

Sprue Bushing Technical Specifications

Sprue Bushing User Guide

All specifications are subject to change without notification.

Integrally Heated Sprue Bushings

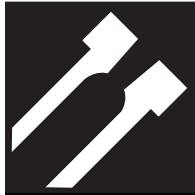


The Integrally Heated Sprue Bushing is an exclusive medium to large volume bushing with the ability to process a wide range of resins. The streamlined flow channel terminates in a reverse taper gate, providing minimum pressure loss and allowing for rapid gate freeze. The formation of a small gate stub on the part or runner results in a machine hold-time reduction, with no increase in sink marks on the part.

The superior heat transfer ability of the Heated Sprue Bushing can be attributed to its integrally heated design. To optimize processing conditions for all thermoplastics, a replaceable thermocouple is strategically located close to the flow channel.

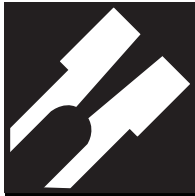
The Integrally Heated Sprue Bushing is available in three flow diameters, two head styles and three gate styles to suit a broad range of applications.

Gating Options for Sprue Bushings



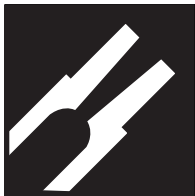
Without Machinable Stock

Suitable for most applications, the **Sprue Bushing without Machinable Stock** is provided as standard on the Heated Sprue Bushing. **Please note that this style gate is not intended for machining.** The press fit areas are held to +/- .0005" (See engineering charts on pages 5, 9 and 13).



With Machinable Stock

The **Sprue Bushing with Machinable Stock** is available for applications requiring machining of the gate area for runner profiles, part contours or adjustment of the bushing height. The .750" diameter and 1.00" diameter bushings have .500" of extra stock, while the 1.500" diameter bushing has .750" of extra stock. The press fit areas are held to +/- .0005" (See engineering charts on pages 5, 9 and 13).



Reduced Diameter

Originally designed for the European market, the **Reduced Diameter Sprue Bushing** is similar to the **Sprue Bushing with Machinable Stock** except that it also has a reduced gate diameter to allow to gating in more restricted areas. This design also minimizes heat loss at the press fit area. The press fit areas are held to +/- .0005" (See engineering charts on pages 5, 9 and 13).

Head Options for Sprue Bushings



.500" Radius* –

Provided with a 0.500" radius to mate in 0.500" radius machine nozzles. Reinforced contact area for improved strength and heat transfer.



.750" Radius* –

Provided with a 0.750" radius to mate in 0.750" radius machine nozzles. Reinforced contact area for improved strength and heat transfer.

*Other radiuses are available by special request.

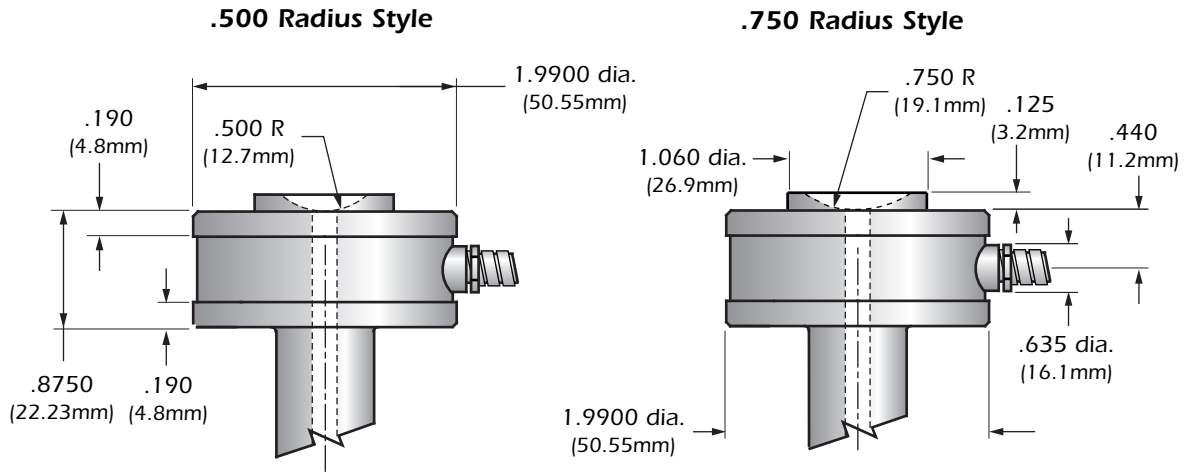
DIRECT FEED APPLICATIONS

Sprue Bushing Technical Specifications

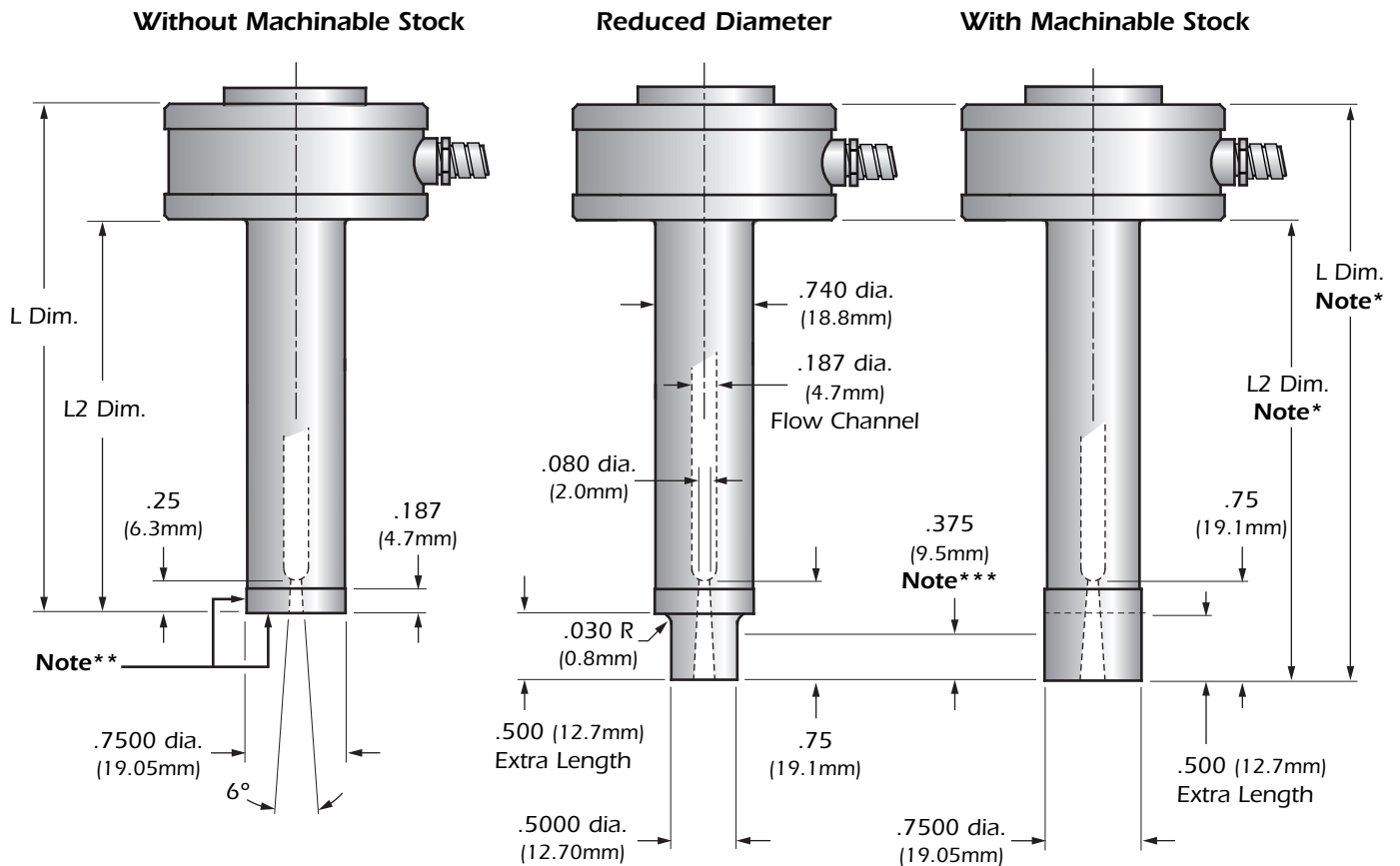
.750" Series

All specifications are subject to change without notification.

