

Adjustable Vanes High Induction Swirl Diffusers



AIR DIFFUSION

AXO SERIES Adjustable Vanes High Induction Swirl Diffusers



AXO swirl diffusers by EffectiV HVAC[™] and MADEL® are designed to be applied in air conditioning, ventilation and 1 1/10 heating systems. The design of their vanes and radial arrangement supplies the air in a swirl pattern while leveraging the coanda effect. The resulting high induction ratio helps reduce stratification.

The individually adjustable vanes support multiple angles to adapt the airflow to virtually any environment. The sectored vanes, combined with a PERFAIR high-performance plenum mixing box, emit a uniform airflow throughout the passage section.

The AXO series diffusers admit a flow variation of 60% while keeping the air stream stable. For optimal conditions, AXO diffusers may be used in ceilings 8.5 up to 13 feet (2.6 up to 4 meters) high, with a temperature differential up to 22°F (12°C).

The air pattern adjustability, high level of induction rate and reduced air stratification allow for designs with a much higher level of comfort and provide opportunities for significant energy savings.

The face and plenum box are ordered separately and attached together with a screw through the face which is fixed in the plenum crossbar.

AXO vanes are made of ABS tested in accordance to UL 94 HB Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances - Horizontal Burning Test







AXO-S & AXO-C by MADEL®

AIR DIFFUSION

Some Applications

Classrooms

Ideal when comfort and energy efficiency matter

Office buildings

Schools

Clean rooms



Meeting rooms

Cafeterias and restaurants

Entrance halls (vertical blast)

Multi-purpose rooms

Quick Selection



| Circular Models Selection | Min cfm | Max cfm |
|------------------------------|---------|---------|
| AXO-C 12 (300 mm) | 50 | 130 |
| AXO-C 16 (400 mm) | 100 | 250 |
| AXO-C 20 (500 mm) | 150 | 330 |
| AXO-C300 25 (625 mm) | 50 | 130 |
| AXO-C400 25 (625 mm) | 100 | 250 |
| AXO-C500 25 (625 mm) | 150 | 330 |
| AXO-C 25, AXO-CY 25 (625 mm) | 230 | 500 |
| AXO-C 33 (825 mm) | 360 | 600 |

Important Note: Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.



| Square Models Selection | Min cfm | Max cfm |
|------------------------------|---------|---------|
| AXO-S 12 (300 mm) | 50 | 130 |
| AXO-S 16 (400 mm) | 100 | 250 |
| AXO-S 20 (500 mm) | 155 | 330 |
| AXO-S300 24 (610 mm) | 50 | 160 |
| AXO-S400 24 (610 mm) | 100 | 250 |
| AXO-S 24, AXO-SY 24 (610 mm) | 230 | 500 |
| AXO-SX 24 (610 mm) | 300 | 550 |
| AXO-S 32 (800 mm) | 360 | 600 |



HIGH PERFORMANCE ARCHITECTURAL DIFFUSERS

Plenum Selection

AXO swirl diffusers are available with a wide selection of PERFAIR plenums to suit any type of application. PERFAIR-SS with side connection is the most popular plenum for Square Diffusers and only requires 14" of ceiling space.

All PERFAIR plenums come with antiseismic tabs and perforated air volume damper / air equalizer.

|--|

Plenum Model Face Type Connection **Recommended For** PERFAIR-CS Side False or closed ceiling Round PERFAIR-CT Round Тор Open ceiling with visible duct coming from top PERFAIR-SS Square Side, Angle False or closed ceiling PERFAIR-SSS Side Open ceiling with visible duct coming from side Square PERFAIR-ST Square Тор Open ceiling with visible duct coming from top PERFAIR-XS Side, Oval Very limited ceiling space (6" min) Square Very limited ceiling space (5" min) PERFAIR-XSS Square Side, Rect.

PERFAIR-SS

Integrated Air Volume Dampers



Perforated damper + air equalizer (Standard)



damper, cable inside the plenum, adjustment through face



Manually operated damper, cable through wall with termination fixture



Battery operated electro-balance damper with remote control, cable through face



Battery operated electro-balance damper with remote control, cable through wall with termination fixture



HORIZONTAL SUPPLY. POSITION 1.







VERTICAL SUPPLY.





AL_{0.2} = Distance at which velocity reaches 40 fpm



AXO-C Round Diffuser, Radial Vanes

| Dim | A (Imperial) | A (Metric) | Free Area (sqf) | Min cfm | Max cfm |
|-----------------|-----------------|---------------|--------------------|---------|---------|
| 12'' (300mm) | 11 39/64" | 295 mm | 0.103 | 50 | 130 |
| 16'' (400mm) | 15 35/34" | 395 mm | 0.216 | 100 | 250 |
| 20'' (500mm) | 19 31/64" | 495 mm | 0.312 | 150 | 330 |
| 25" (625mm) | 24 13/32" | 620 mm | 0.47 | 230 | 500 |
| 32'' (825mm) | 32 9/32" | 825mm | 0.73 | 360 | 600 |





Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.



AXO-C 12 (AXO-C 300) + PERFAIR Performance Data

AXO-C 12 (Imperial), Swirl Effect

AXO-C 300 (Metric)

| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|-----------|--------------------------------|-------|-------|--------|-------|--------|--------|-------|--------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.010 | 0.016 | 0.022 | 0.031 | 0.041 | 0.062 |
| | CFM | 27 | 41 | 55 | 68 | 82 | 95 | 109 | 136 |
| | Pressure Loss (in.w.g.) | 0.01 | 0.02 | 0.03 | 0.05 | 0.07 | 0.09 | 0.12 | 0.181 |
| 5 | NC | < 15 | < 15 | < 15 | 17 | 22 | 25 | 29 | 35 |
| | Throw (ft) - Coanda Effect | 1-2-2 | 1-2-4 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-11 |
| | Throw (ft) - No Ceiling Effect | 1-1-2 | 1-2-3 | 1-2-3 | 2-3-4 | 2-4-5 | 2-4-6 | 3-5-7 | 4-6-9 |
| | CFM | 39 | 59 | 79 | 98 | 118 | 137 | | |
| | Pressure Loss (in.w.g.) | 0.02 | 0.04 | 0.06 | 0.1 | 0.14 | 0.18 | | |
| 6 | NC | < 15 | < 15 | 21 | 26 | 31 | 35 | | |
| | Throw (ft) - Coanda Effect | 1-2-3 | 2-3-5 | 3-4-7 | 3-6-8 | 4-7-10 | 5-8-11 | | |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-3-5 | 3-4-6 | 3-5-8 | 4-6-9 | | |
| | CFM | 70 | 105 | 140 | | | | | |
| | Pressure Loss (in.w.g.) | 0.06 | 0.1 | 0.185 | | | | | |
| 8 | NC | 17 | 28 | 37 | | | | | |
| | Throw (ft) - Coanda Effect | 2-4-6 | 4-6-9 | 5-8-11 | | | | | |
| | Throw (ft) - No Ceiling Effect | 2-3-4 | 3-4-7 | 3-6-9 | | | | | |

Performance Notes

- NC Value based on 10 db room attenuation.



AXO-C 12 (AXO-C 300) + PERFAIR Performance Data (continued)

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|------------------|--------------|-------------|-------------|
| 12"D | Pressure Loss | x 1 | x 1.2 | x.2.4 |
| (300mm) | NC | +0.7 | +1.1 | +2.4 |

| Delta T | Correction F | actors |
|---------|--------------|--------|
| Δ T (F) | Kh | КІ |
| 0 | .036 | 1 |
| -2 | .041 | .985 |
| -4 | .046 | .975 |
| -6 | .052 | .965 |
| -8 | .058 | .95 |
| -10 | .065 | .935 |
| -12 | .072 | .925 |
| -15 | .084 | .91 |



bv= kh x Throw

Throw'(Δ T)= KI x Throw

Kh = Correction Factor for Vertical Diffusion KI = Throw Correction Factor AL_{0.2} = Distance at which velocity reaches 40 fpm

| | Ratios | | |
|---------------|--------|------------------|--|
| Throw (ft) | i | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 10 | 0.046 | induced room air = cfm mixed for given throw |
| 6 | 17 | 0.028 | |
| 8 | 23 | 0.022 | |
| 10 | 29 | 0.017 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 48 | - | |
| 20 | 65 | - | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 100 | - | Delta T (Throw) = T (Room) - T (Throw) |
| 30 | 125 | - | |



AXO-C 16 (AXO-C 400) + PERFAIR Performance Data

AXO-C 16 (Imperial) Swirl Effect

AXO-C 400 (Metric)

| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|-----------|--------------------------------|-------|-------|-------|--------|--------|--------|---------|---------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.01 | 0.016 | 0.022 | 0.031 | 0.041 | .062 |
| | CFM | | 59 | 79 | 98 | 118 | 137 | 157 | 196 |
| | Pressure Loss (in.w.g.) | | 0.009 | 0.016 | 0.025 | 0.035 | 0.046 | 0.06 | 0.092 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 17 | 21 | 26 |
| | Throw (ft) - Coanda Effect | | 1-2-3 | 2-3-4 | 2-4-5 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-2 | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-6 | 3-4-7 | 3-5-8 |
| | CFM | 70 | 105 | 140 | 175 | 209 | 244 | 279 | 349 |
| | Pressure Loss (in.w.g.) | 0.013 | 0.028 | 0.048 | 0.074 | 0.104 | 0.139 | 0.18 | 0.276 |
| 8 | NC | < 15 | < 15 | 16 | 21 | 25 | 29 | 32 | 38 |
| | Throw (ft) - Coanda Effect | 2-3-4 | 2-4-6 | 3-5-8 | 4-7-10 | 5-8-12 | 5-9-14 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-4-6 | 3-5-7 | 3-6-9 | 4-7-10 | 5-8-12 | 6-10-15 |

