

## Design / Application

Model **NAH-720-1** (Opposed Blade Operation) and **NAH-721-1** (Parallel Blade Operation) are Industrial Air Control Damper with Airfoil Shaped Blades. These models consist of a heavy duty flanged frames designed for direct attachment to the ductwork or equipment. **NAH Series** models are ideal for balancing and/or shut off HVAC applications in the industrial systems with many options to meet your needs.

## STANDARD CONSTRUCTION:

### FRAME:

8" x 2" x 12ga H.R.S. steel channel [203.2 x 50.8mm]

### BLADES:

Airfoil-shaped 16 ga H.R.S. double skin construction  
5" [127mm] to 8" [203.2mm] wide.

### AXLES:

Steel 1/2" [12.7mm] Ø

### LINKAGE:

9 ga galvanized jamb linkage

### BEARINGS:

Bronze Oilite

### AVAILABLE FINISHES:

- ☐ Zinc Rich Gray Primer
- ☐ Special 1000°F Paint (Black Only)

## SIZE LIMITATIONS:

Maximum size: 60"w x 96"h [1524 x 2438.4mm]

Minimum size: single blade 6"w x 8"h  
[152.4 x 203.2mm]

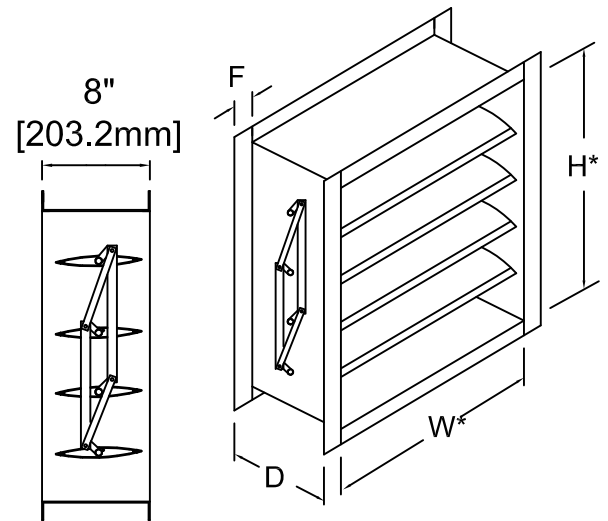
## RATINGS:

Pressure: 8-20" w.g.- differential pressure

Velocity: 2000-4500 fpm

Temperature: 180° - 400°

**Note: Special blade clearances are required when temperatures exceed 250°F (121°C). Consult United Enertech in these cases.**



**NOTE:** Damper blades always run horizontal and are always the first dimension (W) when ordering (example: always order W" x H").

**\*Inside Dimensions are Actual Size(not undersized)**



## OPTIONS

- ☐ Stainless steel jamb seals
- ☐ Flange bolt holes
- ☐ EPDM blade seals 250° F
- ☐ Silicone blade seals 450° F
- ☐ 304 stainless steel construction
- ☐ 316 stainless steel construction
- ☐ Ball bearings: (2) hole flange style
  - ☐ Standard
  - ☐ Stainless steel
- ☐ Stuffing box seal
- ☐ Outboard bearing with shaft seal
- ☐ Linkage cover
- ☐ Central manifold grease system
- ☐ Hand Quadrant
- ☐ Actuator
- ☐ Powder Coated
- ☐ 1000° F (powder coated) resistance
- ☐ Insulated (Foam Filled Blades)

| Quantity: | Max. Temp.<br>(if higher<br>than 250°F) | "W"<br>Width | "H"<br>Height | Frame Depth<br>"D"<br>8" std. | Flange Width<br>"F"<br>2" std. | Bolt Hole Information |    |              |           |   |    |   | REMARKS |
|-----------|-----------------------------------------|--------------|---------------|-------------------------------|--------------------------------|-----------------------|----|--------------|-----------|---|----|---|---------|
|           |                                         |              |               |                               |                                | J                     | N1 | L<br>Spacing | M<br>Dia. | K | N2 | C |         |
|           |                                         |              |               |                               |                                |                       |    |              |           |   |    |   |         |
|           |                                         |              |               |                               |                                |                       |    |              |           |   |    |   |         |
|           |                                         |              |               |                               |                                |                       |    |              |           |   |    |   |         |
|           |                                         |              |               |                               |                                |                       |    |              |           |   |    |   |         |
|           |                                         |              |               |                               |                                |                       |    |              |           |   |    |   |         |

|             |                                                                   |              |             |
|-------------|-------------------------------------------------------------------|--------------|-------------|
| Job Name:   | <input type="checkbox"/> <b>Model NAH-720-1</b> (opposed blades)  |              |             |
| Location:   | <input type="checkbox"/> <b>Model NAH-721-1</b> (parallel blades) |              |             |
| Architect:  | DRAWN BY:                                                         | DATE:        | REV. DATE:  |
| Engineer:   | CLJ                                                               | 8-12-03      | 8-31-15     |
| Contractor: | REV.NO.:                                                          | APPROVED BY: | DWG NO.:    |
|             | 13                                                                | BGT          | <b>C-13</b> |

