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KRUEGER
Excellence in Air Distribution

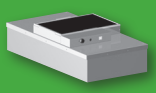
TAD Series
This series of radial face, critical room supply diffusers offer 90˚ or 180˚ air patterns. Available in aluminum or stainless steel construction. A HEPA filter backpan model is also available.

Radiaflo™ Series
This series of flush face, radial critical room supply diffusers offer a 180˚ air pattern. Available in aluminum or stainless steel construction. A HEPA filter backpan model is also available.

Sterilflo®
Sterilflo® is a stainless steel operating room system consisting of center and perimeter panels yielding exceptional particulate control.

Sterilflex™
Sterilflex™ is a modular, aluminum operating room system consisting of center and perimeter panels yielding exceptional particulate control.

5000, 5000HF
The 5000 series are low velocity, non-aspirating, perforated laminar flow panels with aluminum, stainless steel, and cold rolled steel construction. A HEPA filter backpan model is also available.



CRFF Series
The CRFF series of critical room fan filter units feature PSC or ECM motors and multiple filter options.

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Introduction: TAD Series

The Total Air Diffuser (TAD) is a patented radial flow diffuser designed for critical spaces with stringent ventilation requirements. It features a non-aspirating, forced displacement, radial design. Air flows from the TAD diffuser in a radial pattern, displacing large volumes of air out and away from the diffuser. This forced displacement of air prevents entrainment of room air which may be contaminated with pollutants. The TAD is an excellent choice for clean air environment applications. With proper application, the TAD provides superior draft reduction for high air change rate environments such as animal rooms, laboratories, and hospitals. The TAD's aluminum and stainless steel construction option makes the TAD diffuser an excellent choice for corrosive environments. The Krueger Technology Center is well equipped for TAD performance demonstrations. Virtually any application can be modeled in this facility.

TAD (Face View)

TAD (Isometric View)

MODELS

TAD	- Radial Face Critical Room Supply Diffuser; Aluminum Construction
TADSS	- Radial Face Critical Room Supply Diffuser; Stainless Steel Construction
TADHF	- Radial Face Critical Room Supply Diffuser with HEPA Filter Brackets and Backpan; Aluminum Construction
TADSSHF	- Radial Face Critical Room Supply Diffuser with HEPA Filter Brackets and Backpan; Stainless Steel Construction
TAD BACKPAN	- Backpan for Models TAD and TADSS Series of Radial Face Critical Room Supply Diffusers; Available with Aluminum, Stainless Steel, or Cold Rolled Steel Construction
TADFILTER	- HEPA Filter for TADHF and TADSSHF

FEATURES

- Air Patterns: 90° (1-way) or 180° (2-way).
- TAD Backpan greatly reduces sensitivity to inlet conditions.
- High volume, draft free.

OPTIONS

- Surface mounting frames.
- 12"x48", 24"x24", and 24"x48" panel sizes.

FINISHES

- Standard finish is #44 British White.
- Optional finishes available.

RELATED DEFINITIONS*

Air Changes: A method of expressing the amount of air going into or out of a building or room in terms of the number of building volumes or room volumes exchanged.

Diffusion: Distribution of air within a space by an outlet discharging supply air in a spreading pattern.

Entrainment: The induced flow from room air by the primary air from an outlet, creating a mixed air path (also known as secondary air motion).

Induction: The process of drawing room air into the projected air stream due to the velocity of the projected air stream (also known as aspiration).

Pressure Loss: Indication of how much total pressure is required to move air through a diffuser.

Total Pressure: Velocity pressure plus static pressure.

* *Definitions taken from Air Diffusion Dynamics Theory Design and Application© by Ralph G. Nevins, Ph.D.*

TAD, TADSS, TADHF, TADSSHF Typical Applications

OVERVIEW
The Total Air Diffuser (Model TAD), with its revolutionary air pattern, has a number of diverse applications that solve many previously difficult air distribution problems and allows for a broad range of installation conditions.

LABORATORIES
Research laboratories often have fume hoods, bench hoods, highly variable loads, and requirements for active and positive ventilation. Additionally, they have low draft requirements to prevent instrument and balance disruptions. The TAD prevents disturbances to the fume hood inlet velocity profile that is possible with standard draft inducing ceiling diffusers or laminar flow diffusers. The TAD provides balanced airflows, effective over a very broad range of temperature differences (and loads), which allows for application in a number of laboratory situations.

