

REPORT

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

Order No. 102761342

Date: May 31, 2017

REPORT NO. 102761342CRT-001d

**STATIC PRESSURE, SOUND POWER LEVEL,
AREA FACTOR AND THROW TESTS ON A
MODEL 2' X 2' PLAQUE SUPPLY
SQUARE CEILING DIFFUSER
WITH 6 INCH DIAMETER INLET**

RENDERED TO

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INTRODUCTION

This report gives the results of tests conducted on a Model 2' by 2' plaque supply Square Ceiling Diffuser. The test results include Static Pressure, Area Factor, Throw and Sound Power Level. The sample was selected and supplied by the client and was received at the laboratories on October 6, 2016. The sample appeared to be in new unused condition upon receipt.

AUTHORIZATION

Signed Intertek Quotation Number Qu-00716694

TEST METHOD

The diffuser was tested in accordance with the ASHRAE 70-2006 Standard "Method of Testing for Rating the Performance of Air Outlets and Inlets", which incorporates ADC 1062: GRD-84 Test Code for Grilles, Registers and Diffusers. Acoustical data was obtained employing a Bruel & Kjaer Pulse Digital Frequency Analyzer. The reference sound source used for this test was a calibrated Bruel & Kjaer Type 4204, which conforms to the above standard. The octave band sound power levels were plotted on graph of Noise Criteria Curves which is in the ADC Test Code. These curves are reprinted with permission from the ASHRAE Handbook and Product Directory, 1976. The diffuser was installed in the facility and supplied with measured volumes of air. The static pressure was measured 1½ duct diameters upstream of the diffuser.



DESCRIPTION OF TEST SPECIMEN

MODEL 2' X 2' PLAQUE SUPPLY SQUARE CEILING DIFFUSER WITH 6 INCH DIAMETER INLET

The diffuser was constructed from plastic. The diffuser measured 23 3/4 inches square at the face and the inlet measured 6 inches in diameter. The diffuser was tested with supply air only. A photograph of the test sample is available on the last page of the report.

EQUIPMENT

| Equipment | Calibration Date | Due Date | S/N | Model | Asset |
|------------------------|------------------|-----------|---------|-------|-------|
| Pulse Analyzer | 3/13/2017 | 3/13/2018 | 2519258 | 7539 | E446 |
| Reference Sound Source | 9/24/2015 | 9/24/2018 | 2036621 | 4204 | A230 |
| Microphone/Pre - DF | 9/27/2016 | 9/27/2017 | 2381161 | 4942 | E450 |

RESULTS OF TESTS

Octave Band Center
Frequency Hertz

**MODEL 2' X 2' PLAQUE SUPPLY
SQUARE CEILING DIFFUSER
WITH 6 INCH DIAMETER INLET**

Discharge Sound Power Level dB re 10⁻¹² Watt

| | | | | | | |
|---|-------|-------|-------|-------|-------|-------|
| 125 | 41.4* | 44.7* | 46.9* | 49.9* | 52.2 | 57.4 |
| 250 | 35.7 | 40.9 | 44.1 | 47.6 | 50.1 | 55.6 |
| 500 | 27.7 | 37.2 | 40.9 | 44.3 | 47.5 | 52.9 |
| 1000 | 23.2* | 33.2 | 38.1 | 41.7 | 44.8 | 50.3 |
| 2000 | 18.2* | 23.9* | 30.1 | 34.8 | 38.5 | 44.7 |
| 4000 | 17.0* | 18.2* | 19.3* | 24.0* | 29.1 | 37.3 |
| 8000 | 20.9* | 20.9* | 20.9* | 21.1* | 21.6* | 28.0* |
| Supply Air Volume, CFM. | 110 | 150 | 175 | 200 | 225 | 275 |
| Inlet Static Pressure, in. H ₂ O | 0.03 | 0.05 | 0.06 | 0.08 | 0.11 | 0.16 |
| **Noise Criteria (NC) | <15 | 22 | 27 | 31 | 34 | 40 |

* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

** Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.



AREA FACTOR A_k

FOR AIR OUTLETS

MODEL 2' X 2' PLAQUE SUPPLY SQUARE CEILING DIFFUSER WITH 6 INCH DIAMETER INLET

| | | | | | | | | | | | |
|-------------------------------------|-----------------------------|----------|----------|----------|--|---------|---------------|-------------|--------------------|------------|-------|
| | | | | | Inlet Size | 3 " | Radius | Air Density | 0.072 | lbs/ft2 | |
| Throw Dir.: Horizontal | | | | | Neck Area (Sq. Ft.): | | 0.19634954 | | | | |
| Flow Meter: Nozzle Metering Station | | | | | Anemometer: Alnor Velometer Type 6000P | | | | | | |
| | | | | | Serial Number: 6077AL | | | | Date: May 30, 2017 | | |
| Run | | | | | | | | | | | |
| Number | Anemometer - (V_k , FPM) | | | | Static | Q2 Flow | Neck | Neck | Total | Area Fact. | |
| | 1 | 2 | 3 | 4 | Average | "H2O | CFM | Velocity | V.P. | Pressure | Ak |
| #1 | 520 | 560 | 540 | 580 | 550 | 0.08 | 200 | 1018.59 | 0.0621 | 0.142 | 0.364 |
| #2 | 760 | 760 | 720 | 740 | 745 | 0.16 | 275 | 1400.56 | 0.1174 | 0.277 | 0.369 |
| #3 | 1020 | 1040 | 980 | 1000 | 1010 | 0.26 | 350 | 1782.54 | 0.1902 | 0.450 | 0.347 |
| | | | | | | | | | | Average: | 0.360 |



