Meech

# Operating Manual

## Energy Saving Air Curtain

# Contents

# 1. Introduction

Meech Air Technology Energy Saving Air Curtains provide an efficient laminar sheet of compressed air. They are ideal for industrial applications that require a continuous layer of air over a wide area.

Meech Air Curtains are also energy efficient, saving up to 70% of compressed air demand whilst also dramatically reducing noise levels.

The Air Curtain work by releasing a small volume of compressed air through a 0.002” (0.0508mm) slot along the entire length. The air travels down the face of the air curtain, this creates an area of low pressure behind it that entrains ambient air at a ratio of 25:1, delivering a massive airflow to the target.

This operating manual covers the Meech range of Energy Saving Air Curtains.

The following are standard stock lengths of Air Curtain;

A85003 - 80MM Air Curtain
A85006 - 150MM Air Curtain
A85012 - 300mm Air Curtain
A85018 - 450mm Air Curtain
A85024 - 600mm Air Curtain
A85030 - 750mm Air Curtain
A85036 - 900mm Air Curtain
A85048 - 1200mm Air Curtain
A85055 - 1400mm Air Curtain
A85071 - 1800mm Air Curtain

In addition any length between 50mm and 2500mm can be manufactured to order. Hard Anodised and Stainless Steel units are available.

# 2. Safety and Inspection

Meech Air Curtains are packed carefully at our factory. Nevertheless, we recommend careful examination of the carton and contents for any damage.

To protect yourself and others when using compressed air, you should be aware of the following general safety guidelines:

- Warning – When compressed air is misused, it can cause serious injury or even death.
- Never point an air hose at anyone in fun or to remove dirt from clothing or the body.
- Never use compressed air without adequate eye and ear protection. Use safety glasses with side shields or goggles and ear protectors.
- Before attempting to disconnect a hose from an air line, the air should be cut off, and the remaining air bled from the line.
- Keep air hoses off the floor where they become tripping hazards and are subject to damage by vehicles, doors, and dropped tools. If possible, suspend air hoses from overhead.

# 3. Maintenance

Meech Air Curtains have no moving parts. Clean compressed air moving through the Air Curtain will not cause any wear of the components.

Ocassionally dirt or water may enter the Air Curtain from the compressed air supply, this could hinder the performance.

If this happens remove the air curtain from the compressed air supply and clean in soapy water, allow drying time and reconnect to the air supply.

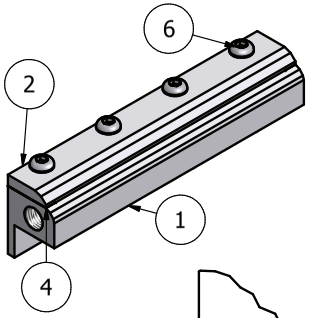
If the build up of dirt becomes too great there may be a need to dismantle the Air Curtain before cleaning.

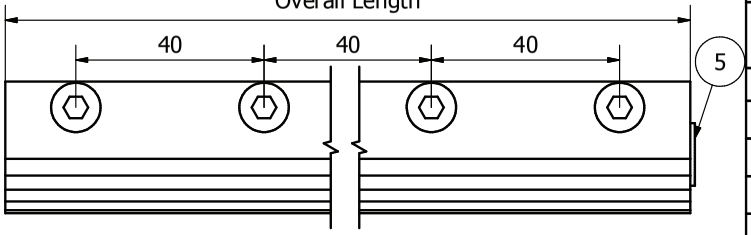
First, remove all the bolts from the length of the air curtain and carefully remove the plastic shim strip. You can then clean all parts.

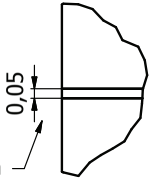
Please remember to fit the shim strip and check the shim tabs are attached to the underside of the cap before reassembling the cap and body.

Do not over tighten the M6 bolts and crush the shims. All bolts should be tightened to a maximum of 4Nm or 2.95f/lbs.

Replacement shim strips and shim tabs are available on request.



