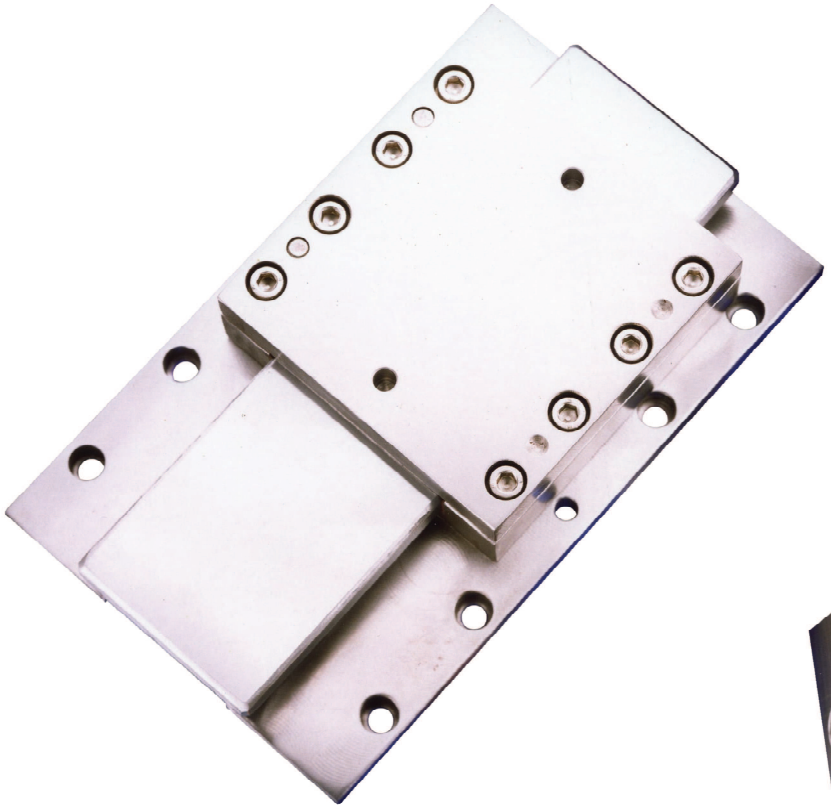
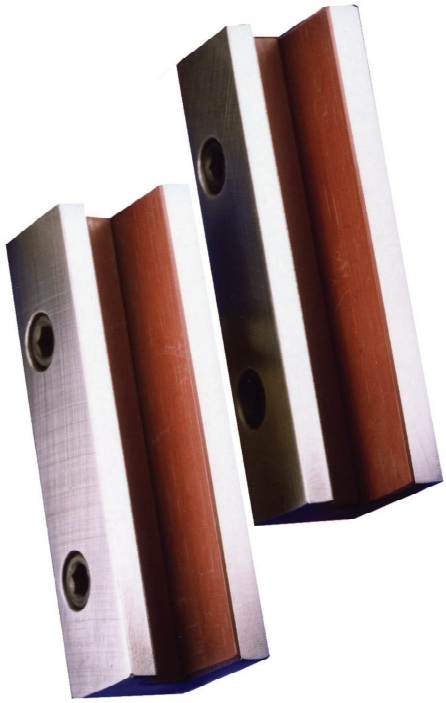
WELKER

ENGINEERED PRODUCTS

ISO 9001 REGISTERED

LINEAR SLIDES & GIB ASSEMBLIES





RELEASED 11/22/17

Welker Engineered Products 1401 Piedmont, Troy MI 48083 (800) 229-0890 www.welkerproducts.com

MAINTENANCE-FREE LINEAR SLIDES & GIB ASSEMBLIES

- ◎ **LOW PROFILE**
- ◎ **INSULATING**
- ◎ **HIGH LOAD CAPACITY**
- ◎ **LOW FRICTION**
- ◎ **LUBRICATION-FREE**
- ◎ **CORROSION RESISTANT**

CONSTRUCTION

Linear Slides and Gib Assemblies feature a bonded construction of Rulon and steel, providing both strength and permanent lubrication.
Carriage (C-Section) is bonded with Rulon for lube-free sliding motion.
Base (H-Section) is steel with a hard chromed mating surface providing strength and durability.

OPERATING ENVIRONMENT

Operating temperatures -60° to +300° F. Higher temperatures can be tolerated with the use of high temperature adhesives. (Contact Welker)
Operates dry or wet in most process chemicals.
Shielding or covering is suggested in areas of heavy contamination. Where practical, bonded surfaces should maintain complete engagement with mating surfaces to produce a self-wiping action.

