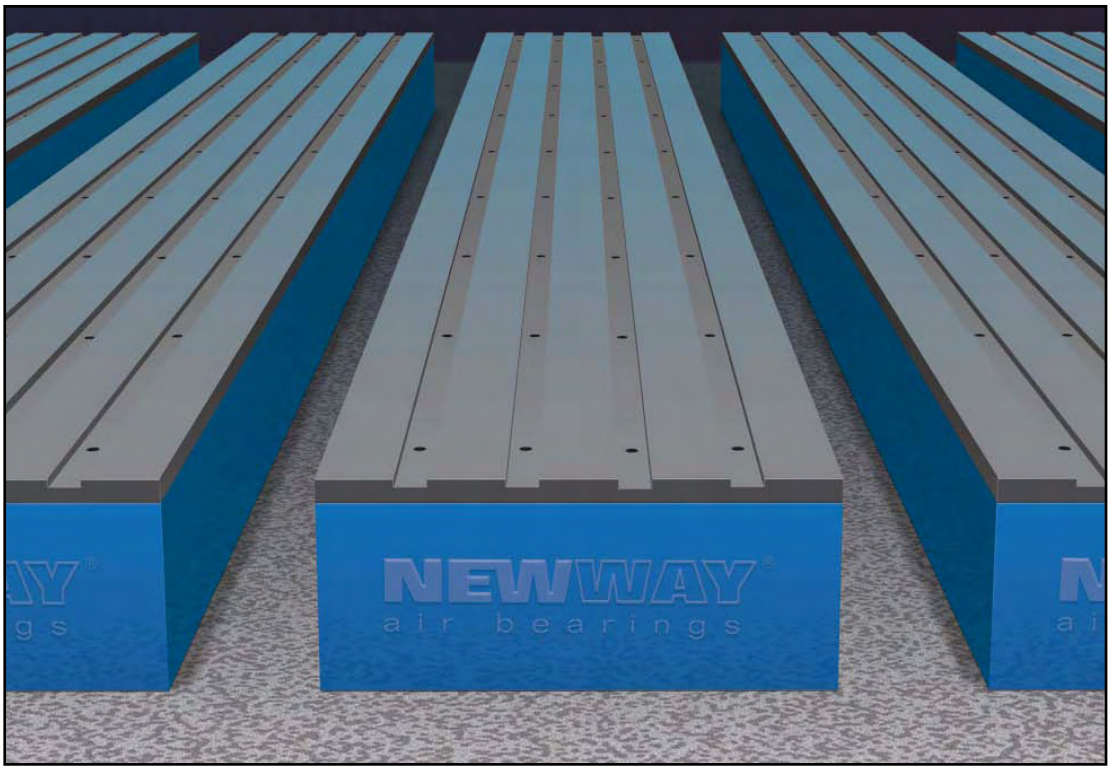
CONVEYOR AIR BEARING PRODUCT SPECIFICATIONS



NEWWAY®
air bearings

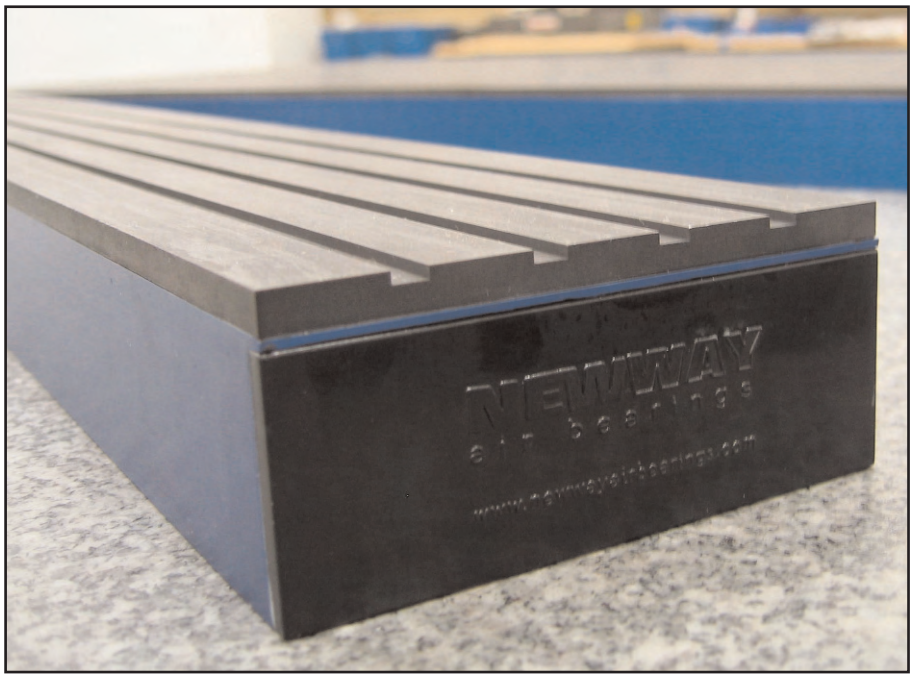
Frictionless Motion™

TABLE OF CONTENTS

NEWWAY® air bearings

CONVEYOR AIR BEARING PRODUCT LINE

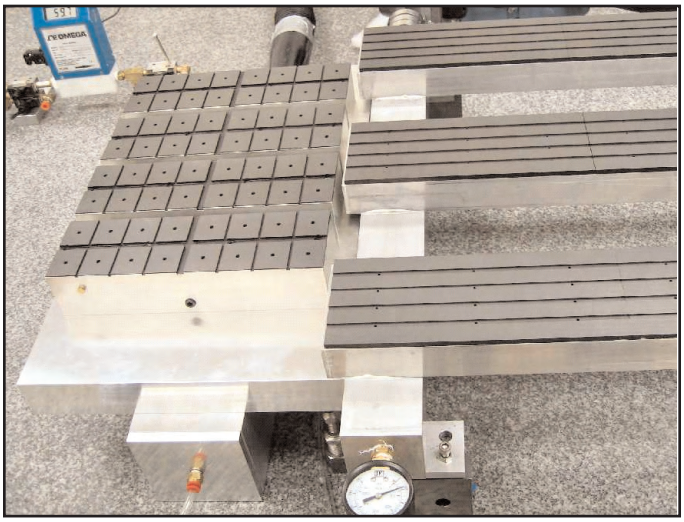
patent pending



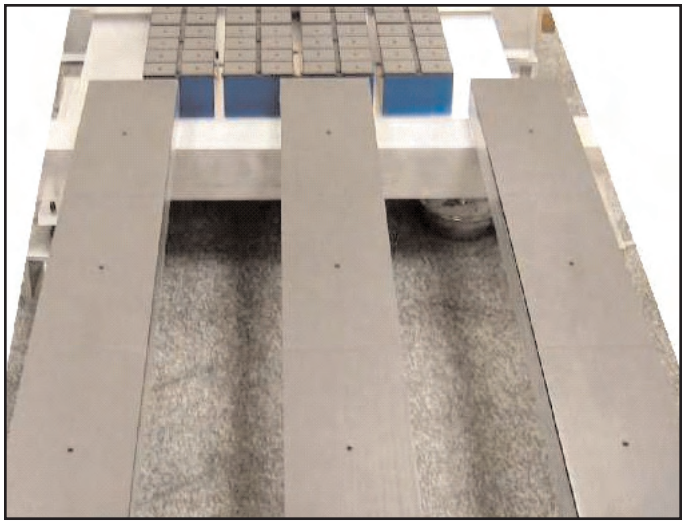
Modular Air Bearings Designed Specifically for FPD Manufacturing

New Way Air Bearings now offers a line of three modular air bearing products specifically designed to meet the glass-handling requirements of the Flat Panel Display (FPD) manufacturing process. This line includes flat panel conveyor air bearings for floating glass in **high speed** applications, **low airflow** applications, and for applications under or near **precision processes**.

These solutions provide significant advantages over conventional contact bearings or orifice-based air bearings, especially for coating or AOI applications in Gen-5 or higher manufacturing lines. Superior stiffness provides for faster settling time and higher yield, without the scratching or breakage typical of competitive systems. And the larger the glass size, the bigger the advantage.



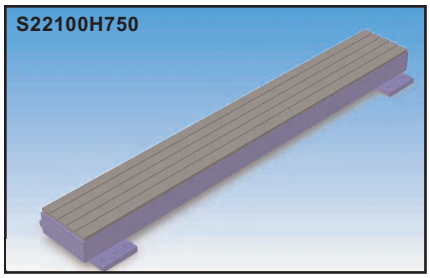
750mm High Speed Conveyor Air Bearings as part of an FPD Glass Handling System with Precision Chuck



750mm Low Airflow Conveyor Air Bearings as part of an Air Conveyor and Precision Chuck FPD Glass Handling System

CONVEYOR AIR BEARINGS

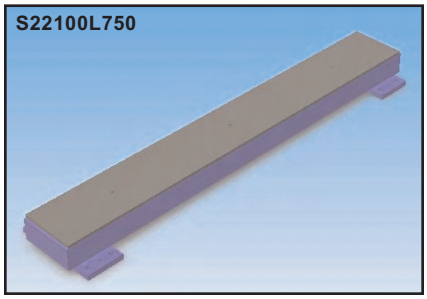
The New Way Product Line



750mm High Speed Conveyor Air Bearing

High Speed Conveyor Air Bearing

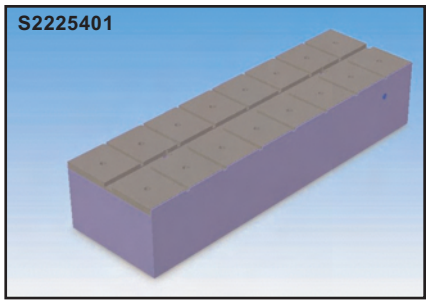
New Way engineered this High Speed Conveyor Air Bearing to provide improved non-contact control of FPD glass at high process speeds. For the best control, air gaps should be less than 50 microns. New Way applies large amounts of vacuum area for strong downward forces on the glass, maintaining the smaller air gap necessary for higher stiffness and improved damping. The large, attractive forces give excellent flattening ability that helps maintain control of the glass.



750mm Low Airflow Conveyor Air Bearing

Low Airflow Conveyor Air Bearing

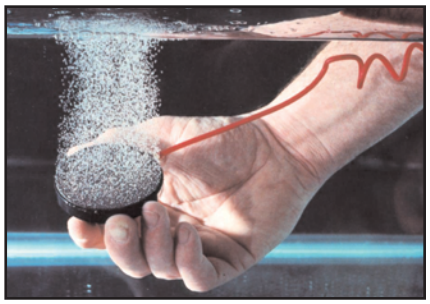
New Way's Low Flow Conveyor Air Bearings provide non-contact control optimized for low airflow requirements. The difficulty with high fly-heights of greater than 50 microns is that they typically result in low air film stiffness (less control) unless they also have correspondingly high pressures and flows. By plumbing most of the porous media face with low pressure air, and with high pressure air only around the vacuum holes, the flow requirements are greatly reduced. The periodic high pressure areas, preloaded by the vacuum, create high stiffness points which stabilize the glass dynamics even at high air gaps and low air consumption.



250x75mm Precision Chuck

Porous Media Precision Chuck

New Way Porous Media Precision Chucks are engineered for use under or near precision FPD glass processes. They provide a much higher level of precision, stiffness, and damping than traditional air conveyors. The vacuum holes are designed so that, with air pressure on, the flow through a vacuum hole is the same whether there is glass over it or not. Simple and smart. This also means that as the glass comes on and off the chuck, the vacuum pressures and air gaps remain the same.



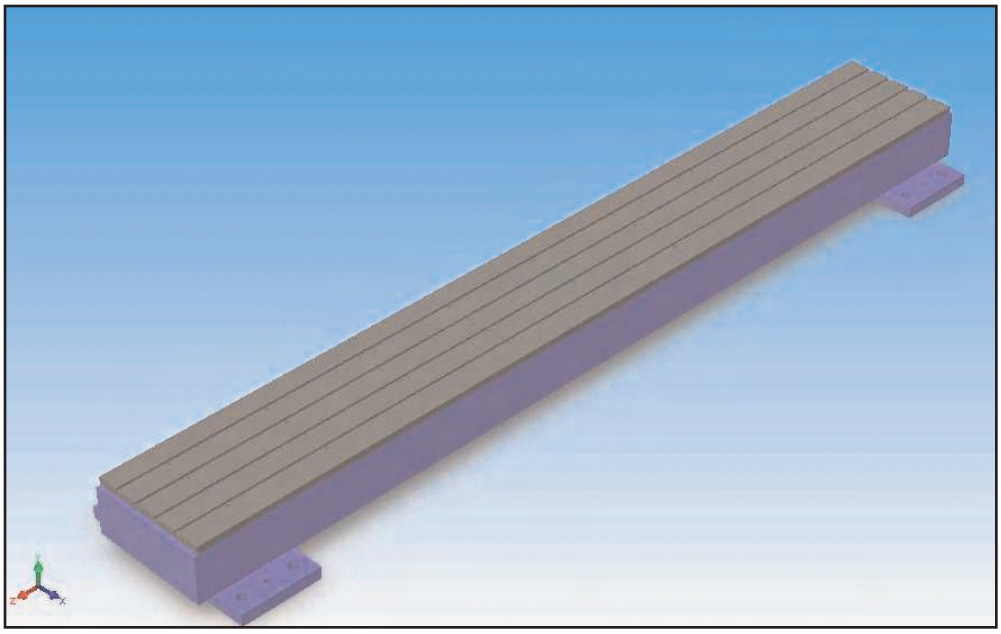
New Way Porous Media Air Bearings

The Advantages of Porous Media

Unlike conventional orifice compensation, New Way Porous Media Air Bearings control the airflow across the entire bearing surface through millions of holes in the porous material. Porous carbon has been found to be one of the best materials for this purpose, producing an ideal supply of uniform air pressure across the face of the bearing while automatically restricting and damping the air flow at the same time. The carbon surface also provides greater bearing protection if there is an air supply failure, and allows the bearings to be moved during air failure without damaging the support surface.

HIGH SPEED CONVEYOR AIR BEARING

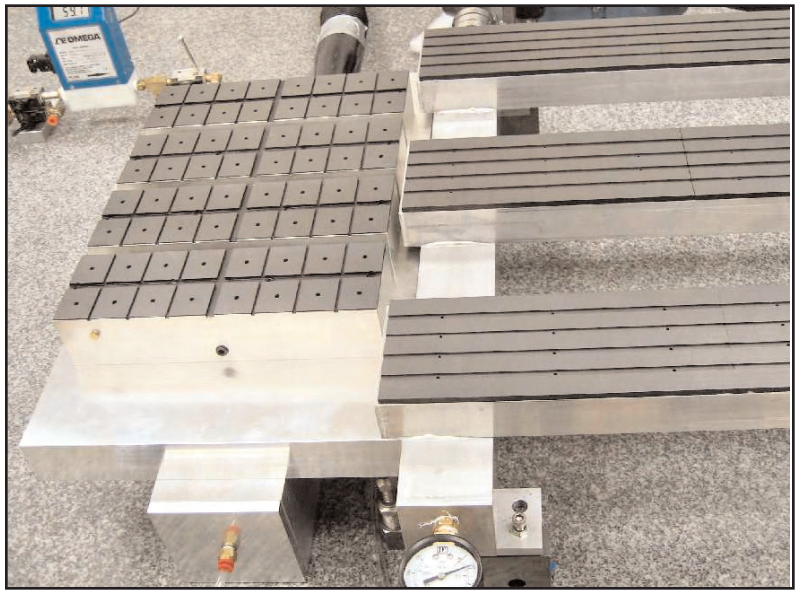
patent pending



750mm High Speed Conveyor Air Bearing S22100H750

Improved Non-Contact Control of FPD Glass at High Speeds

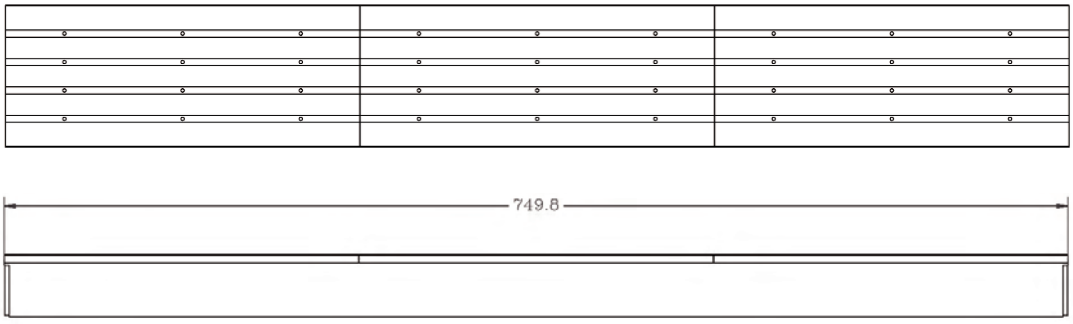
For the best control of FPD glass, air gaps should be less than 50 microns. Large amounts of vacuum area result in large downward forces on the glass making it difficult to maintain large air gaps. The smaller gap results in higher stiffness and improved damping. The large, attractive forces give excellent flattening ability that helps maintain control of the glass. This combined with the constant low pressure at the leading edge of the glass prevents the glass from lifting off the conveyor at high speeds.