Performance Notes

- NC Value based on 10 db room attenuation.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 16"D | Pressure Loss | x 1 | x 1.2 | x 2.3 |
| (400mm) | NC | +0.8 | +1.5 | +2.9 |

| Delta T | Correction | Factors |
|---------|------------|---------|
| Δ T (F) | Kh | KI |
| 0 | .036 | 1 |
| -2 | .041 | .985 |
| -4 | .046 | .975 |
| -6 | .052 | .965 |
| -8 | .058 | .95 |
| -10 | .065 | .935 |
| -12 | .072 | .925 |
| -15 | .084 | .91 |

| | Ratios | |
|---------------|--------|------------------|
| Throw (ft) | i | Delta T Ratio |
| 4 | 7 | 0.052 |
| 6 | 13 | 0.034 |
| 8 | 18 | 0.026 |
| 10 | 24 | 0.019 |
| 15 | 39 | - |
| 20 | 55 | - |
| 25 | 72 | - |



AXO-C 20 (AXO-C 500) + PERFAIR Performance Data

AXO-C 20 (Imperial) Swirl Effect

AXO-C 500 (Metric)

| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 |
|-----------|--------------------------------|--------|--------|---------|---------|--------|---------|---------|
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | .090 |
| | CFM | | 98 | 118 | 137 | 157 | 196 | 236 |
| | Pressure Loss (in.w.g.) | | 0.015 | 0.021 | 0.028 | 0.036 | 0.055 | 0.079 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 19 | 24 |
| | Throw (ft) - Coanda Effect | | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-3 | 2-3-4 | 2-3-5 | 2-3-5 | 3-4-7 | 3-5-8 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 |
| | Pressure Loss (in.w.g.) | 0.029 | 0.045 | 0.062 | 0.084 | 0.108 | 0.166 | 0.281 |
| 8 | NC | < 15 | 17 | 21 | 25 | 28 | 34 | 40 |
| | Throw (ft) - Coanda Effect | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-12 | 6-10-14 |
| | CFM | 218 | 273 | 327 | 382 | | | |
| | Pressure Loss (in.w.g.) | 0.068 | 0.104 | 0.147 | 0.198 | | | |
| 10 | NC | 22 | 28 | 32 | 36 | | | |
| | Throw (ft) - Coanda Effect | 4-6-10 | 5-8-12 | 6-10-15 | 7-11-17 | | | |
| | Throw (ft) - No Ceiling Effect | 3-5-7 | 4-6-9 | 4-7-11 | 5-8-13 | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open | |
|--------------------|---------------|--------------|-------------|-------------|--|
| 20″D | Pressure Loss | x 1 | x 1.4 | x 4 | |
| (500mm) | NC | +0.8 | +2.1 | +2.8 | |





AXO-C 20 (AXO-C 500) + PERFAIR Performance Data (continued)

| | Rat | ios | | |
|---------------|---------------|---------------|------------------|--|
| Throw (ft) | i (type A) | i (type B) | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 6 | 9 | 0.082 | induced room air = cfm mixed for given throw |
| 6 | 12 | 17 | 0.047 | |
| 8 | 16 | 24 | 0.035 | |
| 10 | 20 | 30 | 0.028 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 33 | 50 | 0.018 | Dolta T (Supply) = T (Boom) T (Supply) |
| 20 | 46 | 73 | 0.01 | Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw) |
| 25 | 58 | 97 | | |

AXO-C 25 (AXO-C 625) + PERFAIR Performance Data

AXO-C 25 (Imperial) Swirl Effect

AXO-C 625 (Metric)

| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 | 1400 |
|-----------|--------------------------------|--------|---------|---------|---------|---------|----------|----------|----------|
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | .090 | .122 |
| | CFM | | 98 | 118 | 137 | 157 | 196 | 236 | 275 |
| | Pressure Loss (in.w.g.) | | 0.008 | 0.011 | 0.015 | 0.019 | 0.029 | 0.041 | 0.055 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | < 15 | 18 | 21 |
| | Throw (ft) - Coanda Effect | | 1-2-4 | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 4-6-9 | 4-7-10 |
| | Throw (ft) - No Ceiling Effect | | 1-2-3 | 1-2-3 | 2-3-4 | 2-3-4 | 2-4-6 | 3-4-7 | 3-5-8 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 | 489 |
| | Pressure Loss (in.w.g.) | 0.015 | 0.023 | 0.033 | 0.044 | 0.057 | 0.087 | 0.124 | 0.166 |
| 8 | NC | < 15 | < 15 | 16 | 19 | 21 | 26 | 30 | 33 |
| | Throw (ft) - Coanda Effect | 2-3-5 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-10 | 5-9-13 | 6-10-16 | 7-12-18 |
| | Throw (ft) - No Ceiling Effect | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-7-10 | 5-8-12 | 6-9-14 |
| | CFM | 218 | 273 | 327 | 382 | 436 | 545 | 654 | 764 |
| | Pressure Loss (in.w.g.) | 0.036 | 0.055 | 0.077 | 0.104 | 0.133 | 0.205 | 0.29 | 0.39 |
| 10 | NC | 16 | 21 | 25 | 28 | 30 | 35 | 40 | >40 |
| | Throw (ft) - Coanda Effect | 3-5-8 | 4-7-10 | 5-8-12 | 6-10-14 | 7-11-16 | 8-14-21 | 10-16-25 | 12-19-29 |
| | Throw (ft) - No Ceiling Effect | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-15 | 7-12-19 | 9-14-22 |
| | CFM | 314 | 393 | 471 | 550 | 628 | 785 | | |
| | Pressure Loss (in.w.g.) | 0.071 | 0.11 | 0.155 | 0.208 | 0.276 | 0.345 | | |
| 12 | NC | 24 | 28 | 32 | 35 | 38 | 44 | | |
| | Throw (ft) - Coanda Effect | 5-8-12 | 6-10-15 | 7-12-18 | 8-14-21 | 9-15-23 | 12-19-29 | | |
| | Throw (ft) - No Ceiling Effect | 4-6-9 | 4-7-11 | 5-9-13 | 6-10-16 | 7-11-17 | 9-14-22 | | |

Performance Notes

- NC Value based on 10 db room attenuation.



AXO-C 25 (AXO-C 625) + PERFAIR Performance Data (continued)

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|------------------|--------------|-------------|-------------|
| 25"D | Pressure Loss | x 1 | x 1.5 | x.4.8 |
| (625mm) | NC | +0.9 | +5.8 | +7.7 |

| Type B Throw Correction Factor | | | | | |
|---|-------------------|--|--|--|--|
| Dim | Correction Factor | | | | |
| 25"D | 0.74 | | | | |
| Type B = 50% position 1, 50% position 2 | | | | | |

| Delta T Correction Factors | | | | | | |
|----------------------------|------|------|--|--|--|--|
| Δ T (F) | Kh | KI | | | | |
| 0 | .036 | 1 | | | | |
| -2 | .041 | .985 | | | | |
| -4 | .046 | .975 | | | | |
| -6 | .052 | .965 | | | | |
| -8 | .058 | .95 | | | | |
| -10 | .065 | .935 | | | | |
| -12 | .072 | .925 | | | | |
| -15 | .084 | .91 | | | | |



| Ratios | | | | |
|---------------|---------------|---------------|------------------|--|
| Throw (ft) | i (type A) | i (type B) | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 5 | 7 | 0.115 | induced room air = cfm mixed for given throw |
| 6 | 9 | 14 | 0.068 | |
| 8 | 12 | 19 | 0.052 | |
| 10 | 16 | 25 | 0.04 | Delta T (Throw) - Delta T (Supply) * Delta T Ratio |
| 15 | 26 | 42 | 0.027 | Dena i (iniow) – Dena i (Suppry) – Dena i Natio |
| 20 | 37 | 60 | 0.02 | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 47 | 60 | 0.016 | Delta T (Throw) = T (Room) - T (Throw) |
| 30 | 60 | 100 | - | |



AXO-C 33 (AXO-C 825) + PERFAIR Performance Data

AXO-C 33 (Imperial) Swirl Effect

AXO-C 825 (Metric)

2

| Neels Cine | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 | 1400 |
|------------|--------------------------------|-------|--------|--------|---------|---------|---------|----------|----------|
| Neck Size | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | .090 | .122 |
| | CFM | 314 | 393 | 471 | 550 | 628 | 785 | 942 | 1100 |
| 4.0." | Pressure Loss (in.w.g.) | 0.027 | 0.042 | 0.059 | 0.079 | 0.102 | 0.156 | 0.221 | 0.297 |
| 12" | NC | 16 | 21 | 26 | 30 | 33 | 38 | 43 | 47 |
| (300mm) | Throw (ft) - Coanda Effect | 4-6-9 | 4-7-11 | 5-9-13 | 6-10-15 | 7-12-18 | 9-15-22 | 10-18-26 | 12-20-31 |
| | Throw (ft) - No Ceiling Effect | 3-4-7 | 3-5-8 | 4-7-10 | 5-8-12 | 5-9-13 | 7-11-16 | 8-13-20 | 9-15-23 |

NC Value based on 10 db room attenuation.

Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

| Damper Correction | | 100% | 50% | 10% |
|-------------------|------------------|------|-------|-------|
| Factor | | Open | Open | Open |
| 32''D | Pressure Loss | x 1 | x 1.7 | x.4.5 |
| (02511111) | NC | +0.9 | +4.4 | +7.8 |

| Delta T Correction Factors | | | | | | | |
|----------------------------|------|------|--|--|--|--|--|
| Δ T (F) | Kh | КІ | | | | | |
| 0 | .036 | 1 | | | | | |
| -2 | .041 | .985 | | | | | |
| -4 | .046 | .975 | | | | | |
| -6 | .052 | .965 | | | | | |
| -8 | .058 | .95 | | | | | |
| -10 | .065 | .935 | | | | | |
| -12 | .072 | .925 | | | | | |
| -15 | 084 | 91 | | | | | |

| ŀ | AL 0.2 | bv= kh x Throw |
|---|----------|-------------------------|
| | <u>a</u> | Throw'(Δ T)= KI x Throw |

Kh = Correction Factor for Vertical Diffusion KI = Throw Correction Factor

AL_{0.2} = Distance at which velocity reaches 40 fpm

| | Rat | ios | | |
|-------|----------|----------|---------|--|
| Throw | i | i | Delta T | induced room air = supplied cfm * i |
| (ft) | (type A) | (type B) | Ratio | |
| 4 | < 5 | < 5 | 0.19 | induced room air = cfm mixed for given throw |
| 6 | 6 | 8 | 0.11 | |
| 8 | 8 | 12 | 0.082 | |
| 10 | 12 | 15 | 0.065 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 18 | 25 | 0.044 | |
| 20 | 26 | 36 | 0.033 | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 32 | 16 | 0.026 | Delta T (Throw) = T (Room) - T (Throw) |
| 30 | 41 | 60 | 0.021 | |

How to Specify AXO-C

Supply and mounting of circular high induction swirl diffuser with individually adjustable radial vanes model AXO-C. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



AXO-C300 25 (AXO-C300 625) + PERFAIR Performance Data

AXO-C300 25 (Imperial), Swirl Effect

AXO-C300 625 (Metric)

| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|-----------|--------------------------------|-------|-------|--------|-------|--------|--------|-------|--------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.010 | 0.016 | 0.022 | 0.031 | 0.041 | 0.062 |
| | CFM | 27 | 41 | 55 | 68 | 82 | 95 | 109 | 136 |
| | Pressure Loss (in.w.g.) | 0.01 | 0.02 | 0.03 | 0.05 | 0.07 | 0.09 | 0.12 | 0.181 |
| 5 | NC | < 15 | < 15 | < 15 | 17 | 22 | 25 | 29 | 35 |
| | Throw (ft) - Coanda Effect | 1-2-2 | 1-2-4 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-11 |
| | Throw (ft) - No Ceiling Effect | 1-1-2 | 1-2-3 | 1-2-3 | 2-3-4 | 2-4-5 | 2-4-6 | 3-5-7 | 4-6-9 |
| | CFM | 39 | 59 | 79 | 98 | 118 | 137 | | |
| | Pressure Loss (in.w.g.) | 0.02 | 0.04 | 0.06 | 0.1 | 0.14 | 0.18 | | |
| 6 | NC | < 15 | < 15 | 21 | 26 | 31 | 35 | | |
| | Throw (ft) - Coanda Effect | 1-2-3 | 2-3-5 | 3-4-7 | 3-6-8 | 4-7-10 | 5-8-11 | | |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-3-5 | 3-4-6 | 3-5-8 | 4-6-9 | | |
| | CFM | 70 | 105 | 140 | | | | | |
| 8 | Pressure Loss (in.w.g.) | 0.06 | 0.1 | 0.185 | | | | | |
| | NC | 17 | 28 | 37 | | | | | |
| | Throw (ft) - Coanda Effect | 2-4-6 | 4-6-9 | 5-8-11 | | | | | |
| | Throw (ft) - No Ceiling Effect | 2-3-4 | 3-4-7 | 3-6-9 | | | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|------------------|--------------|-------------|-------------|
| 12"D | Pressure Loss | x 1 | x 1.2 | x.2.4 |
| (300mm) | NC | +0.7 | +1.1 | +2.4 |







| | Ratios | | | | | | |
|---------------|--------|------------------|-------------|--|--|--|--|
| Throw (ft) | i | Delta T Ratio | induced r | | | | |
| 4 | 10 | 0.046 | induced ro | | | | |
| 6 | 17 | 0.028 | | | | | |
| 8 | 23 | 0.022 | | | | | |
| 10 | 29 | 0.017 | Delta T (1 | | | | |
| 15 | 48 | - | (| | | | |
| 20 | 65 | - | Delta T (Su | | | | |
| 25 | 100 | - | Delta T (Tł | | | | |
| 30 | 125 | - | | | | | |

room air = supplied cfm * i

oom air = cfm mixed for given throw

[hrow) = Delta T (Supply) * Delta T Ratio

upply) = T (Room) - T (Supply) hrow) = T (Room) - T (Throw)

AXO-C400 25 (AXO-C400 625) + PERFAIR Performance Data

AXO-C400 25 (Imperial) Swirl Effect

AXO-C400 625 (Metric)

| Neck Size | Size Neck (fpm) Velocity | | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|-----------|--------------------------------|-------|-------|-------|--------|--------|--------|---------|---------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.01 | 0.016 | 0.022 | 0.031 | 0.041 | .062 |
| | CFM | | 59 | 79 | 98 | 118 | 137 | 157 | 196 |
| | Pressure Loss (in.w.g.) | | 0.009 | 0.016 | 0.025 | 0.035 | 0.046 | 0.06 | 0.092 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 17 | 21 | 26 |
| | Throw (ft) - Coanda Effect | | 1-2-3 | 2-3-4 | 2-4-5 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-2 | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-6 | 3-4-7 | 3-5-8 |
| | CFM | | 105 | 140 | 175 | 209 | 244 | 279 | 349 |
| | Pressure Loss (in.w.g.) | 0.013 | 0.028 | 0.048 | 0.074 | 0.104 | 0.139 | 0.18 | 0.276 |
| 8 | NC | < 15 | < 15 | 16 | 21 | 25 | 29 | 32 | 38 |
| | Throw (ft) - Coanda Effect | 2-3-4 | 2-4-6 | 3-5-8 | 4-7-10 | 5-8-12 | 5-9-14 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-4-6 | 3-5-7 | 3-6-9 | 4-7-10 | 5-8-12 | 6-10-15 |

Performance Notes

- NC Value based on 10 db room attenuation.

- Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open | |
|--------------------|---------------|--------------|-------------|-------------|--|
| 16"D | Pressure Loss | x 1 | x 1.2 | x 2.3 | |
| (400mm) | NC | +0.8 | +1.5 | +2.9 | |

| Delta T Correction Factors | | | | |
|----------------------------|------|------|--|--|
| Δ T (F) | Kh | KI | | |
| 0 | .036 | 1 | | |
| -2 | .041 | .985 | | |
| -4 | .046 | .975 | | |
| -6 | .052 | .965 | | |
| -8 | .058 | .95 | | |
| -10 | .065 | .935 | | |
| -12 | .072 | .925 | | |
| -15 | .084 | .91 | | |



Throw'(Δ T)= KI x Throw

Kh = Correction Factor for Vertical Diffusion

KI = Throw Correction Factor

AL_{0.2} = Distance at which velocity reaches 40 fpm



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| | Ratios | | |
|---------------|--------|------------------|--|
| Throw (ft) | i | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 7 | 0.052 | induced room air = cfm mixed for given throw |
| 6 | 13 | 0.034 | |
| 8 | 18 | 0.026 | |
| 10 | 24 | 0.019 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 39 | - | |
| 20 | 55 | - | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 72 | - | Denta i $(infow) = i (Room) - i (infow)$ |

AXO-C500 25 (AXO-C500 625) + PERFAIR Performance Data

AXO-C500 25 (Imperial) Swirl Effect

AXO-C500 625 (Metric)

| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 |
|-----------|--------------------------------|--------|--------|---------|---------|--------|---------|---------|
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | .090 |
| | CFM | | 98 | 118 | 137 | 157 | 196 | 236 |
| | Pressure Loss (in.w.g.) | | 0.015 | 0.021 | 0.028 | 0.036 | 0.055 | 0.079 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 19 | 24 |
| | Throw (ft) - Coanda Effect | | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-3 | 2-3-4 | 2-3-5 | 2-3-5 | 3-4-7 | 3-5-8 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 |
| | Pressure Loss (in.w.g.) | | 0.045 | 0.062 | 0.084 | 0.108 | 0.166 | 0.281 |
| 8 | NC | < 15 | 17 | 21 | 25 | 28 | 34 | 40 |
| | Throw (ft) - Coanda Effect | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-12 | 6-10-14 |
| | CFM | 218 | 273 | 327 | 382 | | | |
| | Pressure Loss (in.w.g.) | | 0.104 | 0.147 | 0.198 | | | |
| 10 | NC | 22 | 28 | 32 | 36 | | | |
| | Throw (ft) - Coanda Effect | 4-6-10 | 5-8-12 | 6-10-15 | 7-11-17 | | | |
| | Throw (ft) - No Ceiling Effect | 3-5-7 | 4-6-9 | 4-7-11 | 5-8-13 | | | |

Performance Notes

- NC Value based on 10 db room attenuation.



| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open | |
|--------------------|---------------|--------------|-------------|-------------|--|
| 20″D | Pressure Loss | x 1 | x 1.4 | x 4 | |
| (500mm) | NC | +0.8 | +2.1 | +2.8 | |

| Delta T Correction Factors | | | | | |
|----------------------------|------|------|--|--|--|
| Δ T (F) | Kh | KI | | | |
| 0 | .036 | 1 | | | |
| -2 | .041 | .985 | | | |
| -4 | .046 | .975 | | | |
| -6 | .052 | .965 | | | |
| -8 | .058 | .95 | | | |
| -10 | .065 | .935 | | | |
| -12 | .072 | .925 | | | |
| -15 | .084 | .91 | | | |



| | Ratios | | | |
|---------------|---------------|---------------|------------------|--|
| Throw (ft) | i (type A) | i (type B) | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 6 | 9 | 0.082 | induced room air = crm mixed for given throw |
| 6 | 12 | 17 | 0.047 | |
| 8 | 16 | 24 | 0.035 | |
| 10 | 20 | 30 | 0.028 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 33 | 50 | 0.018 | Dolta T (Supply) = T (Boom) T (Supply) |
| 20 | 46 | 73 | 0.01 | Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw) |
| 25 | 58 | 97 | | |



AXO-CY Round Diffuser, Radial Inclined Vanes

| Dim | A (Imperial) | A (Metric) | Free Area (sqf) | Min cfm | Max cfm |
|----------------|-----------------|---------------|--------------------|---------|---------|
| 25" (625mm) | 24 13/32" | 620 mm | 0.47 | 230 | 500 |

Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.







