

POROUS MEDIA® **AIR BEARING** SOLUTIONS

| FLOTATION ZONE AIR BAR

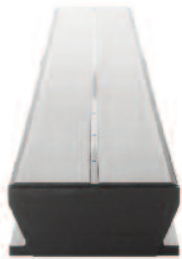
| TRANSITION ZONE AIR BAR

| PRECISION ZONE AIR BAR

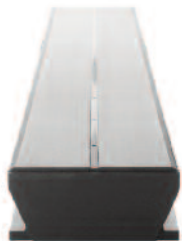
NON-CONTACT GLASS HANDLING
FOR FPD AND SOLAR APPLICATIONS

NEWWAY®
air bearings

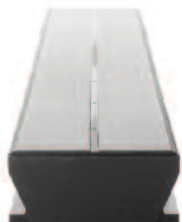
A COMPLETE LINE OF SYSTEM-ENGINEERED TRANSITION ZONE AIR BARS



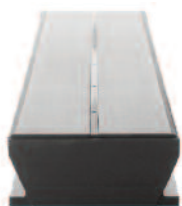
1250mm



1000mm



750mm



500mm



Precision
Zone Air
Bar

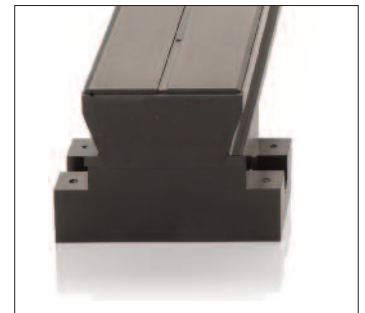
New Way Transition Zone Air Bars combine the best performance characteristics of the company's H-Series (high speed) and L-Series (low airflow) air bars into a single hybrid design. This new profile is engineered to significantly reduce both system and operating costs. It's the next generation in non-contact glass handling for FPD or Solar Module manufacturing and inspection.



1000mm Transition Zone Air Bar, showing bearing surface and porting configuration on the back.

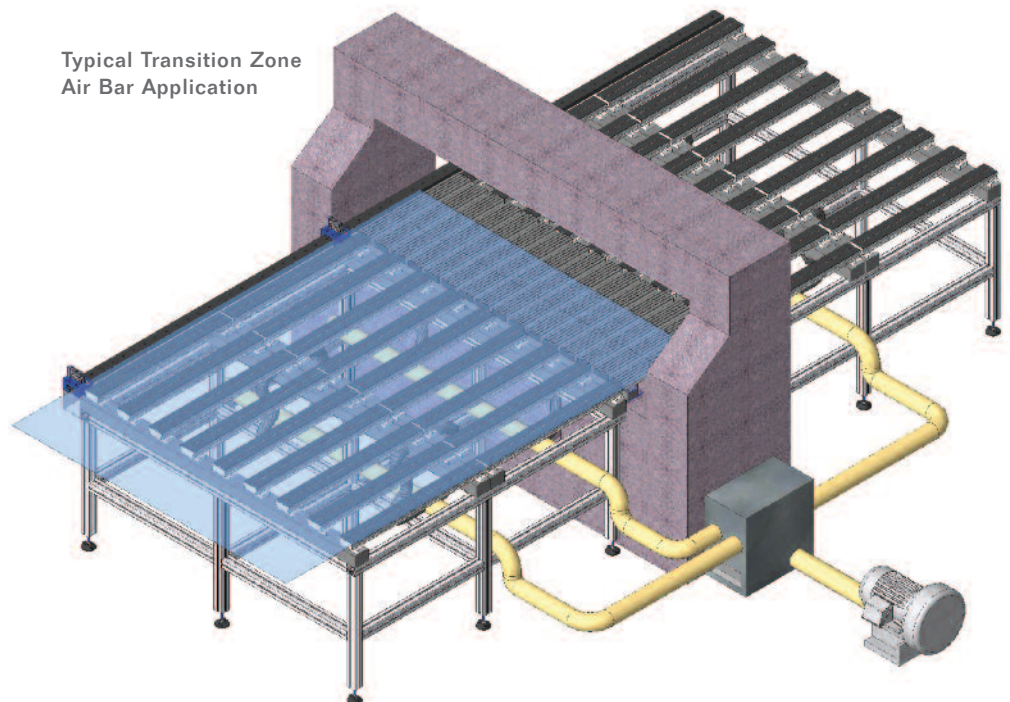
EASY APPLICATION

New Way Transition Zone Air Bars are easy for anyone to install in scalable arrays capable of accommodating Gen 10 Glass, and beyond. This component features a new dovetail profile which provides multiple installation options utilizing a new integral mounting flange. For applications where mounting feet are preferable, adjustable jack screws allow for accurate, independent leveling.