Head Options



Gating Options / Bushing Dimensions



* Dimensions include extra length.

** This surface cannot be machined, modified or altered.

*** Maximum machining stock, only this area can be machined.




Dimensions are in inches. Millimeters are in parentheses.
Note: For additional gate dimensions see page 4.

Sprue Bushing Technical Specifications

.750" Series Ordering Charts

All specifications are subject to change without notification.

Chart A

Gate Style	L Dim.		L2 Dim.		.500 Radius Head	.750 Radius Head	Watts
 3/4 Without Machinable Stock	2.375"	(60.3)	1.500"	(38.1)	HSB1000	HSB1001	315
	2.875"	(73.0)	2.000"	(50.8)	HSB1008	HSB1009	370
	3.375"	(85.7)	2.500"	(63.5)	HSB1016	HSB1017	425
	3.875"	(98.4)	3.000"	(76.2)	HSB1024	HSB1025	480
	4.375"	(111.1)	3.500"	(88.9)	HSB1032	HSB1033	535
 3/4 With Machinable Stock	2.875"	(73.0)	2.000"	(50.8)	HSB1004	HSB1005	315
	3.375"	(85.7)	2.500"	(63.5)	HSB1012	HSB1013	370
	3.875"	(98.4)	3.000"	(76.2)	HSB1020	HSB1021	425
	4.375"	(111.1)	3.500"	(88.9)	HSB1028	HSB1029	480
	4.875"	(123.8)	4.000"	(101.6)	HSB1036	HSB1037	535
 Reduced Diameter	2.875"	(73.0)	2.000"	(50.8)	HSB2000	HSB2001	315
	3.375"	(85.7)	2.500"	(63.5)	HSB2004	HSB2005	370
	3.875"	(98.4)	3.000"	(76.2)	HSB2008	HSB2009	425
	4.375"	(111.1)	3.500"	(88.9)	HSB2012	HSB2013	480
	4.875"	(123.8)	4.000"	(101.6)	HSB2016	HSB2017	535

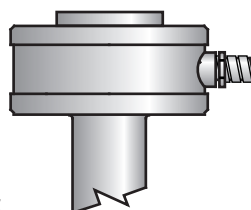
Dimensions are in inches. Millimeters are in parentheses.

Lead Exit Options

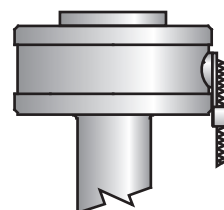
Lead Exit	Right	Front	Back
Braid	▪	▪	▪
Armor	*	N/A	N/A

* Standard Lead exit –
 60" (1.52m) teflon wrap - 600 Volt leads;
 right angle lead exit; and 6" (15.2cm)
 stainless steel, square-lock armor cable.

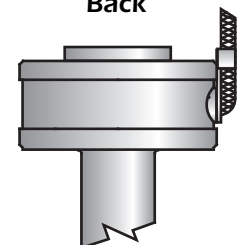
Right (Standard)



Front



Back



DIRECT FEED APPLICATIONS

Sprue Bushing Technical Specifications

DIRECT FEED APPLICATIONS

.750" Series Bore & Gate Dimensions

All specifications are subject to change without notification.

Insulating Washer Ordering

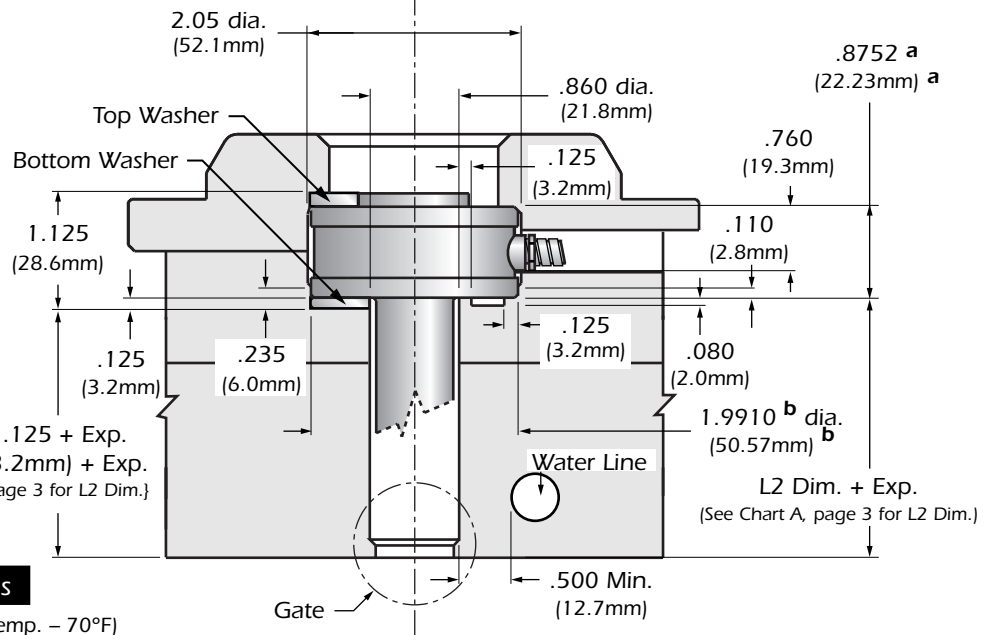
	Top	Bottom
Part#	WV00000	WV00001
O.D.	1.99 (50.5mm)	1.99 (50.5mm)
I.D.	1.07 (27.2mm)	.810 (20.6mm)
Thickness	.125 (3.2mm)	.125 (3.2mm)

Note: Insulating Washers are not required, but are recommended for high temperature applications.

L2 Dim. - .125 + Exp.
L2 Dim. - (3.2mm) + Exp.
[See Chart A, page 3 for L2 Dim.]

Insulating Washer Option

Standard Bore



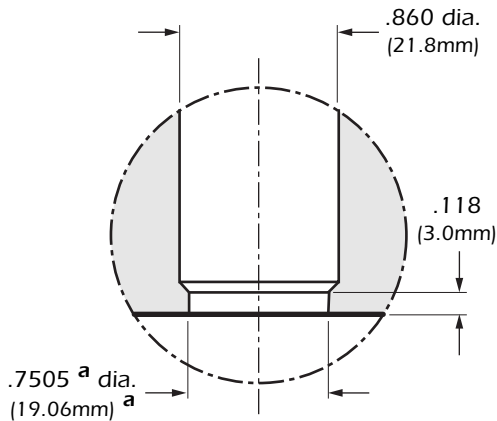
Thermal Expansion (Exp.) Formulas

$$\text{Exp. in} = \text{L2 in.} \times 6.88 \times 10^{-6} \times (\text{Processing Temp.} - 70^\circ\text{F})$$