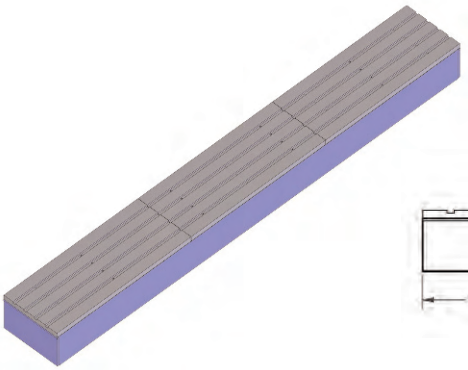


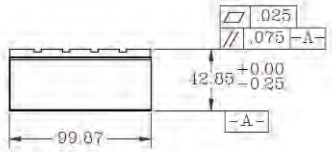
750mm High Speed Conveyor Air Bearings as part of an Air Conveyor and Precision Chuck FPD Glass Handling System

HIGH SPEED CONVEYOR AIR BEARING

Specification Drawings: 750mm Bearing





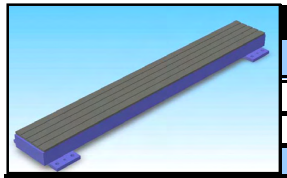


CAUTION

Maximum Allowable Pressure Supply

Do not exceed **60psi (4 atm)**. Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

FLAT PANEL HIGH SPEED CONVEYOR TEST RESULTS



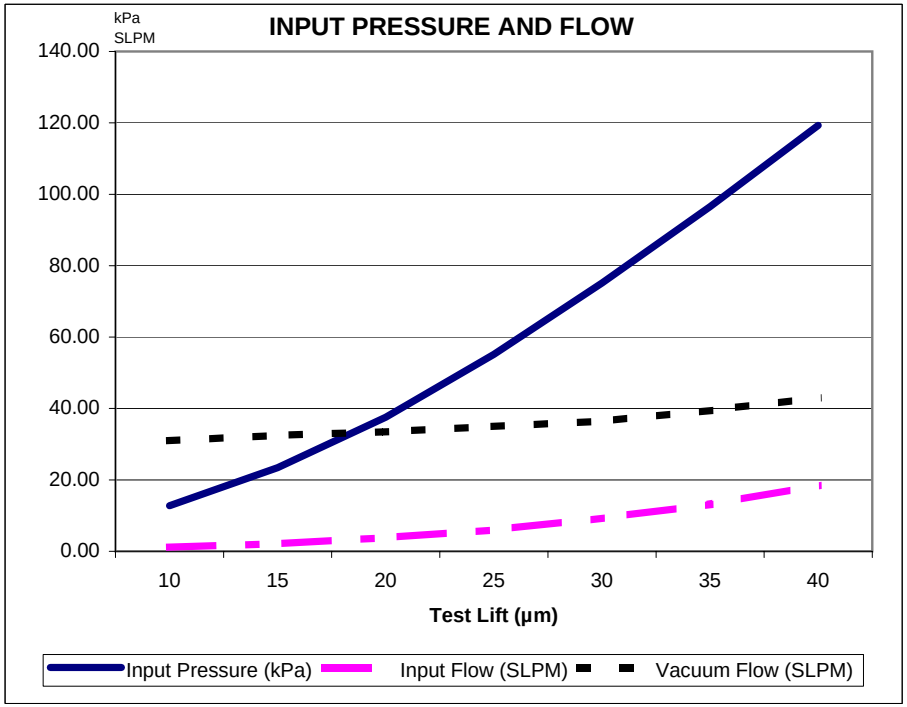
TEST VACUUM	
(in H_20)	(mm H_20)
1	25.40

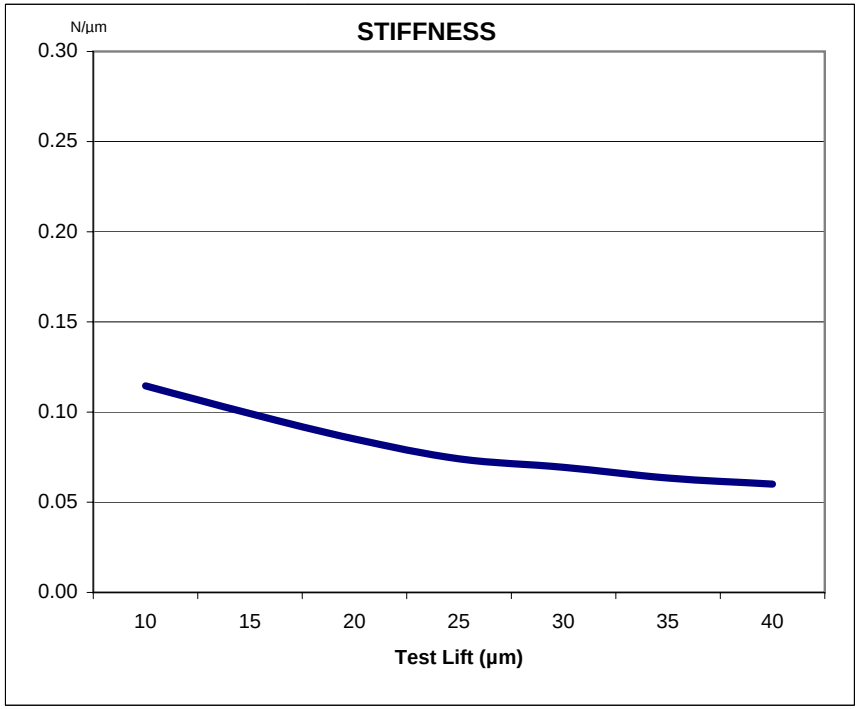
NEWWAY® air bearings

STIFFNESS TEST LOAD		
(lb)	(g)	(N)
0.25	113.3	1.11

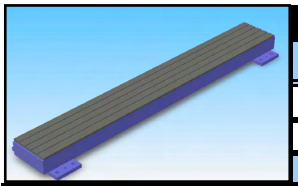
CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

		INPUT PRESSURE				VACUUM		STIFFNESS				
TEST LIFT		PRESSURE		FLOW		FLOW		LOAD LIFT		STIFFNESS		
(in)	(µm)	(psi)	(kPa)	(SCFM)	(SLPM)	(SCFM)	(SLPM)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00039	10	1.85	12.76	0.04	1.17	1.09	31.00	0.00001	0.30	653.89	11.68	0.11
0.00059	15	3.40	23.44	0.08	2.17	1.15	32.50	0.00015	3.80	566.32	10.12	0.10
0.00079	20	5.45	37.58	0.14	3.83	1.18	33.50	0.00027	6.95	486.04	8.68	0.09
0.00098	25	8.00	55.16	0.21	6.00	1.24	35.00	0.00039	10.00	422.85	7.55	0.07
0.00118	30	10.90	75.15	0.33	9.30	1.29	36.50	0.00055	14.00	396.42	7.08	0.07
0.00138	35	14.00	96.53	0.46	13.17	1.39	39.50	0.00069	17.50	362.44	6.47	0.06
0.00157	40	17.30	119.28	0.65	18.50	1.52	43.00	0.00085	21.50	342.85	6.12	0.06





FLAT PANEL HIGH SPEED CONVEYOR TEST RESULTS



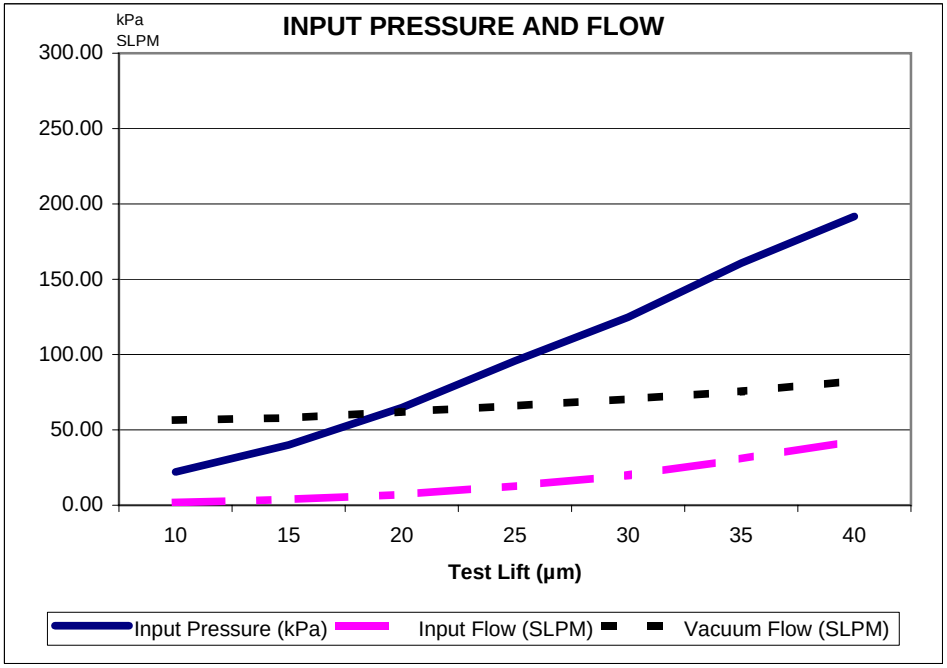
TEST VACUUM	
(in H_20)	(mm H_20)
2	50.80

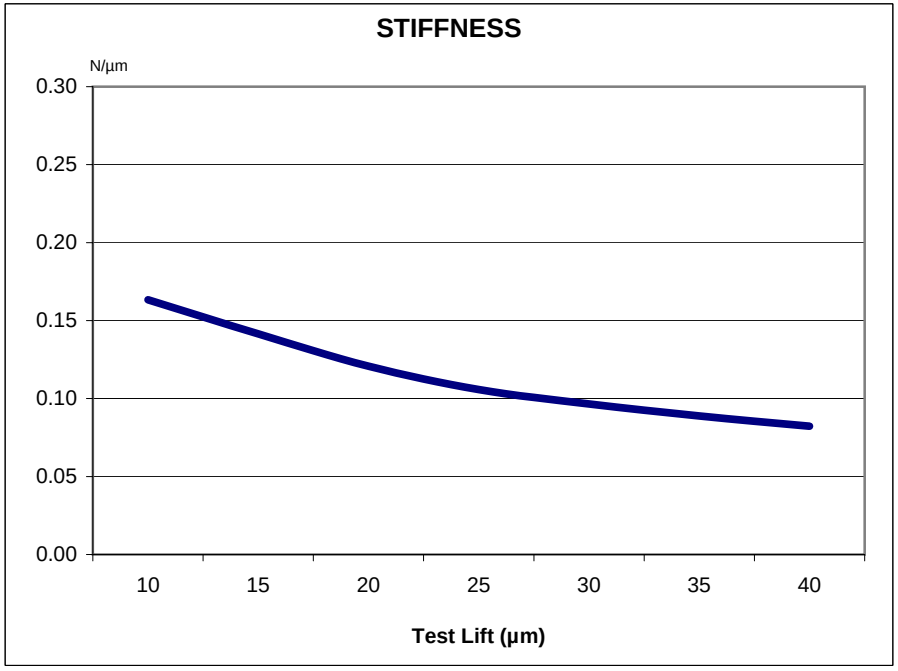
NEWWAY® air bearings

STIFFNESS TEST LOAD		
(lb)	(g)	(N)
0.25	113.3	1.11

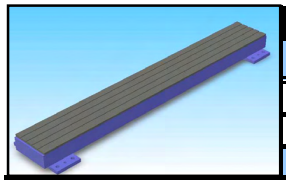
CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

		INPUT PRESSURE				VACUUM		STIFFNESS				
TEST LIFT (in)	TEST LIFT (µm)	PRESSURE (psi)	PRESSURE (kPa)	FLOW (SCFM)	FLOW (SLPM)	FLOW (SCFM)	FLOW (SLPM)	LOAD LIFT (in)	LOAD LIFT (µm)	STIFFNESS (lb/in)	STIFFNESS (g/µm)	STIFFNESS (N/µm)
0.00039	10	3.20	22.06	0.06	1.83	2.00	56.50	0.00013	3.20	932.76	16.66	0.16
0.00059	15	5.80	39.99	0.14	3.83	2.05	58.00	0.00028	7.15	807.99	14.43	0.14
0.00079	20	9.40	64.81	0.25	7.17	2.19	62.00	0.00043	10.80	689.43	12.32	0.12
0.00098	25	13.90	95.84	0.45	12.83	2.33	66.00	0.00057	14.50	604.07	10.79	0.11
0.00118	30	18.10	124.80	0.70	19.83	2.49	70.50	0.00073	18.50	551.54	9.85	0.10
0.00138	35	23.30	160.65	1.08	30.67	2.67	75.50	0.00089	22.50	507.42	9.06	0.09
0.00157	40	27.80	191.67	1.51	42.83	2.91	82.50	0.00104	26.50	469.83	8.39	0.08





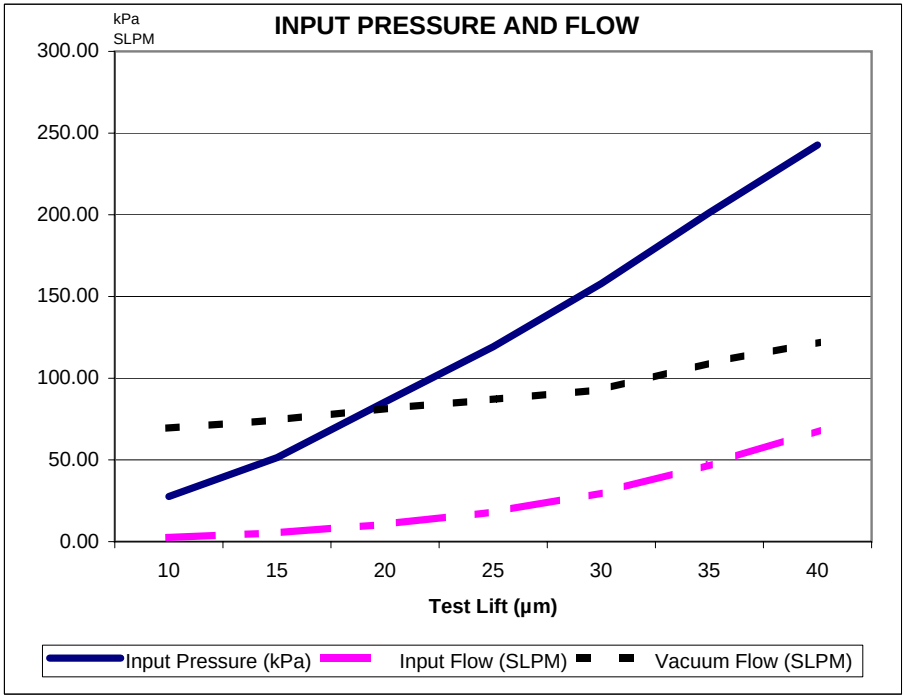
FLAT PANEL HIGH SPEED CONVEYOR TEST RESULTS

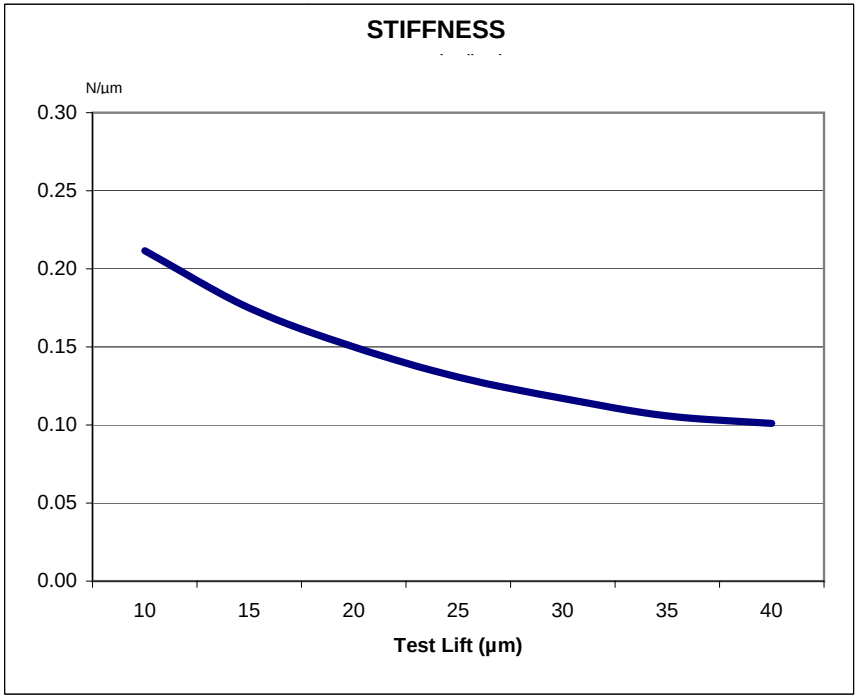


TEST VACUUM			STIFFNESS TEST LOAD		
(in H_20)	(mm H_20)	NEWWAY® air bearings	(lb)	(g)	(N)
3	76.20		0.25	113.3	1.11

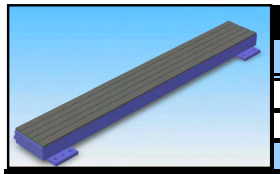
CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

		INPUT PRESSURE				VACUUM		STIFFNESS				
TEST LIFT		PRESSURE		FLOW		FLOW		LOAD LIFT		STIFFNESS		
(in)	(µm)	(psi)	(kPa)	(SCFM)	(SLPM)	(SCFM)	(SLPM)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00039	10	4.00	27.58	0.09	2.50	2.45	69.50	0.00019	4.75	1208.14	21.58	0.21
0.00059	15	7.45	51.37	0.19	5.50	2.63	74.50	0.00034	8.65	998.86	17.84	0.17
0.00079	20	12.40	85.49	0.38	10.67	2.88	81.50	0.00050	12.80	856.52	15.30	0.15
0.00098	25	17.30	119.28	0.64	18.17	3.07	87.00	0.00065	16.50	746.21	13.33	0.13
0.00118	30	22.90	157.89	1.05	29.83	3.28	93.00	0.00083	21.00	668.09	11.93	0.12
0.00138	35	29.20	201.33	1.67	47.17	3.87	109.50	0.00096	24.50	604.07	10.79	0.11
0.00157	40	35.20	242.70	2.40	68.00	4.31	122.00	0.00114	29.00	576.61	10.30	0.10





FLAT PANEL HIGH SPEED CONVEYOR TEST RESULTS



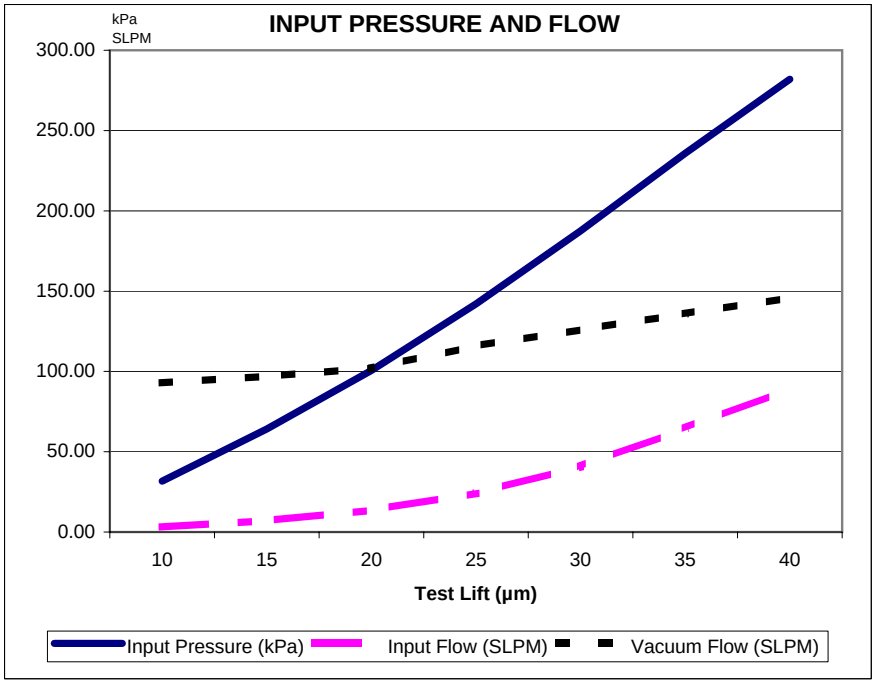
TEST VACUUM	
(in H_20)	(mm H_20)
4	101.60