A close-up of the new Transition Zone Air Bar dovetail profile.

Typical Transition Zone Air Bar Application

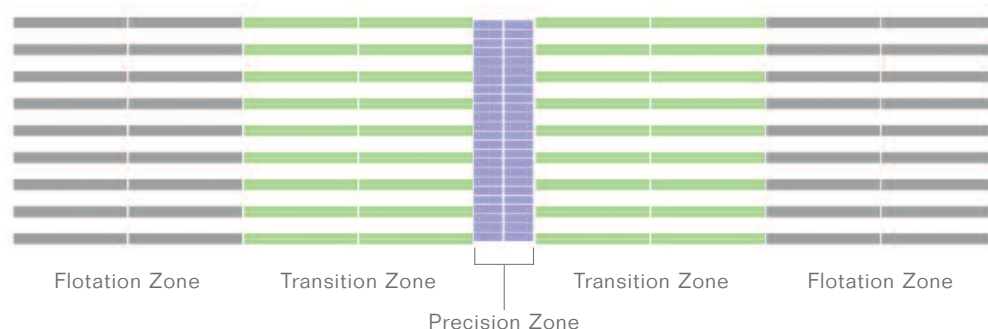


NEW WAY POROUS MEDIA® TECHNOLOGY OFFERS SIGNIFICANT ADVANTAGES

TRANSITION ZONE AIR BARS	
FEATURES	BENEFITS
20-120 micron substrate fly height range	Ideal for FPD and some PV glass processing
±5 micron fly height control	A high level of repeatable control even outside areas of interest where Precision Zone Air Bars are used
Higher air film stiffness	Reduces probability of contact, scratching, breakage High natural frequency
±1 micron glass stability	Significantly reduces vibration
Stiffer air film provides higher damping	Faster settling time
High non-contact clamping force	Flatter glass, reducing curling and corner drooping
Porous carbon media	Eliminates scratching even if contact is made No particulation Lower air consumption
Lower air consumption	Reduced volume of air introduced into clean room Reduced impact on CDA system Can operate using an air compressor or blower
Significantly reduced face velocity at the surface of the bearing	Reduced disruption of clean room air flow patterns
No lubrication required	Eliminates glass contact with lubricants Virtually maintenance free
Segmented design	Scalable and offers many configuration alternatives Easy compensation for inaccuracies in the machine base and optimization of application requirements
Individual mechanical adjustment by unit	Reduced set-up and commissioning time
Supply manifold flexibility (air and vacuum supplied from below)	Flexibility for mounting motion equipment
Standard component	Available off-the-shelf

PRECISION ZONE AIR BARS	
FEATURES	BENEFITS
10-30 micron substrate fly height range	Ideal under or near precision processing or inspection applications
±5 micron fly height control	A high level of process or inspection accuracy (well within the focal range of most AOI cameras)
±1 nanometer glass stability	Significantly reduces vibration

Typical glass flotation system configuration



APPLICATIONS

Non-Contact Glass Handling for:

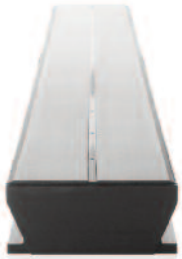
- Automated Optical Inspection (AOI)
- Cleaning
- Coating
- Conveyance
- Direct-Write Lithography
- Probing
- Repair
- Scribing
- Inline or Offline processes