AXO-CY 625 (Metric)

AXO-CY + PERFAIR Performance Data

AXO-CY 25 (Imperial) Swirl Effect

| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 | 1400 |
|-----------|--------------------------------|--------|---------|---------|---------|---------|----------|----------|----------|
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | .090 | .122 |
| | CFM | 79 | 98 | 118 | 137 | 157 | 196 | 236 | 275 |
| | Pressure Loss (in.w.g.) | 0.017 | 0.026 | 0.035 | 0.047 | 0.061 | 0.091 | 0.126 | 0.188 |
| 6 | NC | < 15 | < 15 | 17 | 21 | 24 | 27 | 31 | 37 |
| | Throw (ft) - Coanda Effect | 1-2-4 | 2-3-5 | 2-3-5 | 2-4-6 | 3-4-7 | 3-8-11 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-2-4 | 2-3-4 | 2-3-5 | 2-3-5 | 2-5-9 | 3-5-7 | 3-5-8 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 | 489 |
| | Pressure Loss (in.w.g.) | 0.027 | 0.041 | 0.054 | 0.073 | 0.094 | 0.146 | 0.197 | 0.29 |
| 8 | NC | < 15 | 18 | 21 | 24 | 27 | 32 | 38 | 44 |
| | Throw (ft) - Coanda Effect | 2-4-6 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-11 | 5-9-13 | 7-11-15 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 2-3-5 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-10 | 5-8-12 | 6-9-14 |
| | CFM | 218 | 273 | 327 | 382 | 436 | 545 | 654 | 764 |
| | Pressure Loss (in.w.g.) | 0.036 | 0.055 | 0.077 | 0.104 | 0.133 | 0.205 | 0.29 | 0.39 |
| 10 | NC | 15 | 20 | 23 | 26 | 29 | 33 | 37 | 40 |
| | Throw (ft) - Coanda Effect | 3-5-8 | 4-7-10 | 5-8-12 | 6-10-14 | 7-11-16 | 8-14-21 | 10-16-25 | 12-19-29 |
| | Throw (ft) - No Ceiling Effect | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-15 | 7-12-19 | 9-14-22 |
| | CFM | 314 | 393 | 471 | 550 | 628 | 785 | | |
| | Pressure Loss (in.w.g.) | 0.063 | 0.095 | 0.121 | 0.166 | 0.216 | 0.325 | | |
| 12 | NC | 22 | 27 | 31 | 34 | 38 | 44 | | |
| | Throw (ft) - Coanda Effect | 5-8-11 | 6-10-15 | 8-13-19 | 8-14-21 | 9-15-23 | 12-19-29 | | |
| | Throw (ft) - No Ceiling Effect | 4-6-9 | 4-7-11 | 6-9-14 | 6-10-15 | 7-11-17 | 9-14-22 | | |

Performance Notes

- NC Value based on 10 db room attenuation.



AXO-CY + PERFAIR Performance Data (continued)

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|------------------|--------------|-------------|-------------|
| 25"D | Pressure Loss | x 1 | x 1.5 | x 4.8 |
| (625mm) | NC | + 0.8 | +5.1 | +7 |

| | | | _ | |
|----------------------------|------|------|---|--|
| Delta T Correction Factors | | | | |
| Δ T (F) | Kh | KI | | |
| 0 | .036 | 1 | | |
| -2 | .041 | .985 | | |
| -4 | .046 | .975 | | |
| -6 | .052 | .965 | | |
| -8 | .056 | .95 | | |
| -10 | .064 | .935 | | |
| -12 | .072 | .925 | | |
| -15 | .084 | .91 | | |



Kh = Correction Factor for Vertical Diffusion KI = Throw Correction Factor AL_{0.2} = Distance at which velocity reaches 40 fpm

| Ratios | | | | | | |
|---------------|---------------|--------------------------|-------|--|--|--|
| Throw (ft) | i (type A) | i i (type A) (type B) | | | | |
| 4 | 5 | 7 | 0.115 | | | |
| 6 | 9 | 14 | 0.068 | | | |
| 8 | 12 | 19 | 0.052 | | | |
| 10 | 16 | 25 | 0.04 | | | |
| 15 | 26 | 42 | 0.027 | | | |
| 20 | 37 | 60 | 0.02 | | | |
| 25 | 47 | 60 | 0.016 | | | |
| 30 | 60 | 100 | - | | | |

| induced room air = supplied cfm * i induced room air = cfm mixed for given throw | |
|---|--|
| Delta T (Throw) = Delta T (Supply) * Delta T Ratio | |
| Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw) | |

How to Specify AXO-CY

Supply and mounting of circular high induction swirl diffuser with individually adjustable radial inclined vanes model AXO-CY, dimension 25 inches or 625 mm. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



Type B Throw Correction Factor

Type B = 50% position 1, 50% position 2

Correction Factor

0.74

Dim

25″D

AXO-S Square Diffuser, Radial Vanes

| List Size | А | Free Area (sqf) | CFM Min | CFM Max |
|-------------|-----------------------|--------------------|------------|------------|
| 12 (299) | 11 37/64" (294 mm) | 0.10 | 50 | 160 |
| 16 (400) | 15 3/4" (395 mm) | 0.216 | 100 | 250 |
| 20 (500) | 19 3/4" (495 mm) | 0.312 | 150 | 330 |
| 24 (605) | 23 5/8" (600 mm) | 0.48 | 230 | 550 |
| 32 (800) | 31 1/2" (795 mm) | 0.73 | 360 | 600 |

Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.



AXO-S 12 + PERFAIR Performance Data

12" x 12" Face (Imperial), Swirl Effect

299 mm x 299 mm Face (Metric)

EFFECT/I

| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|--------------------------------|--------------------------------|-------|-------|--------|-------|--------|--------|-------|--------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.010 | 0.016 | 0.022 | 0.031 | 0.041 | 0.062 |
| | CFM | 27 | 41 | 55 | 68 | 82 | 95 | 109 | 136 |
| | Pressure Loss (in.w.g.) | 0.01 | 0.02 | 0.03 | 0.05 | 0.07 | 0.09 | 0.12 | 0.181 |
| 5 | NC | < 15 | < 15 | < 15 | 17 | 22 | 25 | 29 | 35 |
| | Throw (ft) - Coanda Effect | 1-2-2 | 1-2-4 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-11 |
| Throw (ft) - No Ceiling Effect | | 1-1-2 | 1-2-3 | 1-2-3 | 2-3-4 | 2-4-5 | 2-4-6 | 3-5-7 | 4-6-9 |
| | CFM | 39 | 59 | 79 | 98 | 118 | 137 | | |
| | Pressure Loss (in.w.g.) | | 0.04 | 0.06 | 0.1 | 0.14 | 0.18 | | |
| 6 | NC | < 15 | < 15 | 21 | 26 | 31 | 35 | | |
| | Throw (ft) - Coanda Effect | 1-2-3 | 2-3-5 | 3-4-7 | 3-6-8 | 4-7-10 | 5-8-11 | | |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-3-5 | 3-4-6 | 3-5-8 | 4-6-9 | | |
| | CFM | 70 | 105 | 140 | | | | | |
| Pressure Loss (in.w.g.) | | 0.06 | 0.1 | 0.185 | | | | | |
| 8 | NC | 17 | 28 | 37 | | | | | |
| | Throw (ft) - Coanda Effect | 2-4-6 | 4-6-9 | 5-8-11 | | | | | |
| | Throw (ft) - No Ceiling Effect | 2-3-4 | 3-4-7 | 3-6-9 | | | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

| AXO-S by MADEL® |
|--------------------|
| by MADEL® |

AXO-S 12 + PERFAIR Performance Data (continued)

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 12"x12" | Pressure Loss | x1 | x 1.2 | x 2.4 |
| (299mm) | NC | +.07 | +1.1 | +2.4 |

| Delta T Correction Factors | | | | |
|----------------------------|----------|------|--|--|
| Δ T (F) | ;) Kh Kl | | | |
| 0 | .036 | 1 | | |
| -2 | .041 | .985 | | |
| -4 | .046 | .975 | | |
| -6 | .052 | .965 | | |
| -8 | .058 | .95 | | |
| -10 | .065 | .935 | | |
| -12 | .072 | .925 | | |
| -15 | .084 | .91 | | |



KI = Throw Correction Factor AL_{0.2} = Distance at which velocity reaches 40 fpm

| | Ratios | | |
|---------------|--------|------------------|--|
| Throw (ft) | i | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 10 | 0.046 | induced room air = cfm mixed for given throw |
| 6 | 17 | 0.028 | |
| 8 | 23 | 0.022 | |
| 10 | 29 | 0.017 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 48 | - | |
| 20 | 65 | - | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 100 | - | Delta I (Ihrow) = I (Room) - T (Throw) |
| 30 | 125 | - | |