# MODEL NAH-720-1 PERFORMANCE DATA

## Imperial Units (Forward Flow)

| Damper Width X Height | 1 in. w.g. Class | 4 in. w.g. Class | 8 in. wg Class | *Torque (per sq. ft.) |
|-----------------------|------------------|------------------|----------------|-----------------------|
| 12" x 12"             | Class I          | Class II         | Class II       | 15 lbs/in             |
| 24" X 24"             | Class I          | Class I          | Class I        | 12.59 lbs/in          |
| 36" X 36"             | Class I          | Class I          | Class I        | 15 lbs/in             |
| 12" X 48"             | Class III        | Class III        | Class II       | 12.59 lbs/in          |
| 48" X 12"             | Class I          | Class I          | Class I        | 12.59 lbs/in          |
| 60" X 36"             | Class II         | Class II         | Class II       | 15 lbs/in             |

Air leakage is based on operation between 50°F to 104°F. All data corrected to represent air density of 0.075 lbs/ft.<sup>3</sup>

\*Torque applied to hold damper in closed position

## Imperial Units (Back Flow)

| Damper Width X Height | 1 in. w.g. Class | 4 in. w.g. Class | 8 in. wg Class | *Torque (per sq. ft.) |
|-----------------------|------------------|------------------|----------------|-----------------------|
| 12" x 12"             | Class II         | Class III        | Class III      | 15 lbs/in             |
| 24" X 24"             | Class I          | Class I          | Class II       | 12.59 lbs/in          |
| 36" X 36"             | Class II         | Class III        | Class III      | 15 lbs/in             |
| 12" X 48"             | Class III        | Class III        | Class III      | 12.59 lbs/in          |
| 48" X 12"             | Class II         | Class II         | Class II       | 12.59 lbs/in          |
| 60" X 36"             | Class III        | Class III        | Class II       | 15 lbs/in             |

\*Torque applied to hold damper in closed position

|          |       | Leakage, ft <sup>3</sup> /min <sup>2</sup> /ft |    |                            |     |
|----------|-------|------------------------------------------------|----|----------------------------|-----|
|          |       | Required Rating                                |    | Extended Ranges (optional) |     |
| Pressure | Class | 1"                                             | 4" | 8"                         | 12" |
| I        | I     | 4                                              | 8  | 11                         | 14  |
| II       | II    | 10                                             | 20 | 28                         | 35  |
| III      | III   | 40                                             | 80 | 112                        | 140 |

All data corrected to represent standard air at a density of 0.075 lbs/ft.

| NAH-720 SOUND RATINGS |                  |    |                 |    |                 |    |                 |    |
|-----------------------|------------------|----|-----------------|----|-----------------|----|-----------------|----|
| Damper Size           | Damper Full Open |    | Damper 75% Open |    | Damper 50% Open |    | Damper 25% Open |    |
|                       | CFM              | NC | CFM             | NC | CFM             | NC | CFM             | NC |
| 12 x 12               | 2000             | 16 | 1500            | 11 | 1000            | 11 | 500             | *  |
|                       | 3000             | 28 | 2250            | 21 | 1500            | 18 | 750             | *  |
|                       | 4000             | 36 | 3000            | 29 | 2000            | 24 | 1000            | *  |
| 18 x 18               | 2250             | 17 | 1688            | 10 | 1125            | 21 | 563             | *  |
|                       | 4500             | 33 | 3375            | 26 | 2250            | 31 | 1125            | *  |
|                       | 6750             | 43 | 5063            | 37 | 3375            | 40 | 1688            | 15 |
| 24 x 24               | 4000             | 11 | 3000            | 10 | 2000            | 26 | 1000            | *  |
|                       | 8000             | 33 | 6000            | 29 | 4000            | 37 | 2000            | 21 |
|                       | 12000            | 43 | 9000            | 42 | 6000            | 46 | 3000            | 31 |

