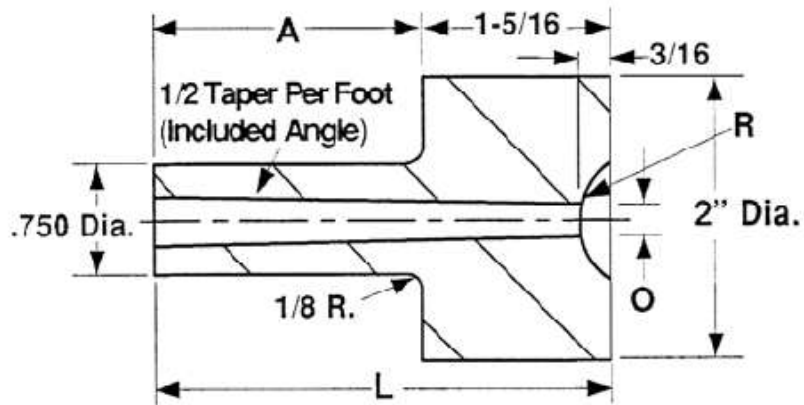


A	L	O=5/32	O=7/32	O=9/32
29/32	1-25/32			
1-13/32	2-9/32			
1-29/32	2-25/32			
2-13/32	3-9/32			
2-29/32	3-25/32			

O = 5/32, 7/32, or 9/32. R = 1/2.

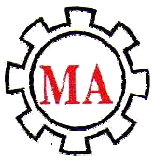


Sprue Bushings – UV Series



A	L	O=5/32	O=7/32	O=9/32
29/32	2-7/32			
1-13/32	2-23/32			
1-29/32	3-7/32			
2-13/32	3-23/32			
2-29/32	4-7/32			

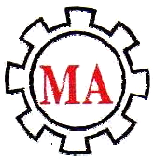
O = 5/32, 7/32, or 9/32. R = 1/2.



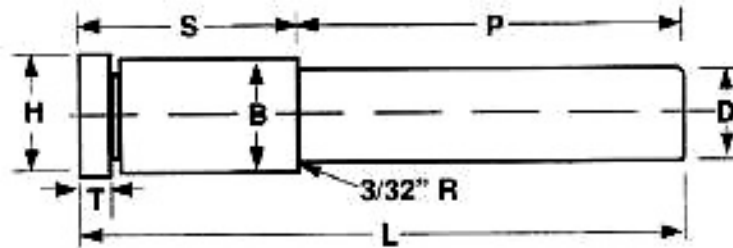
Guide Ejector Leader Pin



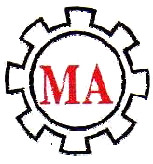
DIA	D +.0000 -.0005	PF +.0000 -.0005	H	T	L
1/2	.499	.501	.615	3/16	4-1/4
3/4	.749	.751	.990	3/16	4-3/4
7/8	.874	.876	1.115	1/4	5-1/4
1	.999	1.001	1.240	1/4	5-3/4
1-3/4	1.249	1.251	1.490	5/16	6-1/4



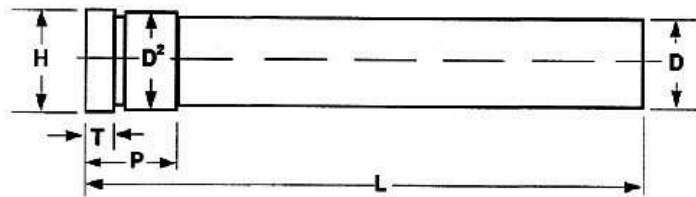
Shoulder Leader Pin



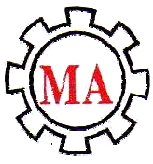
Nominal Dia	D +.0000 -.0005	B +.0005 -.0000	S	P	H	T	L
1/2	.499	.751	7/8	2-7/8	.853	.187	3-3/4
1/2	.499	.751	7/8	3-3/8	.853	.187	4-1/4
1/2	.499	.751	7/8	3-7/8	.853	.187	4-3/4
1/2	.499	.751	7/8	4-3/8	.853	.187	5-1/4
3/4	.749	1.226	7/8	3-3/8	1.250	.312	4-1/4
3/4	.749	1.126	7/8	3-7/8	1.250	.312	4-3/4
3/4	.749	1.126	7/8	4-3/8	1.250	.312	5-1/4
3/4	.749	1.126	7/8	4-7/8	1.250	.312	5-3/4
1	.999	1.376	7/8	3-3/8	1.500	.312	4-1/4
1	.999	1.376	7/8	3-7/8	1.500	.312	4-3/4
1	.999	1.376	7/8	4-3/8	1.500	.312	5-1/4
1	.999	1.376	7/8	4-7/8	1.500	.312	5-3/4



