

PERFORMANCE DATA OVERVIEW

Unlike conventional horizontal or vertically projected jets, the HCR Radial diffuser exhibits the best of both patterns in one diffuser to effectively ventilate and scrub away particles:

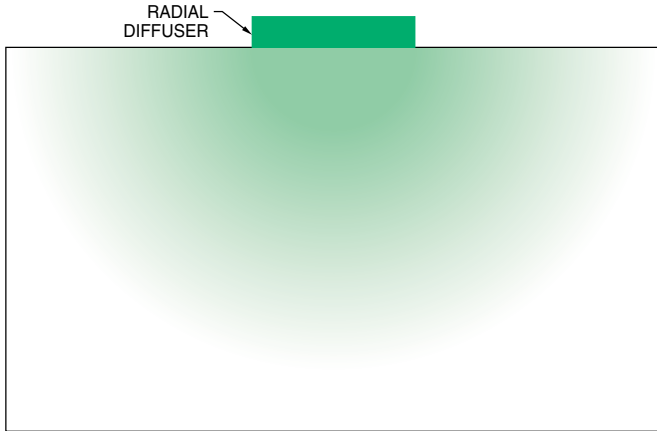


Figure 19: HCR Radial Pattern Diffuser

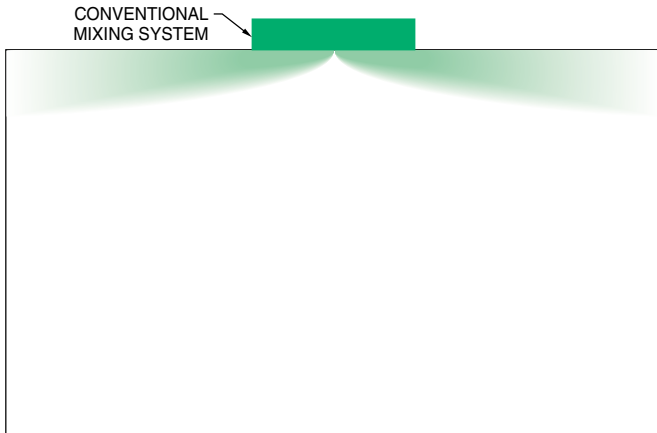


Figure 20: Conventional High Mixing Horizontal Pattern

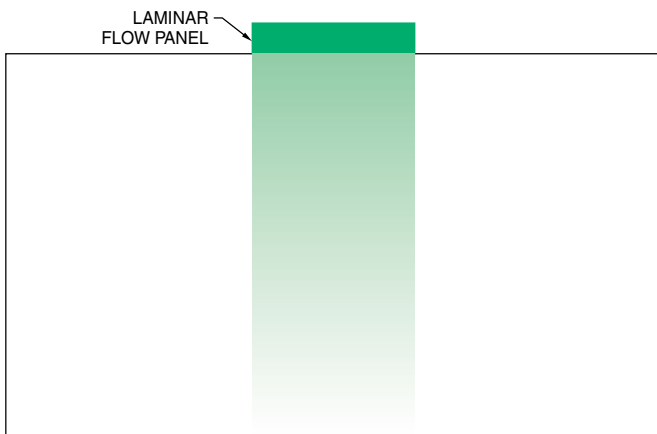


Figure 21: Laminar Flow Low Mixing Vertical Pattern

The HCR provides the level of flexibility necessary to trim adjust the air flow pattern for a wide range of flows and cooling differentials encountered. Initial pattern adjustment is made during Test & Balance at maximum load and/or flow by positioning the pattern controller for the prescribed pattern. This adjustment changes the area factor or strength of the vertical component of the radial pattern. The pattern controller provides effective pattern control for varied design requirements:

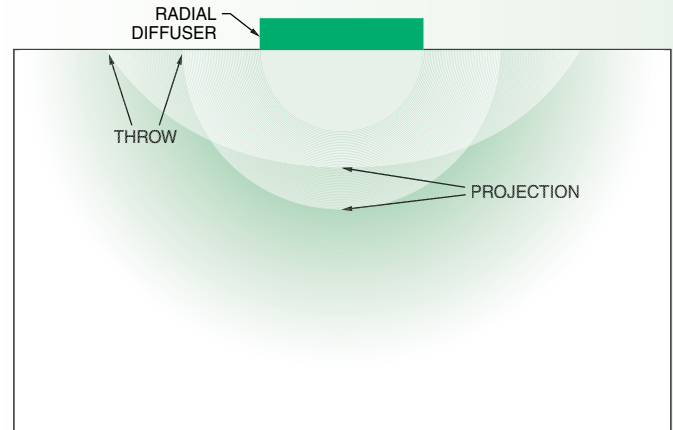


Figure 22: HCR adjustable radial flow pattern

THROW

Since the air discharge pattern consists of both horizontal and vertical jet components, the air discharge data is presented in the performance tables as Max Throw and Max Projection. Max Throw is the horizontal distances, in feet, from the HCR diffuser to a vertical plane, with peak velocities, V_t , of 100, 75, and 50 FPM, respectively. Similarly, the Max Projection is the vertical distance, in feet, from the HCR diffuser to a horizontal plane, with peak velocities, V_t , of 100, 75, and 50 FPM respectively. The vertical projection distances shown are similar for both 5°F and 15°F cooling differentials with the manual pattern controller adjusted for each temperature condition.

PATTERN PROFILES

Horizontal and Vertical throw distances as shown for a 5°F and 15°F cooling differentials are based on tests with the HCR Pattern Controller manually adjusted to reduce the vertical distance to approach an elliptical rather than a pure, hemispherically shaped isovel of the discharge air profile in the vertical plane perpendicular to the longitudinal axis of the diffuser.

TEMPERATURE DIFFERENTIALS

Increasing the cooling temperature differential from 5°F to 15°F without moving the HCR pattern controller, doubles the vertical projection distance without a significant change in the horizontal throw, as the ratio of vertical to horizontal air flow is not changed.



NOMINAL 12" x 48"

| Inlet | CFM | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|-------------------|------------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|
| | Max Throw @ 5° F | 2 - 3 - 4 | 3 - 4 - 5 | 3 - 4 - 6 | 3 - 4 - 7 | 4 - 5 - 7 | 5 - 7 - 8 | 6 - 8 - 9 |
| Max Throw @ 15° F | 2 - 3 - 4 | 3 - 4 - 6 | 3 - 4 - 7 | 4 - 5 - 7 | 5 - 7 - 8 | 6 - 8 - 9 | 7 - 9 - 11 | |
| Max Proj @ 5° F | 1 - 2 - 3 | 1 - 2 - 3 | 2 - 3 - 4 | 3 - 4 - 5 | 3 - 4 - 6 | 4 - 5 - 6 | 5 - 6 - 7 | |
| Max Proj @ 15° F | 1 - 2 - 3 | 1 - 2 - 3 | 2 - 3 - 4 | 3 - 4 - 5 | 3 - 4 - 6 | 4 - 5 - 6 | 5 - 6 - 7 | |
| 6" ø | NC | 29 | 35 | 40 | 44 | 48 | | |
| | Ps | 0.06 | 0.09 | 0.13 | 0.18 | 0.23 | | |
| 7" ø | NC | 25 | 31 | 36 | 41 | 44 | 47 | |
| | Ps | 0.05 | 0.08 | 0.12 | 0.16 | 0.21 | 0.27 | |
| 8" ø | NC | 22 | 28 | 33 | 37 | 41 | 44 | 47 |
| | Ps | 0.05 | 0.08 | 0.11 | 0.15 | 0.2 | 0.25 | 0.31 |
| 9" ø | NC | 20 | 25 | 30 | 35 | 38 | 42 | 44 |
| | Ps | 0.05 | 0.07 | 0.1 | 0.14 | 0.19 | 0.23 | 0.29 |
| 8" x 12" RECT | NC | <20 | 21 | 26 | 30 | 34 | 37 | 40 |
| | Ps | 0.04 | 0.06 | 0.09 | 0.13 | 0.17 | 0.21 | 0.26 |