AXO-S 16 (AXO-S 400) + PERFAIR Performance Data

16" x 16" Face (Imperial), Swirl Effect

400 mm x 400 mm Face (Metric)

| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|-----------|--------------------------------|-------|-------|-------|--------|--------|--------|---------|---------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.01 | 0.016 | 0.022 | 0.031 | 0.041 | .062 |
| | CFM | | 59 | 79 | 98 | 118 | 137 | 157 | 196 |
| | Pressure Loss (in.w.g.) | | 0.009 | 0.015 | 0.025 | 0.035 | 0.046 | 0.06 | 0.092 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 17 | 21 | 26 |
| | Throw (ft) - Coanda Effect | | 1-2-3 | 2-3-4 | 2-4-5 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-2 | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-6 | 3-4-7 | 3-5-8 |
| | CFM | 70 | 105 | 140 | 175 | 209 | 244 | 279 | 349 |
| | Pressure Loss (in.w.g.) | 0.01 | 0.028 | 0.048 | 0.074 | 0.104 | 0.139 | 0.18 | 0.276 |
| 8 | NC | < 15 | < 15 | 16 | 22 | 25 | 29 | 32 | 38 |
| | Throw (ft) - Coanda Effect | 2-3-4 | 2-4-6 | 3-5-8 | 4-7-10 | 5-8-12 | 5-9-14 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-4-6 | 3-5-7 | 3-6-9 | 4-7-10 | 5-8-12 | 6-10-15 |

Performance Notes

- NC Value based on 10 db room attenuation.

| Damper Correction Factor | | 100% Open | 50% Open | 10% Open |
|-----------------------------|---------------|--------------|-------------|-------------|
| 16"x16" | Pressure Loss | x 1 | x 1.2 | x 2.3 |
| (605mm) | NC | +0.8 | +1.5 | +2.9 |

| Delta T (| Correction | Factors |
|-----------|------------|---------|
| Δ T (F) | Kh | KI |
| 0 | .036 | 1 |
| -2 | .041 | .985 |
| -4 | .046 | .975 |
| -6 | .052 | .965 |
| -8 | .058 | .95 |
| -10 | .065 | .935 |
| -12 | .072 | .925 |
| -15 | .084 | .91 |

| | Ratios | | | | | |
|---------------|---------------------------------|-------|--|--|--|--|
| Throw (ft) | w _i Delta T Ratio | | induced room air = supplied crm * i | | | |
| 4 | 7 | 0.052 | induced room air = cfm mixed for given throw | | | |
| 6 | 13 | 0.034 | | | | |
| 8 | 18 | 0.026 | | | | |
| 10 | 24 | 0.019 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio | | | |
| 15 | 39 | - | $\mathbf{D}_{\mathbf{r}}$ | | | |
| 20 | 55 | - | Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw) | | | |
| 25 | 72 | - | | | | |





AXO-S 20 (AXO-S 500) + PERFAIR Performance Data

20" x 20" Face (Imperial), Swirl Effect

⁵⁰⁰ mm x 500 mm Face (Metric)

| | | | | | | | | , |
|--------------------------------|--------------------------------|--------|--------|---------|---------|--------|---------|---------|
| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 |
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | .090 |
| | CFM | | 98 | 118 | 137 | 157 | 196 | 236 |
| | Pressure Loss (in.w.g.) | | 0.015 | 0.021 | 0.028 | 0.036 | 0.055 | 0.079 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 19 | 24 |
| | Throw (ft) - Coanda Effect | | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-3 | 2-3-4 | 2-3-5 | 2-3-5 | 3-4-7 | 3-5-8 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 |
| | Pressure Loss (in.w.g.) | 0.029 | 0.045 | 0.062 | 0.084 | 0.108 | 0.166 | 0.281 |
| 8 | NC | < 15 | 17 | 21 | 25 | 28 | 34 | 40 |
| | Throw (ft) - Coanda Effect | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-12 | 6-10-14 |
| | CFM | 218 | 273 | 327 | 382 | | | |
| | Pressure Loss (in.w.g.) | 0.068 | 0.104 | 0.147 | 0.198 | | | |
| 10 | NC | 22 | 28 | 32 | 36 | | | |
| | Throw (ft) - Coanda Effect | 4-6-10 | 5-8-12 | 6-10-15 | 7-11-17 | | | |
| Throw (ft) - No Ceiling Effect | | 3-5-7 | 4-6-9 | 4-7-11 | 5-8-13 | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open | |
|--------------------|---------------|--------------|-------------|-------------|--|
| 20"x20'' | Pressure Loss | x 1 | x 1.4 | x 4 | |
| (500mm) | NC | +0.8 | +2.1 | +2.8 | |

| Delta T (| Correction | Factors | | |
|-----------|------------|---------|---|--------------------------------------|
| Δ T (F) | Kh | KI | | |
| 0 | .036 | 1 | AL 0.2 | |
| -2 | .041 | .985 | | bv= kh x Throw |
| -4 | .046 | .975 | A | |
| -6 | .052 | .965 | | Throw $(\Delta T) = KT \times Throw$ |
| -8 | .058 | .95 | Kh = Correction Factor for Vertical Diffus | sion |
| -10 | .065 | .935 | KI = Throw Correction Factor | |
| -12 | .072 | .925 | AL _{0.2} = Distance at which velocity reache | es 40 fpm |
| -15 | .084 | .91 | | |



| Ratios | | | | |
|---------------|---------------|---------------|------------------|--|
| Throw (ft) | i (type A) | i (type B) | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 6 | 9 | 0.082 | Induced room air = crm mixed for given throw |
| 6 | 12 | 17 | 0.047 | |
| 8 | 16 | 24 | 0.035 | |
| 10 | 20 | 30 | 0.028 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 33 | 50 | 0.018 | Dolta T (Supply) = T (Poom) T (Supply) |
| 20 | 46 | 73 | 0.01 | Delta T (Throw) = T (Room) - T (Throw) |
| 25 | 58 | 97 | | |





AXO-S 24 + PERFAIR Performance Data

24" x 24" Face (Imperial), Swirl Effect

605mm x 605mm Face (Metric)

| Neck | Neck (fpm) Velocity | 300 | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 | 1400 | 1600 |
|------------------|--------------------------------|-------|--------|---------|---------|---------|---------|---------|----------|---------|---------|
| Size (inches) | Velocity Pressure (H2O) | 0.006 | .010 | .016 | .022 | .031 | .041 | .062 | .090 | .122 | .160 |
| | CFM | | | 98 | 118 | 137 | 157 | 196 | 236 | 275 | 314 |
| | Pressure Loss (in.w.g.) | | | 0.008 | 0.011 | 0.015 | 0.019 | 0.029 | 0.041 | 0.055 | 0.071 |
| 6 | NC | | | < 15 | < 15 | < 15 | < 15 | 15 | 19 | 22 | 25 |
| | Throw (ft) - Coanda Effect | | | 1-2-4 | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 4-6-9 | 4-7-10 | 5-8-12 |
| | Throw (ft) - No Ceiling Effect | | | 1-2-3 | 1-2-3 | 2-3-4 | 2-3-4 | 2-4-6 | 3-4-7 | 3-5-8 | 4-6-9 |
| | CFM | 105 | 140 | 175 | 209 | 244 | 279 | 349 | 419 | 489 | 559 |
| | Pressure Loss (in.w.g.) | 0.010 | 0.015 | 0.023 | 0.033 | 0.044 | 0.057 | 0.087 | 0.124 | 0.166 | 0.215 |
| 8 | NC | < 15 | < 15 | < 15 | 16 | 20 | 22 | 27 | 31 | 35 | 38 |
| | Throw (ft) - Coanda Effect | 2-3-4 | 2-3-5 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-10 | 5-9-13 | 6-10-16 | 7-12-18 | 8-14-21 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-7-10 | 5-8-12 | 6-9-14 | 6-10-16 |
| | CFM | 164 | 218 | 273 | 327 | 382 | 436 | 545 | 654 | | |
| | Pressure Loss (in.w.g.) | 0.020 | 0.036 | 0.055 | 0.077 | 0.104 | 0.133 | 0.205 | 0.29 | | |
| 10 | NC | < 15 | 17 | 22 | 26 | 28 | 32 | 37 | 40 | | |
| | Throw (ft) - Coanda Effect | 3-4-6 | 3-5-8 | 4-7-10 | 5-8-12 | 6-10-14 | 7-11-16 | 8-14-21 | 10-16-25 | | |
| | Throw (ft) - No Ceiling Effect | 2-3-5 | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-15 | 7-12-19 | | |
| | CFM | 236 | 314 | 393 | 471 | 550 | 628 | | | | |
| | Pressure Loss (in.w.g.) | 0.040 | 0.071 | 0.11 | 0.155 | 0.208 | 0.246 | | | | |
| 12 | NC | 19 | 25 | 30 | 34 | 37 | 40 | | | | |
| | Throw (ft) - Coanda Effect | 4-6-9 | 5-8-12 | 6-10-15 | 7-12-18 | 8-14-21 | 9-15-23 | | | | |
| | Throw (ft) - No Ceiling Effect | 3-5-7 | 4-6-9 | 4-7-11 | 5-9-13 | 6-10-16 | 7-11-17 | | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

- Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 12"x12" | Pressure Loss | x1 | x 1.2 | x 2.4 |
| (299mm) | NC | +.07 | +1.1 | +2.4 |
| 24"x24" | Pressure Loss | x 1 | x 1.5 | x 4.8 |
| (605mm) | NC | +0.9 | +5.8 | +7.7 |

| Type B Throw Correction Factor | | | | | | |
|--------------------------------|-------------------|--|--|--|--|--|
| Dim | Correction Factor | | | | | |
| 24" x 24" (605mm) | 0.74 | | | | | |