MARKETS

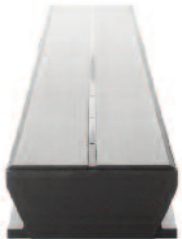
- Flat Panel Display
- Photovoltaics



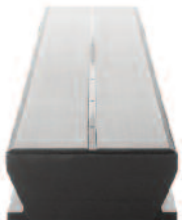
A NEW LINE OF HIGH FLOW TRANSITION ZONE AIR BARS



1250mm



1000mm



750mm

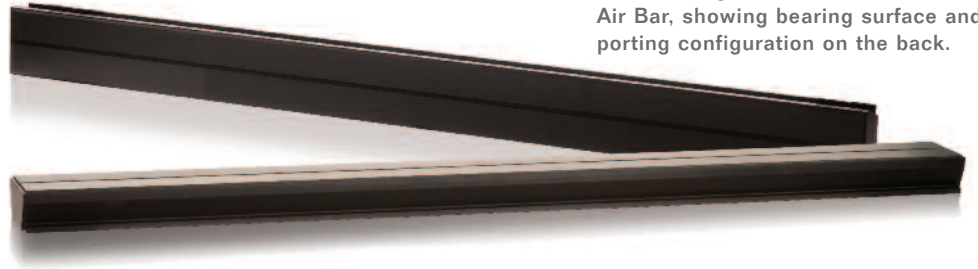


500mm



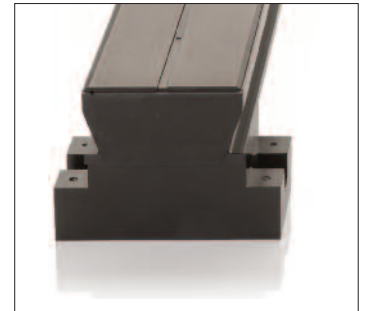
The **High Flow Transition Zone Air Bar** applies high-flow carbon to New Way's new air bar profile, providing greater fly-heights for solar and specific FPD non-contact glass handling applications. The high flow air bar incorporates the same new profile as its normal-flow counterpart, reducing both system and operating costs. New Way's High Flow Transition Air Bar represents the next generation in non-contact glass handling.

1000mm High Flow Transition Zone Air Bar, showing bearing surface and porting configuration on the back.