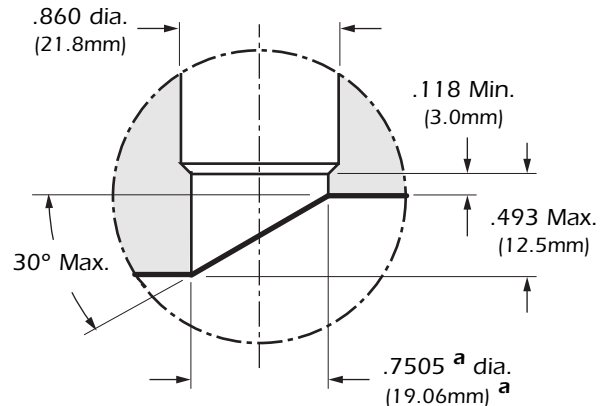
$$\text{Exp. mm} = \text{L2 mm} \times 13 \times 10^{-6} \times (\text{Processing Temp.} - 21^\circ\text{C})$$

$$\text{Ref: } 10^{-6} = 0.000001$$

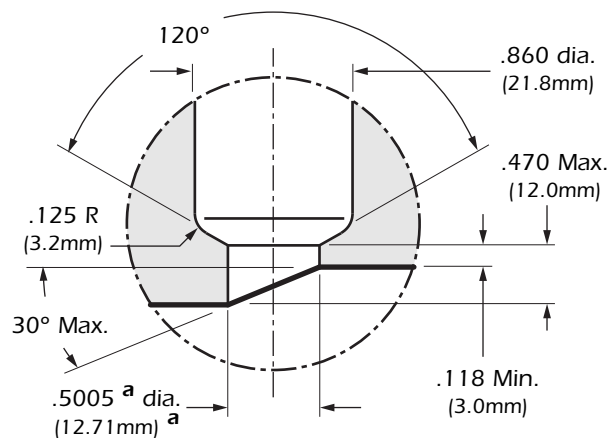
Without Machinable Stock



With Machinable Stock



Reduced Diameter



Bore & Gate Tolerances

Tol. "a" Chart

$$\frac{\text{in: } +0.0005}{-0}$$

$$\frac{\text{mm: } +0.01}{-0}$$

Tol. "b" Chart

$$\frac{\text{in: } +0.0010}{-0}$$

$$\frac{\text{mm: } +0.02}{-0}$$

4

Dimensions are in inches. Millimeters are in parentheses.

Sprue Bushing Technical Specifications

.750" Series Engineering Charts

All specifications are subject to change without notification.

Chart 1

.750" Series Resin Compatibility Chart			
Gating Options	Commodity Resin	Engineering Resin	Glass-Filled Resin
Without Machinable Stock	●	●	●
With Machinable Stock	●	●	●
Reduced Diameter	●	●	●

Reference: ● = Recommended

Chart 2

.750" Series Gate Diameters			
Gating Options	Resin Viscosity		
	High	Medium	Low
Without Machinable Stock	.080" to .125"* Max. (2mm to 3.2mm* Max.)	.080" to .125"* Max. (2mm to 3.2mm* Max.)	.080" to .125"* Max. (2mm to 3.2mm* Max.)
With Machinable Stock	.080" to .125"* Max. (2mm to 3.2mm* Max.)	.080" to .125"* Max. (2mm to 3.2mm* Max.)	.080" to .125"* Max. (2mm to 3.2mm* Max.)
Reduced Diameter	.080" to .125"* Max. (2mm to 3.2mm* Max.)	.080" to .125"* Max. (2mm to 3.2mm* Max.)	.080" to .125"* Max. (2mm to 3.2mm* Max.)

Reference: High Viscosity = Melt Flow (0.02 – 6); Medium Viscosity = Melt Flow (7 – 16); Low Viscosity = Melt Flow (16 – up). The values expressed in grams are for reference purposes only. Part dimensions, wall thickness, mold condition, and molding parameters must also be considered.

* Re-machine gate diameter, if necessary, for larger shot weights. Maintain gate angle and remove all machine marks.

Chart 3

.750" Series Maximum Shot Weights in Grams (0.080" Gate)			
Gating Options	Resin Viscosity		
	High	Medium	Low
Without Machinable Stock	50g	150g	300g
With Machinable Stock	50g	150g	300g
Reduced Diameter	50g	150g	300g

Consult Heaterwerks when changing Max. shot weight.