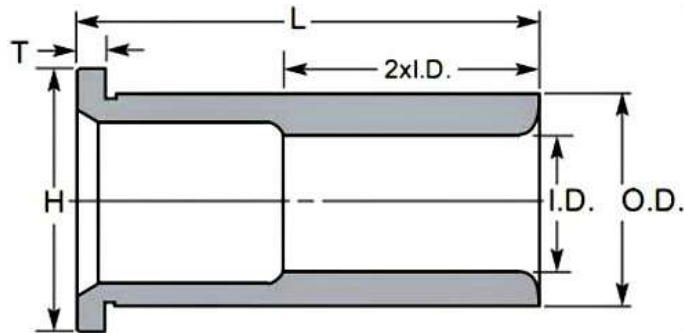
Angle Pin



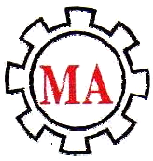
Nominal Dia	D +.0005 -.0000	D ² +.0005 -.0000	H	T	P	L
3/8	.374	.376	.49	.25	.875	6"
1/2	.499	.501	.61	.25	.875	6"
5/8	.624	.626	.74	.25	.875	6"
3/8	.374	.376	.49	.25	1.375	10"
1/2	.499	.501	.61	.25	1.375	10"
5/8	.624	.626	.74	.25	1.375	10"
3/4	.749	.751	.86	.25	1.375	10"



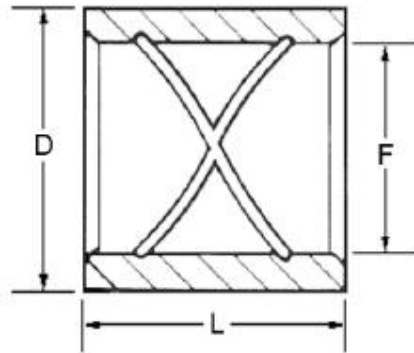
Straight Bushing (Head-Type)



F	D +.0000 -.0005	L +.0005 -.0000	T
3/4	.7505	1.1255	7/8
3/4	.7505	1.1255	1-3/8
7/8	.8755	1.2505	1-3/8
1	1.0005	1.3755	1-3/8
1-1/4	1.2505	1.6255	1-3/8
1-1/4	1.2505	1.6255	1-7/8
1-1/2	1.5005	2.0005	1-3/8
1-1/2	1.5005	2.0005	1-7/8
2	2.0005	2.0005	3-7/8
2-1/2	2.5005	3.2505	4-7/8

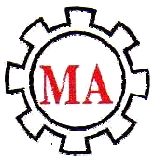


Straight Ejection Bushing (Self-lubricating)

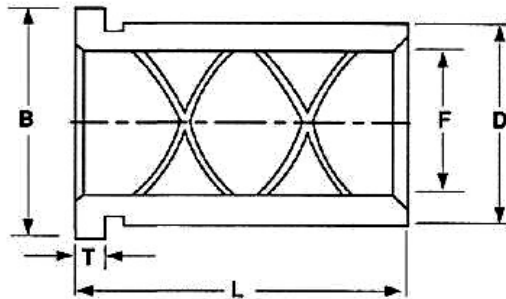


Nominal I.D.	F +0.0005 -0.0000	D +0.0005 -0.0000	L +0.00 -0.060
3/4	.7505	1.1255	7/8
			1-3/8
			1-1/2
7/8	.8755	1.2505	1-1/4
			1-1/2
1	1.0005	1.3755	1-1/4
			1-3/8
			1-1/2
			1-3/4
			2
			3
1-1/4	1.2505	1.6255	1-1/4
			1-3/8
			1-1/2
			1-3/4
			1-7/8
			2
1-1/2	1.5005	2.0005	1-1/4
			1-3/8
			1-1/2
			1-3/4
			1-7/8
			2
3	3.0005	3.7505	2
			2-1/2
			3