NOMINAL 24" x 24"

| Inlet | CFM | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|-------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Max Throw @ 5° F | 3 - 4 - 5 | 3 - 4 - 5 | 3 - 4 - 6 | 4 - 5 - 6 | 5 - 6 - 7 | 5 - 6 - 7 | 6 - 7 - 8 |
| Max Throw @ 15° F | 4 - 5 - 6 | 5 - 6 - 7 | 5 - 6 - 7 | 5 - 6 - 7 | 6 - 7 - 8 | 6 - 7 - 8 | 6 - 7 - 8 | 6 - 7 - 8 |
| Max Proj @ 5° F | 1 - 2 - 3 | 1 - 2 - 3 | 2 - 3 - 4 | 3 - 4 - 5 | 4 - 5 - 6 | 5 - 6 - 7 | 5 - 6 - 7 | 5 - 6 - 7 |
| Max Proj @ 15° F | 1 - 2 - 3 | 1 - 2 - 3 | 2 - 3 - 4 | 3 - 4 - 5 | 4 - 5 - 6 | 5 - 6 - 7 | 5 - 6 - 7 | 5 - 6 - 7 |
| 7" ø | NC | 27 | 33 | 38 | 42 | 46 | 49 | |
| | Ps | 0.04 | 0.07 | 0.1 | 0.13 | 0.17 | 0.22 | |
| 8" ø | NC | 22 | 28 | 33 | 37 | 41 | 44 | 47 |
| | Ps | 0.04 | 0.06 | 0.08 | 0.11 | 0.15 | 0.19 | 0.23 |
| 9" ø | NC | <20 | 24 | 29 | 33 | 36 | 40 | 43 |
| | Ps | 0.03 | 0.05 | 0.08 | 0.1 | 0.13 | 0.17 | 0.21 |
| 10" ø | NC | <20 | <20 | 25 | 29 | 33 | 36 | 39 |
| | Ps | 0.03 | 0.05 | 0.07 | 0.09 | 0.12 | 0.15 | 0.19 |
| 12" ø | NC | <20 | <20 | <20 | 22 | 26 | 29 | 32 |
| | Ps | 0.03 | 0.04 | 0.06 | 0.08 | 0.1 | 0.13 | 0.16 |
| 14" ø | NC | <20 | <20 | <20 | <20 | <20 | 23 | 26 |
| | Ps | 0.02 | 0.03 | 0.05 | 0.07 | 0.09 | 0.11 | 0.14 |

NOMINAL 24" x 48"

| Inlet | CFM | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |
|-------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Max Throw @ 5° F | 4 - 5 - 7 | 5 - 6 - 7 | 5 - 6 - 7 | 5 - 6 - 7 | 6 - 7 - 8 | 7 - 8 - 9 | 7 - 8 - 9 |
| Max Throw @ 15° F | 5 - 6 - 7 | 6 - 7 - 8 | 6 - 7 - 8 | 6 - 7 - 8 | 7 - 8 - 9 | 7 - 8 - 9 | 7 - 8 - 9 | 7 - 8 - 9 |
| Max Proj @ 5° F | 3 - 4 - 5 | 4 - 5 - 6 | 4 - 5 - 6 | 5 - 6 - 7 | 5 - 6 - 7 | 6 - 7 - 8 | 6 - 7 - 8 | 6 - 7 - 8 |
| Max Proj @ 15° F | 3 - 4 - 5 | 4 - 5 - 6 | 4 - 5 - 6 | 5 - 6 - 7 | 5 - 6 - 7 | 6 - 7 - 8 | 6 - 7 - 8 | 6 - 7 - 8 |
| 10" ø | NC | 30 | 36 | 41 | 45 | 49 | | |
| | Ps | 0.05 | 0.07 | 0.11 | 0.14 | 0.19 | | |
| 12" ø | NC | 23 | 29 | 34 | 38 | 42 | 45 | 48 |
| | Ps | 0.04 | 0.05 | 0.08 | 0.11 | 0.14 | 0.18 | 0.22 |
| 14" ø | NC | <20 | 23 | 28 | 32 | 36 | 39 | 42 |
| | Ps | 0.03 | 0.04 | 0.06 | 0.09 | 0.11 | 0.14 | 0.17 |
| 16" ø | NC | <20 | <20 | 23 | 27 | 31 | 34 | 37 |
| | Ps | 0.03 | 0.04 | 0.05 | 0.07 | 0.09 | 0.12 | 0.14 |
| 18" ø | NC | <20 | <20 | <20 | 23 | 27 | 30 | 33 |
| | Ps | 0.02 | 0.03 | 0.04 | 0.06 | 0.08 | 0.1 | 0.12 |

Test Standard

- ANSI / ASHRAE standard 70
- 5° & 15° F refer to the supply air cooling differential during testing.