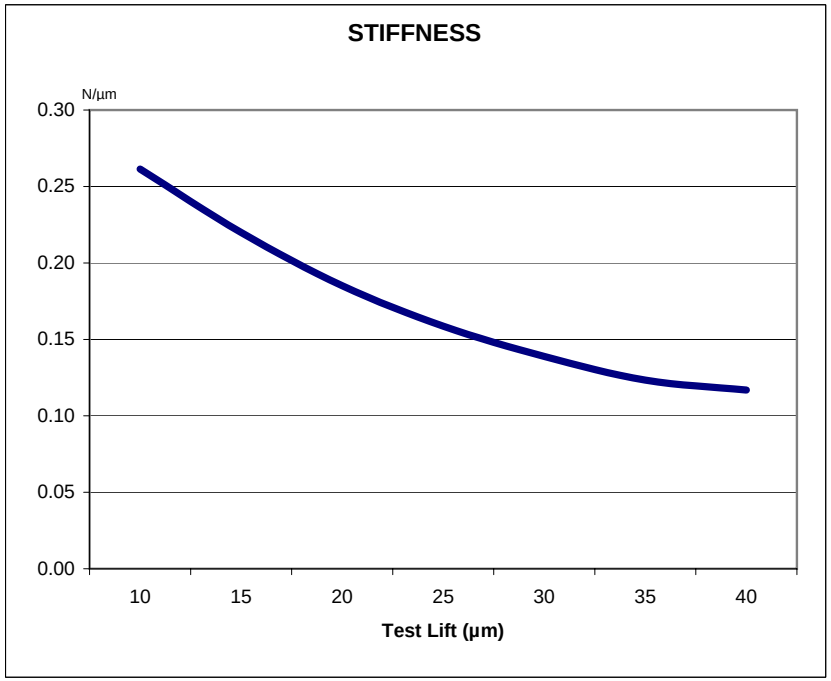
NEWWAY® air bearings

STIFFNESS TEST LOAD		
(lb)	(g)	(N)
0.25	113.3	1.11

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

TEST LIFT		INPUT PRESSURE				VACUUM		STIFFNESS				
		PRESSURE		FLOW		FLOW		LOAD LIFT		STIFFNESS		
(in)	(µm)	(psi)	(kPa)	(SCFM)	(SLPM)	(SCFM)	(SLPM)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00039	10	4.60	31.72	0.11	3.17	3.28	93.00	0.00023	5.75	1492.41	26.66	0.26
0.00059	15	9.30	64.12	0.25	7.17	3.43	97.00	0.00038	9.75	1256.24	22.44	0.22
0.00079	20	14.60	100.66	0.48	13.67	3.60	102.00	0.00055	14.00	1057.13	18.88	0.19
0.00098	25	20.60	142.03	0.85	24.17	4.10	116.00	0.00071	18.00	906.11	16.19	0.16
0.00118	30	27.20	187.54	1.44	40.83	4.45	126.00	0.00087	22.00	792.84	14.16	0.14
0.00138	35	34.20	235.80	2.28	64.67	4.80	136.00	0.00102	26.00	704.75	12.59	0.12
0.00157	40	40.90	282.00	3.15	89.33	5.16	146.00	0.00120	30.50	667.66	11.93	0.12



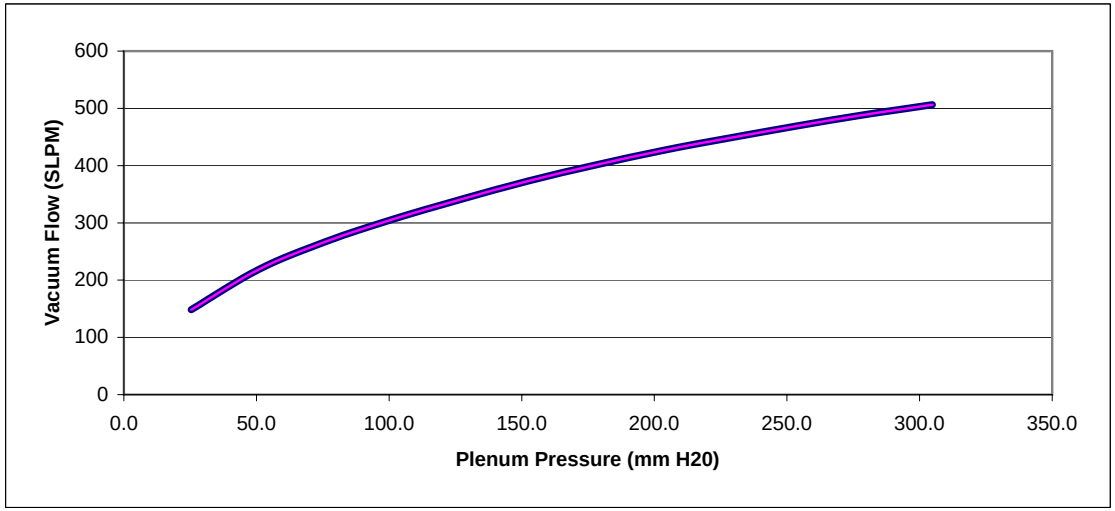


FLAT PANEL HIGH SPEED CONVEYOR TEST RESULTS

Vacuum Flow: No Glass Present

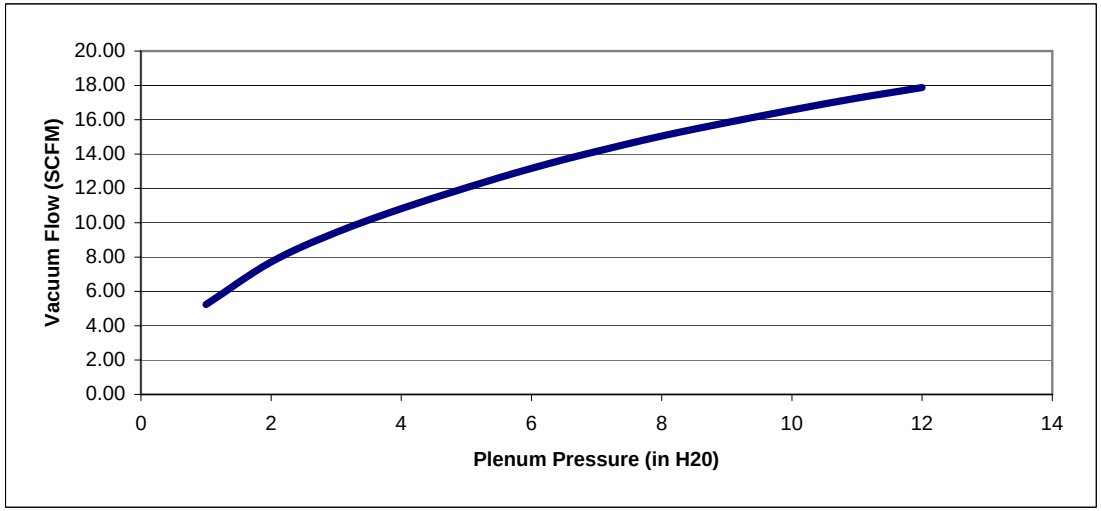
Metric

PLENUM PRESSURE (mm H_20)	VACUUM FLOW (PER BEARING) (SLPM)
25.4	149
50.8	219
76.2	268
101.6	307
127.0	341
152.4	373
177.8	401
203.2	427
228.6	449
254.0	470
279.4	489
304.8	507



English

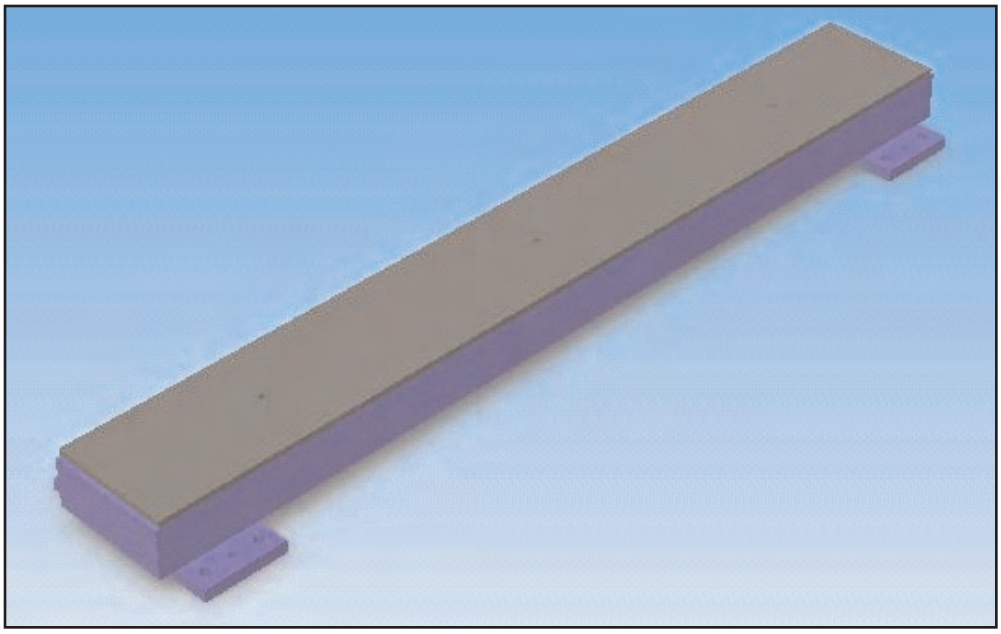
PLENUM PRESSURE (in H_20)	VACUUM FLOW (PER BEARING) (SCFM)
1	5.24
2	7.71
3	9.44
4	10.82
5	12.04
6	13.17
7	14.16
8	15.06
9	15.83
10	16.57
11	17.26
12	17.88




NEW WAY
084178

LOW AIRFLOW CONVEYOR AIR BEARING

patent pending

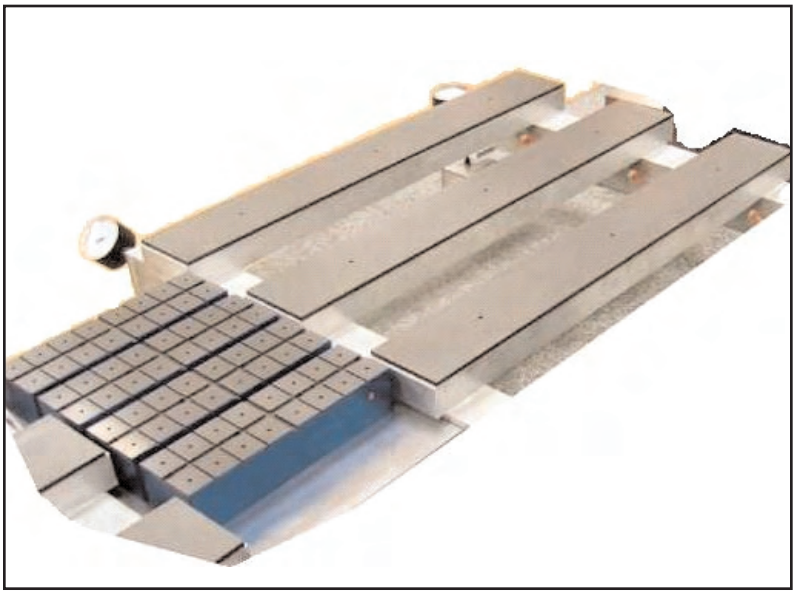


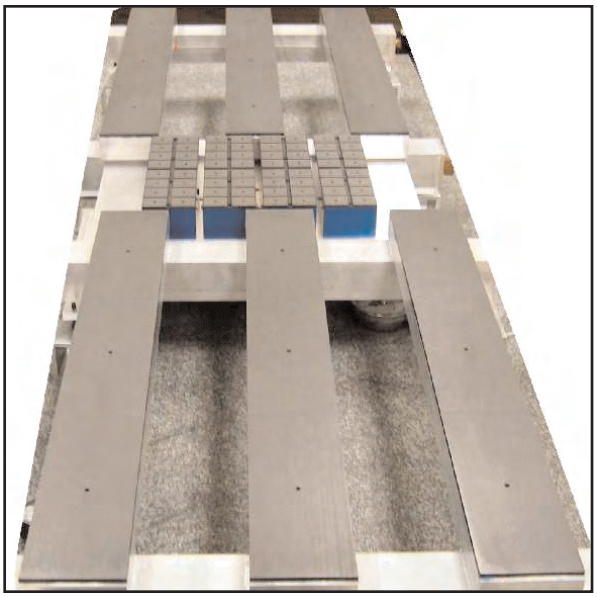
750mm Low Airflow Conveyor Air Bearing S22100L750

Non-Contact Control Optimized for Low Airflow Requirements

The problem with high fly-heights (> 50 microns) is that they typically result in low air film stiffness (less control) unless they also have correspondingly high pressures and flows. By plumbing most of the porous media face with low pressure air, and with high pressure air only around the vacuum holes, the flow requirements are greatly reduced.

The periodic high pressure areas, preloaded by the vacuum, create high stiffness points which stabilize the glass dynamics even at high air gaps and low air consumption. Because the pressurized air bleeds out of the entire bearing face it provides a high margin of safety against glass touch-down.

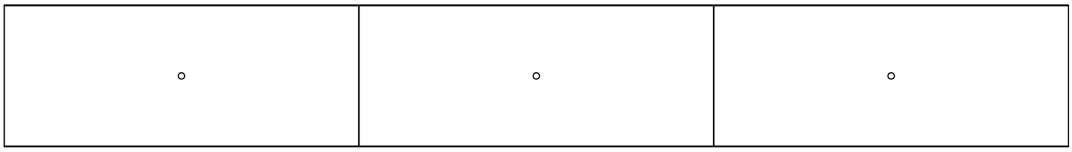


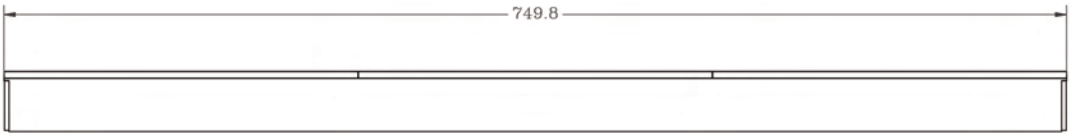


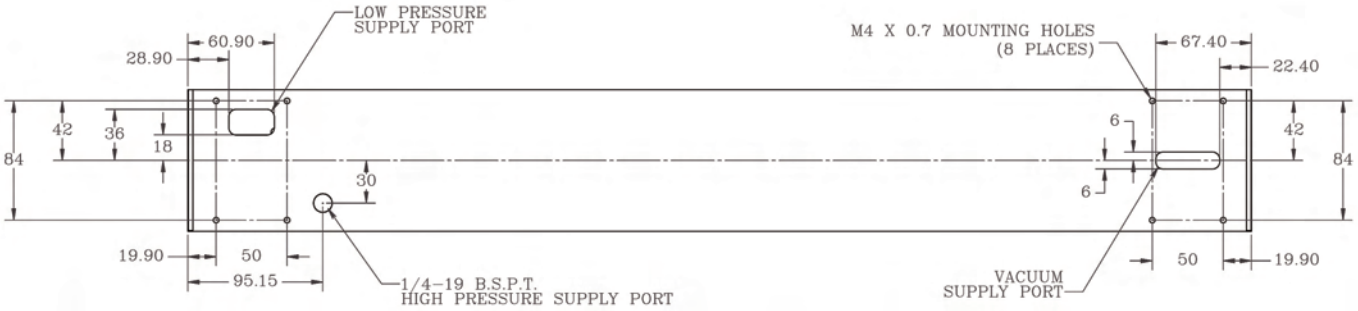
750mm Low Airflow Conveyor Air Bearings as part of an Air Conveyor and Precision Chuck FPD Glass Handling System

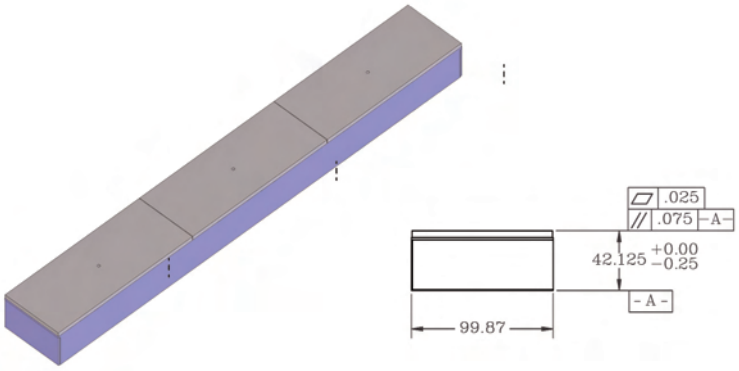
LOW AIRFLOW CONVEYOR AIR BEARING

Specification Drawings: 750mm Bearing









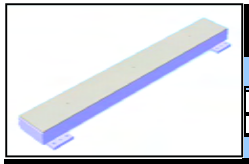
CAUTION

Maximum Allowable Pressure Supply

Do not exceed **60psi (4 atm)**. Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

LOW FLOW CONVEYOR TEST RESULTS

INPUT PRESSURE AND FLOW



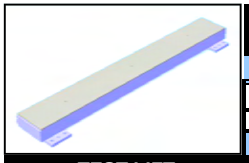
TEST VACUUM PRESSURE	
(in H_20)	(mm H_20)
3	76.20

NEWWAY® air bearings

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

TEST LIFT		HIGH PRESSURE				LOW PRESSURE					
		PRESSURE		FLOW		PRESSURE		FLOW		VACUUM FLOW	
(in)	(µm)	(psi)	(kPa)	(SCFH)	(SLPM)	(psi)	(kPa)	(SCFH)	(SLPM)	(SCFH)	(SLPM)
0.00098	25	0.75	5.17	0.26	0.13	0.02	0.14	0.03	0.01	0.53	0.25
0.00197	50	3.80	26.20	1.32	0.63	0.20	1.38	0.25	0.12	1.70	0.80
0.00295	75	9.50	65.50	3.66	1.73	0.60	4.14	0.65	0.31	4.50	2.12
0.00394	100	16.85	116.18	7.68	3.63	1.40	9.65	1.35	0.64	9.33	4.40
0.00492	125	24.90	171.68	13.03	6.15	2.55	17.58	3.30	1.56	15.90	7.50
0.00591	150	32.35	223.05	18.91	8.93	4.00	27.58	6.15	2.90	22.00	10.38
0.00689	175	38.45	265.10	24.16	11.40	5.80	39.99	9.75	4.60	27.78	13.11

STIFFNESS

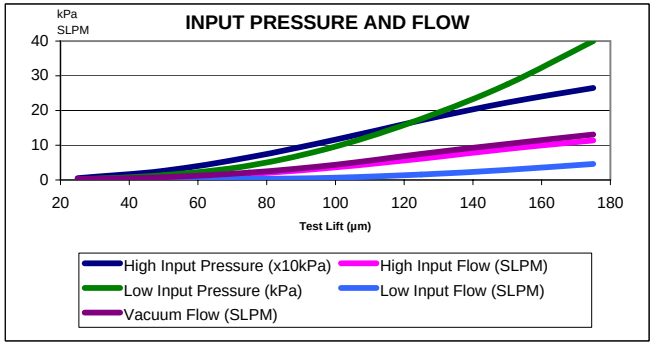


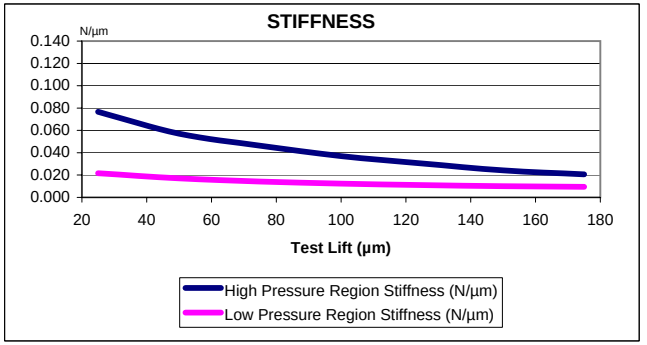
TEST VACUUM PRESSURE	
(in H_20)	(mm H_20)
3	76.20

NEWWAY® air bearings

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

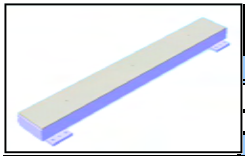
TEST LIFT		HIGH PRESSURE: test load 0.25lb / 113.3g / 1.11N					LOW PRESSURE: test load 0.12lb / 54g / 0.53N				
		LOAD LIFT		STIFFNESS			LOAD LIFT		STIFFNESS		
(in)	(µm)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00098	25	0.00041	10.50	437.43	7.81	0.077	0.00002	0.50	123.39	2.20	0.022
0.00197	50	0.00120	30.50	325.27	5.81	0.057	0.00074	18.90	97.20	1.74	0.017
0.00295	75	0.00201	51.00	264.28	4.72	0.046	0.00148	37.50	80.61	1.44	0.014
0.00394	100	0.00276	70.00	211.43	3.78	0.037	0.00224	56.80	69.98	1.25	0.012
0.00492	125	0.00348	88.50	173.77	3.10	0.030	0.00303	76.90	62.85	1.12	0.011
0.00591	150	0.00409	104.00	137.89	2.46	0.024	0.00383	97.40	57.47	1.03	0.010
0.00689	175	0.00476	121.00	117.46	2.10	0.021	0.00467	118.70	53.69	0.96	0.009