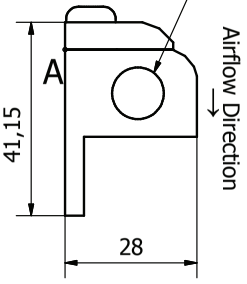



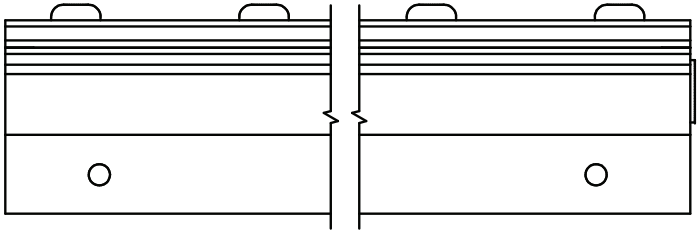




Gap between Cap and Body

A ( 40 : 1 )

1/4"bsp female air entry at each end. units over 600mm have intermediate ports along rear of air curtain.



Meech International
2 Network Point
Range Road, Witney
OX29 0YN, UK
Tel: +44 (0) 1993 706700
Fax: +44 (0) 1993 776977
email: sales@meech.com
web: www.meech.com



TITLE: Air Curtain Assembly

DRAWING No: C000010 - Air Curtain Assembly

MATERIAL: Various

FINISH: Various

TOLERANCE
LINEAR .0.X" 0.2 0.XX" 0.2
ANGULAR .X° 0.1°

DIMENSIONS
MM
DO NOT SCALE

PROJECTION

Sheet: A4

Scale: 1:1

Date: 29/07/2010

Drawn by: Colin Cooper

REVISION: A

SHEET:1 / 3

Air curtain length/Overall length

80mm/130mm
100mm/150mm
150mm/200mm
300mm/300mm
450mm/450mm
600mm/600mm
750mm/750mm
900mm/900mm
1200mm/1200mm
1800mm/1800mm

PARTS LIST

| ITEM | QT | PART NUMBER |
|---|---|---|
| 1 | 1 | D50021 - Air Curtain Body |
| 2 | 1 | D50023 - Air Curtain Cap |
| 3 | 1 | D50025 - Shim Strip |
| 4 | 2 | D50024 - Air Curtain Shim |
| 5 | 1 | D50099 - Plug |
| 6 | 4 | D50022 - M6 X 12 |

# 4. Compressed Air Supply

It is recommended to use a 5-micron (or smaller) filter to remove water and dirt from the compressed air supply. A 5-micron filter will remove 99% of foreign material from the air supply; the use of an oil filter with an effective filtration of 0.01 ppm will remove the oil droplets for an even cleaner compressed air supply.

To achieve maximum performance please ensure that each air inlet on the air curtain is fed with a separate air line. Each air line needs to be directly connected to the compressed air mains or a balanced air manifold.

# 5. Compressed Air Lines Sizes

Figuring the correct pipe size for your compressed air system is an important task. Pipe that is sized too small can create big pressure losses and reduce operating efficiency.

FITTINGS: Every pipe fitting creates a certain amount of increased frictional air loss that is equal to a specified length of pipe. Any turns in the pipe at fittings, ells, tees, and valves increase pressure drops even more.

FUTURE: Are you planning to add more equipment in the next year or two? Then plan for larger piping now. Since the material costs in piping are low compared to installation or replacement cost, it's wise to select pipe of an adequate size. If there is any doubt that a pipe size may create a pressure drop, use the next largest size. Remember that an oversize pipe compensates for possible scale build-up and provides for future expansion of the overall air system.

## Steps to calculating overall piping size for your compressed air system:

1. Determine your air compressor's maximum CFM.

2. Draw a piping schematic and show all pipe fittings, valves, etc.

3. Measure and write the corresponding lengths of pipe on your schematic, then total the length of all straight pipes needed and note that on your schematic.

4. Using TABLE 1 (over page), find your compressor's CFM number on the far left column, and then go to the right until you see the column header with nearest length in feet to your total pipe length. Find where the CFM & PIPE LENGTH intersect on the chart and it will show the recommended pipe size for that length.

5. Take that pipe size to TABLE 2 and use the table to find all the EQUIVELENT LENGTHS OF PIPE needed for each PIPE FITTING. Write these lengths on your piping schematic at each fitting.