Sound Levels

- NC is noise criteria curve that will not be exceeded at the operating point. This is determined by assuming a 10dB (ref: 10⁻¹² watts) room attenuation that is subtracted from the power levels in each of the 2nd thru 7th octave bands

Pressure

- P_s represents static pressure, inches of water

Max Throw

- The numbers shown are horizontal throw distances, in feet, to a vertical plane with peak velocities, V_t = 100, 75, 50 fpm at the cooling differential shown, and the pattern controller adjusted to an intermediate position.

Max Proj

- The numbers shown are vertical projection distances, in feet, to a horizontal plane with peak velocities, V_t = 100, 75, 50 fpm at the cooling differential shown, and the pattern controller adjusted to an intermediate position.



NOMINAL 12" x 48"

| Inlet | CFM | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|---------------|-------------------|-----------|-----------|-----------|-----------|------------|-------------|-------------|
| | Max Throw @ 5° F | 3 - 4 - 5 | 4 - 5 - 6 | 4 - 5 - 8 | 4 - 6 - 8 | 5 - 7 - 9 | 6 - 8 - 9 | 8 - 9 - 10 |
| | Max Throw @ 15° F | 3 - 4 - 5 | 4 - 5 - 8 | 4 - 5 - 9 | 5 - 6 - 9 | 6 - 9 - 10 | 8 - 10 - 12 | 9 - 12 - 14 |
| | Max Proj @ 5° F | 1 - 2 - 3 | 1 - 3 - 4 | 3 - 4 - 5 | 4 - 5 - 6 | 4 - 5 - 8 | 5 - 6 - 8 | 6 - 8 - 9 |
| | Max Proj @ 15° F | 1 - 2 - 3 | 1 - 3 - 4 | 3 - 4 - 5 | 4 - 5 - 6 | 4 - 5 - 8 | 5 - 6 - 8 | 6 - 8 - 9 |
| 6" ø | NC | 29 | 35 | 40 | 44 | 48 | | |
| | Ps | 0.06 | 0.09 | 0.13 | 0.18 | 0.23 | | |
| 7" ø | NC | 25 | 31 | 36 | 40 | 44 | 47 | 50 |
| | Ps | 0.05 | 0.08 | 0.12 | 0.16 | 0.21 | 0.27 | 0.33 |
| 8" ø | NC | 21 | 27 | 32 | 36 | 40 | 43 | 46 |
| | Ps | 0.05 | 0.08 | 0.11 | 0.15 | 0.2 | 0.25 | 0.31 |
| 9" ø | NC | <20 | 24 | 29 | 33 | 37 | 40 | 43 |
| | Ps | 0.05 | 0.07 | 0.1 | 0.14 | 0.19 | 0.23 | 0.29 |
| 8" x 12" RECT | NC | <20 | <20 | 23 | 27 | 31 | 34 | 37 |
| | Ps | 0.04 | 0.06 | 0.09 | 0.13 | 0.17 | 0.21 | 0.26 |

NOMINAL 24" x 24"