NC = Noise criteria in Decibels is based on room effect and 10db of room attenuation.  
\* = Less than 10 NC

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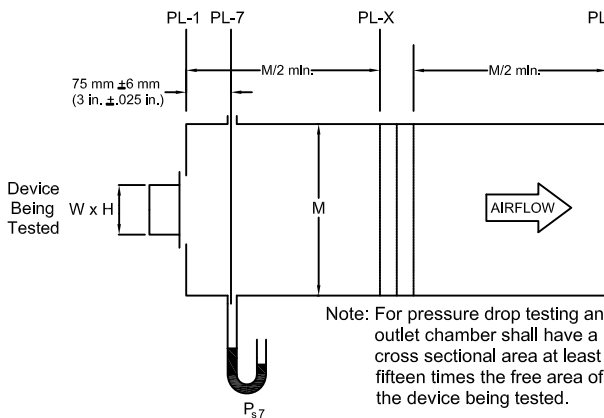


Figure 5.4- Test Device Setup with Outlet Chamber

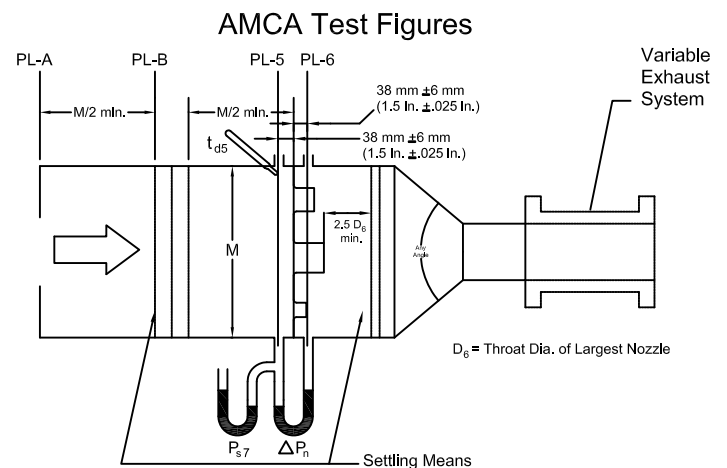


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet

# MODEL NAH-720-1 PERFORMANCE DATA

## Standard International Units (Forward Flow)

| Damper Width X Height (mm) | 250 Pa Class | 1 KPa Class | 2 KPa Class | *Torque        |
|----------------------------|--------------|-------------|-------------|----------------|
| 305 x 305                  | Class I      | Class II    | Class II    | 2,679 grams/cm |
| 610 X 610                  | Class I      | Class I     | Class I     | 2,248 grams/cm |
| 915 X 915                  | Class I      | Class I     | Class I     | 2,679 grams/cm |
| 305 X 1220                 | Class III    | Class III   | Class II    | 2,248 grams/cm |
| 1220 X 305                 | Class I      | Class I     | Class I     | 2,248 grams/cm |
| 1525 X 915                 | Class II     | Class II    | Class II    | 2,679 grams/cm |

Air leakage is based on operation between 10°C to 40°C. All data corrected to represent air density of 1.201 kg/m<sup>3</sup>.

\*Torque applied to hold damper in closed position

## Standard International Units (Back Flow)

| Damper Width X Height (mm) | 250 Pa Class | 1 KPa Class | 2 KPa Class | *Torque        |
|----------------------------|--------------|-------------|-------------|----------------|
| 305 x 305                  | Class II     | Class III   | Class III   | 2,679 grams/cm |
| 610 X 610                  | Class I      | Class I     | Class II    | 2,248 grams/cm |
| 915 X 915                  | Class II     | Class III   | Class III   | 2,679 grams/cm |
| 305 X 1220                 | Class III    | Class III   | Class III   | 2,248 grams/cm |
| 1220 X 305                 | Class II     | Class II    | Class II    | 2,248 grams/cm |
| 1525 X 915                 | Class III    | Class III   | Class II    | 2,679 grams/cm |

\*Torque applied to hold damper in closed position

| Leakage, L/s /m <sup>2</sup> |                 |         |                            |         |
|------------------------------|-----------------|---------|----------------------------|---------|
| Class \ Pressure             | Required Rating |         | Extended Ranges (optional) |         |
|                              | 0.25 kPa        | 1.0 kPa | 2.0 kPa                    | 3.0 kPa |
| I                            | 20.3            | 40.6    | 55.9                       | 71.1    |
| II                           | 50.8            | 102     | 142                        | 178     |
| III                          | 203             | 406     | 569                        | 711     |

## FRAME & BOLT HOLE CONSTRUCTION OPTIONS

Flange (F Dim): Standard - 2"

Optional - 1-1/2" to 4"

Bolt holes: (Standard construction is **no** bolt holes)

Optional- United Enertech recommended standard pattern.