LOW FLOW CONVEYOR TEST RESULTS

INPUT PRESSURE AND FLOW



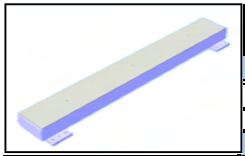
TEST VACUUM PRESSURE	
(in H_20)	(mm H_20)
6	152.40

NEWWAY® air bearings

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

		HIGH PRESSURE				LOW PRESSURE					
TEST LIFT		PRESSURE		FLOW		PRESSURE		FLOW		VACUUM FLOW	
(in)	(µm)	(psi)	(kPa)	(SCFH)	(SLPM)	(psi)	(kPa)	(SCFH)	(SLPM)	(SCFH)	(SLPM)
0.00098	25	1.30	8.96	0.48	0.23	0.03	0.21	0.02	0.01	0.73	0.34
0.00197	50	6.60	45.51	2.38	1.13	0.20	1.38	0.15	0.07	2.68	1.26
0.00295	75	15.20	104.80	6.73	3.18	0.40	2.76	0.53	0.25	6.63	3.13
0.00394	100	26.10	179.95	14.04	6.63	1.00	6.89	1.23	0.58	14.35	6.77
0.00492	125	37.70	259.93	23.57	11.13	1.80	12.41	2.20	1.04	23.70	11.19
0.00591	150	49.20	339.22	33.74	15.93	2.90	19.99	3.75	1.77	34.30	16.19

STIFFNESS

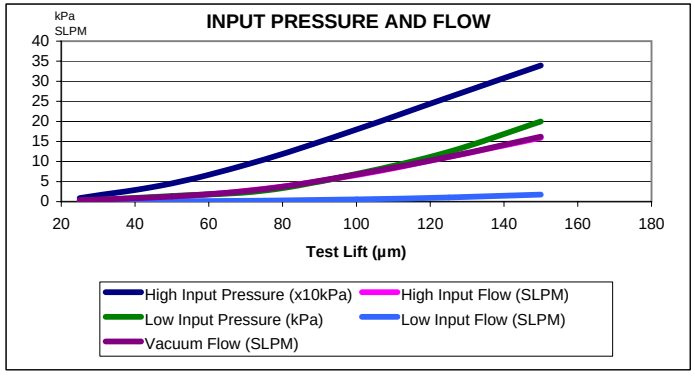


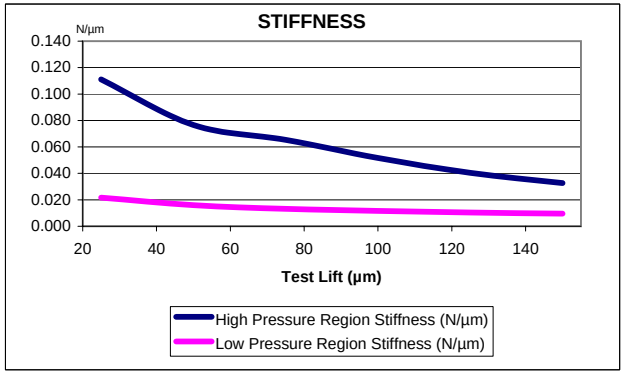
TEST VACUUM PRESSURE	
(in H_20)	(mm H_20)
6	152.40

NEWWAY® air bearings

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

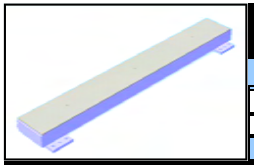
		HIGH PRESSURE: test load 0.25lb / 113.3g / 1.11N					LOW PRESSURE: test load 0.12lb / 54g / 0.53N				
TEST LIFT		LOAD LIFT		STIFFNESS			LOAD LIFT		STIFFNESS		
(in)	(µm)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00098	25	0.00059	15.00	634.28	11.33	0.111	0.00002	0.50	123.39	2.20	0.022
0.00197	50	0.00140	35.50	437.43	7.81	0.077	0.00066	16.75	90.92	1.62	0.016
0.00295	75	0.00228	58.00	373.10	6.66	0.065	0.00138	34.95	75.48	1.35	0.013
0.00394	100	0.00309	78.50	295.01	5.27	0.052	0.00215	54.50	66.44	1.19	0.012
0.00492	125	0.00384	97.50	230.65	4.12	0.040	0.00293	74.40	59.74	1.07	0.010
0.00591	150	0.00457	116.00	186.55	3.33	0.033	0.00373	94.65	54.62	0.98	0.010





LOW FLOW CONVEYOR TEST RESULTS

INPUT PRESSURE AND FLOW



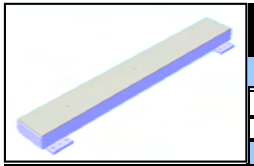
TEST VACUUM PRESSURE	
(in H_20)	(mm H_20)
9	228.60

NEWWAY® air bearings

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

		HIGH PRESSURE				LOW PRESSURE					
TEST LIFT		PRESSURE		FLOW		PRESSURE		FLOW		VACUUM FLOW	
(in)	(µm)	(psi)	(kPa)	(SCFH)	(SLPM)	(psi)	(kPa)	(SCFH)	(SLPM)	(SCFH)	(SLPM)
0.00098	25	2.00	13.79	0.69	0.33	0.00	0.00	0.00	0.00	1.00	0.47
0.00197	50	9.20	63.43	3.55	1.68	0.00	0.00	0.00	0.00	3.48	1.64
0.00295	75	20.65	142.38	10.17	4.80	0.10	0.69	0.00	0.00	9.48	4.47
0.00394	100	33.80	233.04	20.13	9.50	0.40	2.76	0.00	0.00	18.98	8.96
0.00492	125	47.14	325.02	32.05	15.13	1.10	7.58	0.40	0.19	30.88	14.57

STIFFNESS

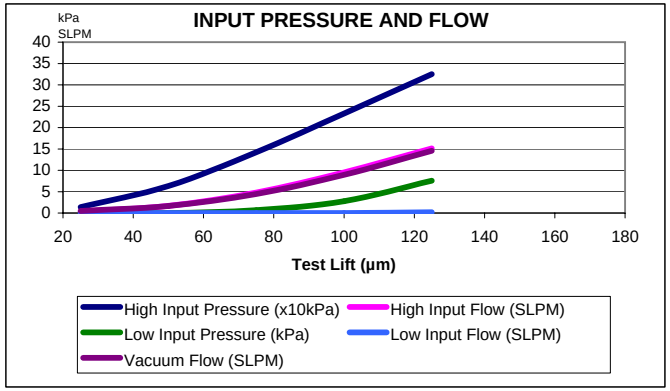


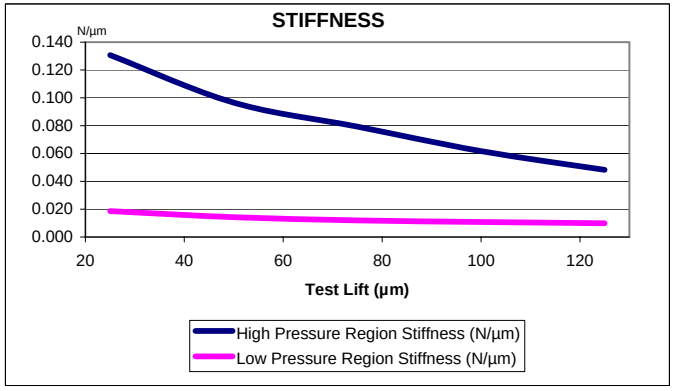
TEST VACUUM PRESSURE	
(in H_20)	(mm H_20)
9	228.60

NEWWAY® air bearings

CAUTION: Maximum Allowable Pressure Supply - Do not exceed 60psi (4 atm). Failure to observe this limitation could result in damage to the bearing and serious bodily injury.

		HIGH PRESSURE: test load 0.25lb / 113.3g / 1.11N					LOW PRESSURE: test load 0.12lb / 54g / 0.53N				
TEST LIFT		LOAD LIFT		STIFFNESS			LOAD LIFT		STIFFNESS		
(in)	(µm)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00098	25	0.00065	16.50	746.21	13.33	0.131	0.00000	0.00	106.07	1.89	0.019
0.00197	50	0.00152	38.50	551.54	9.85	0.097	0.00051	12.95	81.59	1.46	0.014
0.00295	75	0.00240	61.00	453.05	8.09	0.079	0.00120	30.60	68.09	1.22	0.012
0.00394	100	0.00323	82.00	352.38	6.29	0.062	0.00201	51.00	61.69	1.10	0.011
0.00492	125	0.00402	102.00	275.77	4.93	0.048	0.00282	71.65	56.66	1.01	0.010



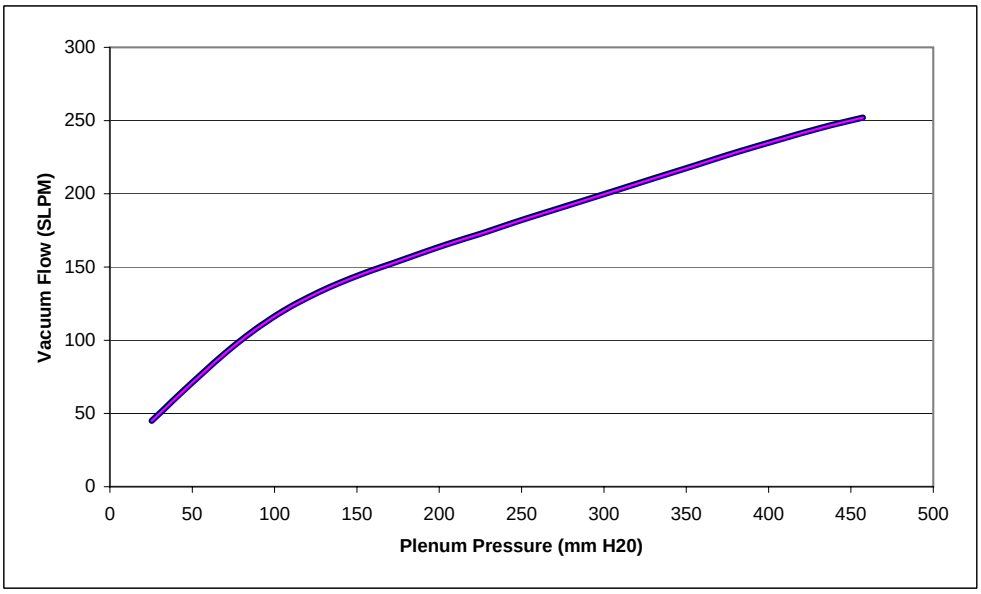


LOW FLOW CONVEYOR TEST RESULTS

Vacuum Flow: No Glass Present

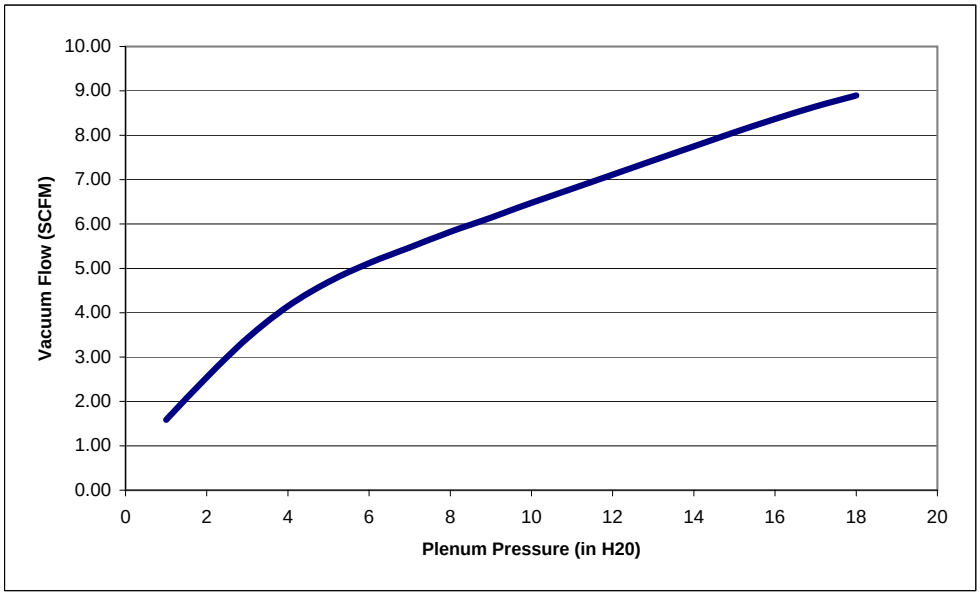
Metric

PLENUM PRESSURE (mm H_20)	VACUUM FLOW (PER BEARING) (SLPM)
25.4	45
50.8	72
76.2	97
101.6	118
127.0	133
152.4	145
177.8	155
203.2	165
228.6	174
254.0	184
279.4	193
304.8	202
330.2	211
355.6	220
381.0	229
406.4	237
431.8	245
457.2	252



English

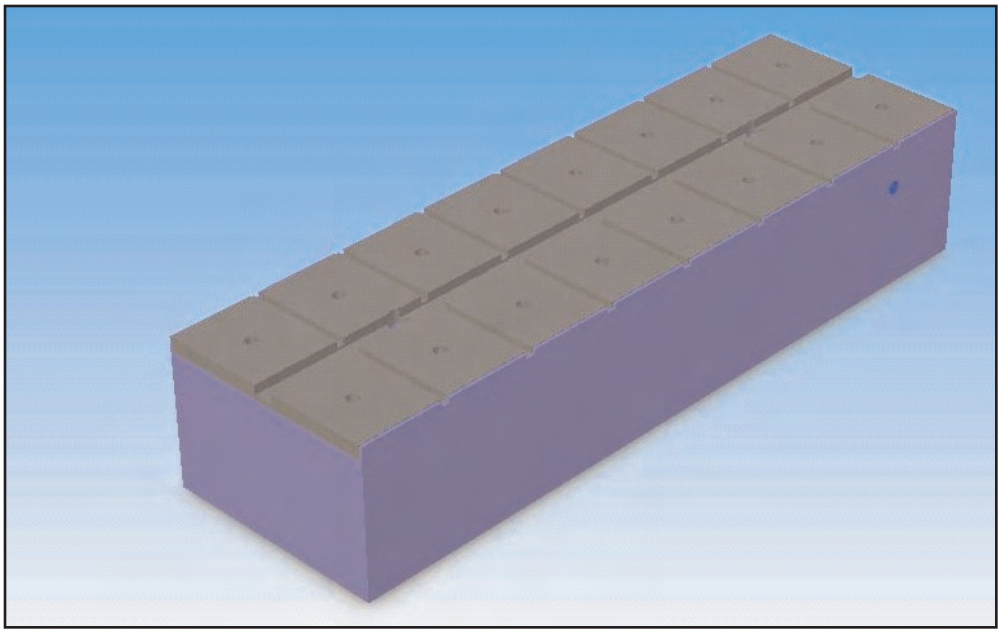
PLENUM PRESSURE (in H_20)	VACUUM FLOW (PER BEARING) (SCFM)
1	1.59
2	2.54
3	3.42
4	4.15
5	4.69
6	5.12
7	5.47
8	5.82
9	6.14
10	6.48
11	6.80
12	7.11
13	7.43
14	7.75
15	8.07
16	8.37
17	8.65
18	8.90




CALIBRATION

POROUS MEDIA PRECISION CHUCK

patent pending

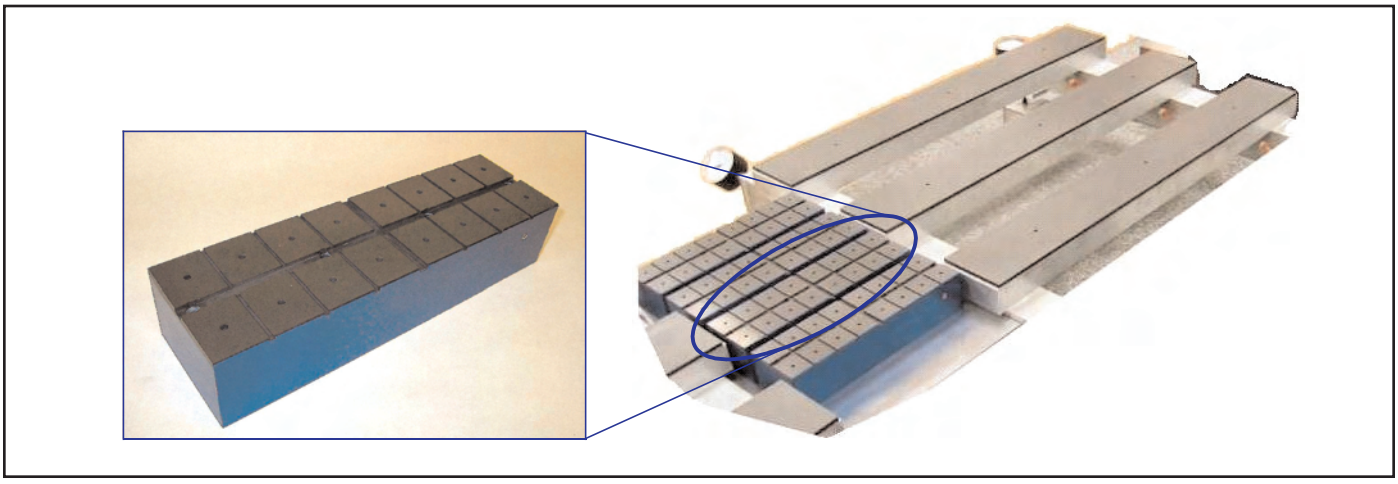


250x75mm Precision Chuck S2225401

Non-Contact Control of FPD Glass in Precision Processing

New Way Porous Media Precision Chucks are for use under or near precision processes. They possess much higher level of precision, stiffness, and damping than traditional air conveyors. The vacuum holes are designed so that, with air pressure on, the flow through a vacuum hole is the same whether there is glass over it or not. Simple and smart. This also means that as the glass comes on and off the chuck, the vacuum pressures and air gaps remain the same.

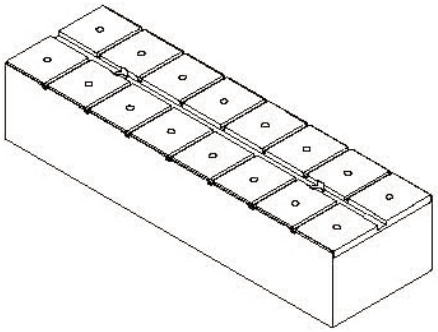
By being able to move the glass over an array of Precision Chucks, large substrate sized vacuum chucks are eliminated. Also, the high pressure air exiting the gap prevents back-side damage from contamination between the chuck and the glass.