6. TOTAL all the EQUIVELENT LENGTHS OF PIPE needed for each PIPE FITTING and add to your total of straight length of pipe. This will give you a new and more accurate total pipe length needed.

7. Take your new total of EQUIVELENT LENGTH OF PIPE IN FEET back to TABLE 1 and use this number to determine the PIPE SIZE you need.

# How to determine what size of PIPE you need for compressed air lines:

| Your Air Compressor's CFM | TABLE 1: EQUIVALENT LENGTH OF PIPE LINES IN FEET *Don't forget to include *PIPE FITTINGS in your final calculations* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 25 feet | 50 feet | 75 feet | 100 feet | 150 feet | 200 feet | 250 feet | 300 feet |
| 1 | ½ | ½ | ½ | ½ | ½ | ½ | ½ | ½ |
| 2 | ½ | ½ | ½ | ½ | ½ | ½ | ½ | ½ |
| 3 | ½ | ½ | ½ | ½ | ½ | ½ | ½ | ½ |
| 5 | ½ | ½ | ½ | ½ | ½ | ½ | ½ | ½ |
| 10 | ½ | ½ | ½ | ¾ | ¾ | ¾ | ¾ | ¾ |
| 15 | ½ | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ |
| 20 | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ |
| 25 | ¾ | ¾ | ¾ | ¾ | ¾ | 1 | 1 | 1 |
| 30 | ¾ | ¾ | ¾ | ¾ | 1 | 1 | 1 | 1 |
| 35 | ¾ | ¾ | 1 | 1 | 1 | 1 | 1 | 1 |
| 40 | ¾ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60 | 1 | 1 | 1 | 1 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 |
| 70 | 1 | 1 | 1 | 1 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 |
| 80 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 |
| 100 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 |
| 125 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 |
| 150 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/4 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 |
| 175 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 2 | 2 | 2 | 2 |
| 200 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 2 | 2 | 2 | 2 |
| 225 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 1 - 1/2 | 2 | 2 | 2 | 2 |
| 250 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 275 | 2 | 2 | 2 | 2 | 2 | 2 | 2 - 1/2 | 2 - 1/2 |
| 300 | 2 | 2 | 2 | 2 | 2 | 2 | 2 - 1/2 | 2 - 1/2 |
| 350 | 2 | 2 | 2 | 2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 |
| 400 | 2 | 2 | 2 | 2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 |
| 450 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 3 | 3 |
| 500 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 3 | 3 |
| 550 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 3 | 3 | 3 | 3 |
| 600 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 3 | 3 | 3 | 3 |
| 750 | 2 - 1/2 | 2 - 1/2 | 2 - 1/2 | 3 | 3 | 3 | 3 | 4 |
| 1000 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 |

**TABLE 2: * EQUIVALENT LENGTH OF PIPE (FT.) for PIPE FITTINGS**
***Add these numbers for each pipe fitting to total length of straight pipe***

| Pipe Size | Long Rad, Ell or run of tee | STD. Ell or Run of reduced tee | Tee Thru side outlet | Globe Valve | Gate Valve |
|---|---|---|---|---|---|
| ½ | 0.62 | 1.55 | 3.1 | 17.3 | 0.36 |
| ¾ | 0.82 | 2.06 | 4.12 | 22.9 | 0.48 |
| 1 | 1.05 | 2.62 | 5.24 | 29.1 | 0.61 |
| 1 - 1/4 | 1.38 | 3.45 | 6.9 | 38.3 | 0.81 |
| 1 - 1/2 | 1.61 | 4.02 | 8.04 | 44.7 | 0.94 |
| 2 | 2.07 | 5.17 | 10.3 | 57.4 | 1.21 |
| 2 - 1/2 | 2.47 | 6.16 | 12.3 | 68.5 | 1.44 |
| 3 | 3.07 | 6.16 | 15.3 | 85.2 | 1.79 |
| 4 | 4.03 | 7.67 | 20.2 | 112 | 2.35 |

# 6. Installation

Compressed air lines should be sized to hold pressure drops to a minimum. Do not use restrictive fittings or undersized lines that can ‘starve’ the Air Knife by causing excessive line pressure drop.