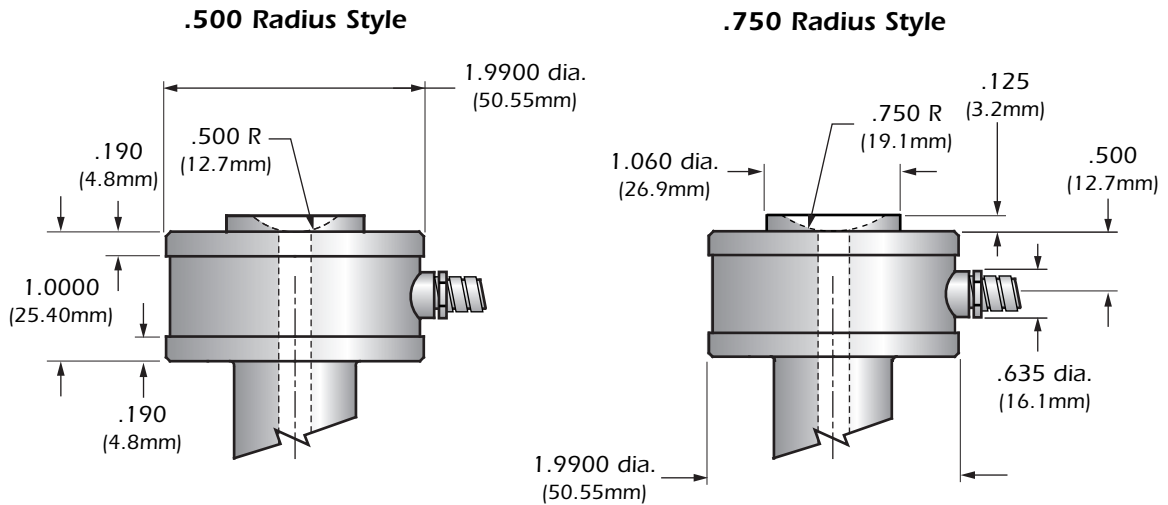
DIRECT FEED APPLICATIONS

Sprue Bushing Technical Specifications

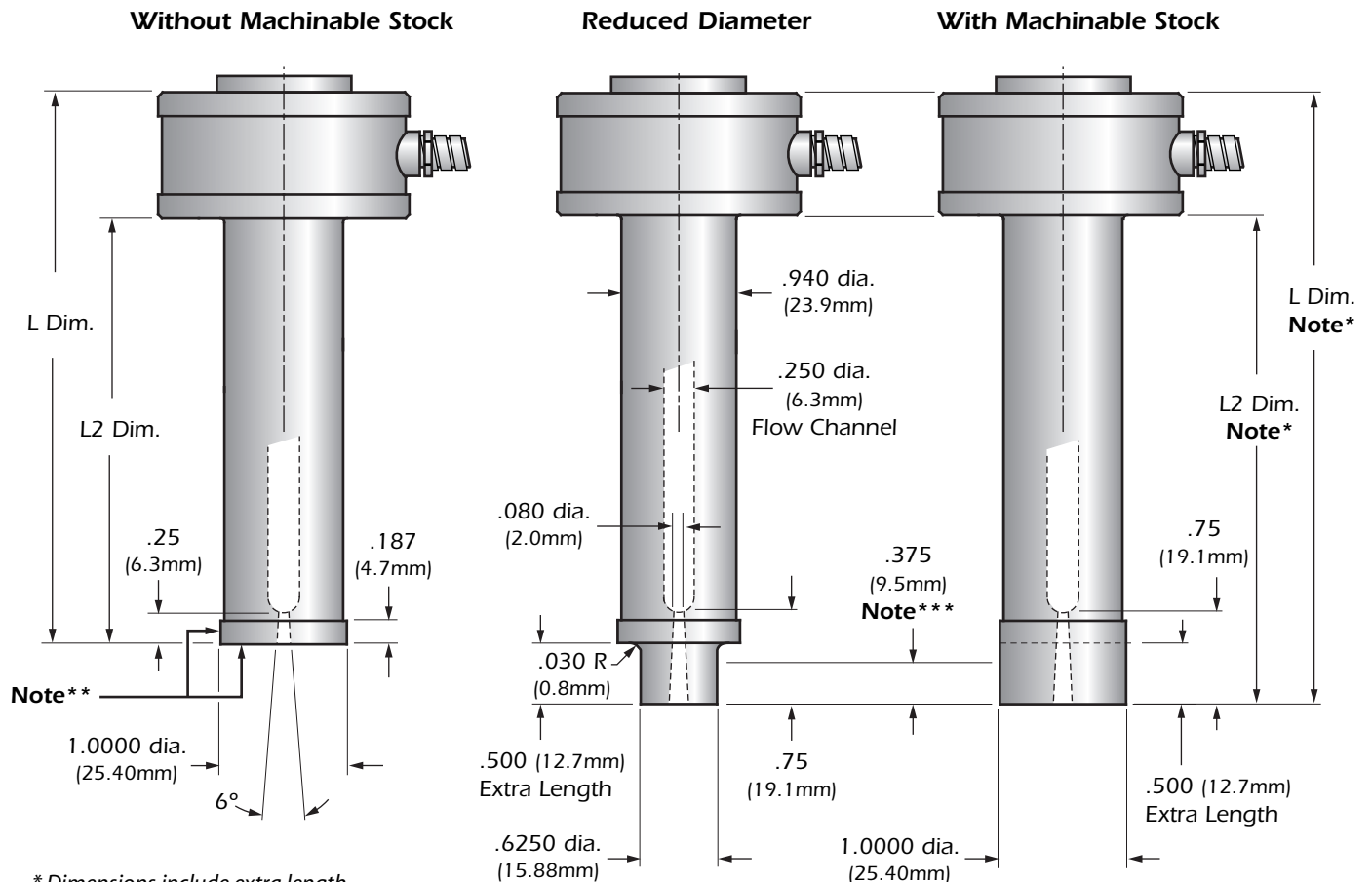
1.000" Series

All specifications are subject to change without notification.

Head Options



Gating Options / Bushing Dimensions



* Dimensions include extra length.

** This surface cannot be machined, modified or altered.

*** Maximum machining stock, only this area can be machined.




Dimensions are in inches. Millimeters are in parentheses.
Note: For additional gate dimensions see page 8.

Sprue Bushing Technical Specifications

1.000" Series Ordering Charts

All specifications are subject to change without notification.

Chart A

Gate Style	L Dim.		L2 Dim.		.500 Radius Head	.750 Radius Head	Watts	
	2.375"	(60.3)	1.375"	(34.9)	HSB1040	HSB1041	325	
	2.875"	(73.0)	1.875"	(47.6)	HSB1048	HSB1049	380	
	3.375"	(85.7)	2.375"	(60.3)	HSB1056	HSB1057	435	
	3.875"	(98.4)	2.875"	(73.0)	HSB1064	HSB1065	490	
	4.375"	(111.1)	3.375"	(85.7)	HSB1072	HSB1073	545	
	4.875"	(123.8)	3.875"	(98.4)	HSB1080	HSB1081	600	
	5.375"	(136.5)	4.375"	(111.1)	HSB1088	HSB1089	655	
	5.875"	(149.2)	4.875"	(123.8)	HSB1096	HSB1097	710	
	6.375"	(161.9)	5.375"	(136.5)	HSB1104	HSB1105	765	
	6.875"	(174.6)	5.875"	(149.2)	HSB1112	HSB1113	820	
	7.375"	(187.3)	6.375"	(161.9)	HSB1120	HSB1121	875	
		2.875"	(73.0)	1.875"	(47.6)	HSB1044	HSB1045	325
		3.375"	(85.7)	2.375"	(60.3)	HSB1052	HSB1053	380
		3.875"	(98.4)	2.875"	(73.0)	HSB1060	HSB1061	435
4.375"		(111.1)	3.375"	(85.7)	HSB1068	HSB1069	490	
4.875"		(123.8)	3.875"	(98.4)	HSB1076	HSB1077	545	
5.375"		(136.5)	4.375"	(111.1)	HSB1084	HSB1085	600	
5.875"		(149.2)	4.875"	(123.8)	HSB1092	HSB1093	655	
6.375"		(161.9)	5.375"	(136.5)	HSB1100	HSB1101	710	
6.875"		(174.6)	5.875"	(149.2)	HSB1108	HSB1109	765	
7.375"		(187.3)	6.375"	(161.9)	HSB1116	HSB1117	820	
7.875"		(200.0)	6.875"	(174.6)	HSB1124	HSB1125	875	
		2.875"	(73.0)	1.875"	(47.6)	HSB2020	HSB2021	325
		3.375"	(85.7)	2.375"	(60.3)	HSB2024	HSB2025	380
		3.875"	(98.4)	2.875"	(73.0)	HSB2028	HSB2029	435
	4.375"	(111.1)	3.375"	(85.7)	HSB2032	HSB2033	490	
	4.875"	(123.8)	3.875"	(98.4)	HSB2036	HSB2037	545	
	5.375"	(136.5)	4.375"	(111.1)	HSB2040	HSB2041	600	
	5.875"	(149.2)	4.875"	(123.8)	HSB2044	HSB2045	655	
	6.375"	(161.9)	5.375"	(136.5)	HSB2048	HSB2049	710	
	6.875"	(174.6)	5.875"	(149.2)	HSB2052	HSB2053	765	
	7.375"	(187.3)	6.375"	(161.9)	HSB2056	HSB2057	820	
	7.875"	(200.0)	6.875"	(174.6)	HSB2060	HSB2061	875	

Dimensions are in inches. Millimeters are in parentheses.

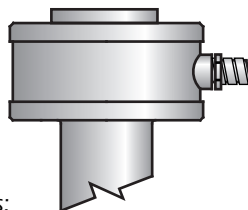
Lead Exit Options

Lead Exit	Right	Front	Back
Braid	▪	▪	▪
Armor	*	N/A	N/A

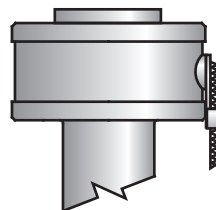
* Standard Lead exit –

60" (1.52m) teflon wrap - 600 Volt leads;
right angle lead exit; and 6" (15.2cm)
stainless steel, square-lock armor cable.

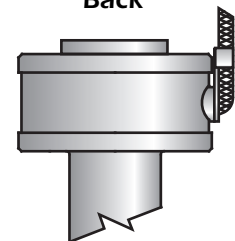
Right (Standard)



Front



Back



Sprue Bushing Technical Specifications

DIRECT FEED APPLICATIONS

1.000" Series Bore & Gate Dimensions

All specifications are subject to change without notification.