HOSPITAL ROOMS
The superior and unique airflow patterns of the TAD make applications in hospital facilities an obvious choice. The TAD provides air cleaning properties and low velocity air movement, both of which are required in critical patient rooms and support areas. The TAD provides excellent ventilation in hospital facilities where a high volume of conditioned air is required and drafts must be avoided. Isolation rooms benefit by the ability of the TAD to displace air away from the critical occupant.

ANIMAL ROOMS
Animal laboratories have their own special requirements. Conditions of very low temperature differentials, high airflows, and cleanliness are required to protect immune deficient experimental animals from adverse environmental reactions. In addition, the rooms must be properly “cleansed” by effective ventilation to protect the laboratory personnel. The TAD has been successfully tested and installed in several animal research facilities. Animal rooms often have varying requirements for airflow as load and humidity requirements are changed. Optimum configurations for the TAD have been determined with full-scale mock-ups. Several successful installations have been studied with room center-line locations for the TAD units. Contact Krueger for your research mock-up needs.

CLEAN ROOMS
Cleanliness and superior ventilation are the primary benefits of the TAD, which makes it well suited for many applications where high airflow and low draft conditions are required. The TAD has been tested in clean room environments and provides superior air quality.

Clean rooms have very high air change rates and are best served by continuous rows of TADs. Air returns are placed at several locations at the floor around the perimeter of the room. This provides the most uniform cleansing of the space at low, uniform air speeds, which also tends to make the space more comfortable.

DUST CONTROL FOR MANUFACTURING PROCESSES
TAD’s radial flow pattern is very successful in controlling dust in various manufacturing processes. For example, pharmaceutical tableting facilities produce a great deal of dust. Properly applied, TADs have been shown in actual tests to “wash” and entire tableting facility because of the radial flow pattern.

SMOKE CONTROL
The use of TADs can reduce smoke and other contaminants in an office or public area by displacing smoke away from specific areas within a room.

OFFICE SPACES
The TAD provides office spaces with quality air distribution. This is especially true in areas of high variable load, such as conference rooms, entrance areas, group activity areas, training facilities, and word processor areas. The office environment is the largest potential benefactor of the TAD’s unique ability to provide uniform ventilation to a space over a range of loads and air volumes.

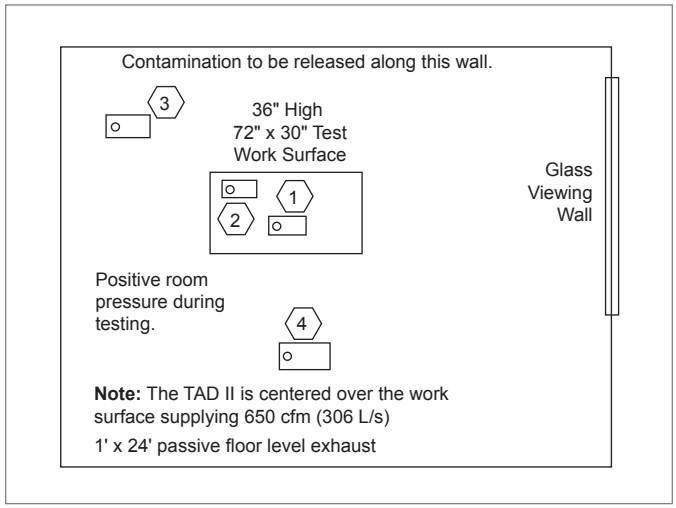
TAD INSTALLATION IN LABORATORY

TAD, TADSS, TADHF, TADSSHF Application Analysis

Although several types of application tests have been conducted, one typical particle count decay test can be used as an example of the TAD's ability to remove particles from a clean environment that has experienced a sudden contamination. A cleansed room, 20'x24'x9', was supplied with 650 cfm of Δ20°F cooling air which had been passed through a 99.99°% HEPA filter and then into the room through a 24"x48" TAD II with low side-wall exhausts maintaining a positive room pressure (See Figure 1). The room was then subjected to a sudden contamination of particles between 0.5 and 5 micron size in a burst of concentration greater than 30,000 particles per cubic foot. A laser particle counter was used to record the concentration of particles at the four test points shown in Figure 1. The counter ran continuously from before the injection of a burst of contaminating particles until the concentration level at each point had been returned to its pre-tested baseline. The total time elapsed between the release of particles into the space and the time the particle concentration reached benchmark contamination levels is shown in Table 1. The data shows the time required to reduce the concentration of particles in the test room with air supplied through a 24"x48" TAD II diffuser.