Dim. "M": 7/16" dia. hole

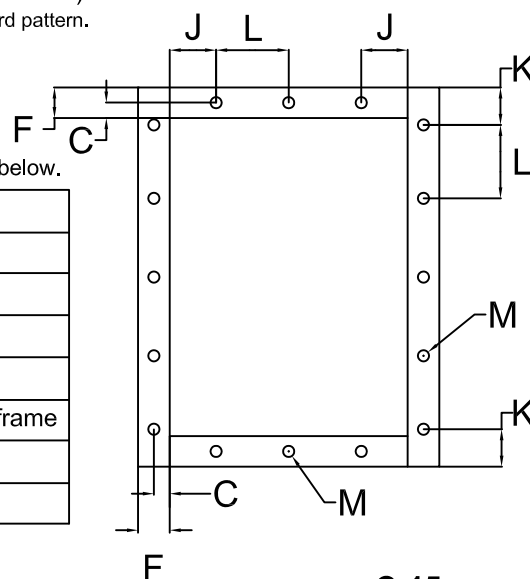
Dim. "L": 6" Center to Center

Web (D Dim): Standard - 8"

Optional - 8" to 12"

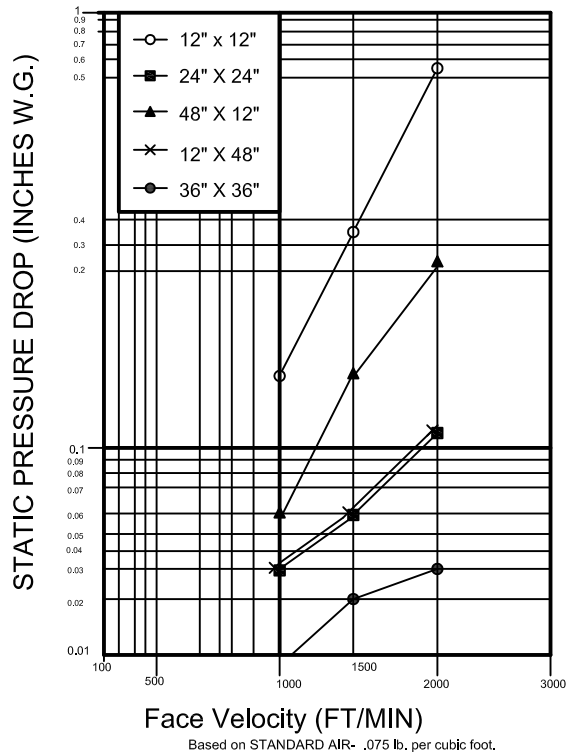
**Note:** Customer must be within Min. or Max limits on table below.

| Dim.      | Min or Max     | Standard | Description                                       |
|-----------|----------------|----------|---------------------------------------------------|
| <b>J</b>  | min. 3/4"      |          | First/Last Space in <u>Head/Sill</u>              |
| <b>N1</b> | min. 1.0"      |          | No. of holes in <u>Head/Sill</u>                  |
| <b>K</b>  | min. F/2"      |          | First/Last Space in <u>Jamb</u>                   |
| <b>N2</b> | min. 1.0"      |          | No. of holes in <u>Jamb</u>                       |
| <b>C</b>  | .75"D" to 3/4" | F/(2*M)" | Centerline of bolt hole from inside edge of frame |
| <b>L</b>  | 2" to 12"      | 6.0"     | Hole Spacing                                      |
| <b>M</b>  | 1/4" to 11/16" | 7/16"    | Mounting hole Diameter                            |



# MODEL NAH-720-1 PERFORMANCE DATA

## PRESSURE DROP



NAH-720-1 sizes: 12x12, 24x24, 48x12, 12x48, 36x36  
(305x305, 610x610, 1219x305, 305x1219, 914x914)

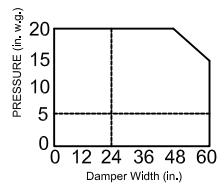
NAH-720-1

## PRESSURE LIMITATIONS

The chart at the right shows conservative pressure limitations based on a maximum blade deflection of  $w/360$ .