Air Curtains from 50mm to 600mm in length require air to be fed to one air inlet. Typically this is located at one end of the Air Curtain.

Air Curtains between 601mm and 1,099 in length require two air inlets, these are located at each end of the Air Curtain.

Any Air Curtain larger than this will require multiple air inlets; these will be located at both ends and at the back of the Air Curtain. The positioning of the air inlets on Air Curtains over 1,100 in length are shown below.

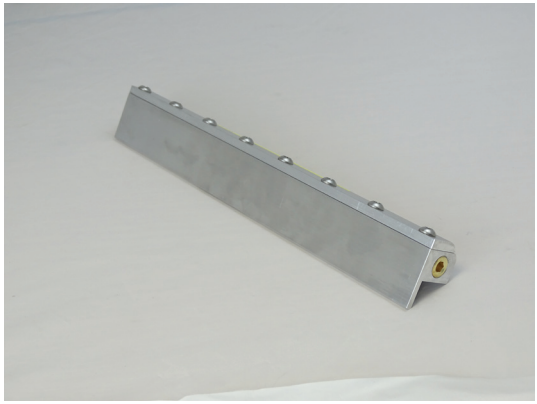
## Rear Ports Positioning

Drill between screw holes (11.5mm drill for 1/4” BSP TAP)

| | | | | |
|---|---|---|---|---|
| 1100mm | | | | |
| 390 | | 320 | | 390 |
| 1200mm | | | | |
| 440 | | 320 | | 440 |
| 1300mm | | | | |
| 470 | | 360 | | 470 |
| 1400mm | | | | |
| 520 | | 360 | | 520 |
| 1500mm | | | | |
| 550 | | 400 | | 550 |
| 1600mm | | | | |
| 600 | | 400 | | 600 |
| 1700mm | | | | |
| 625 | | 450 | | 625 |
| 1800mm | | | | |
| 400 | 320 | 360 | 320 | 400 |
| 1900mm | | | | |
| 450 | 320 | 360 | 320 | 450 |
| 2000mm | | | | |
| 520 | 320 | 320 | 320 | 520 |
| 2100mm | | | | |
| 520 | 360 | 360 | 360 | 520 |
| 2200mm | | | | |
| 560 | 360 | 360 | 360 | 560 |
| 2250mm | | | | |
| 562 | 375 | 375 | 375 | 562 |

## Fixing

A flange runs down the length of the Air Curtain. This flange is designed to be used as a fixing point. Holes can be drilled into the flange without affecting the performance of the Air Curtain.



# 7. Operation

The air flow from the air curtain should be uniform along its entire length. A pressure drop at any point along the Air Curtain could be the result of an insufficient volume of air being supplied to the Air Curtain. Alternatively the problem could be caused by not enough air inlets being supplied with air (see sections 5 and 6).

It is important that the Air Curtain is set at the correct inlet air pressure for the application it's being used in. The higher the air pressure the higher the running costs.

The table below shows the air consumption of various length air curtains at different pressures.

Air Consumption of Air Curtains in CFM
PSI

| | | Air Curtain Length in mm | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inlet Air Pressure (PSI) | bar | 80 | 100 | 150 | 300 | 450 | 600 | 750 | 900 | 1200 | 1400 | 1600 | 1800 | 2000 |
| 20 | 1.4 | 5 | 6 | 9 | 19 | 28 | 37 | 47 | 56 | 75 | 87 | 100 | 112 | 124 |
| 30 | 2 | 6 | 8 | 12 | 24 | 36 | 48 | 60 | 72 | 97 | 113 | 129 | 145 | 161 |
| 40 | 2.7 | 8 | 10 | 15 | 30 | 44 | 59 | 74 | 89 | 119 | 138 | 158 | 178 | 198 |
| 50 | 3.5 | 9 | 12 | 18 | 35 | 53 | 70 | 88 | 105 | 141 | 164 | 187 | 211 | 234 |
| 60 | 4.1 | 11 | 14 | 20 | 41 | 61 | 81 | 102 | 122 | 162 | 190 | 217 | 244 | 271 |
| 70 | 4.8 | 12 | 15 | 23 | 46 | 69 | 92 | 115 | 138 | 184 | 215 | 246 | 277 | 307 |
| 80 | 5.4 | 14 | 17 | 26 | 52 | 77 | 103 | 129 | 155 | 206 | 241 | 275 | 310 | 344 |
| 90 | 6.2 | 15 | 19 | 29 | 57 | 86 | 114 | 143 | 171 | 228 | 266 | 304 | 343 | 381 |
| 100 | 6.8 | 17 | 21 | 31 | 63 | 94 | 125 | 156 | 188 | 250 | 292 | 334 | 375 | 417 |