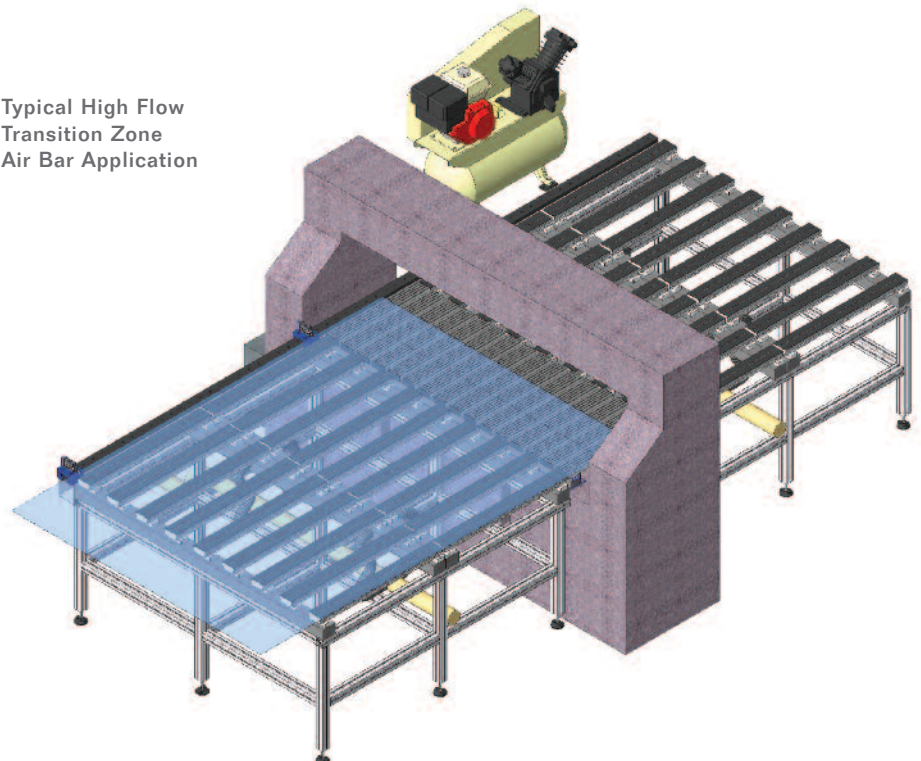
EASY APPLICATION

New Way High Flow Transition Zone Air Bars are easy for anyone to install in scalable arrays capable of accommodating Gen 10 Glass, and beyond. Like its normal-flow counterpart, the High Flow Air Bar features a new dovetail profile. An integral mounting flange provides multiple installation options. For applications where mounting feet are preferable, adjustable jack screws allow for accurate, independent leveling.



A close-up of the new High Flow Transition Zone Air Bar dovetail profile.

Typical High Flow Transition Zone Air Bar Application



NEW WAY POROUS MEDIA[®] TECHNOLOGY OFFERS SIGNIFICANT ADVANTAGES

120-300 micron substrate fly height range	Ideal PV glass processing and some FPD applications
±15 micron fly height control	A high level of repeatable control even outside areas of interest where Precision Zone Air Bars are used
High air film stiffness	Reduces probability of contact, scratching, breakage High natural frequency
±5 micron glass stability	Reduces vibration
Stiff air film provides higher damping	Fast settling time
High non-contact clamping force	Flatter glass, reducing curling and corner drooping
Porous carbon media	Eliminates scratching even if contact is made No particulation Lower air consumption
Low air consumption	Reduced volume of air introduced into clean room Reduced impact on CDA system Can operate using a smaller CDA air compressor
Reduced face velocity at the surface of the bearing	Reduced disruption of clean room air flow patterns
No lubrication required	Eliminates glass contact with lubricants Virtually maintenance free
Segmented design	Scalable and offers many configuration alternatives Easy compensation for inaccuracies in the machine base and optimization of application requirements
Individual mechanical adjustment by unit	Reduced set-up and commissioning time
Supply manifold flexibility (air and vacuum supplied from below)	Flexibility for mounting motion equipment
Standard component	Available off-the-shelf

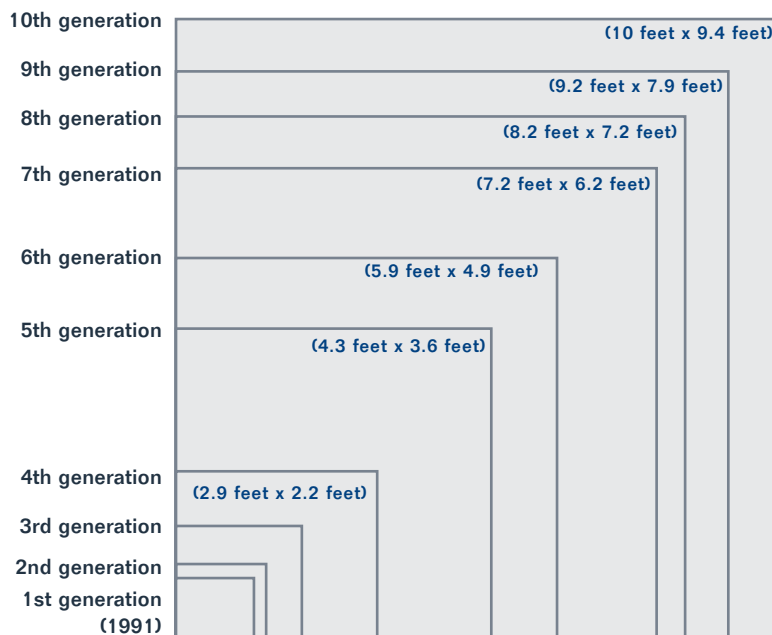
APPLICATIONS

Non-Contact Glass Handling for:

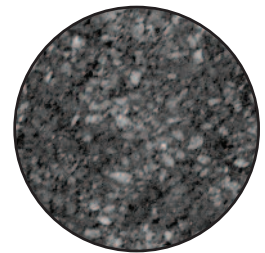
- Automated Optical Inspection (AOI)
- Cleaning
- Coating
- Conveyance
- Direct-Write Lithography
- Probing
- Repair
- Scribing
- Inline or Offline processes

MARKETS

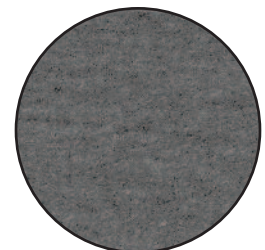
- Photovoltaics
- Flat Panel Display



Source: Corning; Corning Samsung; Others.