RUNNING CLEARANCE

Many applications require looser running clearances. Shims are installed in WS 6,9,12 slides to provide these running clearances. The laminated shims are .010" thick and composed of .002" peelable layers. Remove shims from between top plate and L- Gib to accommodate
applications that require tighter clearances.
For applications requiring close running clearances, specify "-PF" suffix to the part number for "Precision Fit". Shims are not included in "PF" configurations.

APPLICATIONS

- ***Positioning slides***
- ***Weld gun slides***
- ***Metering devices***
- ***Gaging***
- ***Machine tools***
- ***Clamp positioning***
- ***Staking / Pressing***
- ***Grippers***

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DESIGN CRITERIA FOR SLIDES

SLIDE ORIENTATION

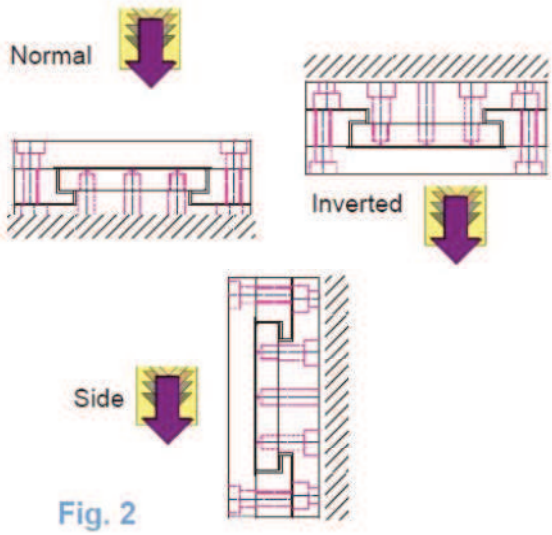

Fig. 2

LOADING

Fig. 1

DYNAMIC LOAD CAPACITY / STATIC LOAD LIMIT (cbf)
PER INCH OF ENGAGEMENT

SERIES	NORMAL	SIDE	INVERTED
WS03	200 / 2000	35 / 350	60 / 600
WS04	275 / 2750	35 / 350	60 / 600
WS06	400 / 4000	50 / 500	200 / 2000
WS09	600 / 6000	90 / 900	300 / 3000
WS12	900 / 9000	90 / 900	300 / 3000
WS24	1950 / 19500	100 / 1000	200 / 2000

Load capacity calculated at 100 psi.
Static load limit is at 1000 psi
Example: WS03-C4-H8
Slide is 100% engaged.
Load direction is inverted.
Load capacity = 4 in. x 60 lb/in. = 240 lbs.

1. Dynamic load capacity equals sum of all weight, torque and overhung moments.
2. Overhung loads are not to exceed two times carriage width from any slide edge.
3. Carriage disengagement in use is not to exceed 1/4 carriage length.
4. Complete carriage engagement is preferred in contaminated environments or high load applications.
5. Load capacity is rated per inch of engagement.
6. Carriages must be powered from within the width dimension “A” (Fig. 5). Driving the carriage from outside this envelope applies a moment to the carriage and may result in unpredictable performance.
7. Disengagement of C-section from H-section is not recommended for high torque loads, long or heavy overhangs, or extremely dirty conditions.