Type B = 50% position 1, 50% position 2



AXO-S + PERFAIR Performance Data (continued)

| Delta T Correction Factors | | | | | | | |
|----------------------------|------|------|--|--|--|--|--|
| ΔT (F) | Kh | KI | | | | | |
| 0 | .036 | 1 | | | | | |
| -2 | .041 | .985 | | | | | |
| -4 | .046 | .975 | | | | | |
| -6 | .052 | .965 | | | | | |
| -8 | .058 | .95 | | | | | |
| -10 | .065 | .935 | | | | | |
| -12 | .072 | .925 | | | | | |
| -15 | .084 | .91 | | | | | |



bv= kh x Throw

Throw'(Δ T)= KI x Throw

Kh = Correction Factor for Vertical Diffusion KI = Throw Correction Factor

AL0.2 = Distance at which velocity reaches 40 fpm

| | | Rat | ios | | |
|---------------|----------|----------------------|--------------|--------------|----------------------|
| Throw (ft) | i 12″ | Delta T Ratio 12″ | i 24" (A) | i 24" (B) | Delta T Ratio 24" |
| 4 | 10 | 0.046 | 7 | 7 | 0.115 |
| 6 | 17 | 0.028 | 9 | 14 | 0.068 |
| 8 | 23 | 0.022 | 11 | 19 | 0.052 |
| 10 | 29 | 0.017 | 16 | 25 | 0.04 |
| 15 | 48 | - | 26 | 42 | 0.027 |
| 20 | 65 | - | 37 | 60 | 0.02 |
| 25 | 100 | - | 47 | 80 | 0.016 |
| 30 | 125 | - | 61 | 100 | - |

induced room air = supplied cfm * i

induced room air = cfm mixed for given throw

Delta T (Throw) = Delta T (Supply) * Delta T Ratio

Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw)

AXO-S 32 (AXO-S 800) + PERFAIR Performance Data

32" x 32" Face (Imperial), Swirl Effect

800 mm x 800 mm Face (Metric) Neck (fpm) 700 1400 400 500 600 800 1000 1200 Velocity Neck Size Velocity Pressure .010 .016 .022 .031 .041 .062 .090 .122 (H2O) CFM 314 393 471 550 628 785 942 1100 0.102 Pressure Loss (in.w.g.) 0.027 0.042 0.059 0.079 0.156 0.221 0.297 12" NC 18 24 29 33 37 43 48 > 50 (300mm) Throw (ft) - Coanda Effect 4-6-9 4-7-11 5-9-13 6-10-15 7-12-18 9-15-22 11-17-26 12-20-31 Throw (ft) - No Ceiling Effect 3-4-7 3-5-8 4-7-10 5-8-12 5-9-13 7-11-16 8-13-20 9-15-23

NC Value based on 10 db room attenuation.

Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|------------------|--------------|-------------|-------------|
| 32''x32'' | Pressure Loss | x 1 | x 1.7 | x.4.5 |
| (800mm) | NC | +0.9 | +4.4 | +7.8 |

| Type B Th | row Correction Factor |
|----------------------|-----------------------|
| Dim | Correction Factor |
| 32′′x32′′ (800mm) | 0.74 |

Type B = 50% position 1, 50% position 2



AXO-S 32 (AXO-S 800) + PERFAIR Performance Data (continued)

| Delta T | Correctior | Factors | | |
|---------|------------|----------|---------|---|
| Δ T (F) | Kh | КІ | | |
| 0 | .036 | 1 | | AL 0.2 |
| -2 | .041 | .985 | | bv= kh x Throw |
| -4 | .046 | .975 | | |
| -6 | .052 | .965 | | |
| -8 | .058 | .95 | | Kh = Correction Factor for Vertical Diffusion |
| -10 | .065 | .935 | | KI = Throw Correction Factor |
| -12 | .072 | .925 | | AL _{0.2} = Distance at which velocity reaches 40 fpm |
| -15 | .084 | .91 | | |
| | Rat | ios | | |
| Throw | i | i | Delta T | induced room air = supplied cfm * i |
| (#) | (type A) | (type B) | Ratio | induced record air - of mixed for given throw |
| 4 | < 5 | < 5 | 0.19 | induced room air = crm mixed for given throw |
| 6 | 6 | 8 | 0.11 | |
| 8 | 8 | 12 | 0.082 | |
| 10 | 12 | 15 | 0.065 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 18 | 25 | 0.044 | |
| 20 | 26 | 36 | 0.033 | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 32 | 16 | 0.026 | Deita I (Throw) = I (Room) - I (Throw) |
| 30 | 41 | 60 | 0.021 | |

How to Specify AXO-S

Supply and mounting of square high induction swirl diffuser model AXO-S, with individually adjustable radial vanes. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



AXO-S300 Square Diffuser, Radial Vanes, Very Low CFM

| Dim | Free Area | CFM | CFM |
|--------------------|-----------|-----|-----|
| A | (sqf) | Min | Max |
| 24"x24" (605mm) | 0.10 | 50 | 160 |

AXO-S300

Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.



AXO-S300 + PERFAIR Performance Data

24" x 24" Face (Imperial), Swirl Effect

605mm x 605mm Face (Metric)

| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
|-----------|--------------------------------|-------|-------|--------|-------|--------|--------|-------|--------|
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.010 | 0.016 | 0.022 | 0.031 | 0.041 | 0.062 |
| | CFM | 27 | 41 | 55 | 68 | 82 | 95 | 109 | 136 |
| | Pressure Loss (in.w.g.) | 0.01 | 0.02 | 0.03 | 0.05 | 0.07 | 0.09 | 0.12 | 0.181 |
| 5 | NC | < 15 | < 15 | < 15 | 17 | 22 | 25 | 29 | 35 |
| | Throw (ft) - Coanda Effect | 1-2-2 | 1-2-4 | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-11 |
| | Throw (ft) - No Ceiling Effect | 1-1-2 | 1-2-3 | 1-2-3 | 2-3-4 | 2-4-5 | 2-4-6 | 3-5-7 | 4-6-9 |
| | CFM | 39 | 59 | 79 | 98 | 118 | 137 | | |
| | Pressure Loss (in.w.g.) | 0.02 | 0.04 | 0.06 | 0.1 | 0.14 | 0.18 | | |
| 6 | NC | < 15 | < 15 | 21 | 26 | 31 | 35 | | |
| | Throw (ft) - Coanda Effect | 1-2-3 | 2-3-5 | 3-4-7 | 3-6-8 | 4-7-10 | 5-8-11 | | |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-3-5 | 3-4-6 | 3-5-8 | 4-6-9 | | |
| | CFM | 70 | 105 | 140 | | | | | |
| | Pressure Loss (in.w.g.) | 0.06 | 0.1 | 0.185 | | | | | |
| 8 | NC | 17 | 28 | 37 | | | | | |
| | Throw (ft) - Coanda Effect | 2-4-6 | 4-6-9 | 5-8-11 | | | | | |
| | Throw (ft) - No Ceiling Effect | 2-3-4 | 3-4-7 | 3-6-9 | | | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 24"x24" | Pressure Loss | x1 | x 1.2 | x 2.4 |
| (605mm) | NC | +.07 | +1.1 | +2.4 |



AXO-S300 + PERFAIR Performance Data (continued)

| Delta T (| Correctior | Factors | |
|--|---|---|--|
| Δ T (F) | Kh | КІ | |
| 0 | .036 | 1 | AL 02 |
| -2 | .041 | .985 | bv= kh x Throw |
| -4 | .046 | .975 | |
| -6 | .052 | .965 | |
| -8 | .058 | .95 | Kh = Correction Factor for Vertical Diffusion |
| -10 | .065 | .935 | KI = Throw Correction Factor |
| -12 | .072 | .925 | AL _{0.2} = Distance at which velocity reaches 40 fpm |
| -15 | .084 | .91 | |
| | | | |
| | Ratios | | |
| Throw (ft) | Ratios | Delta T Ratio | induced room air = supplied cfm * i |
| Throw (ft) 4 | i 10 | Delta T Ratio 0.046 | <pre>induced room air = supplied cfm * i induced room air = cfm mixed for given throw</pre> |
| Throw (ft) 4 6 | Ratios i 10 17 | Delta T Ratio 0.046 0.028 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw |
| Throw (ft) 4 6 8 | Ratios i 10 17 23 | Delta T Ratio 0.046 0.028 0.022 | <pre>induced room air = supplied cfm * i induced room air = cfm mixed for given throw</pre> |
| Throw (ft) 4 6 8 10 | Ratios i 10 17 23 29 | Delta T Ratio 0.046 0.028 0.022 0.017 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| Throw (ft) 4 6 8 10 15 | Ratios i 10 17 23 29 48 | Delta T Ratio 0.046 0.028 0.022 0.017 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| Throw (ft) 4 6 8 10 15 20 | Image: Ratios i 10 17 23 29 48 65 | Delta T Ratio 0.046 0.028 0.022 0.017 - | <pre>induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio Delta T (Supply) = T (Room) - T (Supply)</pre> |
| Throw (ft) 4 6 8 10 15 20 25 | Ratios i 10 17 23 29 48 65 100 | Delta T Ratio 0.046 0.028 0.022 0.017 - - - | <pre>induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw)</pre> |

How to Specify AXO-S300

Supply and mounting of square high induction swirl diffuser model AXO-S300, with individually adjustable radial vanes for lower CFM. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



EFFECTIV-HVAC.COM

AXO-S400 Square Diffuser, Radial Vanes, Low CFM

| Dim | Free Area | CFM | CFM |
|---------------------|-----------|-----|-----|
| A | (sqf) | Min | Max |
| 24"x24'' (605mm) | 0.22 | 100 | 250 |

Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.