Insulating Washer Ordering

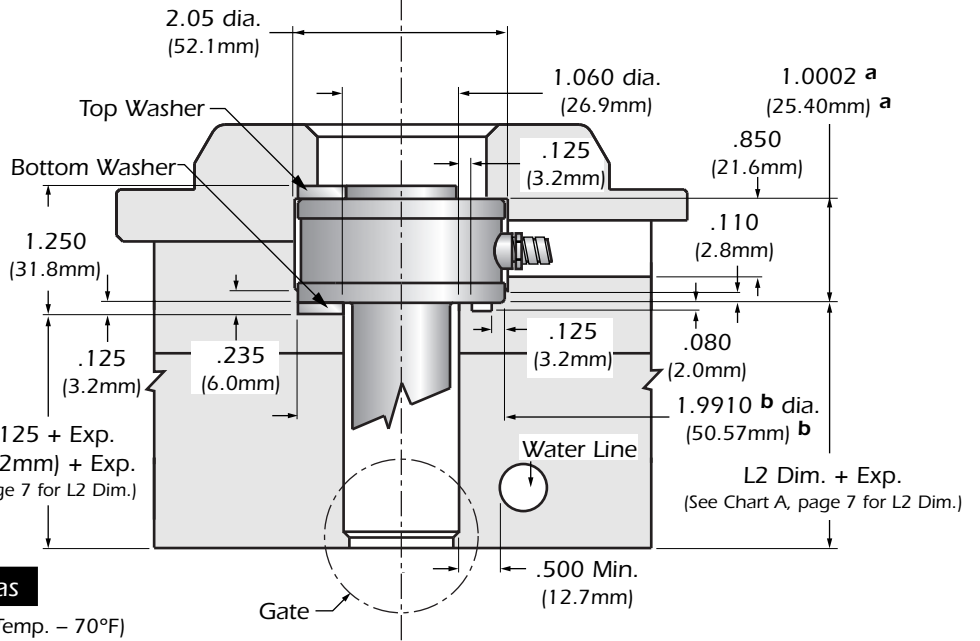
	Top	Bottom
Part#	WV00000	WV00000
O.D.	1.99 (50.5mm)	1.99 (50.5mm)
I.D.	1.07 (27.2mm)	1.07 (27.2mm)
Thickness	.125 (3.2mm)	.125 (3.2mm)

Note: Insulating Washers are not required, but are recommended for high temperature applications.

L2 Dim. - .125 + Exp.
L2 Dim. - (3.2mm) + Exp.
(See Chart A, page 7 for L2 Dim.)

Insulating Washer Option

Standard Bore



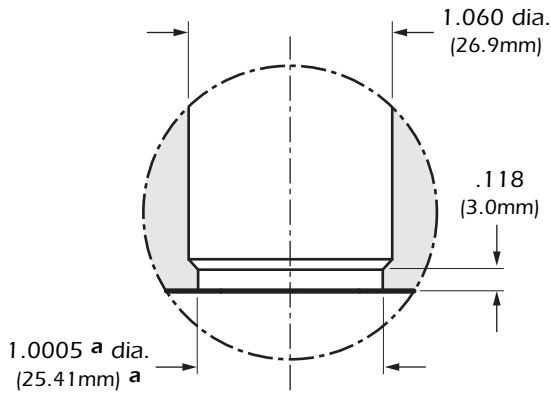
Thermal Expansion (Exp.) Formulas

Exp. in = L2 in. x 6.88×10^{-6} x (Processing Temp. - 70°F)

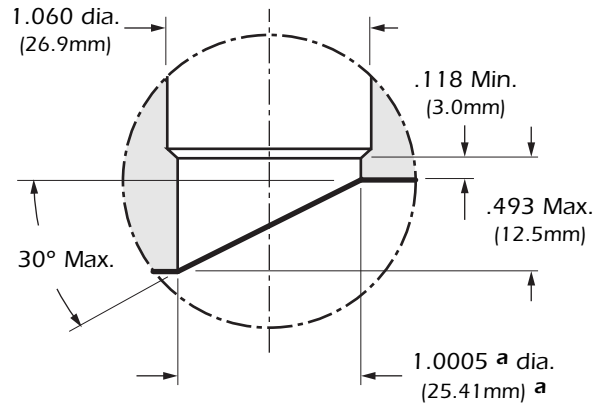
Exp. mm = L2 mm x 13×10^{-6} x (Processing Temp. - 21°C)

Ref: 10^{-6} = 0.000001

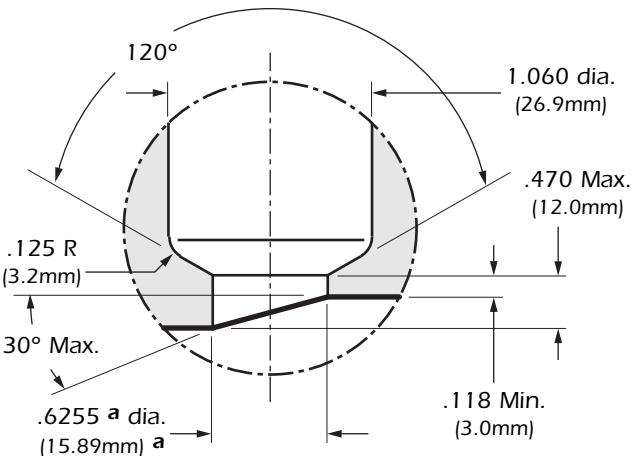
Without Machinable Stock



With Machinable Stock



Reduced Diameter



Bore & Gate Tolerances

Tol. "a" Chart	
in.	$\frac{+0.0005}{-0}$
mm.	$\frac{+0.01}{-0}$

Tol. "b" Chart	
in.	$\frac{+0.0010}{-0}$
mm.	$\frac{+0.02}{-0}$

8

Dimensions are in inches. Millimeters are in parentheses.

Sprue Bushing Technical Specifications

1.000" Series Engineering Charts

All specifications are subject to change without notification.

Chart 1

1.000" Series Resin Compatibility Chart			
Gating Options	Commodity Resin	Engineering Resin	Glass-Filled Resin
Without Machinable Stock	●	●	●
With Machinable Stock	●	●	●
Reduced Diameter	●	●	●

Reference: ● = Recommended

Chart 2

1.000" Series Gate Diameters			
Gating Options	Resin Viscosity		
	High	Medium	Low
Without Machinable Stock	.080" to .156"* Max. (2mm to 4mm* Max.)	.080" to .156"* Max. (2mm to 4mm* Max.)	.080" to .156"* Max. (2mm to 4mm* Max.)
With Machinable Stock	.080" to .156"* Max. (2mm to 4mm* Max.)	.080" to .156"* Max. (2mm to 4mm* Max.)	.080" to .156"* Max. (2mm to 4mm* Max.)
Reduced Diameter	.080" to .156"* Max. (2mm to 4mm* Max.)	.080" to .156"* Max. (2mm to 4mm* Max.)	.080" to .156"* Max. (2mm to 4mm* Max.)

Reference: High Viscosity = Melt Flow (0.02 – 6); Medium Viscosity = Melt Flow (7 – 16); Low Viscosity = Melt Flow (16 – up). The values expressed in grams are for reference purposes only. Part dimensions, wall thickness, mold condition, and molding parameters must also be considered.

* Re-machine gate diameter, if necessary, for larger shot weights. Maintain gate angle and remove all machine marks.

Chart 3

1.000" Series Maximum Shot Weights in Grams (0.080" Gate)			
Gating Options	Resin Viscosity		
	High	Medium	Low
Without Machinable Stock	200g	300g	500g
With Machinable Stock	200g	300g	500g
Reduced Diameter	200g	300g	500g

Consult Heaterwerks when changing Max. shot weight.