## TEMPERATURE LIMITATIONS

Blade Seals: EPDM -40° to +250°F  
Silicone Rubber -40° to +450°F  
Jamb Seals: Flexible stainless steel -40° to +400°F



## VELOCITY LIMITATIONS

The chart at the right shows conservative velocity limitations based on damper size.

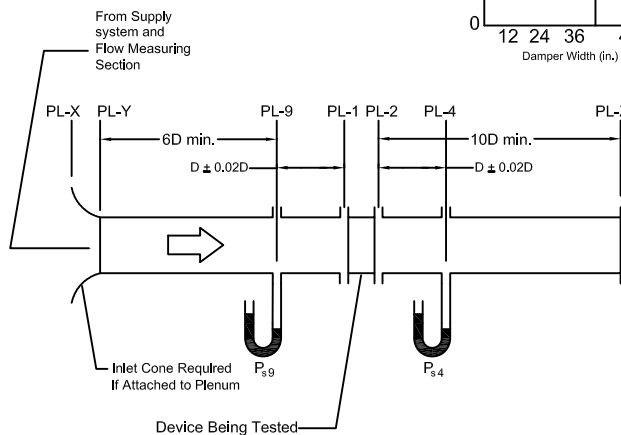
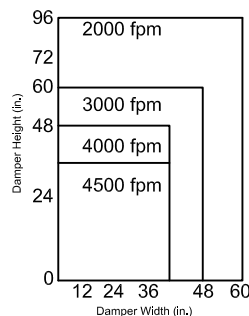


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

### AMCA Test Figure 5.3

Figure 5.3 illustrates a fully ducted damper. This configuration has low pressure drop because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

### Pressure Drop Data

This pressure drop data was conducted in accordance with AMCA Standard 500 using Test Figure 5.3. All data has been corrected to represent standard air at a density of .075 lb/cu.ft.

Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

| 12 x 12                       |                                |
|-------------------------------|--------------------------------|
| Face Velocity<br>ft/min (m/s) | Pressure Drop<br>in. w.g. (Pa) |
| 1000 (5.08)                   | 0.15 (38)                      |
| 1500 (7.62)                   | 0.33 (83)                      |
| 2000 (10.16)                  | 0.55 (139)                     |

| 24 x 24                       |                                |
|-------------------------------|--------------------------------|
| Face Velocity<br>ft/min (m/s) | Pressure Drop<br>in. w.g. (Pa) |
| 1000 (5.08)                   | 0.03 (7)                       |
| 1500 (7.62)                   | 0.06 (15)                      |
| 2000 (10.16)                  | 0.11 (27)                      |

| 48 x 12                       |                                |
|-------------------------------|--------------------------------|
| Face Velocity<br>ft/min (m/s) | Pressure Drop<br>in. w.g. (Pa) |
| 1000 (5.08)                   | 0.06 (15)                      |
| 1500 (7.62)                   | 0.15 (38)                      |
| 2000 (10.16)                  | 0.23 (58)                      |

| 12 x 48                       |                                |
|-------------------------------|--------------------------------|
| Face Velocity<br>ft/min (m/s) | Pressure Drop<br>in. w.g. (Pa) |
| 1000 (5.08)                   | 0.03 (7)                       |
| 1500 (7.62)                   | 0.06 (15)                      |
| 2000 (10.16)                  | 0.11 (27)                      |

| 36 x 36                       |                                |
|-------------------------------|--------------------------------|
| Face Velocity<br>ft/min (m/s) | Pressure Drop<br>in. w.g. (Pa) |
| 1000 (5.08)                   | 0.009 (2)                      |
| 1500 (7.62)                   | 0.02 (5)                       |
| 2000 (10.16)                  | 0.03 (7)                       |

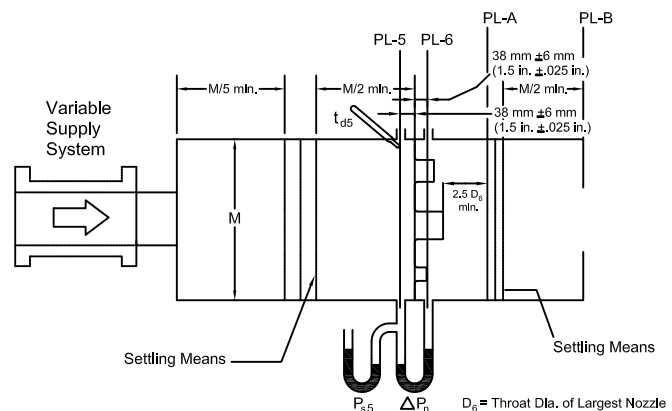


Figure 6.5- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Outlet