The same test was conducted again in the same environment; however, with different air distribution devices. A high induction ceiling diffuser was employed at the same location and at the same flow rate with a 30% decline in particle removal efficiency in the space.

TEST MOCK-UP



PARTICULATE REMOVAL RATES (MIN:SEC) OF A CLEAN ROOM TAD APPLICATION

Concentration P/ft³	Test Pt. 1	Test Pt. 2	Test Pt. 3	Test Pt. 4
30,000	00:00	00:00	00:00	00:00
10,000	14:10	10:31	12:45	21:58
5,000	18:43	14:28	16:12	26:01
1,000	34:55	30:34	27:38	-
<500	47:46	47:57	46:27	-

NOTE: Dash indicates all particles removed.

Once again, another test was conducted in the same environment, incorporating a laminar flow device at the same location and at the same flow rate with a 200% decline in particle removal efficiency in the space. Contamination was controlled at the work surface underneath the laminar flow device; however, there was no room particle control.

Radial forced displacement generated by the Krueger TAD maximizes the particle removal efficiency for a given design air change rate.

DIFFUSER CHARACTERISTICS

In addition to extensive laboratory testing of the TAD during development, Krueger commissioned Flomerics, an independent leader in the simulation of ventilation performance in buildings, to use FLOVENT* to analyze the performance characteristics.

Traditional ceiling diffusers, such as the Krueger 1400, are designed to create a horizontal flow of air that travels along the ceiling after exiting the diffuser, even at low volumes of air. This ceiling effect is referred to as the "Coanda Effect" and is a key reason ceiling diffusers can exhibit long horizontal throw characteristics.

In a typical room, ceiling diffusers create an upward flow of room air toward the center of the diffuser. The re-entrainment of air increases the rate of thermal mixing in the room, producing uniform velocities, except in the jets themselves, which leads to increased comfort. This also allows the room air contaminants and particulates to recirculate.

Laminar flow diffusers, such as the Krueger 5000 series, are designed to create a vertical flow of air that travels down through a space and out through room exhaust grilles. The "Coanda Effect" is not employed since long horizontal throws are not a design element. Re-entrainment of the room air towards the center of the diffuser is not present with this type of diffuser, yet some entrainment of air is observed from the ceiling. The low-velocity air travels directly down from the diffuser, effectively cleaning the air beneath it, but low flow regions may exist in adjacent areas. Further, comfort may be sacrificed in the high flow region.

The TAD by Krueger is engineered to throw air radially away from the diffuser. Horizontal and vertical throw are both present, as are throws at all angles in between. The TAD diffusion pattern results in the supply of high volume, low velocity air with minimal entrainment. The large face area of the diffuser creates a very uniform velocity distribution without any sacrifice in occupant comfort by distributing air to all areas of the room. The air flows in all directions away from the diffuser before finally reaching the low level return grilles. The relative absence of entrainment and recirculation of potentially contaminated air makes the TAD especially well suited for applications where particle displacement is essential, and where occupant comfort is critically important.

** FLOVENT is a registered trademark of Flomerics Limited.*

TAD, TADSS, TADHF, TADSSHF Application Analysis

SELECTION GUIDELINES

- Determine the number of room air changes per hour necessary for the application.
- Calculate the incoming air volume (CFM) by multiplying the number of air changes by the room volume and divide by 60.
- Use the performance data on the following pages to find the sizes and quantities of TAD diffusers required.

INSTALLATION GUIDELINES

While the TAD is very forgiving on inlet conditions when using the Krueger optional backpan, it is recommended that as much straight duct as possible be provided at the inlet. Sharp bends in the inlet duct at the diffuser may disrupt the discharge patterns. If a backpan other than the optional Krueger backpan is utilized, sensitivity to supply duct orientation may be greater.