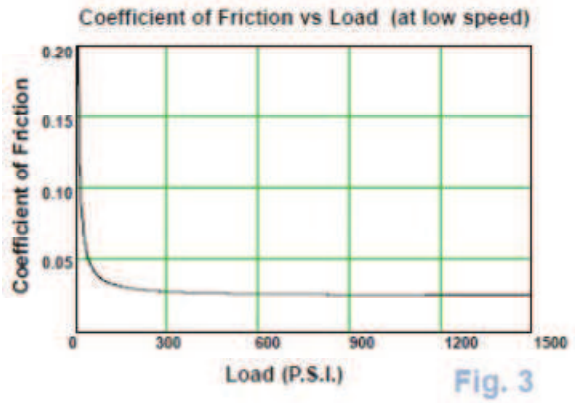

Fig. 3

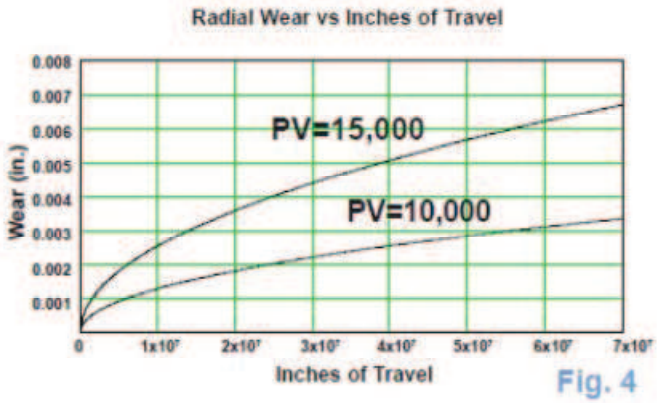

Fig. 4

WEAR

Wear is a function of inches of travel at various PV (pressure times velocity) values. For intermittent or short-time duty, higher PV values can be used. Use of lubricants improves wear rates and increases permissible PV limits. *The units of PV are psi x ft/min. The charted load capacities and moment loading reflect pressures of 100 psi. To determine the PV for your application, multiply your percentage of load capacity x 100 psi x your sliding velocity.*

SPEED

Rulon is limited to 400 FPM under dry operating conditions. Higher speeds are permitted with lubricants. When fully lubricated with oil, Rulon will exhibit a coefficient of friction about 0.1

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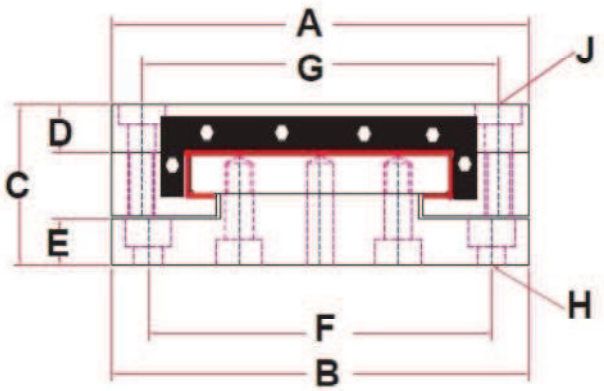
SLIDE PROFILE

STANDARD BASE



WIDE BASE

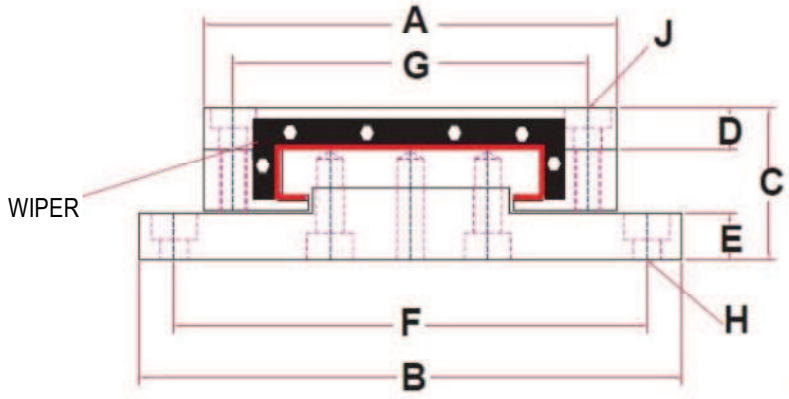


Fig. 5

		B					F			Hole Specs	
SERIES	A	STD	WIDE	C	D	E	STD	WIDE	G	H	J
WS03	2.95	2.95	3.94	1.250	0.400	0.195	2.38	3.25	2.375	1/4 or M6 FHCS	1/4-20
WS04	3.94	3.94	4.92	1.500	0.450	0.393	3.25	4.25	3.375	1/4 or M6 FHCS	1/4-20
***WS06**	5.90	5.90	7.87	2.000	0.530	0.500	5.00	7.00	5.000	3/8 or M10 FHCS	3/8-16
***WS09**	8.86	8.86	10.83	2.500	0.600	0.559	7.50	9.50	7.500	3/8 or M10 FHCS	3/8-16
***WS12**	11.81	11.81	13.78	2.750	0.700	0.711	10.50	12.50	10.500	3/8 or M10 FHCS	3/8-16
WS24	23.50	23.50	27.00	4.000	1.000	0.940	21.50	25.00	21.500	3/4 or M16 FHCS	5/8-11

Standard Slide mfg. with base holes.