Nominal I.D.	F +0.0005 -0.0000	D +0.0005 -0.0000	L +0.00 -0.060
1-3/4	1.7505	2.2505	1-1/4
			1-1/2
			1-3/4
			2
			2-1/2
2	2.0005	2.5005	3
			3-1/2
			4
			1-1/4
			1-1/2
2-1/4	2.2505	2.7505	2
			2-1/2
			3
			3-7/8
			1-1/2
2-1/2	2.5005	3.2505	2
			3
			4-7/8
			2
			2-1/2
3	3.0005	3.7505	3
			3-1/2
			4-7/8
			2
			2-1/2



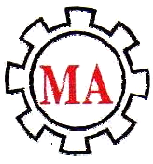
Guided Ejection Bushing (Self-lubricating)



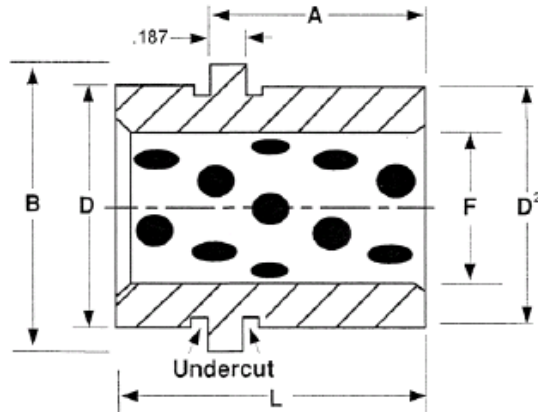
Nominal I.D.	F +.0005 -.0000	D +.0005 -.0000	B	L +.000 -.060
3/4	.7505	1.1255	1.30	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8
7/8	.8755	1.2505	1.43	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8
1	1.0005	1.3755	1.55	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8
1-1/4	1.2505	1.6255	1.80	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8

Nominal I.D.	F +.0005 -.0000	D +.0005 -.0000	B	L +.000 -.060
1-1/2	1.5005	2.0005	2.18	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8
2	2.0005	2.5005	2.68	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8
2-1/2	2.5005	3.2505	3.43	7/8
				1-3/8
				1-7/8
				2-3/8
				2-7/8
				3-3/8
				3-7/8
				4-3/8
				4-7/8
3	3.0005	3.7505	3.99	5-7/8
				3-3/8
				3-7/8
				4-7/8
				5-7/8
				5-7/8

Whereas T=3/16



Guided Ejection Bushing (Self-lubricating)



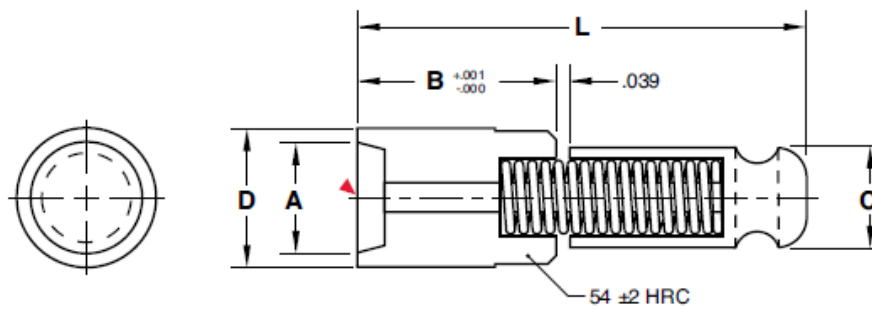
F	D² +.0005 -.0000	D +.0005 -.0000	B	A	L
3/4	1.1255	1.124	1.302	1	1-1/2
7/8	1.2505	1.249	1.427	1	1-1/2
1	1.3755	1.374	1.552	1-1/8	1-3/4
1	1.3755	1.374	1.552	1-5/8	2
1-1/4	1.6255	1.624	1.802	1-1/8	1-3/4
1-1/4	1.6255	1.624	1.802	1-7/8	2-1/2
1-1/2	2.0005	1.999	2.177	1-1/8	1-3/4
1-1/2	2.0005	1.999	2.177	1-7/8	2-1/2
2	2.5005	2.499	2.687	1-5/8	2-1/4



Air Valve

MATERIAL: 420 Stainless steel

HARDNESS: 52-56 HRC



	D			A		B		C		L	
	mm	Inch		mm	Inch	mm	Inch	mm	Inch	mm	Inch
AV-08	8	.3149	+0.0006 +0.0002	6.6	.260	11	.433	6	.236	23.5	.925
AV-12	12	.4727	+0.0007 +0.0003	9.7	.382	18	.708	8	.315	34.0	1.339
AV-18	18	.7086	+0.0007 +0.0003	14.8	.583	22	.866	12	.472	45.5	1.791