AXO-S400

605mm x 605mm Face (Metric)



AXO-S400 + PERFAIR Performance Data

24" x 24" Face (Imperial), Swirl Effect

| | | | | | | | | • | |
|-----------|--------------------------------|-------|-------|--------|---------|---------|--------|---------|---------|
| Neck Size | Neck (fpm) Velocity | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 1000 |
| (inches) | Velocity Pressure (H2O) | 0.002 | 0.006 | 0.01 | 0.016 | 0.022 | 0.031 | 0.041 | .062 |
| | CFM | | 59 | 79 | 98 | 118 | 137 | 157 | 196 |
| | Pressure Loss (in.w.g.) | | 0.009 | 0.015 | 0.025 | 0.035 | 0.046 | 0.06 | 0.092 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | 17 | 21 | 26 |
| | Throw (ft) - Coanda Effect | | 1-2-3 | 2-3-4 | 2-4-5 | 3-4-7 | 3-5-8 | 4-6-9 | 4-7-11 |
| | Throw (ft) - No Ceiling Effect | | 1-2-2 | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-6 | 3-4-7 | 3-5-8 |
| | CFM | 70 | 105 | 140 | 175 | 209 | 244 | 279 | 349 |
| | Pressure Loss (in.w.g.) | 0.01 | 0.028 | 0.048 | 0.074 | 0.104 | 0.139 | 0.18 | 0.276 |
| 8 | NC | < 15 | < 15 | 16 | 22 | 25 | 29 | 32 | > 40 |
| | Throw (ft) - Coanda Effect | 2-3-4 | 2-4-6 | 3-5-8 | 4-7-10 | 5-8-12 | 5-9-14 | 6-10-16 | 8-13-19 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 2-3-4 | 2-4-6 | 3-5-7 | 3-6-9 | 4-7-10 | 5-8-12 | 6-10-15 |
| | CFM | 109 | 164 | 218 | 273 | 327 | | | |
| | Pressure Loss (in.w.g.) | 0.03 | 0.065 | 0.110 | 0.173 | 0.244 | | | |
| 10 | NC | < 15 | 22 | 28 | 34 | > 40 | | | |
| | Throw (ft) - Coanda Effect | 2-4-6 | 4-6-9 | 5-8-12 | 6-10-15 | 7-12-18 | | | |
| | Throw (ft) - No Ceiling Effect | 2-3-5 | 3-5-7 | 4-6-9 | 5-8-11 | 5-9-14 | | | |

Performance Notes

- NC Value based on 10 db room attenuation.

- Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 24"x24" | Pressure Loss | x 1 | x 1.2 | x 2.3 |
| (605mm) | NC | +0.8 | +1.5 | +2.9 |

EFFECT

AXO-S400 + PERFAIR Performance Data (continued)

| Delta T (| Correctio | n Factors | |
|--|--|---|---|
| Δ T (F) | Kh | KI | |
| 0 | .036 | 1 | AL 0.2 |
| -2 | .041 | .985 | bv= kh x Throw |
| -4 | .046 | .975 | |
| -6 | .052 | .965 | |
| -8 | .058 | .95 | Kh = Correction Factor for Vertical Diffusion |
| -10 | .065 | .935 | KI = Throw Correction Factor |
| -12 | .072 | .925 | AL _{0.2} = Distance at which velocity reaches 40 fpm |
| -15 | .084 | .91 | |
| | | | |
| | | | |
| Throw | Ratios | Delta T | induced room air = supplied cfm * i |
| Throw (ft) | Ratios | Delta T Ratio | induced room air = supplied cfm * i |
| Throw (ft) 4 | Ratios i 7 | Delta T Ratio 0.052 | <pre>induced room air = supplied cfm * i induced room air = cfm mixed for given throw</pre> |
| Throw (ft) 4 6 | Ratios i 7 13 | Delta T Ratio 0.052 0.034 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw |
| Throw (ft) 4 6 8 | Ratios i 7 13 18 | Delta T Ratio 0.052 0.034 0.026 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw |
| Throw (ft) 4 6 8 10 | Ratios i 7 13 18 24 | Delta T Ratio 0.052 0.034 0.026 0.019 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| Throw (ft) 4 6 8 10 15 | Ratios i 7 13 18 24 39 | Delta T Ratio 0.052 0.034 0.026 0.019 | induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| Throw (ft) 4 6 8 10 15 20 | Ratios i 7 13 18 24 39 55 | Delta T Ratio 0.052 0.034 0.026 0.019 - | induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio Delta T (Supply) = T (Room) - T (Supply) |
| Throw (ft) 4 6 8 10 15 20 25 | Ratios i 7 13 18 24 39 55 72 | Delta T Ratio 0.052 0.034 0.026 0.019 - - - | induced room air = supplied cfm * i induced room air = cfm mixed for given throw Delta T (Throw) = Delta T (Supply) * Delta T Ratio Delta T (Supply) = T (Room) - T (Supply) Delta T (Throw) = T (Room) - T (Throw) |

How to Specify AXO-S400

Supply and mounting of square high induction swirl diffuser model AXO-S400, with individually adjustable radial vanes for lower CFM. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



EFFECTIV-HVAC.COM

AXO-SX Square Diffuser, Radial Vanes, High CFM

| Dim | Free Area | CFM | CFM |
|--------------------|-----------|-----|-----|
| A | (sqf) | Min | Max |
| 24"x24" (605mm) | 0.62 | 300 | 550 |

Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.



AXO-SX



AXO-SX + PERFAIR Performance Data

24" x 24" Face (Imperial), Swirl Effect

605mm x 605mm Face (Metric)

| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 | 1400 | 1600 |
|----------------------------|--------------------------------|-------|--------|--------|---------|---------|---------|---------|---------|----------|
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | 0.09 | 0.122 | 0.16 |
| | CFM | | | 118 | 137 | 157 | 196 | 236 | 275 | 314 |
| | Pressure Loss (in.w.g.) | | | 0.007 | 0.01 | 0.013 | 0.019 | 0.027 | 0.037 | 0.047 |
| 6 | NC | | | < 15 | < 15 | < 15 | < 15 | < 15 | 16 | 20 |
| | Throw (ft) - Coanda Effect | | | 2-3-4 | 2-3-4 | 2-3-4 | 2-4-5 | 3-4-7 | 3-5-8 | 4-6-9 |
| | Throw (ft) - No Ceiling Effect | | | 1-2-3 | 1-2-3 | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-6 | 3-4-7 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 | 489 | 559 |
| | Pressure Loss (in.w.g.) | 0.013 | 0.015 | 0.022 | 0.029 | 0.038 | 0.058 | 0.082 | 0.11 | 0.142 |
| 8 | NC | < 15 | < 15 | < 15 | < 15 | 17 | 23 | 28 | 32 | 36 |
| | Throw (ft) - Coanda Effect | 2-3-4 | 2-3-5 | 2-4-6 | 3-4-7 | 3-5-8 | 4-6-10 | 5-8-12 | 5-9-14 | 6-10-16 |
| | Throw (ft) - No Ceiling Effect | 1-2-3 | 1-2-4 | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 | 4-6-9 | 4-7-10 | 5-8-12 |
| | CFM | 218 | 273 | 327 | 382 | 436 | 545 | 654 | 764 | 873 |
| | Pressure Loss (in.w.g.) | 0.023 | 0.036 | 0.051 | 0.069 | 0.088 | 0.135 | 0.191 | 0.258 | 0.332 |
| 10 | NC | < 15 | 16 | 21 | 25 | 29 | 36 | 41 | 45 | 47 |
| | Throw (ft) - Coanda Effect | 2-4-6 | 3-5-8 | 4-6-9 | 4-7-11 | 5-8-12 | 6-10-15 | 7-12-18 | 9-14-21 | 10-16-24 |
| Throw (ft) - No Ceiling Ef | | 2-3-5 | 2-4-6 | 3-5-7 | 3-5-8 | 4-6-9 | 5-8-11 | 5-9-14 | 6-11-16 | 7-12-18 |
| CFM | | 314 | 393 | 471 | 550 | 628 | 785 | | | |
| 12 | Pressure Loss (in.w.g.) | 0.047 | 0.072 | 0.102 | 0.138 | 0.177 | 0.271 | | | |
| | NC | 20 | 27 | 31 | 36 | 40 | 46 | | | |
| | Throw (ft) - Coanda Effect | 4-6-9 | 4-7-11 | 5-9-13 | 6-10-15 | 7-12-18 | 9-14-22 | | | |
| | Throw (ft) - No Ceiling Effect | 3-4-4 | 3-5-8 | 4-6-10 | 5-8-12 | 5-9-13 | 7-11-16 | | | |

Performance Notes

- NC Value based on 10 db room attenuation.



AXO-SX + PERFAIR Performance Data (continued)

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 24"x24" | Pressure Loss | x1 | x1.5 | x4.8 |
| (605mm) | NC | +0.8 | +4.8 | +5.2 |

| Type B Throw Correction Factor | | | | |
|--------------------------------|-------------------|--|--|--|
| Dim | Correction Factor | | | |
| 24"x24'' | 0.6 | | | |

Type B = 50% position 1, 50% position 2

| Delta T Correction Factors | | | | |
|----------------------------|------|------|--|--|
| Δ T (F) | Kh | KI | | |
| 0 | 0.36 | 1 | | |
| -2 | .041 | .985 | | |
| -4 | .046 | .975 | | |
| -6 | .058 | .965 | | |
| -8 | .058 | .95 | | |
| -10 | .065 | .935 | | |
| -12 | .072 | .925 | | |
| -15 | .084 | .91 | | |

| AL _{0.2} | bv= kh x Throw Throw'(Δ T)= KI x Throw |
|--|---|
| Kh = Correction Factor for Vertical Diffusion KI = Throw Correction Factor AL _{0.2} = Distance at which velocity reaches 40 |) fpm |

| | Rat | ios | | |
|---------------|---------------|---------------|------------------|--|
| Throw (ft) | i (type A) | i (type B) | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | < 5 | 9 | 1.3 | induced room air = cfm mixed for given throw |
| 6 | 8 | 18 | 0.08 | |
| 8 | 12 | 26 | 0.06 | |
| 10 | 16 | 34 | 0.047 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 28 | 55 | 0.03 | |
| 20 | 43 | 82 | 0.023 | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 56 | 115 | 0.018 | Delta T (Throw) = T (Room) - T (Throw) |
| 30 | 78 | 145 | 0.015 | |

How to Specify AXO-SX

Supply and mounting of square high induction swirl diffuser model AXO-SX, with individually adjustable radial vanes for higher CFM. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



AXO-SY Square Diffuser, Radial Incline Vanes

| Dim | Free Area | CFM | CFM |
|--------------------|-----------|-----|-----|
| A | (sqf) | Min | Max |
| 24"x24" (605mm) | 0.47 | 230 | 500 |

Min cfm and Max cfm are recommended values for optimal performance and can be exceeded in VAV applications.