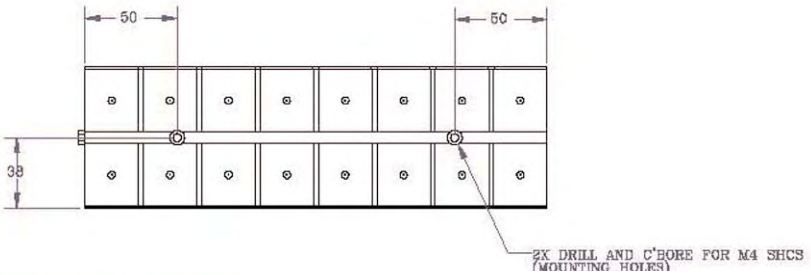


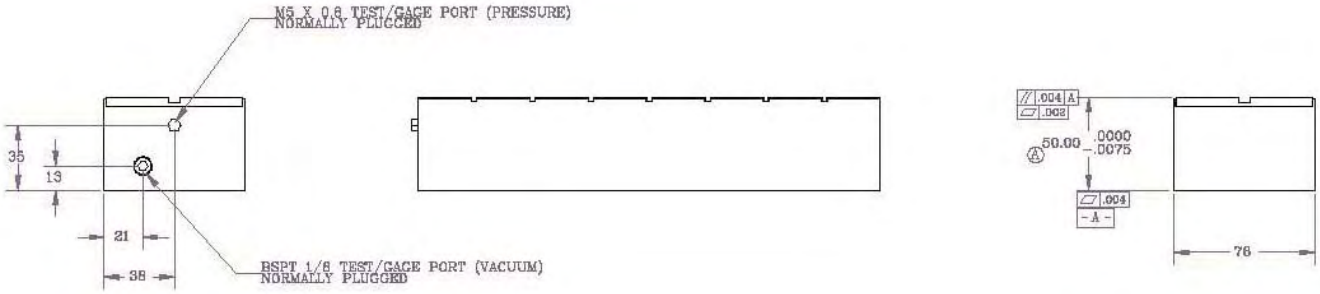
Porous Media Precision Chuck shown with New Way Air Conveyors in a FPD Glass Handling System

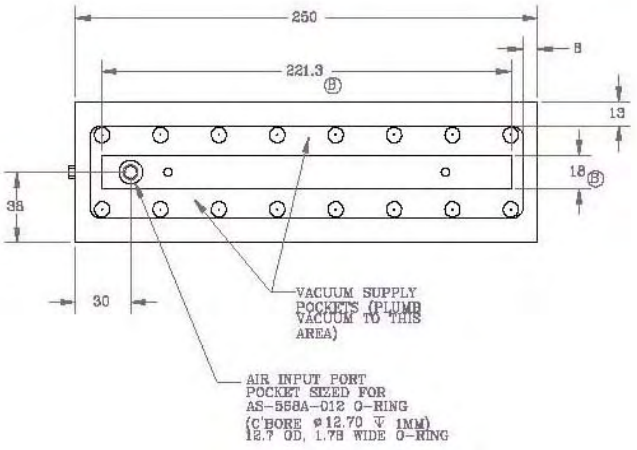
POROUS MEDIA PRECISION CHUCK

Specification Drawings

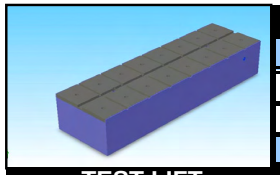








PRECISION NON-CONTACT CHUCK TEST RESULTS

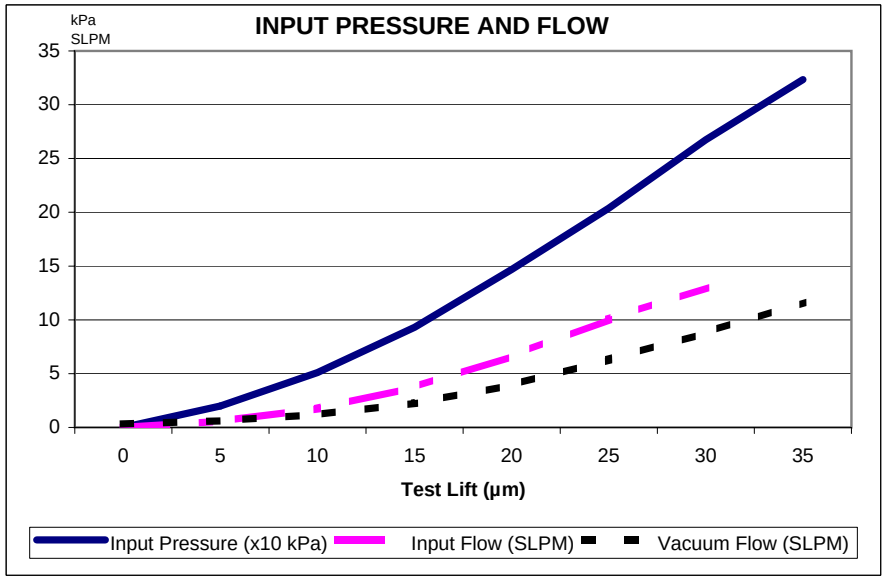


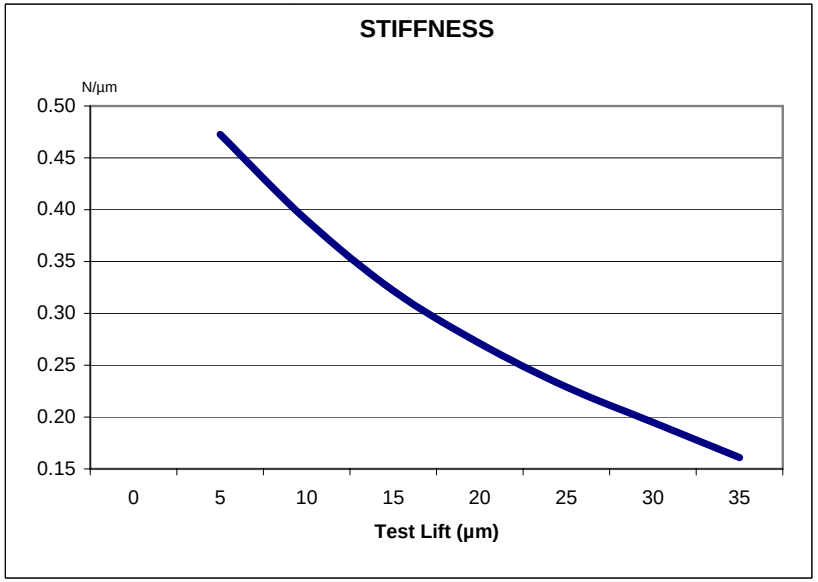
TEST VACUUM	
(IN./H2O)	(mm/H2O)
45.5	1157.00

NEWWAY® air bearings

STIFFNESS TEST LOAD		
(lb)	(g)	(N)
0.25	113.3	1.11

		INPUT PRESSURE				VACUUM		STIFFNESS				
TEST LIFT		PRESSURE		FLOW		FLOW		LOAD LIFT		STIFFNESS		
(in)	(µm)	(psi)	(kPa)	(SCFM)	(SLPM)	(SCFM)	(SLPM)	(in)	(µm)	(lb/in)	(g/µm)	(N/µm)
0.00000	0	0.00	0.00	0.000	0.00	0.012	0.33	0.00000				
0.00020	5	2.90	19.99	0.021	0.60	0.022	0.62	0.00010	2.65	2699.05	48.21	0.47
0.00039	10	7.40	51.02	0.062	1.76	0.043	1.21	0.00028	7.15	2225.53	39.75	0.39
0.00059	15	13.50	93.08	0.132	3.75	0.080	2.26	0.00045	11.55	1838.48	32.84	0.32
0.00079	20	21.30	146.86	0.234	6.64	0.139	3.95	0.00063	15.90	1547.01	27.63	0.27
0.00098	25	29.55	203.74	0.355	10.05	0.222	6.30	0.00079	20.15	1307.78	23.36	0.23
0.00118	30	38.80	267.52	0.459	13.00	0.311	8.81	0.00096	24.30	1112.76	19.88	0.19
0.00138	35	46.90	323.36			0.411	11.64	0.00111	28.10	919.24	16.42	0.16



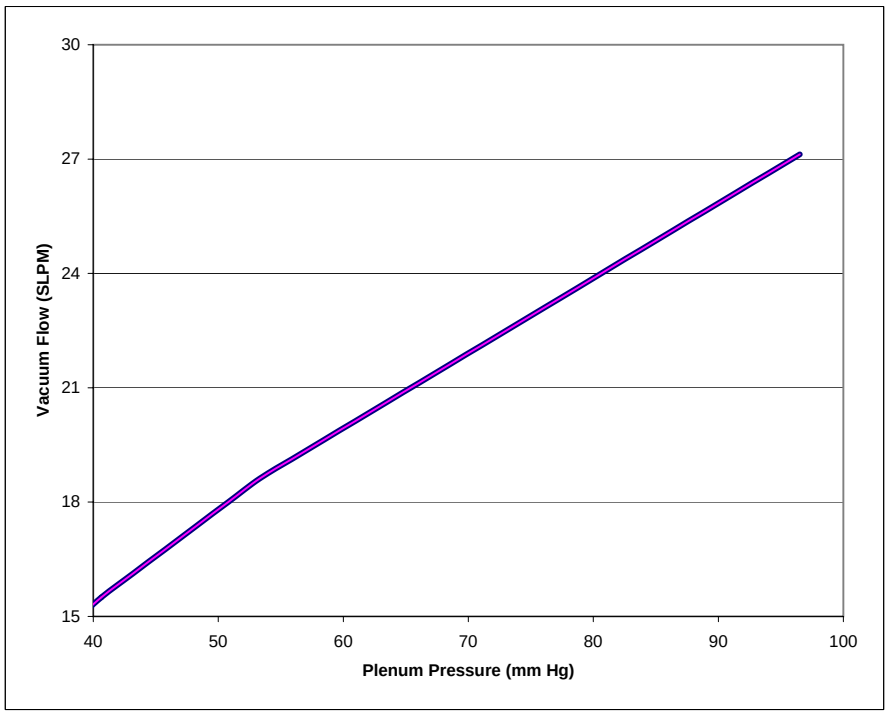


PRECISION CHUCK TEST RESULTS

Vacuum Flow: No Glass Present

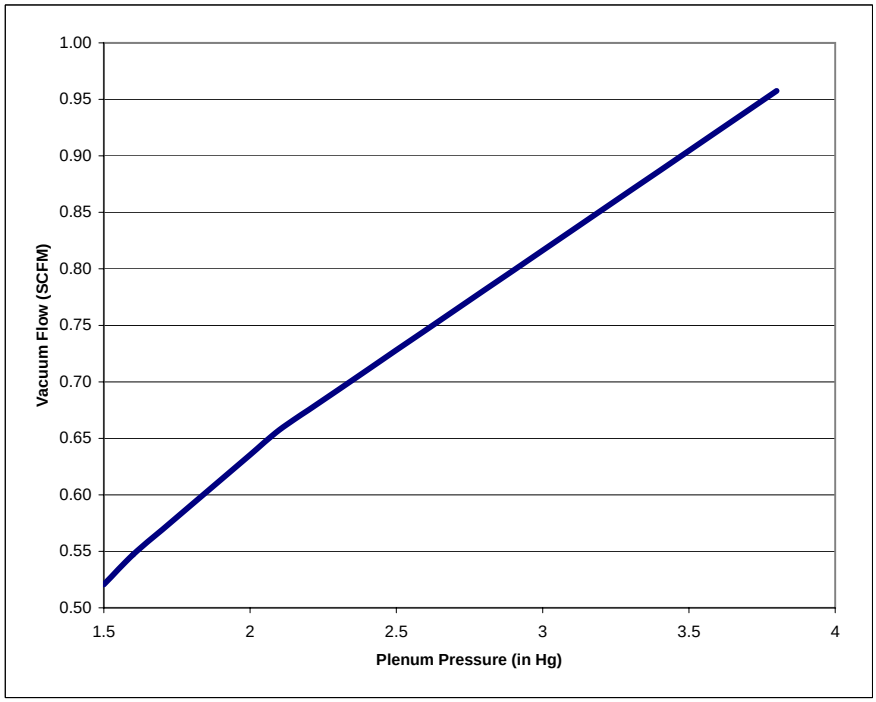
Metric

PLENUM PRESSURE (mm Hg)	VACUUM FLOW (PER BEARING) (SLPM)
38.1	15
40.6	16
43.2	16
45.7	17
48.3	17
50.8	18
53.3	19
55.9	19
58.4	20
61.0	20
63.5	21
66.0	21
68.6	22
71.1	22
73.7	23
76.2	23
78.7	24
81.3	24
83.8	25
86.4	25
88.9	26
91.4	26
94.0	27
96.5	27



English

PLENUM PRESSURE (in Hg)	VACUUM FLOW (PER BEARING) (SCFM)
1.5	0.52
1.6	0.55
1.7	0.57
1.8	0.59
1.9	0.61
2	0.64
2.1	0.66
2.2	0.68
2.3	0.69
2.4	0.71
2.5	0.73
2.6	0.75
2.7	0.76
2.8	0.78
2.9	0.80
3	0.82
3.1	0.83
3.2	0.85
3.3	0.87
3.4	0.89
3.5	0.90
3.6	0.92
3.7	0.94
3.8	0.96



POROUS MEDIA PRECISION CHUCK

Global Flatness Performance Data

TEST PARAMETERS:
Input Flow (SLPM): 29.12
Max. Vacuum @ Plenum (MM./HG.): 85.09
Input Pressure (BAR): 1.38

NOTES:

- All units in microns unless otherwise specified.
- Measurements ‘A’ and ‘E’ were made at edges of part. Measurement ‘C’ was center of part.
- Measurements ‘B’ and ‘D’ were made between ‘A’ and ‘C’ and between ‘C’ and ‘E’ respectively.

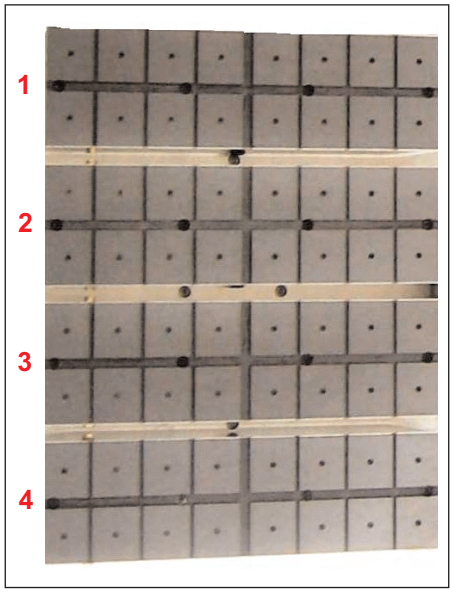
VACUUM INPUT

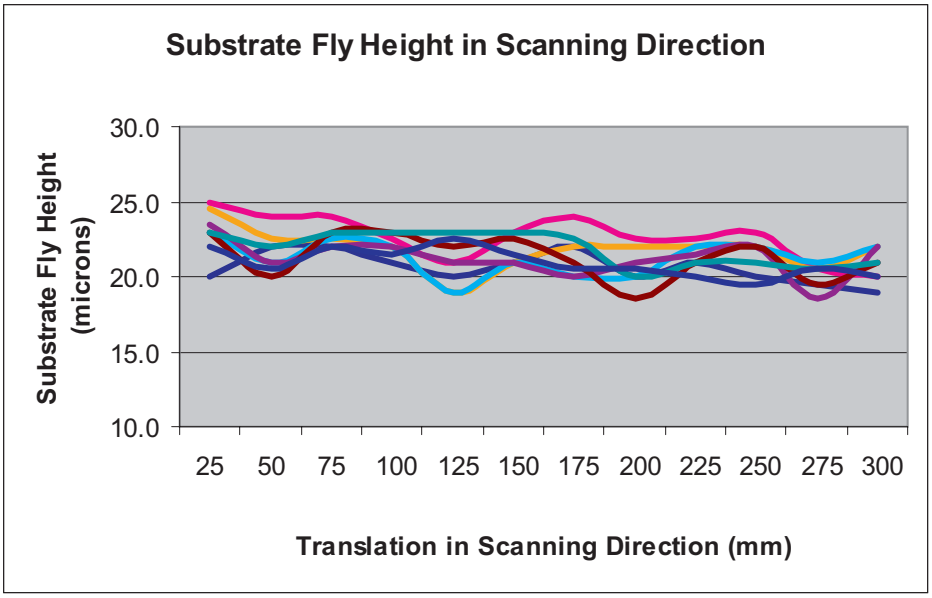
1	20.0	25.0	24.5	23.0	23.5	23.0	23.0	22.0	A
	22.0	24.0	22.5	21.0	21.0	20.0	22.0	20.5	C
	22.0	24.0	22.5	22.5	22.0	23.0	23.0	22.0	E
2	21.0	22.5	22.0	22.0	22.0	23.0	23.0	21.5	A
	20.0	21.0	19.0	19.0	21.0	22.0	23.0	22.5	C
	21.0	23.0	21.0	21.0	21.0	22.5	23.0	21.5	E
3	22.0	24.0	22.0	20.0	20.0	21.0	22.5	20.5	A
	20.0	22.5	22.0	20.0	21.0	18.5	20.0	20.5	C
	21.0	22.5	22.0	22.0	21.5	21.0	21.0	20.0	E
4	20.0	23.0	22.0	22.0	22.0	22.0	21.0	19.5	A
	19.5	20.5	20.5	21.0	18.5	19.5	20.5	20.5	C
	19.0	20.0	22.0	22.0	22.0	21.0	21.0	20.0	E

STATS	
RANGE=	5.0
AVG=	22.42
3STD=	3.84
RANGE=	4.0
AVG=	21.60
3STD=	3.44
RANGE=	5.5
AVG=	21.15
3STD=	3.53
RANGE=	4.5
AVG=	20.79
3STD=	3.41

300 mm

250 mm





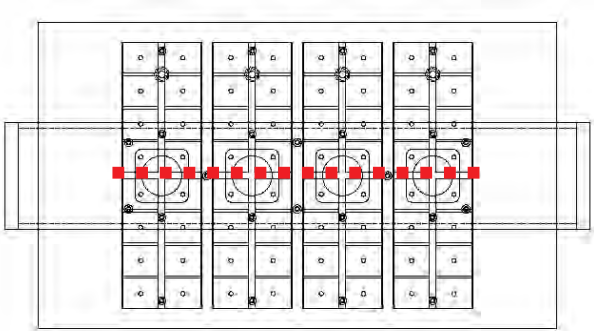
POROUS MEDIA PRECISION CHUCK

Line Flatness Performance Data

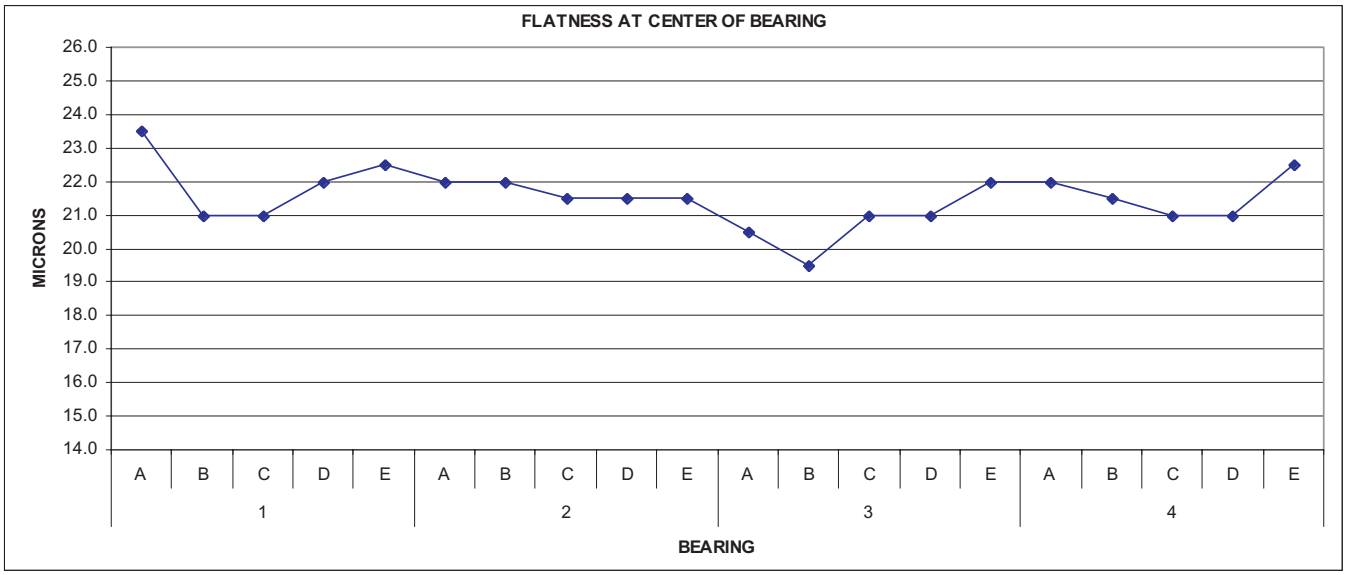
TEST PARAMETERS:

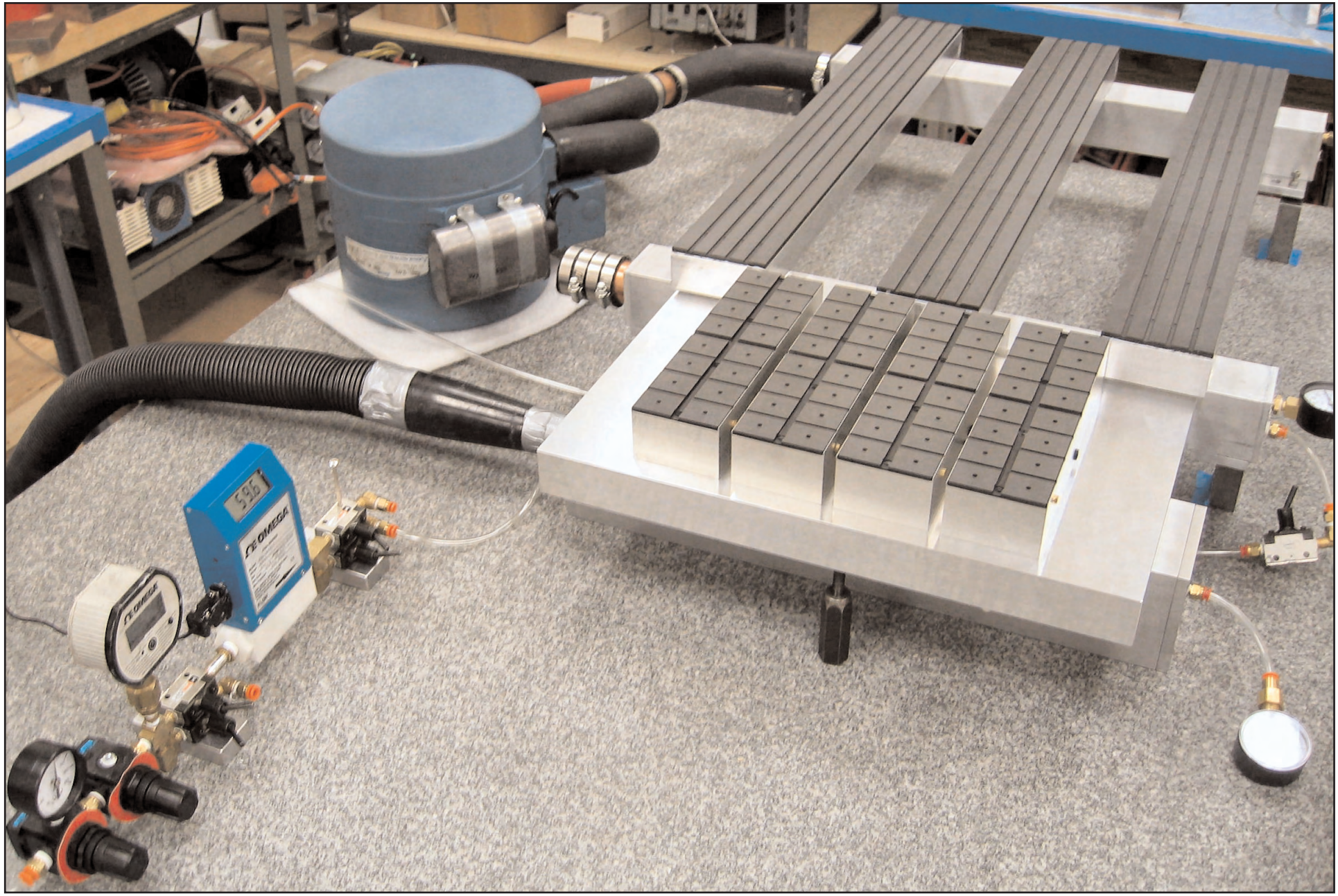
Input Flow (SLPM): 29.12
Max. Vacuum @ Plenum (MM./HG.): 85.09
Input Pressure (BAR): 1.38

Maximum Lift (microns): 25.00
Minimum Lift (microns): 18.50
Lift Range (microns): 6.50
Average Lift (microns): 21.49
Total Lift 3STD: 4.00



BEARING		CENTER	STATS		
1	A	23.5	RANGE=	2.5	RANGE= 4.0
	B	21.0	AVG=	22.00	AVG= 21.53
	C	21.0	3STD=	2.85	3STD= 2.49
	D	22.0			
	E	22.5			
2	A	22.0	RANGE=	0.5	
	B	22.0	AVG=	21.70	
	C	21.5	3STD=	0.73	
	D	21.5			
	E	21.5			
3	A	20.5	RANGE=	2.5	
	B	19.5	AVG=	20.80	
	C	21.0	3STD=	2.44	
	D	21.0			
	E	22.0			
4	A	22.0	RANGE=	1.5	
	B	21.5	AVG=	21.60	
	C	21.0	3STD=	1.75	
	D	21.0			
	E	22.5			




OMEGA

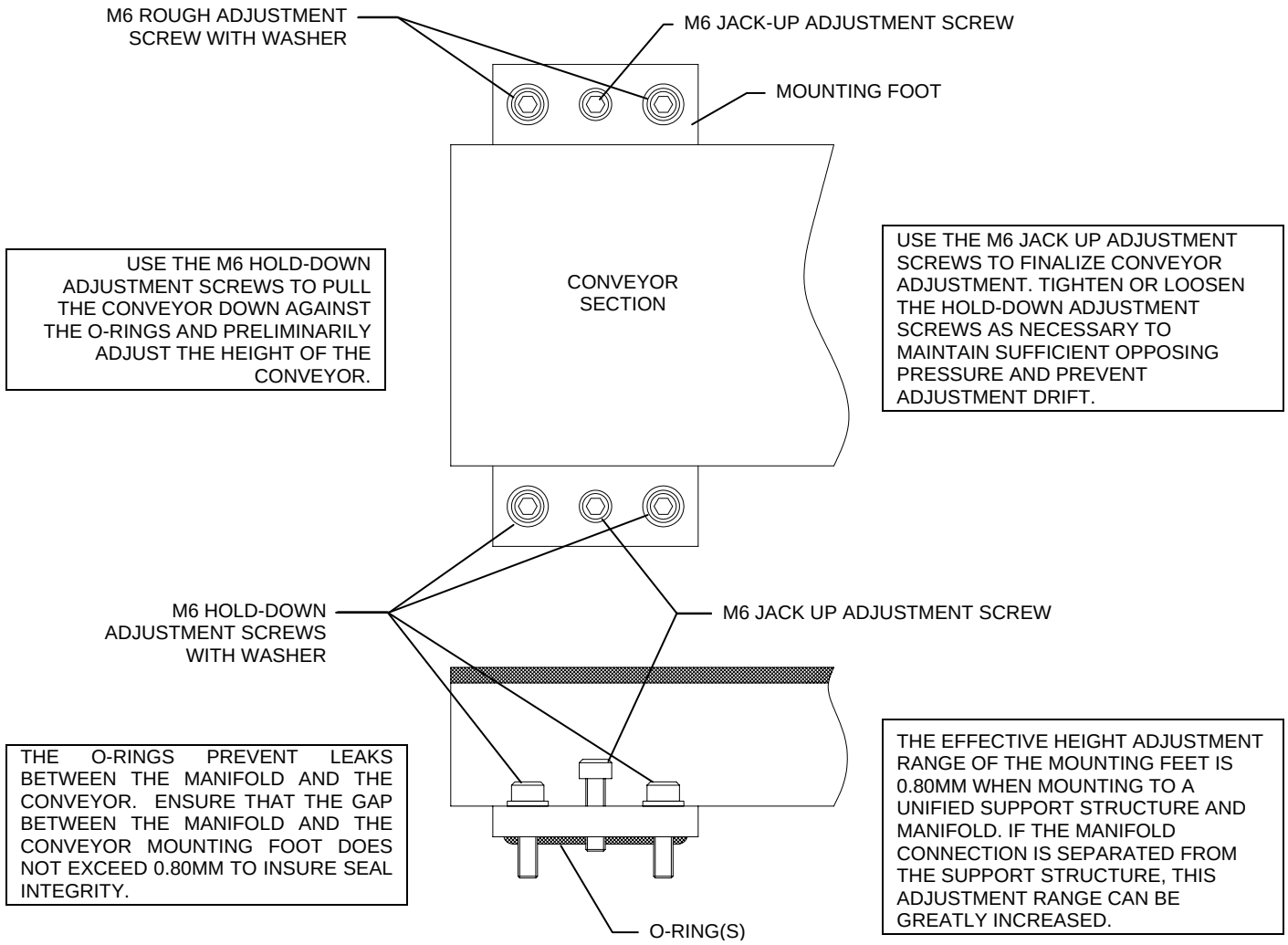
CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

PROPER INSTALLATION AND ADJUSTMENT OF THE AIR BEARING CONVEYOR IS CRITICAL TO ACHIEVE MAXIMUM PERFORMANCE. THE TOP SURFACE OF EACH CONVEYOR SECTION MUST BE LEVEL AND PROPERLY ALIGNED TO ADJOINING PROCESS EQUIPMENT AND CONVEYOR SECTIONS. THE CONVEYORS SHOULD BE MOUNTED ON A STURDY SUPPORT STRUCTURE WITH PROVISIONS FOR PROPER CONVEYOR POSITIONING AND MOUNTING. THE AIR SUPPLIED TO THE CONVEYORS MUST BE CLEAN AND DRY. AIR AND VACUUM SUPPLY PLENUMS MUST BE SIZED TO INSURE THAT PRESSURE AND VACUUM FLOW REQUIREMENTS ARE MET.

THE OPTIONAL MOUNTING FEET PROVIDE A PRE-DESIGNED SOLUTION FOR ATTACHMENT AND ALIGNMENT OF THE CONVEYOR AND ALSO PROVIDE PRESSURE AND VACUUM CONNECTIONS.

CONVEYOR ADJUSTMENT FEATURES

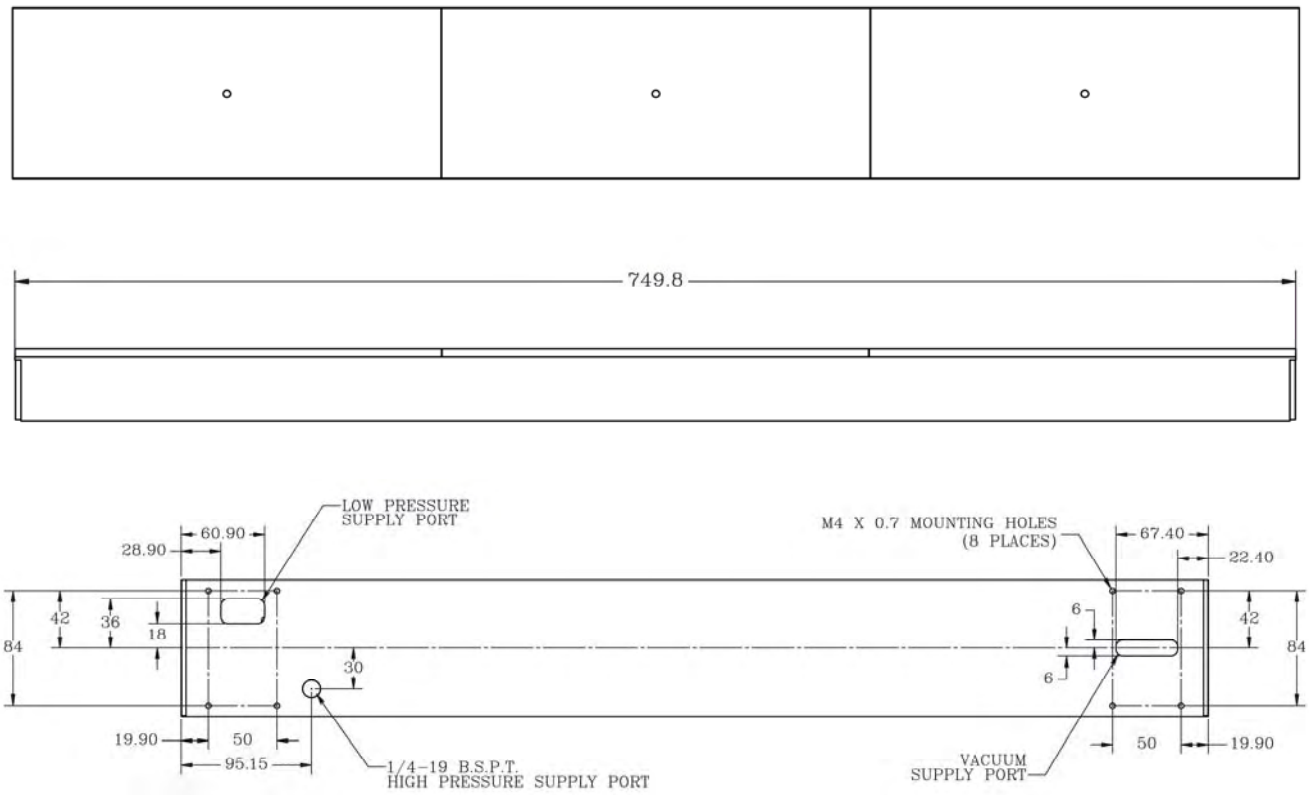
THE FOLLOWING ILLUSTRATION DESCRIBES THE FEATURES THAT ARE PROVIDED FOR HEIGHT ADJUSTMENT WHEN THE OPTIONAL MOUNTING FEET ARE INSTALLED ON THE CONVEYOR SECTIONS.

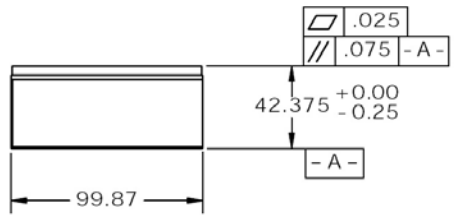


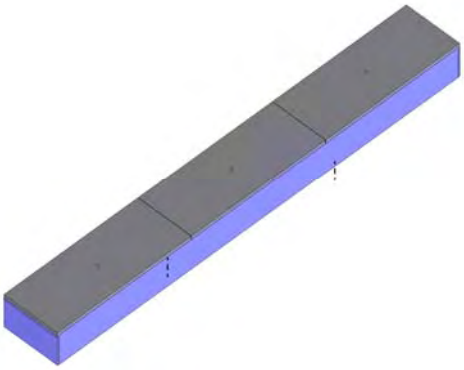
CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

THE FOLLOWING ILLUSTRATIONS DESCRIBE THE MOUNTING FEATURES REQUIRED WHEN THE OPTIONAL MOUNTING FEET ARE INSTALLED ON THE CONVEYOR SECTIONS.

LOW FLOW CONVEYOR

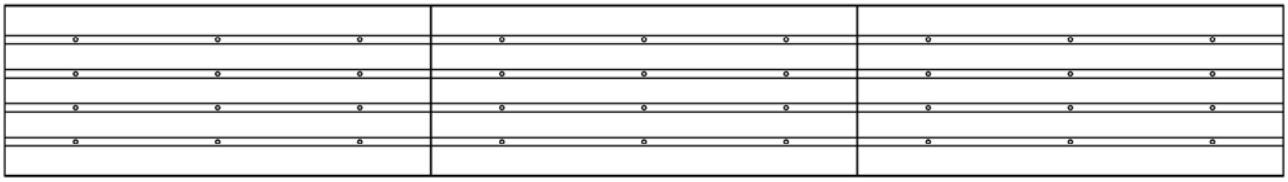


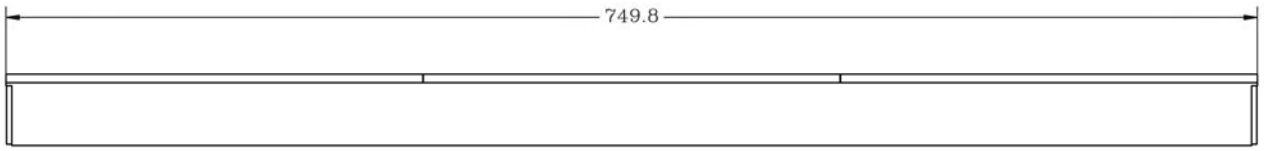


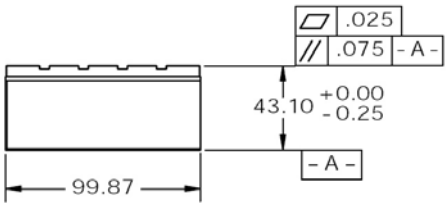


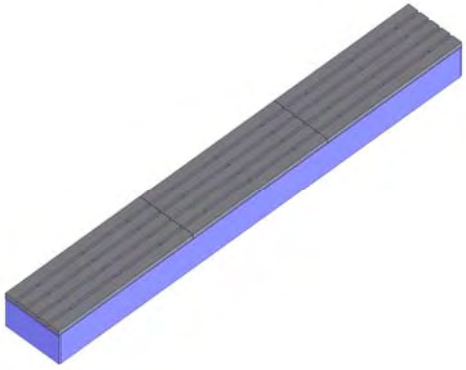
CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