| Inlet | CFM | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|-------|-------------------|-----------|-----------|-----------|-----------|------------|------------|------------|
| | Max Throw @ 5° F | 3 - 4 - 5 | 4 - 5 - 6 | 4 - 5 - 8 | 5 - 6 - 8 | 6 - 8 - 9 | 6 - 8 - 9 | 8 - 9 - 10 |
| | Max Throw @ 15° F | 5 - 7 - 8 | 6 - 8 - 9 | 6 - 8 - 9 | 6 - 8 - 9 | 8 - 9 - 10 | 8 - 9 - 10 | 8 - 9 - 10 |
| | Max Proj @ 5° F | 1 - 3 - 4 | 1 - 3 - 4 | 3 - 4 - 5 | 4 - 5 - 6 | 5 - 6 - 8 | 6 - 8 - 9 | 6 - 8 - 9 |
| | Max Proj @ 15° F | 1 - 3 - 4 | 1 - 3 - 4 | 3 - 4 - 5 | 4 - 5 - 6 | 5 - 6 - 8 | 6 - 8 - 9 | 6 - 8 - 9 |
| 7" ø | NC | 28 | 34 | 39 | 43 | 46 | 50 | |
| | Ps | 0.04 | 0.06 | 0.09 | 0.12 | 0.16 | 0.2 | |
| 8" ø | NC | 23 | 29 | 34 | 38 | 42 | 45 | 48 |
| | Ps | 0.04 | 0.06 | 0.08 | 0.11 | 0.15 | 0.19 | 0.23 |
| 9" ø | NC | 20 | 25 | 30 | 34 | 38 | 41 | 44 |
| | Ps | 0.03 | 0.05 | 0.08 | 0.11 | 0.14 | 0.18 | 0.22 |
| 10" ø | NC | <20 | 21 | 26 | 31 | 34 | 37 | 40 |
| | Ps | 0.03 | 0.05 | 0.07 | 0.1 | 0.13 | 0.17 | 0.21 |
| 12" ø | NC | <20 | <20 | 20 | 24 | 28 | 31 | 34 |
| | Ps | 0.03 | 0.05 | 0.07 | 0.09 | 0.12 | 0.15 | 0.19 |
| 14" ø | NC | <20 | <20 | <20 | <20 | 23 | 26 | 29 |
| | Ps | 0.03 | 0.05 | 0.06 | 0.09 | 0.11 | 0.14 | 0.18 |

NOMINAL 24" x 48"

| Inlet | CFM | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |
|-------|-------------------|-----------|------------|------------|------------|-------------|-------------|-------------|
| | Max Throw @ 5° F | 5 - 7 - 8 | 6 - 8 - 9 | 6 - 8 - 9 | 6 - 8 - 9 | 8 - 9 - 10 | 9 - 10 - 12 | 9 - 10 - 12 |
| | Max Throw @ 15° F | 7 - 8 - 9 | 8 - 9 - 10 | 8 - 9 - 10 | 8 - 9 - 10 | 9 - 10 - 12 | 9 - 10 - 12 | 9 - 10 - 13 |
| | Max Proj @ 5° F | 4 - 5 - 7 | 5 - 6 - 8 | 5 - 6 - 8 | 6 - 8 - 9 | 6 - 8 - 9 | 8 - 9 - 10 | 8 - 9 - 10 |
| | Max Proj @ 15° F | 4 - 5 - 7 | 5 - 6 - 8 | 5 - 6 - 8 | 6 - 8 - 9 | 6 - 8 - 9 | 8 - 9 - 10 | 8 - 9 - 10 |
| 10" ø | NC | 36 | 42 | 47 | | | | |
| | Ps | 0.06 | 0.09 | 0.13 | | | | |
| 12" ø | NC | 27 | 33 | 38 | 43 | 46 | 49 | |
| | Ps | 0.05 | 0.07 | 0.09 | 0.13 | 0.17 | 0.21 | |
| 14" ø | NC | 20 | 26 | 31 | 35 | 39 | 42 | 45 |
| | Ps | 0.04 | 0.05 | 0.07 | 0.1 | 0.13 | 0.16 | 0.2 |
| 16" ø | NC | <20 | <20 | 25 | 29 | 32 | 36 | 39 |
| | Ps | 0.03 | 0.04 | 0.06 | 0.08 | 0.1 | 0.13 | 0.16 |
| 18" ø | NC | <20 | <20 | <20 | 23 | 27 | 30 | 33 |
| | Ps | 0.02 | 0.03 | 0.05 | 0.06 | 0.08 | 0.11 | 0.13 |

Test Standard

- ANSI / ASHRAE standard 70
- 5° & 15° F refer to the supply air cooling differential during testing.

Sound Levels

- NC is noise criteria curve that will not be exceeded at the operating point. This is determined by assuming a 10dB (ref: 10⁻¹² watts) room attenuation that is subtracted from the power levels in each of the 2nd thru 7th octave bands

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Max Throw

- The numbers shown are horizontal throw distances, in feet, to a vertical plane with peak velocities, V_t = 100, 75, 50 fpm at the cooling differential shown, and the pattern controller adjusted to an intermediate position.

Max Proj

- The numbers shown are vertical projection distances, in feet, to a horizontal plane with peak velocities, V_t = 100, 75, 50 fpm at the cooling differential shown, and the pattern controller adjusted to an intermediate position.