MODEL 2' X 2' PLAQUE SUPPLY SQUARE CEILING DIFFUSER WITH 6 INCH DIAMETER INLET

| Distance | | MODEL 2'x2' PLAQUE SUPPLY w/ 6" Diameter Inlet | | | | | | | | |
|----------|----|--|-----|-----|-------------|------------|----|----|----|---------|
| From | | Inlet Static Pressure | | | 0.080 " H2O | | | | | |
| Ceiling | | Distance From Diffuser (Ft) | | | | Air Volume | | | | 200 CFM |
| Inches | 0' | 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 10' |
| 1" | 84 | 175 | 137 | 103 | 82 | 74 | 48 | 44 | 36 | -- |
| 3" | 44 | 57 | 65 | 62 | 65 | 58 | 43 | 42 | 37 | -- |
| 6" | 30 | 30 | 27 | 27 | 34 | 34 | 28 | 28 | 28 | -- |
| 9" | 21 | 19 | 18 | 21 | 19 | 15 | 16 | 19 | 19 | -- |
| 12" | 16 | 15 | 16 | 23 | 16 | 14 | 11 | 16 | 13 | -- |
| 18" | 15 | 10 | 14 | 17 | 12 | 15 | 6 | 11 | 11 | -- |
| 24" | 8 | 10 | 9 | 14 | 8 | 10 | 7 | 8 | 6 | -- |

| Distance | | MODEL 2'x2' PLAQUE SUPPLY w/ 6" Diameter Inlet | | | | | | | | |
|----------|-----|--|-----|----|-------------|------------|-----|---------|--|--|
| From | | Inlet Static Pressure | | | 0.160 " H2O | | | | | |
| Ceiling | | Distance From Diffuser (Ft) | | | | Air Volume | | 275 CFM | | |
| Inches | 0' | 2' | 4' | 6' | 8' | 10' | 12' | | | |
| 1" | 137 | 179 | 109 | 75 | 53 | 30 | -- | | | |
| 3" | 57 | 84 | 83 | 69 | 52 | 34 | -- | | | |
| 6" | 38 | 26 | 44 | 49 | 38 | 27 | -- | | | |
| 9" | 27 | 16 | 24 | 37 | 29 | 25 | -- | | | |
| 12" | 19 | 16 | 22 | 25 | 19 | 22 | -- | | | |
| 18" | 17 | 15 | 21 | 17 | 17 | 16 | -- | | | |
| 24" | 16 | 16 | 15 | 12 | 11 | 19 | -- | | | |

| Distance | | MODEL 2'x2' PLAQUE SUPPLY w/ 6" Diameter Inlet | | | | | | | | |
|----------|-----|--|-----|----|-------------|------------|-----|---------|--|--|
| From | | Inlet Static Pressure | | | 0.260 " H2O | | | | | |
| Ceiling | | Distance From Diffuser (Ft) | | | | Air Volume | | 350 CFM | | |
| Inches | 0' | 2' | 4' | 6' | 8' | 10' | 12' | 14' | | |
| 1" | 163 | 241 | 147 | 93 | 66 | 46 | 38 | -- | | |
| 3" | 75 | 105 | 112 | 87 | 67 | 51 | 38 | -- | | |
| 6" | 53 | 38 | 54 | 55 | 54 | 46 | 29 | -- | | |
| 9" | 44 | 25 | 27 | 36 | 39 | 25 | 20 | -- | | |
| 12" | 36 | 24 | 21 | 25 | 25 | 18 | 17 | -- | | |
| 18" | 31 | 20 | 17 | 26 | 16 | 18 | 17 | -- | | |
| 24" | 26 | 17 | 14 | 26 | 13 | 17 | 18 | -- | | |

NOTE: All throw values are in feet per minute.

PHOTOGRAPH OF TEST SAMPLE



CONCLUSION

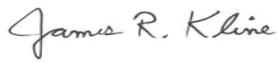
The test method employed for this test has no pass-fail criteria; therefore, the evaluation of the test results is left to the discretion of the client.

Dates of Tests: May 25, 2017 through May 30, 2017

Report Approved by:


Brian Cyr
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Acoustical Testing

Report Reviewed By:


James R. Kline
Engineer/Quality Supervisor
Acoustical Testing

Attachments: None