EXAMPLE SELECTION

Given a 10'x10'x12' (3048x3048x3658mm)
Room with 30 Air Changes per Hour:

$$CFM = 30/hr \times \frac{(10x10x12)ft^3}{60\ min/hr} = 600\ ft^3/min$$

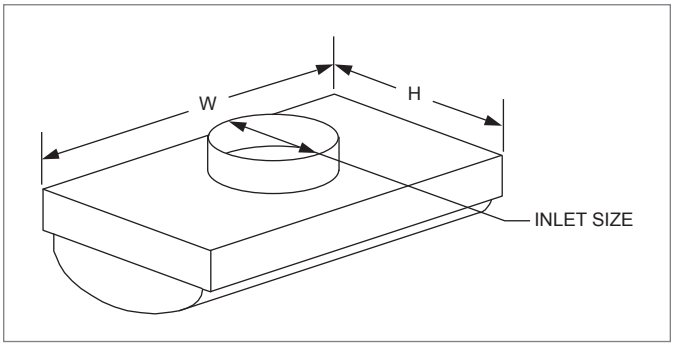
$$L/s = 30/hr \times 2.777 \times 10^{-9} \frac{hr \cdot L}{s \cdot mm^3} \times (LxWxH)mm^3 = 283\ L/s$$

TADFILTER Dimensional Information

The design of the TADHF and TADSSHF minimizes both static pressure drop and backpan size. To compliment this, the filter must have a gel pocket seal and a maximum depth of 3". The TADHF backpan sealing edge is equal to the nominal unit size minus 1". (i.e., The 24"x48" model has a sealing edge of 23"x47".) The maximum length and width of the filter cannot exceed the nominal unit size. The selected filter must have an overall size and pocket width that allows it to fit these parameters.

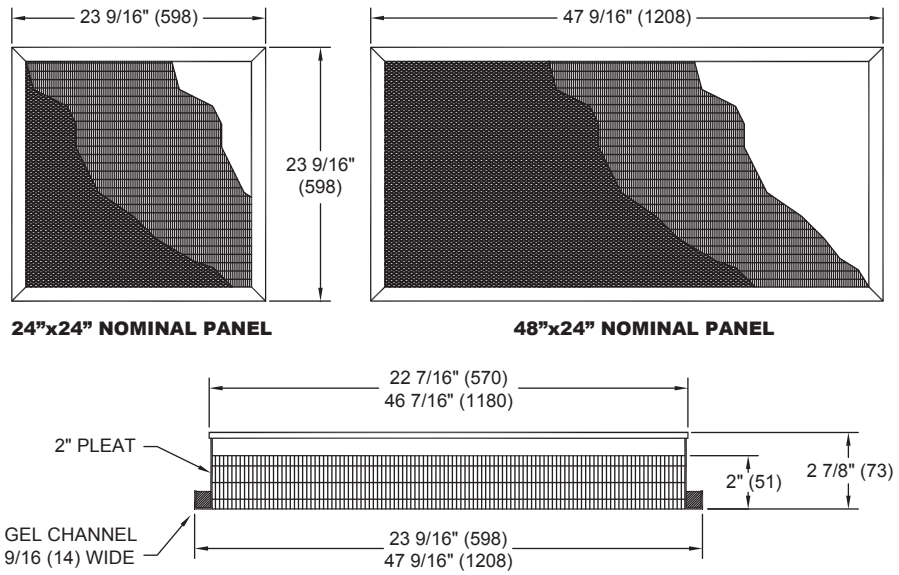
Krueger is able to provide a HEPA filter (model TADFILTER) for the TADHF and TADSSHF products, which this filter is designed to fit.