AXO-SY + PERFAIR Performance Data

24" x 24" Face (Imperial), Swirl Effect

605mm x 605mm Face (Metric)

AXO-SY

| Neck Size | Neck (fpm) Velocity | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 | 1400 |
|-----------|--------------------------------|--------|--------|---------|---------|---------|----------|---------|---------|
| (inches) | Velocity Pressure (H2O) | .010 | .016 | .022 | .031 | .041 | .062 | 0.09 | 0.122 |
| | CFM | | 98 | 118 | 137 | 157 | 196 | 236 | 275 |
| | Pressure Loss (in.w.g.) | | 0.008 | 0.011 | 0.015 | 0.019 | 0.03 | 0.042 | 0.057 |
| 6 | NC | | < 15 | < 15 | < 15 | < 15 | < 15 | 17 | 21 |
| | Throw (ft) - Coanda Effect | | 1-2-3 | 2-3-4 | 2-3-5 | 2-4-5 | 3-4-7 | 3-5-8 | 4-6-10 |
| | Throw (ft) - No Ceiling Effect | | 1-2-3 | 1-2-3 | 1-2-4 | 2-3-4 | 2-3-5 | 2-4-6 | 3-5-7 |
| | CFM | 140 | 175 | 209 | 244 | 279 | 349 | 419 | 489 |
| | Pressure Loss (in.w.g.) | 0.016 | 0.024 | 0.034 | 0.045 | 0.058 | 0.089 | 0.127 | 0.17 |
| 8 | NC | < 15 | < 15 | < 15 | 18 | 21 | 26 | 31 | 35 |
| | Throw (ft) - Coanda Effect | 2-3-5 | 2-4-6 | 3-5-7 | 3-6-8 | 4-6-10 | 5-8-12 | 6-10-15 | 7-11-17 |
| | Throw (ft) - No Ceiling Effect | 1-2-4 | 2-3-5 | 2-4-5 | 3-4-6 | 3-5-7 | 4-6-9 | 4-7-11 | 5-8-13 |
| | CFM | | 273 | 327 | 382 | 436 | 545 | 654 | 764 |
| | Pressure Loss (in.w.g.) | 0.036 | 0.056 | 0.079 | 0.106 | 0.137 | 0.209 | 0.296 | 0.399 |
| 10 | NC | 15 | 20 | 25 | 29 | 32 | 38 | > 40 | > 40 |
| | Throw (ft) - Coanda Effect | 3-5-8 | 4-6-10 | 5-8-11 | 5-9-13 | 6-10-15 | 8-13-19 | 9-15-23 | 11-18-2 |
| | Throw (ft) - No Ceiling Effect | 2-4-6 | 3-5-7 | 3-6-9 | 4-7-10 | 5-8-11 | 6-9-14 | 7-11-17 | 8-13-20 |
| | CFM | | 393 | 471 | 550 | 628 | 785 | | |
| | Pressure Loss (in.w.g.) | 0.073 | 0.112 | 0.158 | 0.213 | 0.273 | 0.342 | | |
| 12 | NC | 24 | 30 | 34 | 38 | >40 | >40 | | |
| | Throw (ft) - Coanda Effect | 4-7-11 | 5-9-14 | 7-11-16 | 8-13-19 | 9-15-23 | 12-19-29 | | |

Performance Notes

- NC Value based on 10 db room attenuation.

Throw (ft) - No Ceiling Effect

- Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

3-5-8 4-7-10 5-8-12 6-10-14 7-10-16 9-14-22



AXO-SY + PERFAIR or BOXSTAR Performance Data (continued)

| Damper (Factor | Correction | 100% Open | 50% Open | 10% Open |
|--------------------|---------------|--------------|-------------|-------------|
| 24"x24" | Pressure Loss | x1 | x1.5 | x4.8 |
| (605mm) | NC | +0.9 | +5.1 | +7 |

| Type B Throw Correction Factor | | | | |
|--------------------------------|------|--|--|--|
| Dim Correction Factor | | | | |
| 24"x24'' | 0.75 | | | |

Type B = 50% position 1, 50% position 2



| Ratios | | | | |
|---------------|---------------|---------------|------------------|--|
| Throw (ft) | i (type A) | i (type B) | Delta T Ratio | induced room air = supplied cfm * i |
| 4 | 5 | 7 | 0.125 | induced room air = cfm mixed for given throw |
| 6 | 9 | 13 | 0.075 | |
| 8 | 13 | 19 | 0.057 | |
| 10 | 17 | 27 | 0.045 | Delta T (Throw) = Delta T (Supply) * Delta T Ratio |
| 15 | 26 | 45 | 0.03 | |
| 20 | 39 | 65 | 0.023 | Delta T (Supply) = T (Room) - T (Supply) |
| 25 | 50 | 86 | 0.018 | Delta T (Throw) = T (Room) - T (Throw) |
| 30 | 62 | 115 | 0.014 | |

How to Specify AXO-SY

Supply and mounting of square high induction swirl diffuser model AXO-SY, with individually adjustable radial inclined vanes. Constructed from galvanized steel face panel powder coated in white M9016, with ABS adjustable diffusion vanes featuring airflow straighteners on the back of the vanes. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.



AXO-S 24 and AXO-C 25 Adjustment and Patterns



Throw Correction Factors

| Adjustment | Ка | |
|------------|-----|---------------------|
| 1-Way | 1.4 | Throw' - Ko y Throw |
| 2-Way | 1.2 | THIOW – Kd X THIOW |
| 3-Way | 1.1 | |

2 Way Corner



2 Way Opposed







AXO-S400 and AXO-C400 Adjustment and Patterns

Swirl (standard)



Throw Correction Factors

| Adjustment | Ка | | | | |
|------------|-----|-----------------------|--|--|--|
| 1-Way | 1.4 |] Throw' - Ka y Throw | | | |
| 2-Way | 1.2 | | | | |
| 3-Way | 1.1 | | | | |

2 Way Corner



2 Way Opposed







AXO-SX 24 Adjustment and Patterns

Swirl (standard)



Throw Correction Factors

| Adjustment | Ка | | | | |
|------------|-----|-------------------|--|--|--|
| 1-Way | 1.4 | Throw' - Kay Thro | | | |
| 2-Way | 1.2 | | | | |
| 3-Way | 1.1 | | | | |







How to Order AXO Series

| AXO | -S | -AB | 24 | + PERFAIR-SS | 24 | 10 | lameter | 5" 6" 9" 10" or 10" D |
|-----|--------|-------------------------------|--------|--------------|---|-----------------------|--------------------|--|
| | | | | | Neck Diameter Face Dimension PERFAIR-CS | | | 5, 6, 8, 10, 01, 12, D Match Product Face |
| | | | | | | | nsion | Matchiniouder face |
| | | | | | | | FAIR-CS | Round, Side Entry |
| | | | | | | PER | FAIR-CT | Round, Top Entry |
| | Plenum | | Plenum | PERFAIR-SS | | | Square, Side Entry | |
| | | | | | | PERFAIR-ST | | Square, Top Entry |
| | | | | | | PER | FAIR-X | Square, Side, Entry, 10" H |
| | | | | | | PERFAIR-XS | | Square, Side, Entry, 6" H |
| | | | Fac | e Dimension | | | 12 | 12" x 12" or 12" Diameter |
| | | | | | | | 16 | 16" x 16" or 16" Diameter |
| | | | | | | | 20 | 20" x 20" or 20" Diameter |
| | | | | | | | 24 | 24" x 24" Square Face |
| | | | | | | | 25 | 25" Diameter Face |
| | | | | | | | 32 | 32" X 32" |
| | | | | | | | 33 | 33" Diameter Face |
| | | Induction Vanes Color default | | ult | Black Induction Vanes | | | |
| | | | | AB | | White Induction Vanes | | |
| | | laboM | | | | | C300 | Round, Very Low CFM |
| | | Woder | | | | C400 | Round, Low CFM | |
| | | | | | | | с | Round, Straight Vanes |
| | | | | | | | СҮ | Round, Inclined Vanes |
| | | | | | | | S300 | Square, Very Low CFM |
| | | | | | | | S400 | Square, Low CFM |
| | | | | | | | S | Square, Stainght Vanes |
| | | | | | | | SX | Square, High CFM |
| | | | | | | | SY | Square, Inclined Vanes |
| | | | | | | | ALU-C | Alum, Round, Straight Vanes |
| | | | | | | | ALU-CY | Alum, Round, Inclined Vanes |
| | | | | | | | ALU-S300 | Alum, Square, Very Low CFM |
| | | | | | | | ALU-S400 | Alum, Square, Low CFM |
| | | | | | | | ALU-S | Alum, Square, Straight Vanes |
| | | | | | | | ALU-SX | Alum, Square, High CFM |
| | | | | | | | | |





HIGH PERFORMANCE ARCHITECTURAL DIFFUSERS