SLIDE PART ORDERING INFORMATION

WS 06	-	**C6**	-	**H9**	-	**W**	-	**PF**
Welker Slide Nominal Width (6" wide)		Length of C-Section (Carriage) 6" long		Length of H-Section (Base) 9" long		Optional Wide Base		Optional "Precision Fit"

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HOLE PATTERN

See Profile Chart
Customer may remove up to four screws from holes (J) and use for detail mounting.

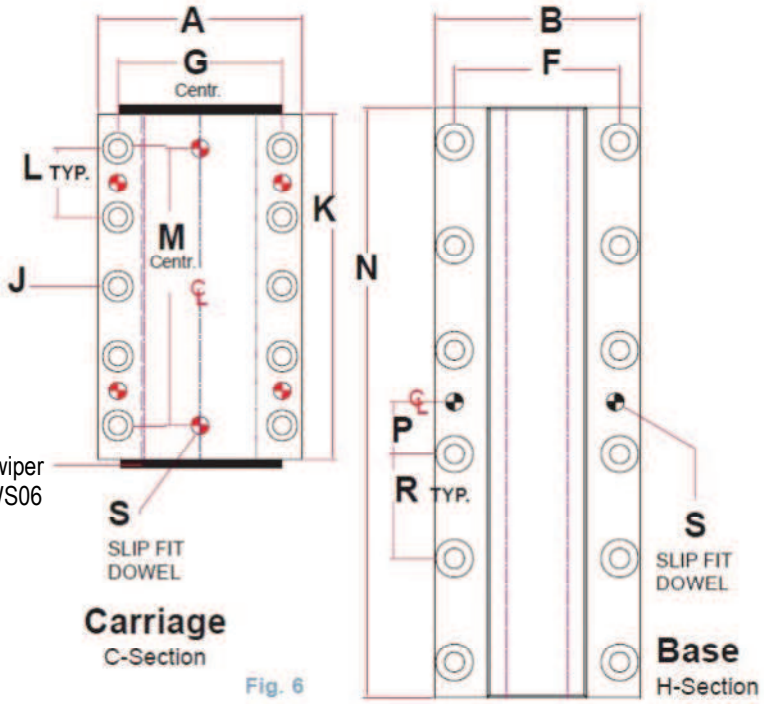

Fig. 6

	C-SECTION					H-SECTION			
SERIES		K	L	M		N	P	R	S
WS03	C4	4.00	1.000	3.000	H6	6.00	1.500	1.500	0.250
	C8	8.00		7.000	H8	8.00			
	C12	12.00		11.000	H12	12.00			
WS04	C4	4.00	1.000	3.000	H6	6.00	1.500	1.500	0.250
	C6	6.00		5.000	H8	8.00			
	C8	8.00		7.000	H12	12.00			
	C12	12.00		11.000	H18	18.00			
*WS06	C6	6.00	1.500	4.500	H9	9.00	1.500	1.500	0.375
	C9	9.00		7.500	H12	12.00			
	C12	12.00		10.500	H18	18.00		3.000	
	C15	15.00		13.500	H24	24.00			
*WS09	C9	9.00	1.500	6.000	H12	12.00	1.500	1.500	0.375
	C12	12.00		9.000	H18	18.00		3.000	
	C15	15.00		12.000	H24	24.00			
	C18	18.00		15.000	H30	30.00			
*WS12	C9	9.00	1.500	6.000	H12	12.00	1.500	1.500	0.375
	C12	12.00		9.000	H18	18.00		3.000	
	C15	15.00		12.000	H24	24.00			
	C18	18.00		15.000	H30	30.00			
WS24	C18	18.00	3.000	15.000	H24	24.00	1.500	3.000	0.750
	C24	24.00		21.000	H30	30.00			
	C30	30.00		27.000	H36	36.00			

*WIPERS

1/4” thick molded Urethane / Moly wipers are provided on both ends of the carriage (C-Section) on Slides WS06 through WS12.
Wipers are attached with hex head, 8-32 x 3/8” thread cutting screws.

SHIMS

Many applications require looser running clearances. Shims are installed in WS 6,9,12 slides to provide these running clearances.
The laminated shims are .010" thick and composed of .002"peelable layers.
Remove shims from top plate and L-Gib to accommodate applications that require tighter clearances.