TAD BACKPAN DETAIL



Panel = WxH (Nominal), Inlet Size = Duct Size (Nominal)

TADFILTER, 24"x24" & 24"x48" PANEL FACE AND SIDE VIEWS



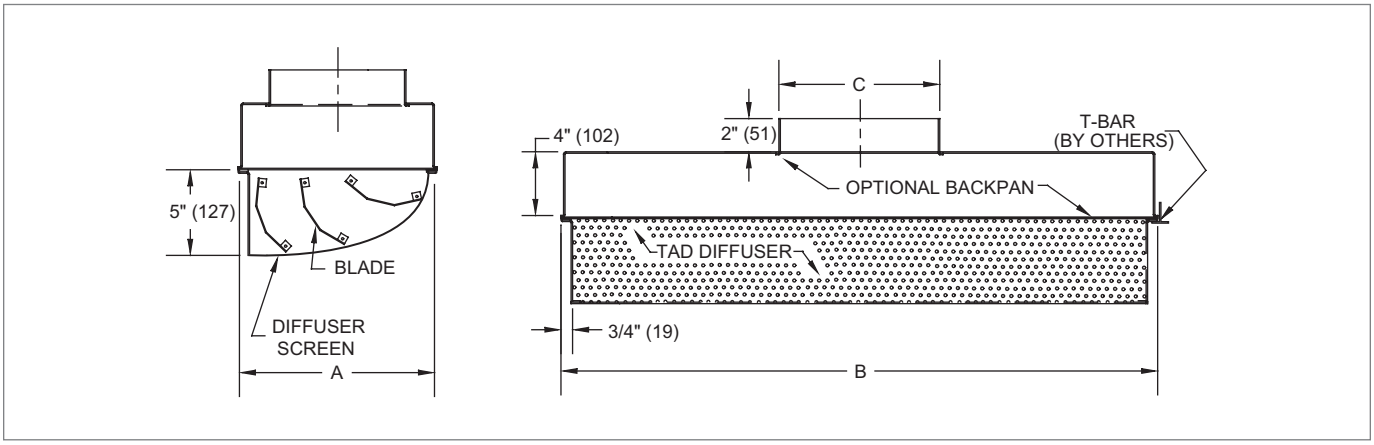
STANDARD FEATURES:

1. *99.99% Minimum Efficiency.*
2. *Each filter is tested and certified.*
3. *Anodized extruded aluminum frame.*
4. *Lightweight and compact.*
5. *Gel pocket provides airtight seal around edges.*
6. *Mini-pleat design features maximum media cleaning potential.*
7. *Classified under UL 900 and UL 586.*

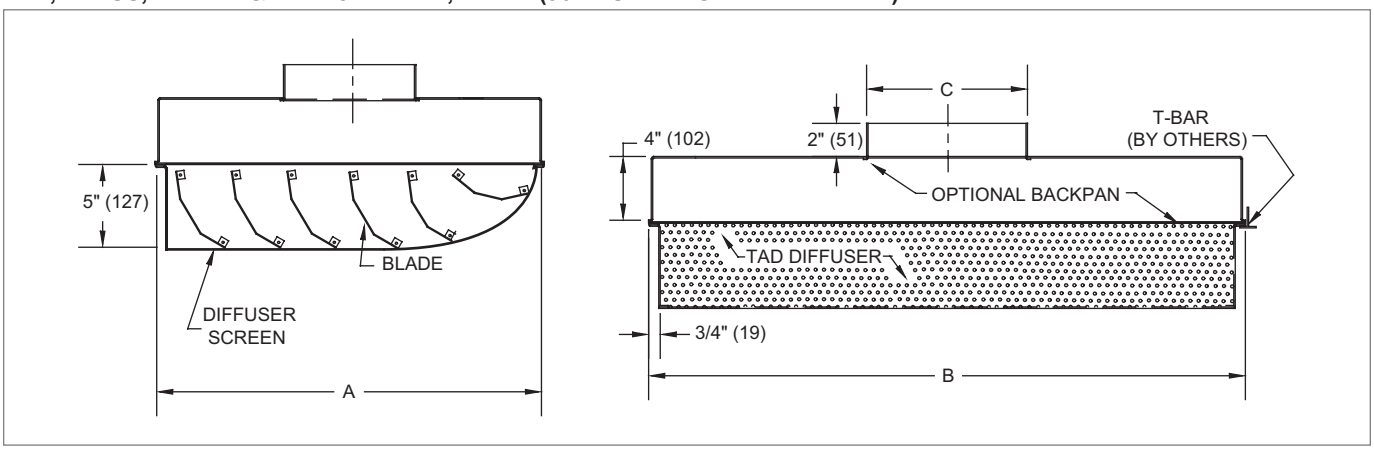
NOTES: Dimensions in parentheses are mm.