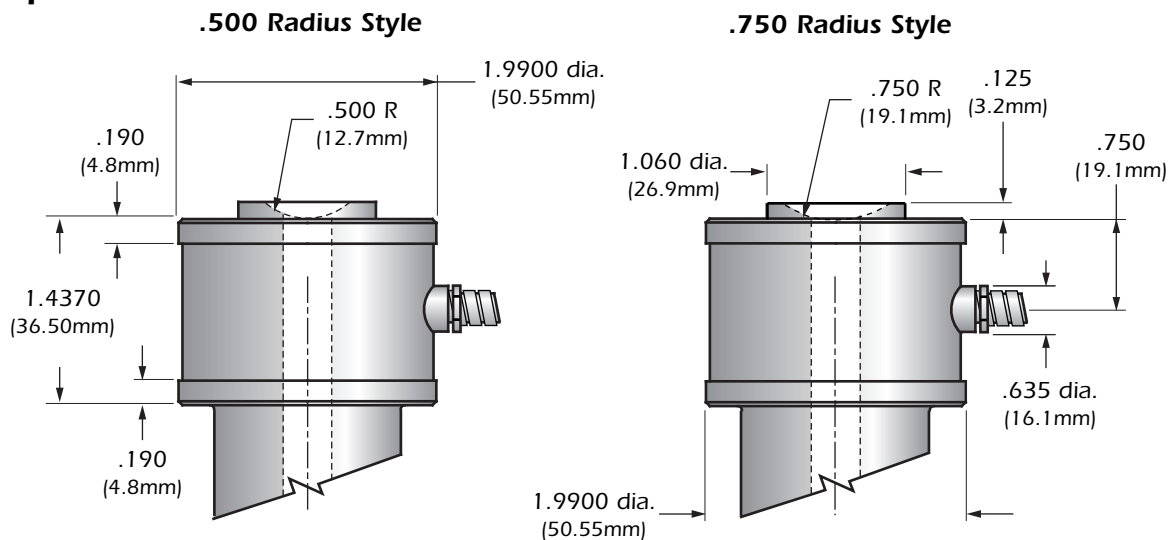
DIRECT FEED APPLICATIONS

Sprue Bushing Technical Specifications

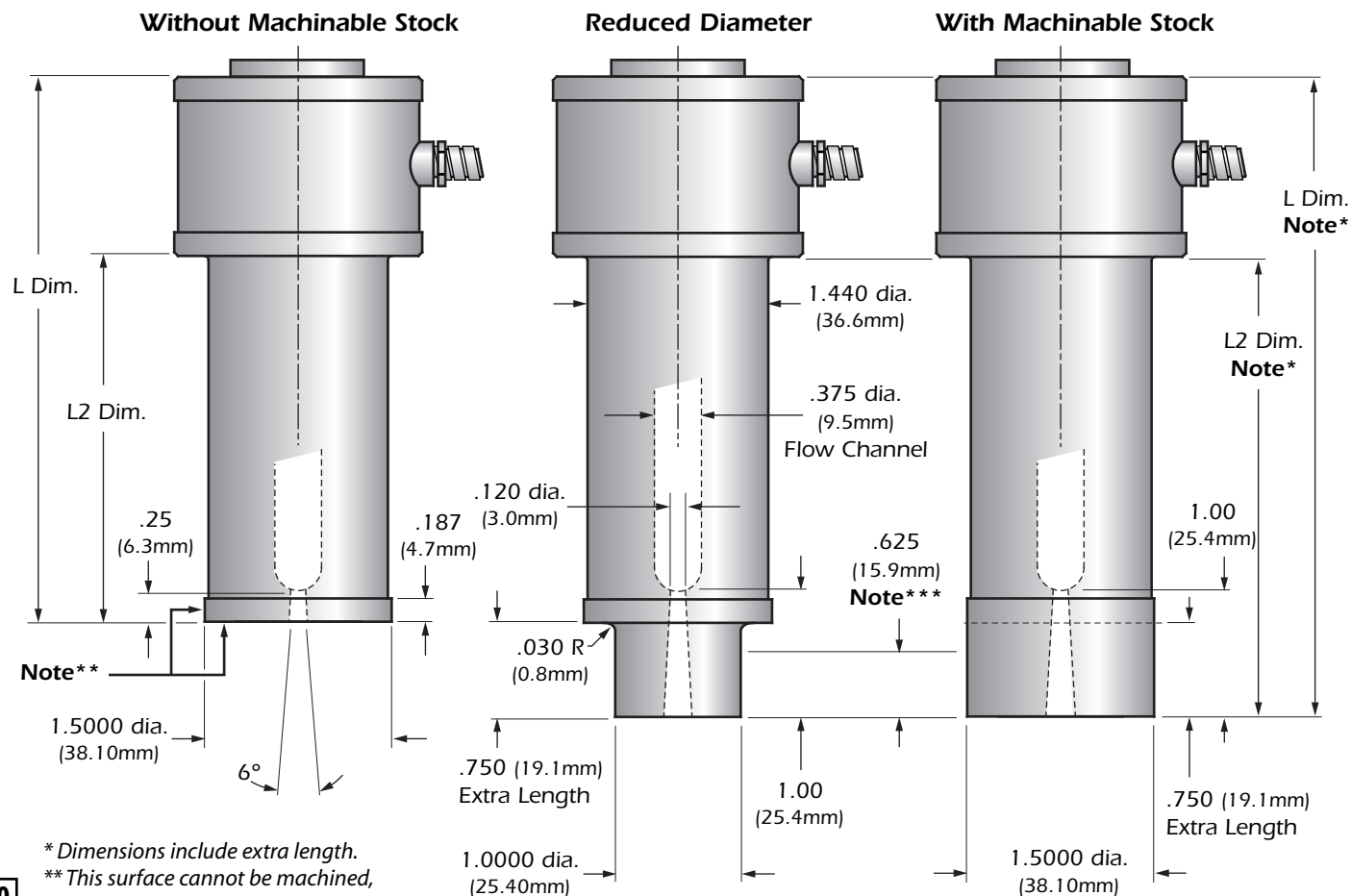
1.500" Series

All specifications are subject to change without notification.

Head Options



Gating Options / Bushing Dimensions



Note** * Dimensions include extra length.
 ** This surface cannot be machined, modified or altered.
 *** Maximum machining stock, only this area can be machined.

Dimensions are in inches. Millimeters are in parentheses.
 Note: For additional gate dimensions see page 12.




DIRECT FEED APPLICATIONS

Sprue Bushing Technical Specifications

1.500" Series Ordering Charts

All specifications are subject to change without notification.

Chart A

Gate Style	L Dim.		L2 Dim.		.500 Radius Head	.750 Radius Head	Watts
	3.375"	(85.7)	1.938"	(49.2)	HSB1128	HSB1129	700
	3.875"	(98.4)	2.438"	(61.9)	HSB1136	HSB1137	780
	4.375"	(111.1)	2.938"	(74.6)	HSB1144	HSB1145	860
	4.875"	(123.8)	3.438"	(87.3)	HSB1152	HSB1153	945
	5.375"	(136.5)	3.938"	(100.0)	HSB1160	HSB1161	1025
	5.875"	(149.2)	4.438"	(112.7)	HSB1168	HSB1169	1110
	6.375"	(161.9)	4.938"	(125.4)	HSB1175	HSB1177	1190
	6.875"	(174.6)	5.438"	(138.1)	HSB1184	HSB1185	1275
	7.375"	(187.3)	5.938"	(150.8)	HSB1192	HSB1193	1360
	4.125"	(104.8)	2.688"	(68.3)	HSB1132	HSB1133	700
	4.625"	(117.5)	3.188"	(81.0)	HSB1140	HSB1141	780
	5.125"	(130.2)	3.688"	(93.7)	HSB1148	HSB1149	860
	5.625"	(142.9)	4.188"	(106.4)	HSB1156	HSB1157	945
	6.125"	(155.6)	4.688"	(119.1)	HSB1164	HSB1165	1025
	6.625"	(168.3)	5.188"	(131.8)	HSB1172	HSB1173	1110
	7.125"	(181.0)	5.688"	(144.5)	HSB1180	HSB1181	1190
	7.625"	(193.7)	6.188"	(157.2)	HSB1188	HSB1189	1275
	8.125"	(206.4)	6.688"	(169.9)	HSB1196	HSB1197	1360
	4.125"	(104.8)	2.688"	(68.3)	HSB2064	HSB2065	700
	4.625"	(117.5)	3.188"	(81.0)	HSB2068	HSB2069	780
	5.125"	(130.2)	3.688"	(93.7)	HSB2072	HSB2073	860
	5.625"	(142.9)	4.188"	(106.4)	HSB2076	HSB2077	945
	6.125"	(155.6)	4.688"	(119.1)	HSB2080	HSB2081	1025
	6.625"	(168.3)	5.188"	(131.8)	HSB2084	HSB2085	1110
	7.125"	(181.0)	5.688"	(144.5)	HSB2088	HSB2089	1190
	7.625"	(193.7)	6.188"	(157.2)	HSB2092	HSB2093	1275
	8.125"	(206.4)	6.688"	(169.9)	HSB2096	HSB2097	1360

Dimensions are in inches. Millimeters are in parentheses.