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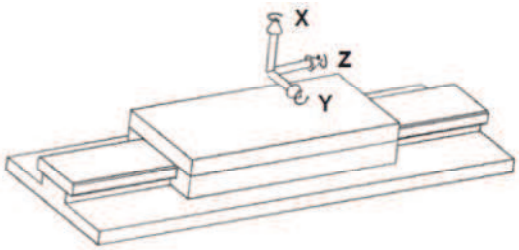
WELKER LINEAR SLIDE MOMENT LOADING

Moment MX (lbf) Fig. 7						
Carriage Length	WS03	WS04	WS06	WS09	WS12	WS24
4	300	300				
6			900	1575		
8	1200	1200				
9			2025	3544	3544	
12	2700	2700	3600	6300	6300	
15			5625	9844	9844	11250
18					14175	16200
24						28800
30						45000



Moment MZ (lbf) Fig. 8						
Carriage Length	WS03	WS04	WS06	WS09	WS12	WS24
4	143	243				
6			2106	4868		
8	287	487				
9			3159	7301	11014	
12	430	730	4212	9735	14685	
15			5265	12169	18356	
18					22028	35100
24						46800
30						58500

Moment MY (lbf) Fig. 9						
Carriage Length	WS03	WS04	WS06	WS09	WS12	WS24
4	400	400				
6			3240	4950		
8	1600	1600				
9			7290	11138	11138	
12	3600	3600	12960	19800	19800	
15			20250	30938	30938	
18					44550	32400
24						57600
30						90000

Fig. 10

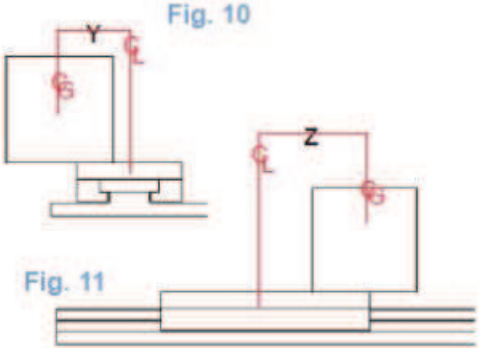


Fig. 11

MOMENT TO APPARENT LOAD CONVERSION			
	MX	MY	MZ
WS03	1.44	1.08	0.28
WS04	1.44	1.08	0.16
WS06	1.44	1.08	0.10
WS09	1.44	1.08	0.07
WS12	1.44	1.08	0.04
WS24	1.44	1.08	0.02

Fig. 12

STATIC LOADING														
Load Condition	Payload		Capacity Fig. 1		C' Length Fig. 6								% Rated Capacity	
Normal	25	/	400	/	6	=	100	=	1%					
Side		/		/		=	100	=						
Inverted		/		/		=	100	=						
T Total Static Load = 2 5														
MOMENT LOADING														
Load														
Axis	Payload		Load Offset		Applied Moment		Capacity							% Rated Capacity
MX	0	x	0	=	0	/	3240	=		x	100	=		
MY	25	x	10	=	250	/	3240	=	0.0772	x	100	=		7.72%
MZ	25	x	6	=	150	/	2106	=	0.0712	x	100	=		7.12%
FRICTIONAL LOAD														
Load														
Axis	Applied Moment		Conversion Factor		C" Length									
MX		x		/		=								
MY	250	x	1.08	/	6	=	45							Estimated
MZ	150	x	0.1		xxxxx	=	15							Force to
Total Static Load						=	25							Overcome
Total Apparent Load						=	85	x	0.25		21.25			Friction

COMPOUND LOAD APPLICATION EXAMPLE:

A WS06-C6-H9 slide carries a 25 lbf. payload. It is offset 6" in the Y direction and 10" in the Z direction.
Example shows apparent load and force required to drive the slide.
Straight load in the Normal direction is 25lbf., this is 25/2400 or 1% rated capacity.
Applied moment MZ is (25 lbf.) X (6 in.) = 150 in. lbf. This is 150/2106 or 7.12% rated capacity.
From the table: the apparent load is (.10 in.) X (150 in-lbf.) = 15 lbf.
Applied moment MY is (25 lbf.) X (10 in.) = 250 in-lbf. This is 250/3240 or 7.72% rated capacity.
From the table: the apparent load is (1.08 in.) / (6 in.) X 250 in-lbf.) = 45 lbf.

TOTAL APPARENT LOAD IS:
25 lbf.
15 lbf.
45 lbf.
85 lbf.