Air Consumption of Air Curtains in CFM
Bar

| | | Air Curtain Length in mm | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inlet Air Pressure (bar) | PSI | 80 | 100 | 150 | 300 | 450 | 600 | 750 | 900 | 1200 | 1400 | 1600 | 1800 | 2000 |
| 1 | 14.5 | 4 | 5 | 8 | 16 | 23 | 31 | 39 | 47 | 63 | 73 | 83 | 94 | 104 |
| 2 | 29 | 6 | 8 | 12 | 24 | 35 | 47 | 59 | 71 | 94 | 110 | 126 | 142 | 157 |
| 3 | 43.5 | 8 | 11 | 16 | 32 | 47 | 63 | 79 | 95 | 126 | 147 | 168 | 189 | 210 |
| 4 | 58 | 11 | 13 | 20 | 40 | 59 | 79 | 99 | 119 | 158 | 184 | 211 | 237 | 263 |
| 5 | 72.5 | 13 | 16 | 24 | 47 | 71 | 95 | 119 | 142 | 190 | 222 | 253 | 285 | 317 |
| 6 | 87 | 15 | 18 | 28 | 55 | 83 | 111 | 139 | 166 | 222 | 259 | 296 | 333 | 370 |
| 7 | 102 | 17 | 21 | 32 | 64 | 96 | 127 | 159 | 191 | 255 | 297 | 340 | 382 | 425 |
| 8 | 116 | 19 | 24 | 36 | 71 | 107 | 143 | 178 | 214 | 285 | 333 | 381 | 428 | 476 |
| 9 | 131 | 21 | 27 | 40 | 80 | 119 | 159 | 199 | 239 | 318 | 371 | 425 | 478 | 531 |
| 10 | 145 | 23 | 29 | 44 | 87 | 131 | 175 | 218 | 262 | 349 | 407 | 465 | 524 | 582 |

# 9. Troubleshooting

## Air flow

Problems with compressed air flow can be caused by:

1. Air pressure too low – increase air pressure at the relevant regulator
2. Undersized compressed air lines – replace pipes with correct sizes, see section 4
3. Blocked compressed air line – remove blockage
4. Insufficient compressor size – Check compressor size for fitting Air Curtain

## Air Curtain

Air flow across Air Curtain not consistent:

1. Check all air inlets are connected
2. Check the bolts are not over tightened
3. Check air pressure

**Meech International (UK)**
2 Network Point
Range Road, Witney
OX29 0YN, UK

Tel: +44 (0)1993 706700
Fax: +44 (0)1993 776977
email: sales@meech.com

**Meech Static Eliminators USA Inc**
2915 Newpark Drive
Norton, OH 44203
USA

Tel: +1 330 564 2000 / 1 800 232 4210
Fax: +1 330 564 2005
email: info@meech.com

**Meech Elektrostatik SA**
Kaiserbaracke 66
B-4780 St.Vith
Belgium

Tel: +32 8086 2983
Fax: +32 8086 2821
email: mesa@meech.com

**Meech CE**
2151 Fót
Széchenyi út. 46
Hungary

Tel: +36 27535075
Fax: +36 27535076
email: ce@meech.com

**Meech Static Eliminators (Shanghai) Co. Ltd**
7G, 7F, LP Tower
#25 Xiangfeng Road
201103 Shanghai
China

Tel: +86 400 820 0102
Fax: +86 21 6405 7736
email: china@meech.com

**Meech Shavotech**
Shavo House, Survey No.21A / 10 B, Plot No.394
South Main Road, Koregaon Park,
PUNE 411 001
India

Tel: 020-26069641/ 26069642,
Fax: 020-26069644
e-mail: india@meech.com