HIGH SPEED CONVEYOR







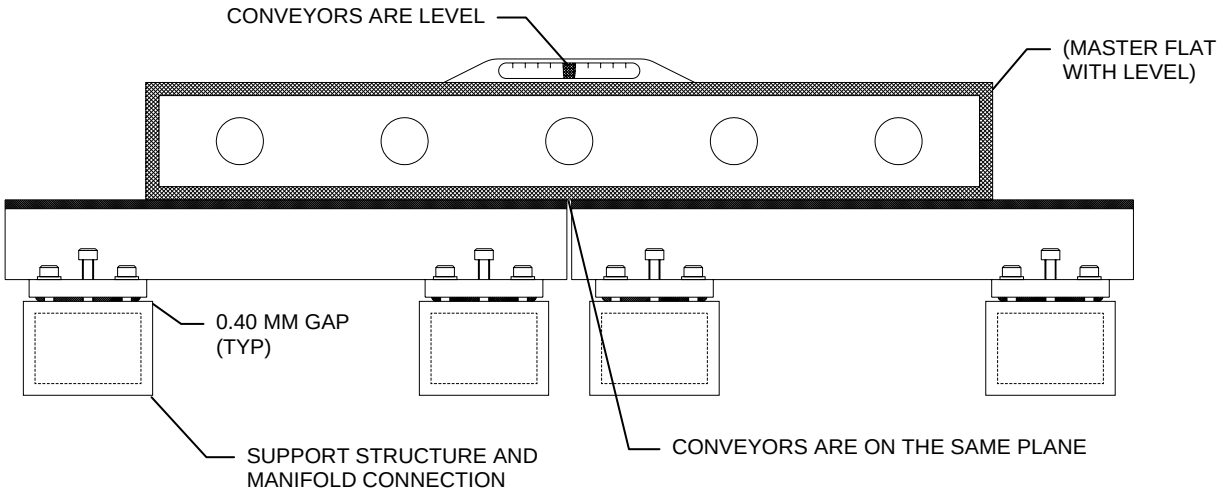


CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

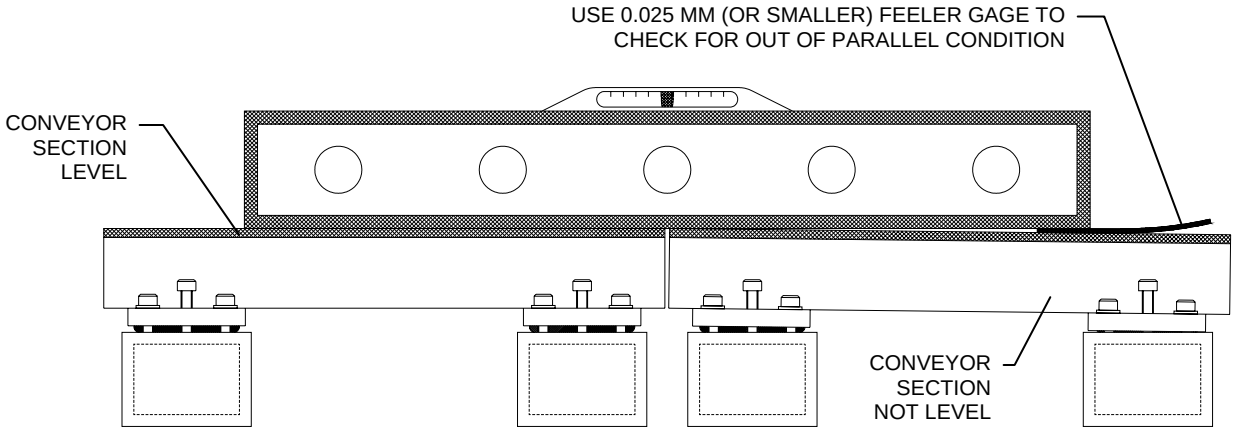
ROUGH ADJUSTMENT

INITIALLY, THE CONVEYOR SECTIONS SHOULD BE INSTALLED AND THE GAP BETWEEN THE ADJUSTMENT FEET AND THE SUPPORT STRUCTURE AND MANIFOLD ADJUSTED TO A NOMINAL GAP OF 0.40 MM. THIS WILL PLACE THE CONVEYOR IN THE MIDDLE OF THE 0.80 MM RANGE OF THE ADJUSTMENT FEET. AT THIS TIME, THE GENERAL LEVELNESS OF THE CONVEYOR SECTIONS AND THE ALIGNMENT OF THE CONVEYORS TO OTHER PROCESS EQUIPMENT SHOULD BE NOTED. THE SUPPORT STRUCTURE POSITION SHOULD BE MODIFIED IF NECESSARY. ONCE THE SUPPORT STRUCTURE POSITIONING IS DETERMINED TO BE SATISFACTORY, ADJUST ALL CONVEYOR SECTIONS TO BE LEVEL AND ALIGNED ON THE SAME PLANE. USE THE HOLD-DOWN AND JACK-UP ADJUSTMENT SCREWS, MASTER FLAT, LEVEL AND A 0.025 MM (OR SMALLER) FEELER GAGE TO GET THE ROUGH ADJUSTMENT AS CLOSE AS POSSIBLE.

DESIRED ALIGNMENT (SIDE VIEW)

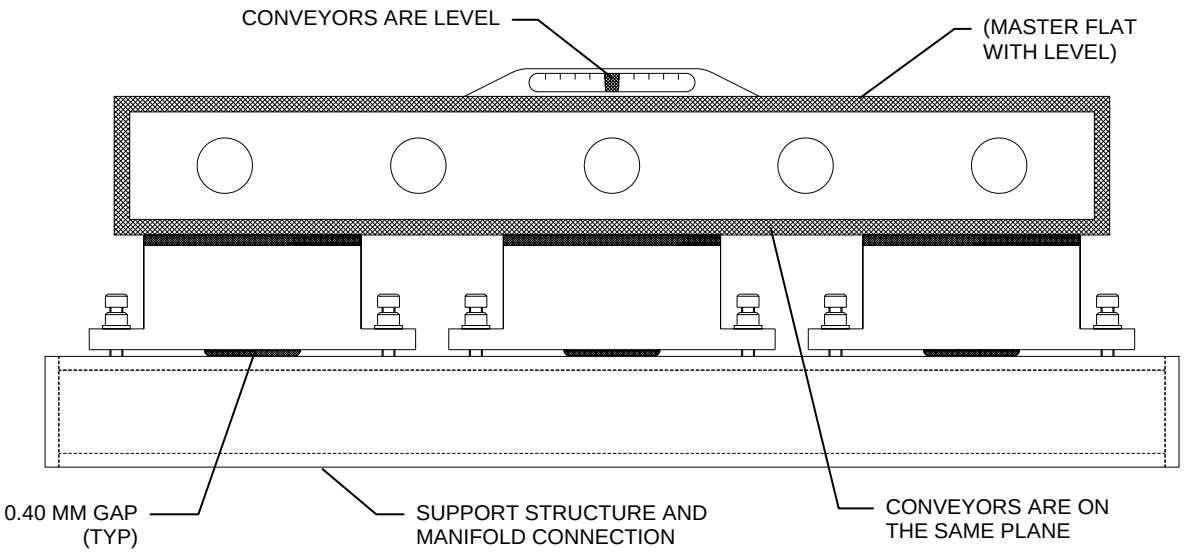


ALIGNMENT PROBLEMS (SIDE VIEW)

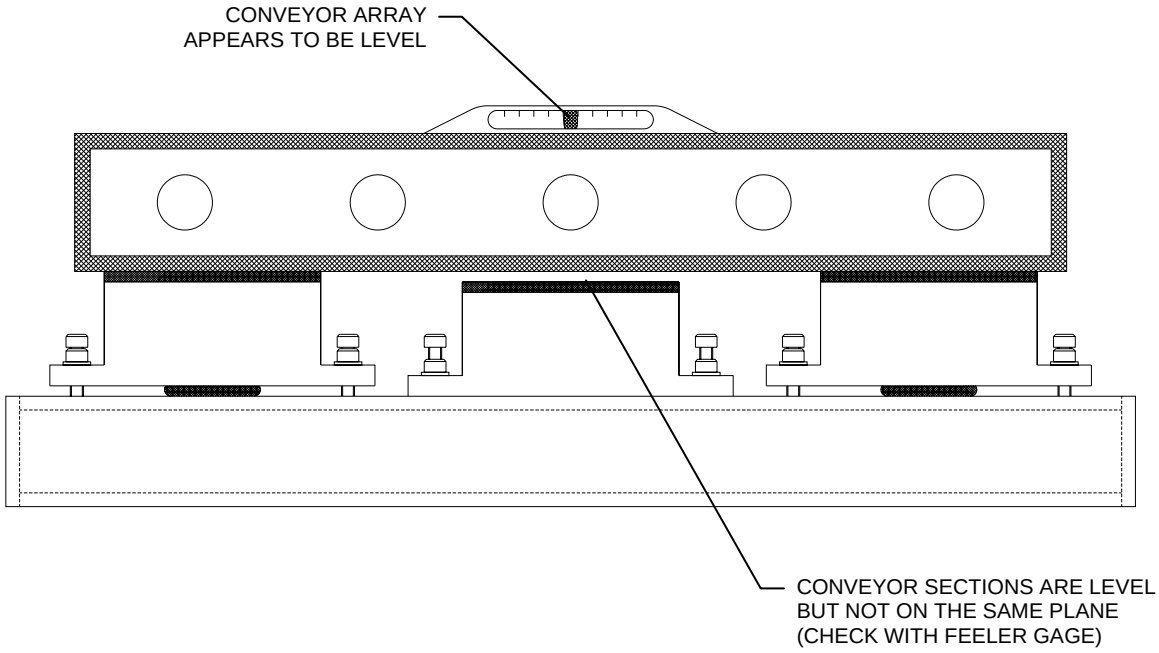


CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

DESIRED ALIGNMENT (END VIEW)

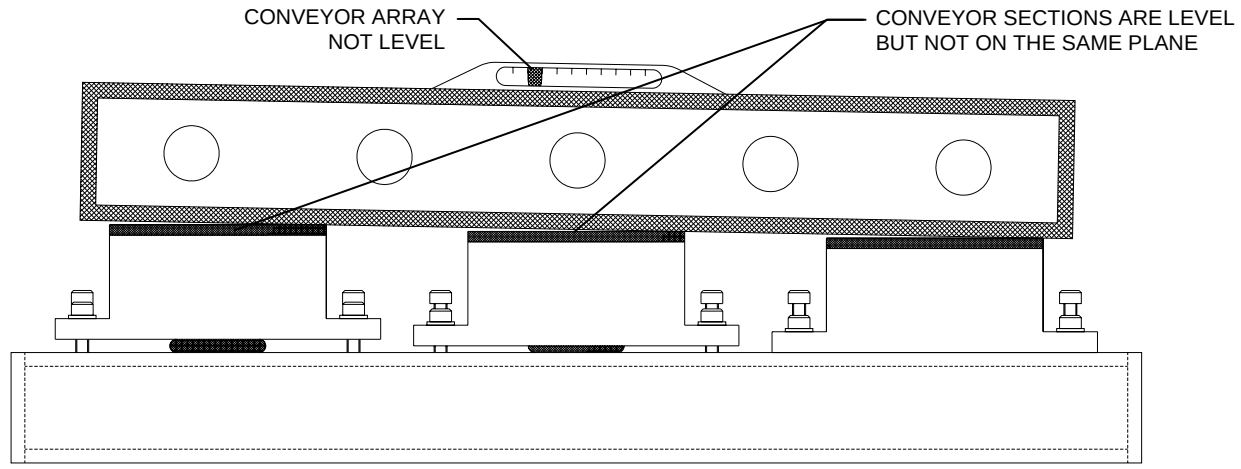


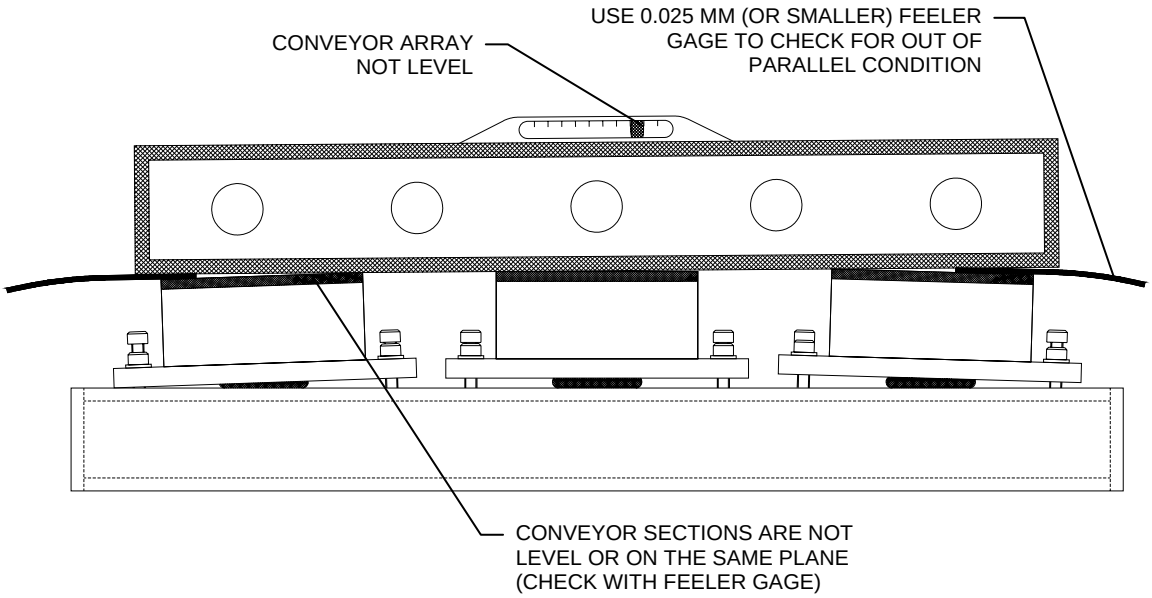
ALIGNMENT PROBLEMS (END VIEW)



CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

ALIGNMENT PROBLEMS (END VIEW)



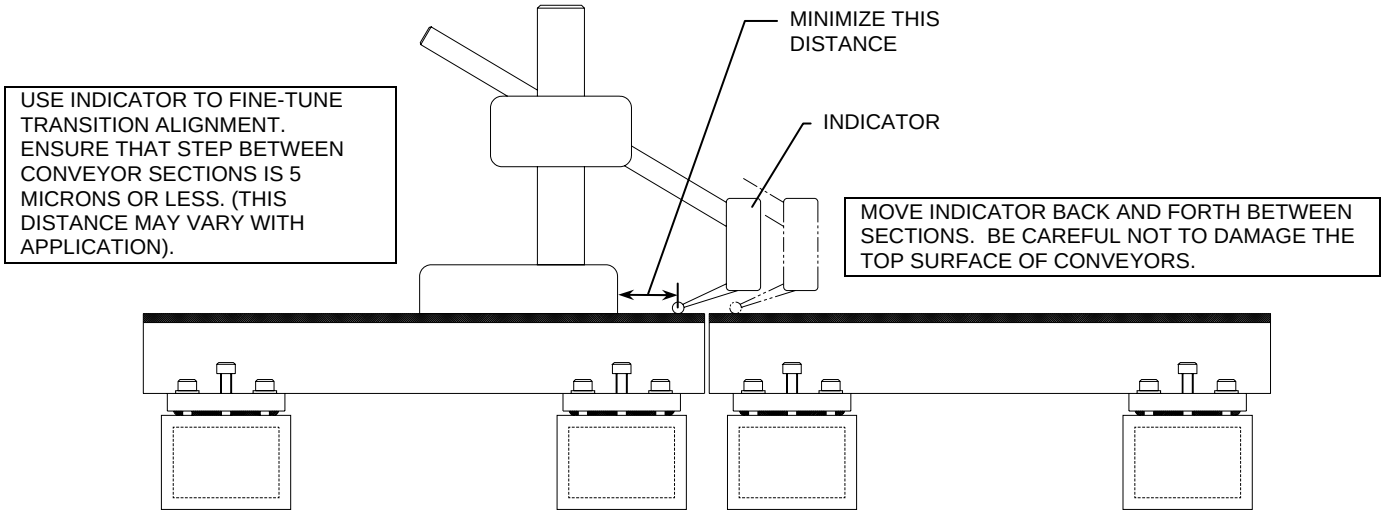


CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

FINE ADJUSTMENT

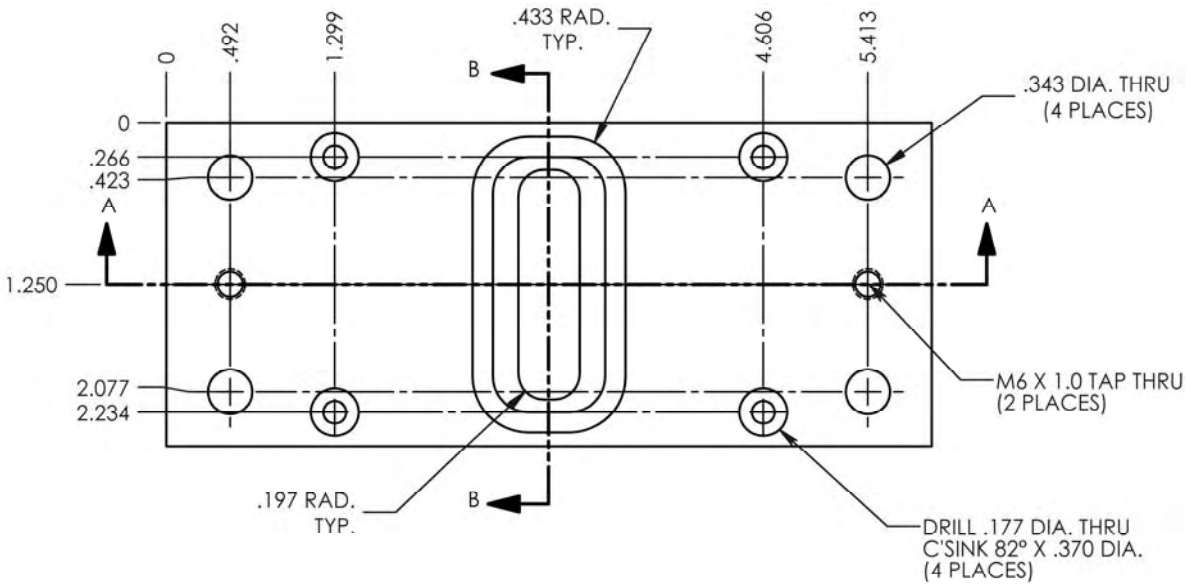
ROUGH ADJUSTMENT WILL SET EACH OF THE CONVEYOR'S SECTIONS LEVEL AND CLOSE TO FINAL POSITION IN RELATION TO OTHER PROCESS EQUIPMENT AND CONVEYOR SECTIONS. FINE ADJUSTMENT IS A FINE-TUNING OF THE TRANSITION POINTS TO ENSURE SMOOTH FLOW OF WORK ALONG THE CONVEYOR. THE ALLOWABLE MISMATCH AT EACH TRANSITION POINT WILL VARY BASED ON APPLICATION REQUIREMENTS. USE THE JACK-UP ADJUSTMENT SCREWS TO ADJUST, TIGHTEN OR LOOSEN THE HOLD-DOWN ADJUSTMENT SCREWS AS NECESSARY TO MAINTAIN SUFFICIENT OPPOSING PRESSURE AND PREVENT ADJUSTMENT DRIFT. BE CAREFUL NOT TO USE TOO MUCH FORCE. THIS MAY DISTORT THE BEARING AWAY FROM THE TRANSITION POINT.

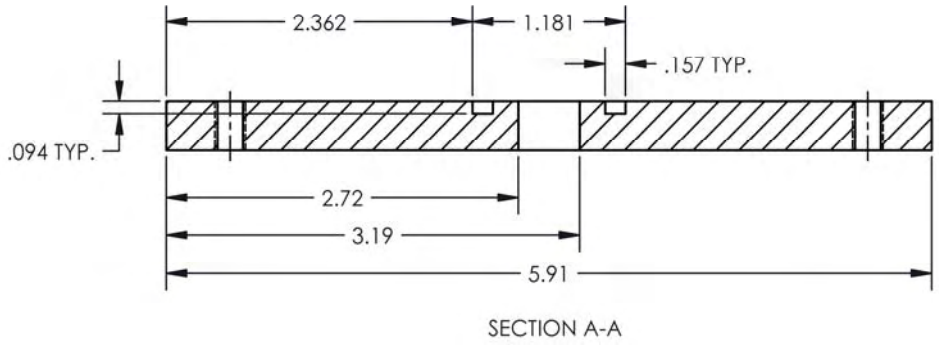
FINE ADJUSTMENT (SIDE VIEW)



CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

FLAT PANEL CONVEYOR MOUNTING FOOT

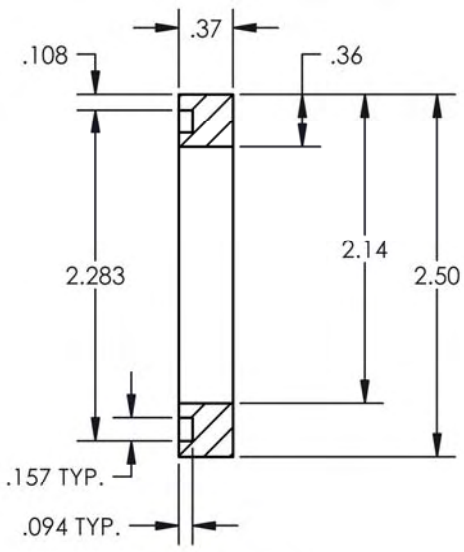




SECTION A-A

When used with High Speed Conveyor Bearings single hole conducts pressure.