TAD, TADSS Dimensional Information

TAD, TADSS, 12"x48" PANEL, 1-WAY (90˚ DISCHARGE AIR PATTERN)



TAD, TADSS, 24"x24" & 24"x48" PANEL, 1-WAY (90˚ DISCHARGE AIR PATTERN)



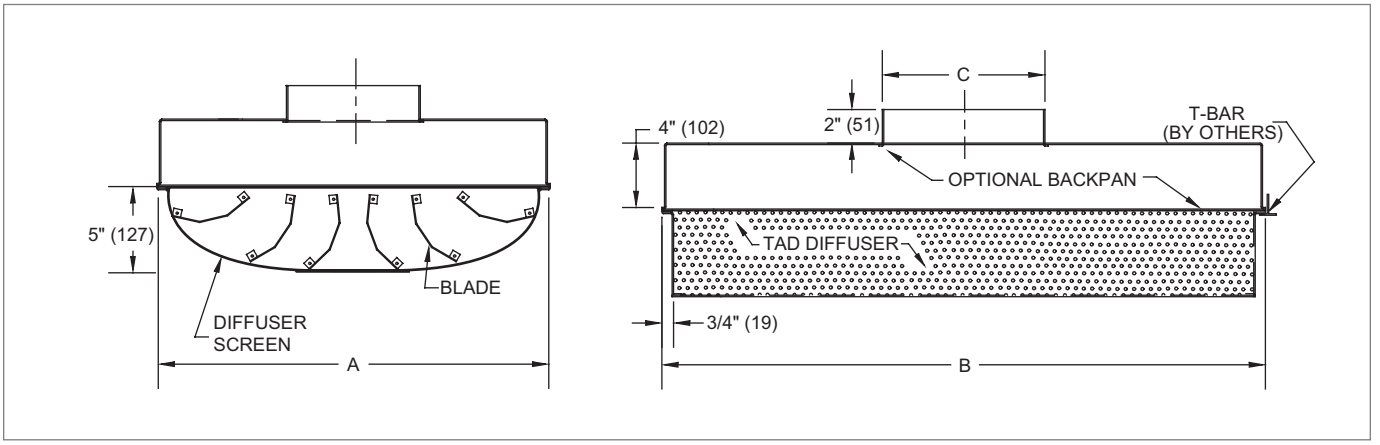
TAD, TADSS, 1-WAY AVAILABLE SIZES

Panel Size	A	B	C
12" x 48" (305 x 1219)	11 3/4" (298)	47 3/4" (1213)	7 7/8" (200)
24" x 24" (610 x 610)	23 3/4" (603)	23 3/4" (603)	7 7/8" (200)
24" x 48" (610 x 1219)	23 3/4" (603)	47 3/4" (1213)	11 7/8" (302)

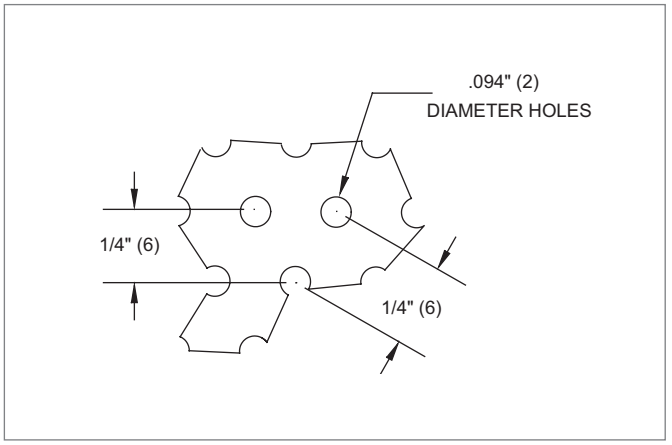
NOTES: Dimensions in parentheses are mm. Standard construction is aluminum. Stainless steel is available. Optional backpan is constructed of steel, aluminum, or stainless steel. To allow for cleaning, optional backpan requires 1 3/4" (44) clearance to remove. (Based on T-Bar height of 1 1/8" (29)) Perforated Face: .094" (2) diameter holes 13% open area. Backpan Screen: .040" (1) diameter holes 43% open area.