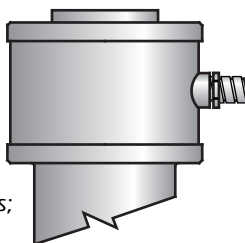
Lead Exit Options

Lead Exit	Right	Front	Back
Braid	▪	▪	▪
Armor	*	N/A	N/A

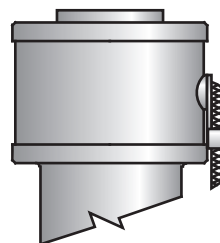
* Standard Lead exit –

60" (1.52m) teflon wrap - 600 Volt leads;
right angle lead exit; and 6" (15.2cm)
stainless steel, square-lock armor cable.

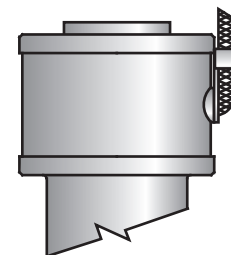
Right (Standard)



Front



Back



Sprue Bushing Technical Specifications

1.500" Series Bore & Gate Dimensions

All specifications are subject to change without notification.

Insulating Washer Ordering

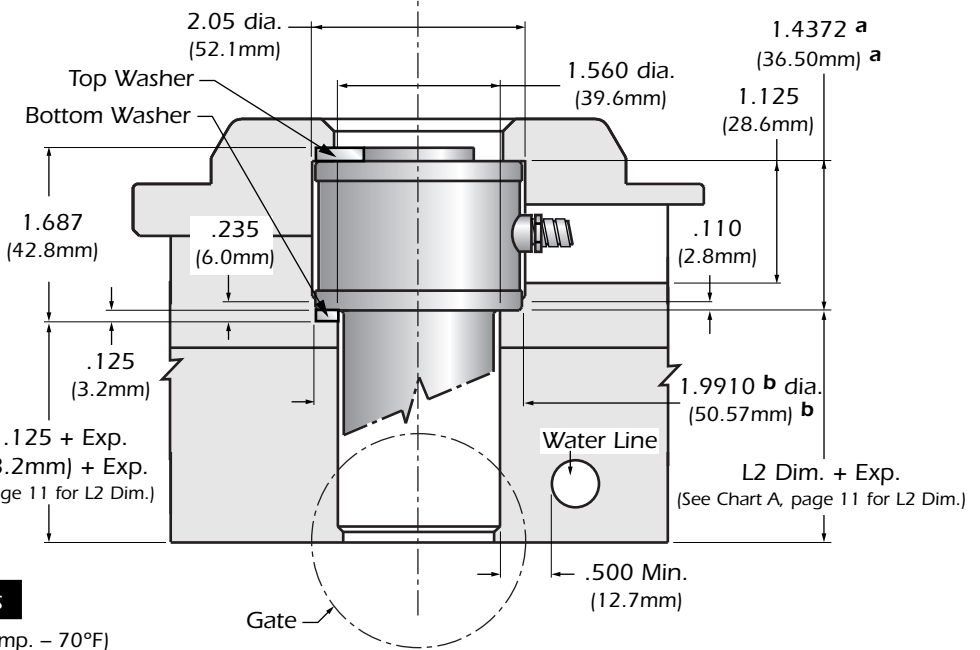
	Top	Bottom
Part#	WV00000	WV00002
O.D.	1.99 (50.5mm)	1.99 (50.5mm)
I.D.	1.07 (27.2mm)	1.56 (39.6mm)
Thickness	.125 (3.2mm)	.125 (3.2mm)

Note: Insulating Washers are not required, but are recommended for high temperature applications.

L2 Dim. - .125 + Exp.
L2 Dim. - (3.2mm) + Exp.
(See Chart A, page 11 for L2 Dim.)

Insulating Washer Option

Standard Bore



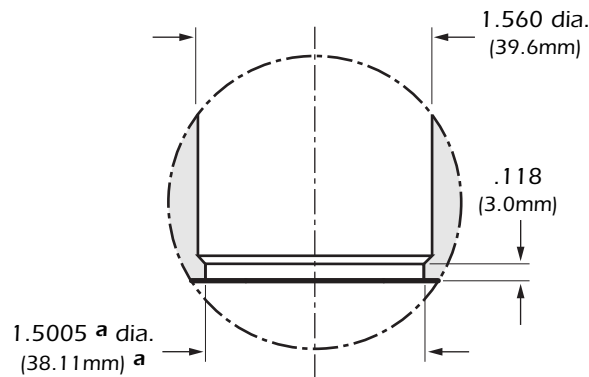
Thermal Expansion (Exp.) Formulas

Exp. in = L2 in. x 6.88 x 10⁻⁶ x (Processing Temp. - 70°F)

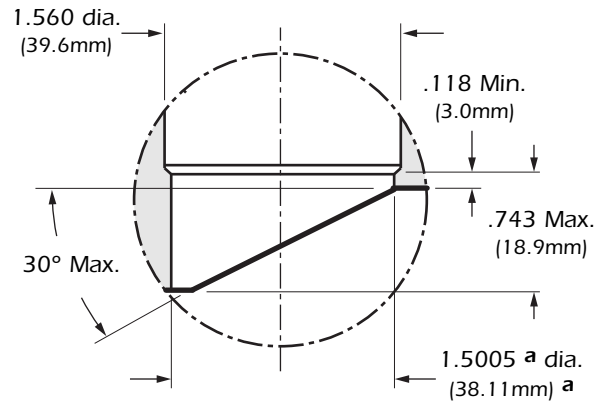
Exp. mm = L2 mm x 13 x 10⁻⁶ x (Processing Temp. - 21°C)

Ref: 10⁻⁶ = 0.000001

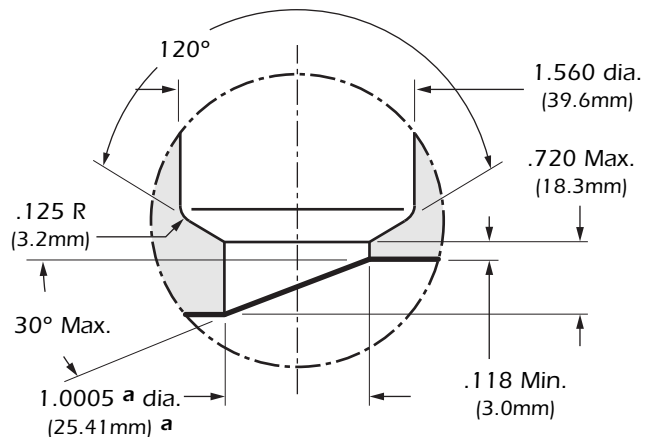
Without Machinable Stock



With Machinable Stock



Reduced Diameter



Bore & Gate Tolerances

Tol. "a" Chart

in: $\frac{+0.0005}{-0}$
mm: $\frac{+0.01}{-0}$

Tol. "b" Chart

in: $\frac{+0.0010}{-0}$
mm: $\frac{+0.02}{-0}$

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Dimensions are in inches. Millimeters are in parentheses.