ESTIMATED MINIMUM FORCE REQUIRED TO MOVE THE LOAD IS: .25 x 105 lbf. = 21.25

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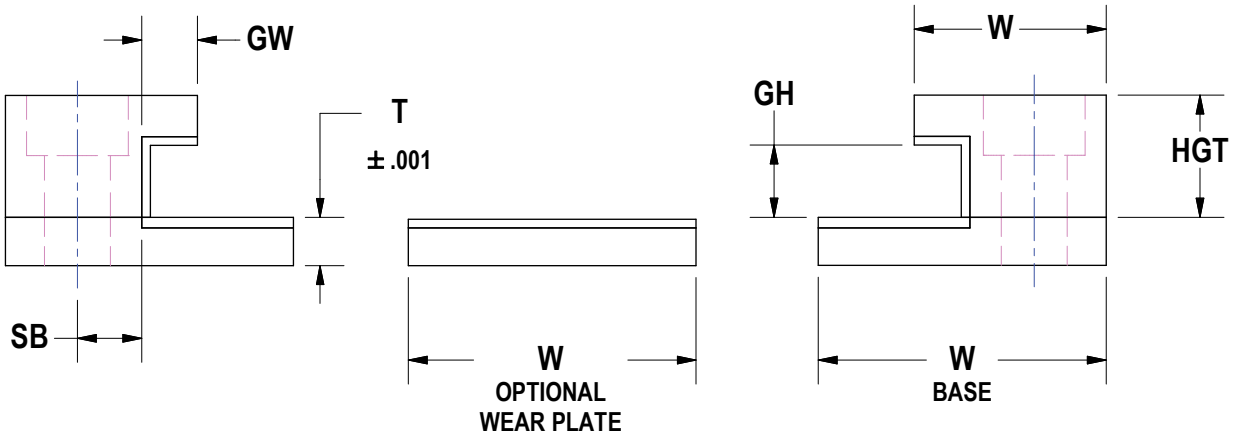
WELKER GIB ASSEMBLIES



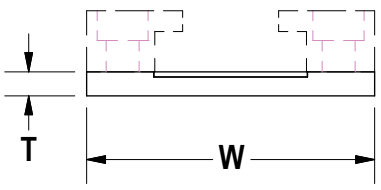
Standard Hole Pattern

PART NUMBER	LENGTHS (XX) ±.015	GW ±.010	GH ±.001	W	HGT T	SB SET BACK	HOLE SPACING	NO. OF HOLES	Clearance holes for English & Metric screws -H
L-GIB-0375-XX	6", 12"	0.250	0.376	1.00"	0.625	0.375	2	3, 6	5/16" or 8mm
BASE-0375-XX				1-1/2"	0.250				
L-GIB-0500-XX	10", 15", 20"	0.375	0.501	1.25"	0.875	0.437	2.5	4, 6, 8	3/8" or 10mm
BASE-0500-XX				2"	0.375				
L-GIB-0750-XX	12', 18", 24"	0.500	0.751	1.50"	1-1/4"	0.500	3	4, 6, 8	3/8" or 10mm
BASE-0750-XX				2"	0.375				
L-GIB-0875-XX	16", 24"	0.625	0.876	2.00"	1-1/2"	0.687	4	4, 6	1/2" or 12mm
BASE-0875-XX				2-1/2"	0.375				
PLATE-0875-XX				3"	0.375				
L-GIB-1250-XX	24"	0.750	1.251	2.50"	2"	0.875	4	6	5/8" or 16mm
BASE-1250-XX				3"	0.375				
PLATE-1250-XX				3"	0.375				
L-GIB-1500-XX	24"	1.000	1.501	3.00"	2-1/2"	1.00	6	4	5/8" or 16mm
BASE-1500-XX				4"	0.375				
PLATE-1500-XX				4"	0.375				

Fractional width & height dimensions are nominal -.050/.060 Hole locations are ±.005

Non-standard sizes available.
Special lengths available. Replace XX in part number with desired non-standard length.
Example: L-GIB-0750-14.5
Gibs are provided without holes. Add -H for standard hole pattern. Holes are clearance for both English and Metric screws.
Example: L-GIB-0500-10-H
Customer hole pattern can be provided to print.
Customer side plate specs:
Hardness: Rc35 minimum
Finish: Ground 8-16 RMS in direction of travel or Electroless Nickel plate or hard chrome to .0002 minimum thickness.

ALTERNATIVE CONSTRUCTION



Single Base
Allow 1/16" below nominal width.
Allow 1/32" below nominal height.
This allows grind clean-up of nominal stock.

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