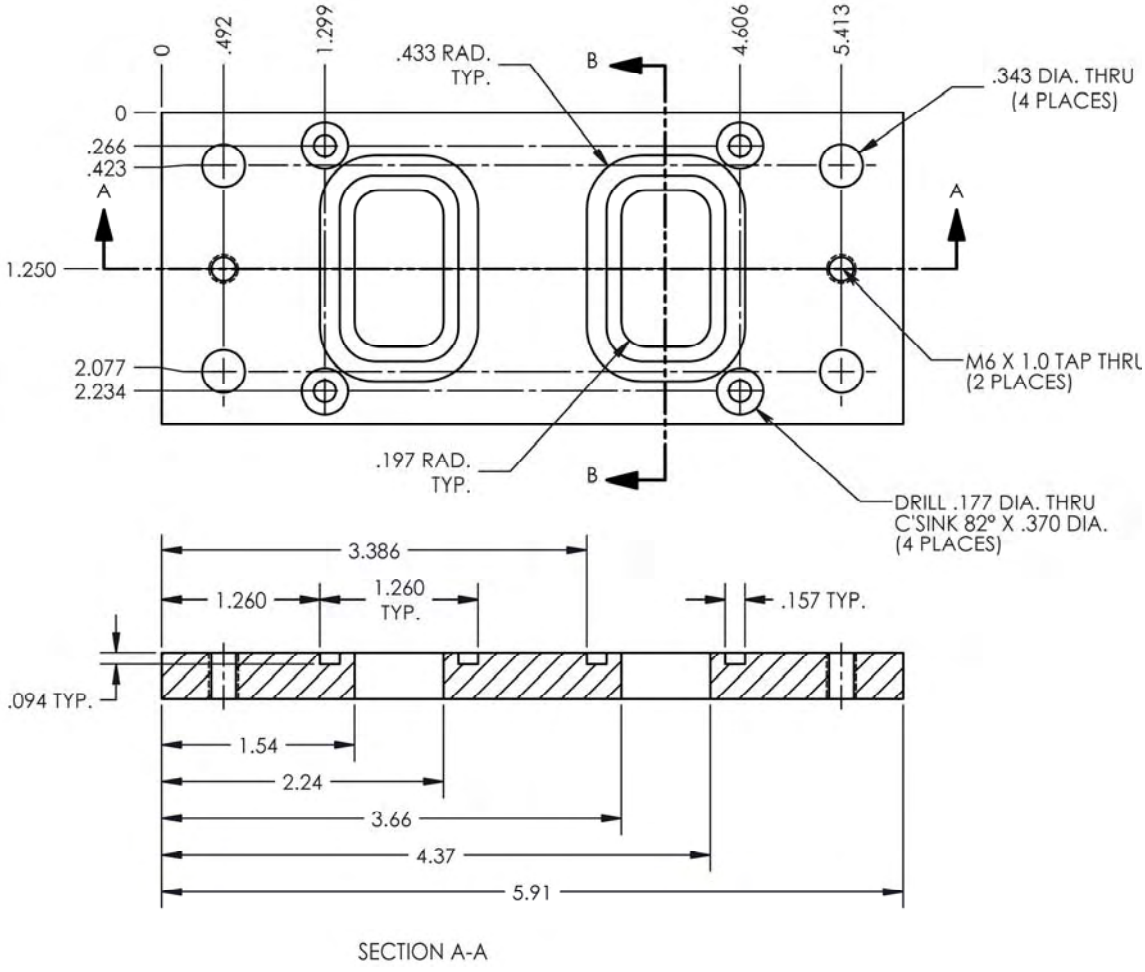
When used with Low Airflow Conveyor Bearings single hole conducts vacuum.



SECTION B–B

CONVEYOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS

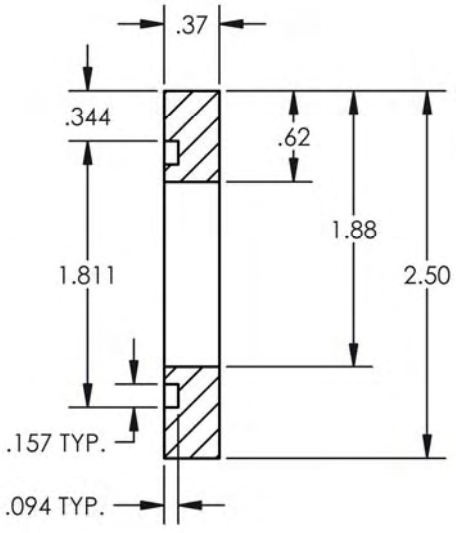
FLAT PANEL CONVEYOR MOUNTING FOOT



SECTION A-A

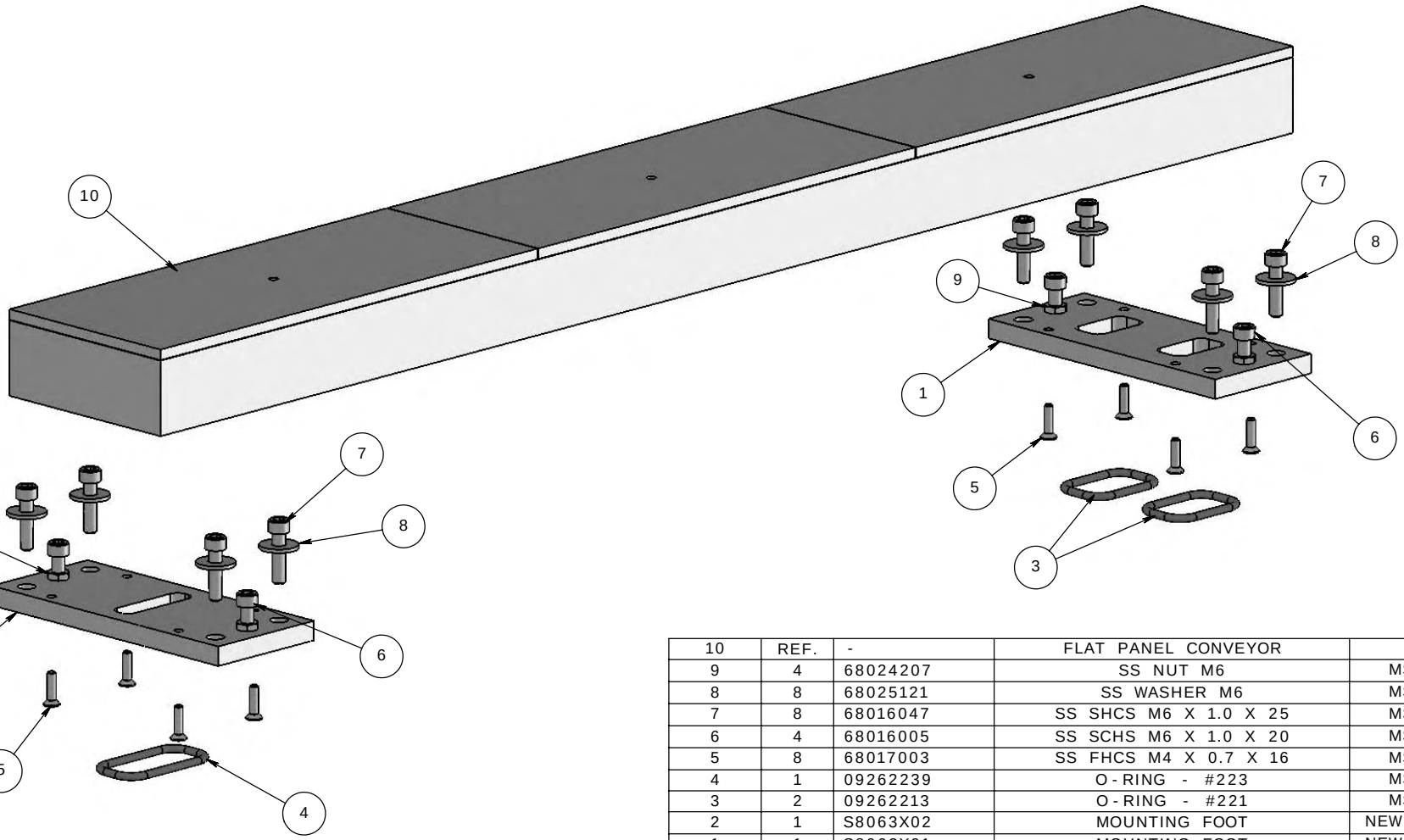
When used with High Speed Conveyor Bearings both holes shown conduct vacuum.

When used with Low Airflow Conveyor Bearings only one of the two holes shown is used to conduct pressure (because bearing has only one mating hole).



SECTION B–B

REVISIONS				
ECN #	REV.	DESCRIPTION	DATE	APPROVED
001024	A	ADDED M6 NUTS-CHANGED BOM FORMAT	5/27/2005	JHA



ITEM NO.	QTY.	NAME	DESCRIPTION	VENDOR
10	REF.	-	FLAT PANEL CONVEYOR	-
9	4	68024207	SS NUT M6	MSC
8	8	68025121	SS WASHER M6	MSC
7	8	68016047	SS SHCS M6 X 1.0 X 25	MSC
6	4	68016005	SS SCHS M6 X 1.0 X 20	MSC
5	8	68017003	SS FHCS M4 X 0.7 X 16	MSC
4	1	09262239	O-RING - #223	MSC
3	2	09262213	O-RING - #221	MSC
2	1	S8063X02	MOUNTING FOOT	NEW WAY
1	1	S8063X01	MOUNTING FOOT	NEW WAY

TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES ± 1/2°
DECIMALS .xx ± .010
DECIMALS .xxx ± .005
FRACTIONS ± 1/64
SURFACE ROUGHNESS
63 RMS MAX
BREAK ALL SHARP EDGES
.005-.020

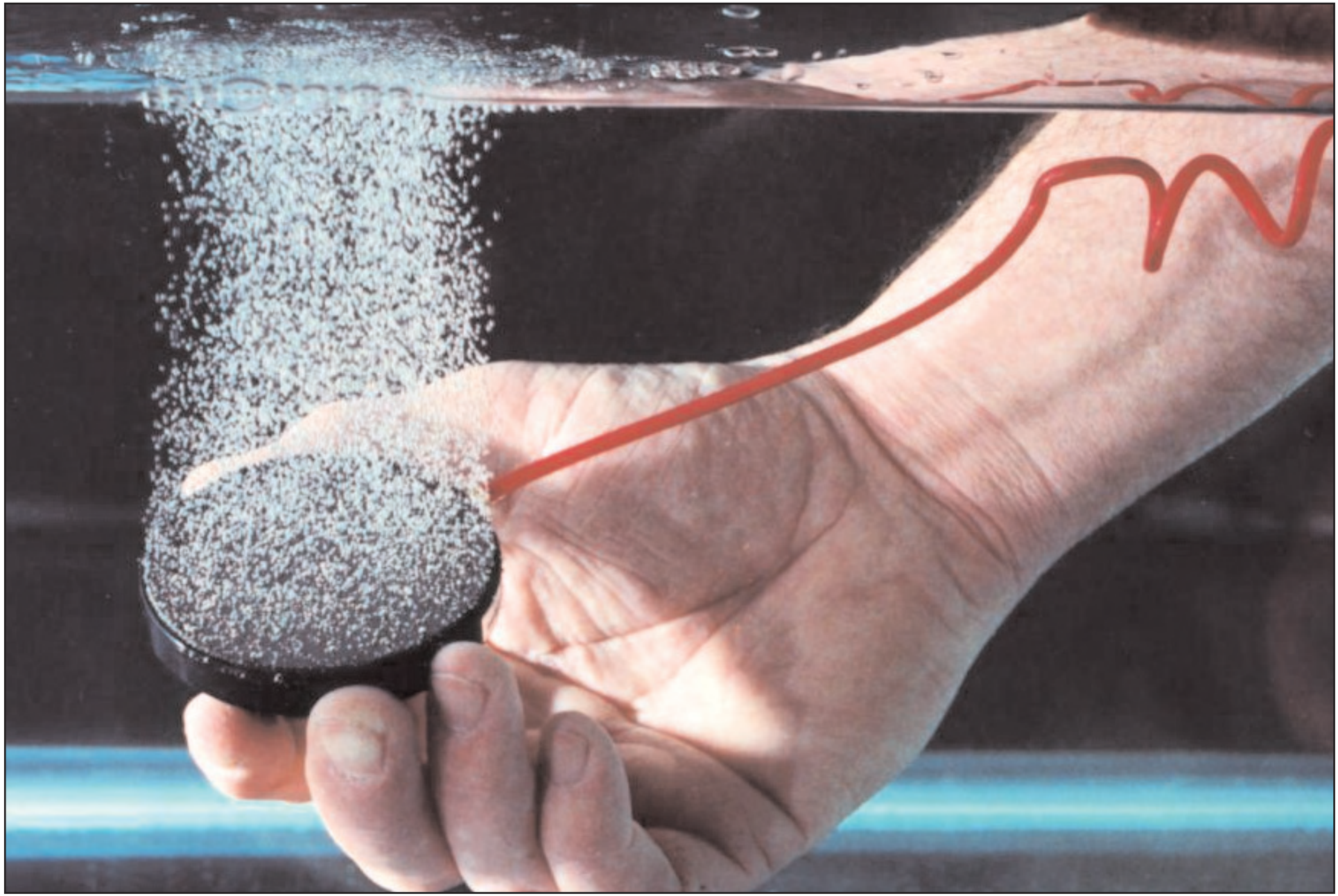
TITLE: MOUNTING FOOT KIT

DRAWN:	DATE:	MATERIAL:
JHA	4/8/05	
CHECKED:	DATE:	HEAT TREAT:
SCALE: 2:3	SHT 1 OF 1	
USED ON: -	FINISH: -	

NEWWAY air bearings

EWO. NO.

DWG. NO. S22100K001 REV. A.02

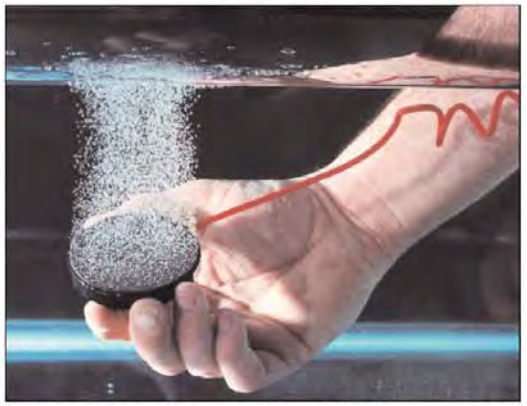


WHY YOU NEED AIR BEARINGS
FOR YOUR FLAT PANEL MANUFACTURING PROCESS

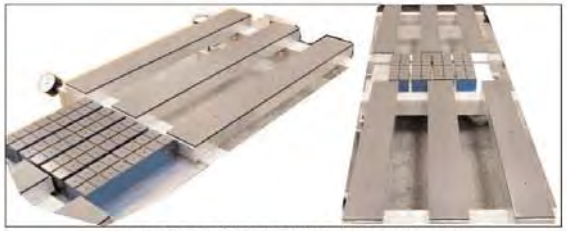
If you are a Gen-5 or above manufacturer, New Way® Air Bearing technology can reduce your costs and enhance your yields by:

- Reducing glass scratching and breakage.
- Decreasing your consumption of air, and the turbulence of air flow, if you're currently using air.
- Enhancing your product throughput with a more stable, more controllable process.

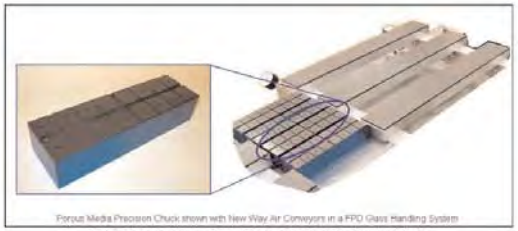
Contact Mike LaPort at New Way® Air Bearings today.



NEW WAY® POROUS MEDIA



LOW-AIRFLOW CONVEYOR AIR BEARING

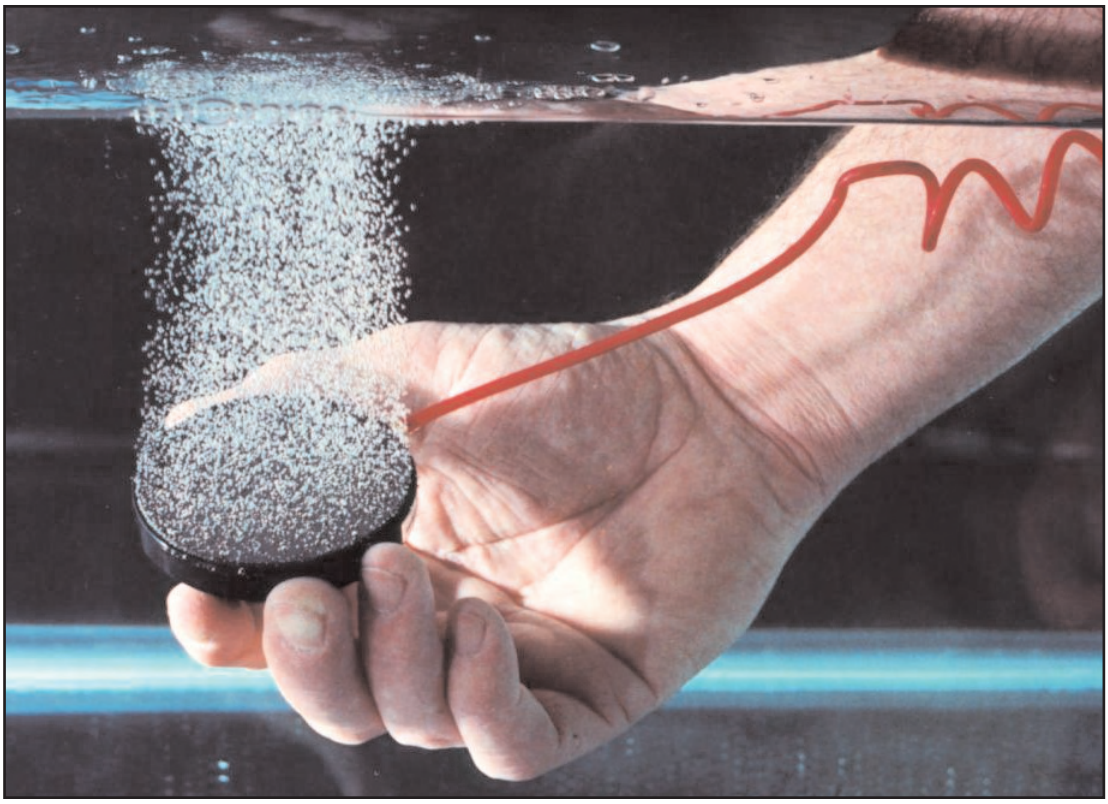


POROUS MEDIA PRECISION CHUCK

HIGH-SPEED CONVEYOR AIR BEARING

NEWWAY®
air bearings

New Way® Air Bearings ▪ 50 McDonald Boulevard Aston, PA 19014 USA ▪ +1 (610) 494-6700 ▪ www.newwayairbearings.com



POROUS MEDIA AIR BEARING SOLUTIONS™