High Flow Carbon



Normal Flow Carbon

THE NEXT GENERATION OF NON-CONTACT GLASS HANDLING

NEW WAY POROUS MEDIA® TECHNOLOGY



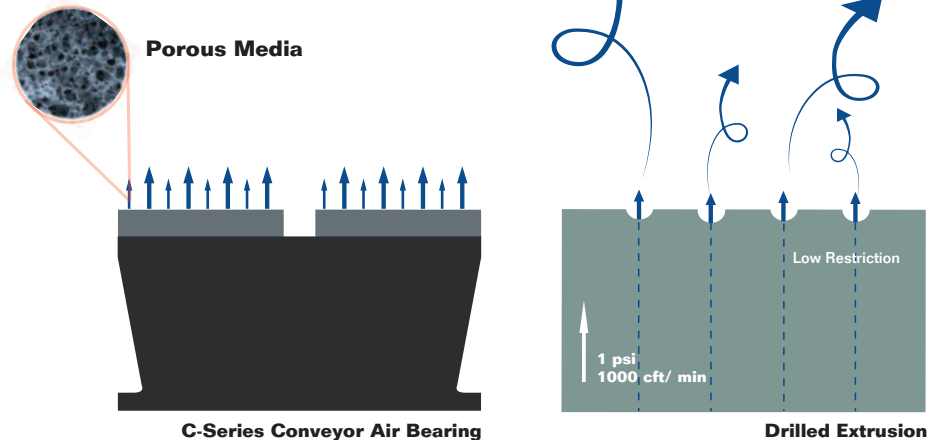
Unlike conventional orifice bearing systems, New Way's Porous Media® Technology distributes air evenly through millions of sub-micron sized holes across the bearing surface. More consistent air pressure distribution provides for superior performance.

BENEFITS

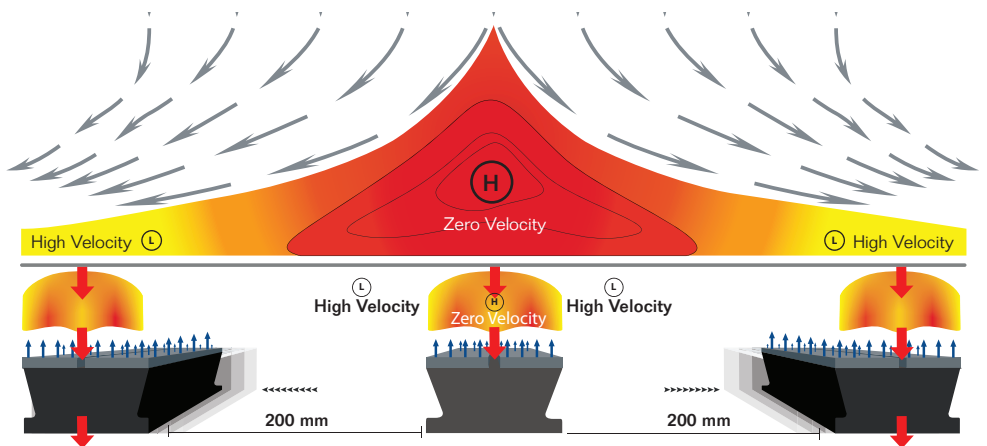
- Uniform Pressure Distribution
- Greater Stiffness
- More Consistent Fly-Height
- Superior Control
- Damps Air Flow
- Reduced Clean Dry Air (CDA) Consumption
- Clean Room
- Traps Unfiltered Particulates
- Reduced Disruptive Air Flow Sources
- Damage Tolerance
- Maintenance-Free

The New Way Transition Zone Air Bar is a non-contact glass handling solution. Unlike orifice-based products, which rely on holes drilled into a bearing surface, these air bars use New Way Porous Media Technology to distribute air pressure evenly through millions of submicron-sized holes across the bearing surface. Because the porous media is highly restrictive, the pressure remains high, but the flow is significantly reduced, as is the exit velocity. As a result, the system uses much less air, while virtually eliminating air streams in the clean room.