Sprue Bushing Technical Specifications

1.500" Series Engineering Charts

All specifications are subject to change without notification.

Chart 1

1.500" Series Resin Compatibility Chart

Gating Options	Commodity Resin	Engineering Resin	Glass-Filled Resin
Without Machinable Stock	●	●	●
With Machinable Stock	●	●	●
Reduced Diameter	●	●	●

Reference: ● = Recommended

Chart 2

1.500" Series Gate Diameters

Gating Options	Resin Viscosity		
	High	Medium	Low
Without Machinable Stock	.120" to .312"* Max. (3mm to 8mm* Max.)	.120" to .312"* Max. (3mm to 8mm* Max.)	.120" to .312"* Max. (3mm to 8mm* Max.)
With Machinable Stock	.120" to .312"* Max. (3mm to 8mm* Max.)	.120" to .312"* Max. (3mm to 8mm* Max.)	.120" to .312"* Max. (3mm to 8mm* Max.)
Reduced Diameter	.120" to .312"* Max. (3mm to 8mm* Max.)	.120" to .312"* Max. (3mm to 8mm* Max.)	.120" to .312"* Max. (3mm to 8mm* Max.)

Reference: High Viscosity = Melt Flow (0.02 – 6); Medium Viscosity = Melt Flow (7 – 16); Low Viscosity = Melt Flow (16 – up). The values expressed in grams are for reference purposes only. Part dimensions, wall thickness, mold condition, and molding parameters must also be considered.

* Re-machine gate diameter, if necessary, for larger shot weights. Maintain gate angle and remove all machine marks.

Chart 3

1.500" Series Maximum Shot Weights in Grams (0.120" Gate)

Gating Options	Resin Viscosity		
	High	Medium	Low
Without Machinable Stock	900g	1500g	2500g
With Machinable Stock	900g	1500g	2500g
Reduced Diameter	900g	1500g	2500g

Consult Heaterwerks when changing Max. shot weight.

DIRECT FEED APPLICATIONS

Sprue Bushing Technical Specifications

Operating/Service Instructions

All specifications are subject to change without notification.

Operating & Servicing Instructions

The Sprue Bushing bodies are identical in design, but differ in length, diameter and head style. All Sprue Bushings feature: an integrated heater; Type "J" thermocouple; 60" teflon wrap - 600 Volt leads; right angle lead exit; and 6" stainless steel, square-lock armor cable.

Start-up/Operating Procedures

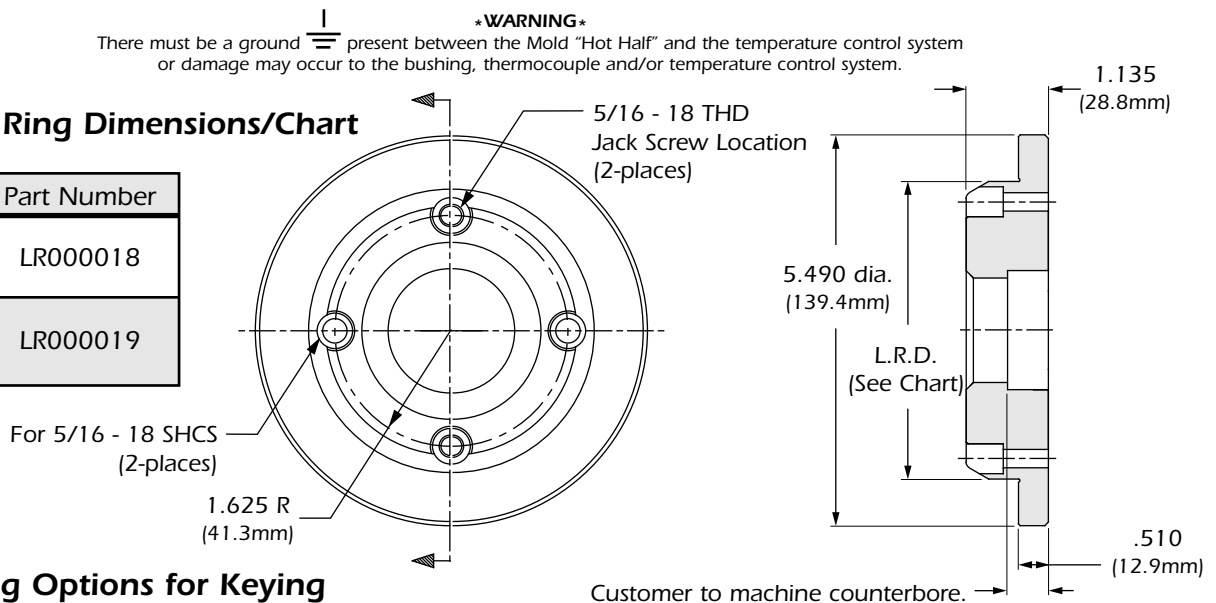
If the temperature controller does not utilize "soft start" technology, set the controller to 200°F (93.3°C) in automatic or 10% in manual. Allow bushing to "soak" for 15 minutes before increasing to processing temperature. This step will allow the unit to dissipate any moisture and prolong heater life.

Power Requirements

- 240 Volts AC – 15 amp fuse
- Grounding – Heaterwerks bushings utilize the direct contact of the bushing, mold plates, and machine platens to establish a path for grounding.

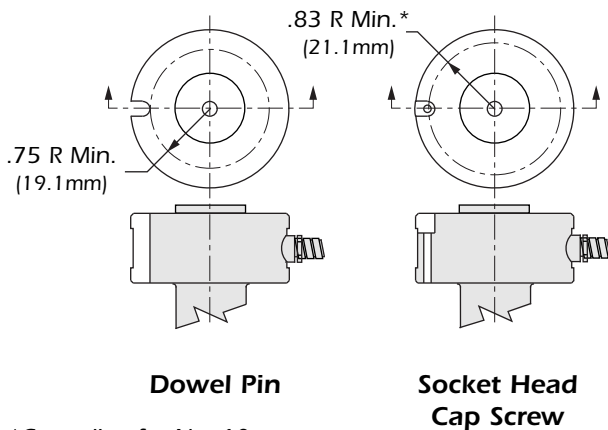
Locating Ring Dimensions/Chart

L.R.D.	Part Number
3.990" (101.3mm)	LR000018
4.990" (126.7mm)	LR000019

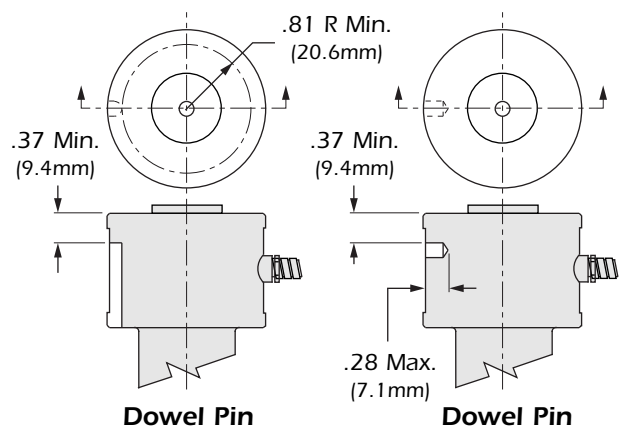


Machining Options for Keying

.750" & 1.000" Series



1.500" Series



*Centerline for No. 10 screw.

Dimensions are in inches. Millimeters are in parentheses.