Air flow from a porous media conveyor air bearing versus a drilled extrusion.



To float glass, conventional air bars force air through small holes drilled in an extrusion. But the down draft in a clean room creates high pressure above the glass. This force can easily be a multiple of the weight of the glass, increasing sag between the air bars, where there are no counterbalancing forces. This sag can be disastrous – especially as the glass feeds onto a perpendicular surface.

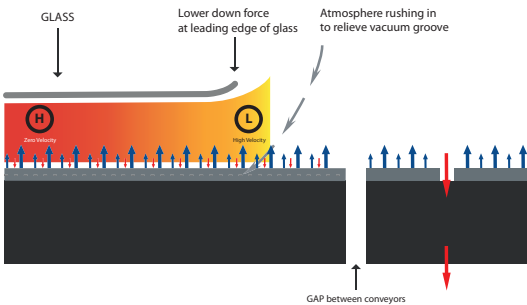


The New Way Transition Zone Air Bar uses atmospheric forces to your advantage. With a differential of less than 1 kpa pressure, the down-force distributed across a glass substrate can be 100 kgs. When this down-force of 10 times the weight of the glass meets the opposing (10 kpa) force from the pressurized air bar surface, it puts the glass in a very safe place. The atmosphere presses the glass down evenly against a stiffer, higher-pressure air film.

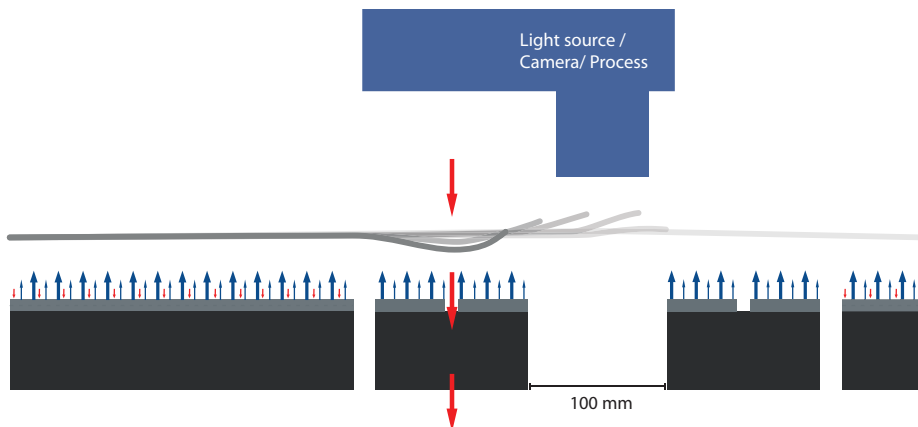
FOR FLAT PANEL DISPLAY AND SOLAR APPLICATIONS

Vacuum is critical to the process. Glass floating without it is like the surface of a lake, subject to low-frequency waves. These waves effectively shorten the length of the glass and, because it is stiff in a plane, position and image stability issues occur as inertial forces shift the glass axially. Using vacuum, New Way Transition Air Bars can provide vertical glass stability of 1nm with the glass flying at 25 microns.

New Way uses a groove, featuring integral vacuum holes, to distribute vacuum under the glass. This groove provides low pressure vacuum continuously at the leading edge of the glass, enabling safe, high-speed glass conveyance. Further, with the glass traveling parallel to the air bars in an array, the groove draws the glass down in the center. This has the effect of flattening the glass, reducing sag between conveyors. The continuous down-force is also more practical when glass warping or stress from coatings requires the flattening functionality of vacuum.

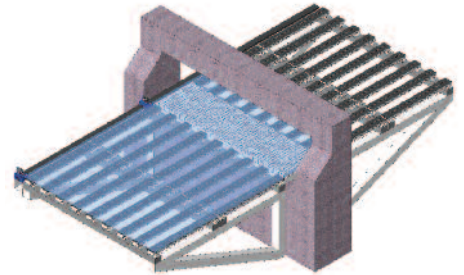


Another functional advantage occurs when the glass transitions between air bar components. Because air flows into the vacuum groove at the leading edge of the glass, reducing the vacuum pressure there, it does not hold the glass down with as much force. In effect, this creates a glass 'wheelie.' It rises, slightly, enabling it to clear a larger gap, before setting down lightly on the next air bar.

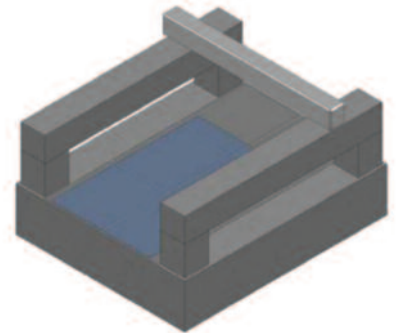


Further, when the conveyors are arranged orthogonally (perpendicular to the motion of the glass), this effect can be harnessed to 'jump' the glass across very large gaps (100mm) or process areas, enabling the use of a broader array of inspection or processing equipment.

SIMPLIFIED STRUCTURAL LOOP



VS



The Transition Zone Air Bar enables FPD and PV Fabs to move a substrate weighing only a few kilograms through stationary inspection zones, instead of moving 3m gantries over huge granite bases, or substrate-sized vacuum chucks beneath a stationary gantry. The result of this new machine design is a tight structural loop limited to the inspection or process zone itself, and a reduction of up to 75% of the machine weight

NEW WAY AIR BAR PRODUCT LINE

PRODUCT LINE SPECIFICATIONS: TRANSITION ZONE AIR BAR

Part No.	Length mm	Width mm	Height mm	Bearing Face Surface Size Carbon* mm	Viable Pressure Range** kPa	Substrate Fly Height Range microns	Fly Height Control microns	Air Film Stiffness N/micron	Stability nanometers	Example: Fly Height 80 microns			
										Input Pressure kPa	Input Pressure Flow SLPM	Input Vacuum mm H2O	Input Vacuum Flow SLPM
S22100C500	505	100	42.85	100 x 500	3.48 – 275.79	20 – 120	±5	0.04	±5	145	12.20	50.8	8.2
S22100C750	755	100	42.85	100 x 750	3.48 – 275.79	20 – 120	±5	0.04	±5	145	18.40	50.8	12.4
S22100C1000	1005	100	42.85	100 x 1000	3.48 – 275.79	20 – 120	±5	0.04	±5	145	24.50	50.8	16.5
S22100C1250	1255	100	42.85	100 x 1250	3.48 – 275.79	20 – 120	±5	0.04	±5	145	30.60	50.8	20.6

*Bearing Surface Flatness 0.025mm **Maximum Allowable Pressure Supply 275.79 kPa

PRODUCT LINE SPECIFICATIONS: PRECISION ZONE AIR BAR

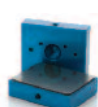
Part No.	Length mm	Width mm	Height mm	Bearing Face Surface Size Carbon* mm	Viable Pressure Range** kPa	Substrate Fly Height Range microns	Fly Height Control microns	Air Film Stiffness N/micron	Stability nanometers	Example: Fly Height 25 microns			
										Input Pressure kPa	Input Pressure Flow SLPM	Input Vacuum mm H2O	Input Vacuum Flow SLPM
S2225401	250	76	50	74 x 250	20.00 - 324.00	25	±5	18	±1	140	10.05		6.3 *

*Bearing Surface Flatness 0.002mm (0.00008 in) **Maximum Allowable Pressure Supply 324.00 kPa

COMPLETE NEW WAY POROUS MEDIA® AIR BEARING PRODUCT LINE



Flat Round
Air Bearings



Flat Rectangular
Air Bearings



Vacuum Preloaded
Air Bearings



Air Bars



Radial
Air Bearings



Air Bushings



Air Slides

ISO
9001:2008
CERTIFIED

New Way Air Bearings
products are manufactured
using ISO 9001:2008
certified processes

NEWWAY®
air bearings

Frictionless Motion®

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