TAD, TADSS Dimensional Information

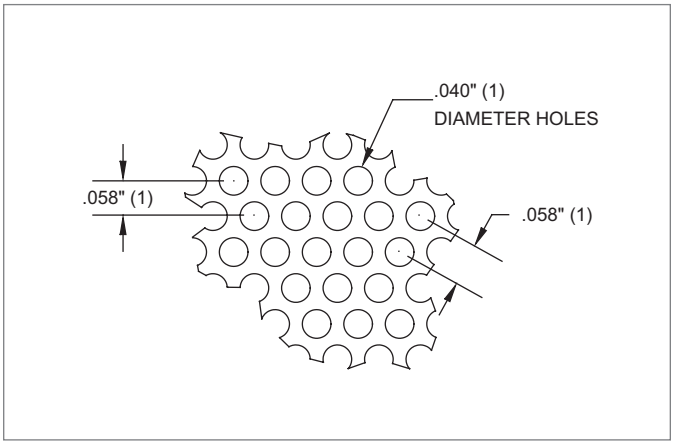
TAD, TADSS, 24"x24" & 24"x48" PANEL, 2-WAY (180˚ DISCHARGE AIR PATTERN)



TAD, TADSS, PERFORATED FACE DETAIL 2-WAY (180˚ DISCHARGE AIR PATTERN)



TAD, TADSS, PERFORATED BACKPAN SCREEN DETAIL 2-WAY (180˚ DISCHARGE AIR PATTERN)



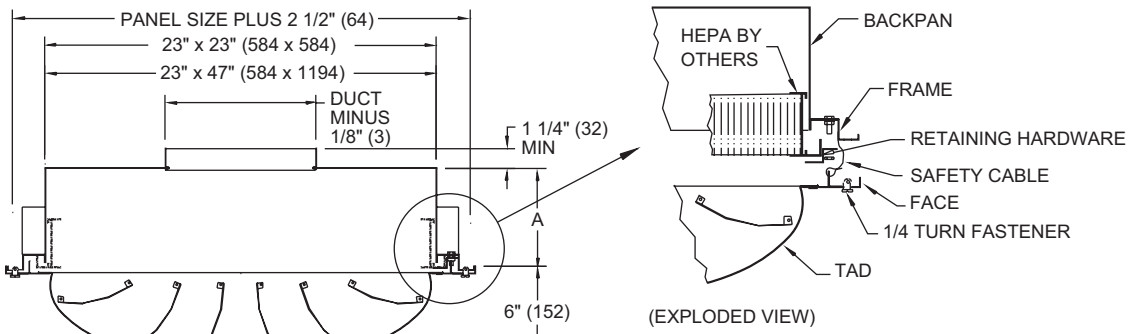
TAD, TADSS, 2-WAY AVAILABLE SIZES

Panel Size	A	B	C
24" x 24" (610 x 610)	23 3/4" (603)	23 3/4" (603)	7 7/8" (200)
24" x 48" (610 x 1219)	23 3/4" (603)	47 3/4" (1213)	11 7/8" (302)

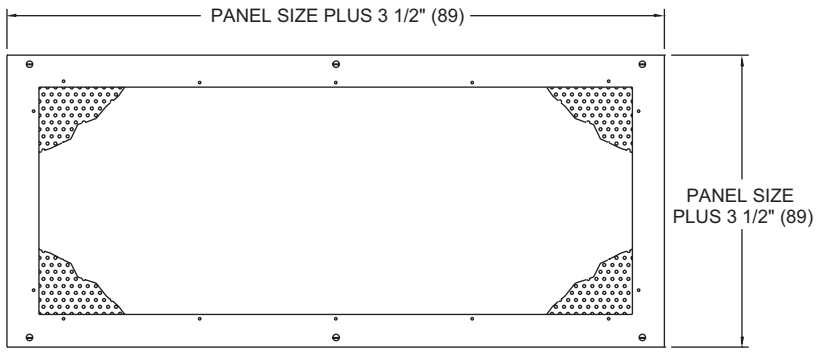
NOTES: Dimensions in parentheses are mm. Standard construction is aluminum. Stainless steel is available. Optional backpan is constructed of steel, aluminum, or stainless steel. To allow for cleaning, optional backpan requires 1 3/4" (44) clearance to remove. (Based on T-Bar height of 1 1/8" (29)) Perforated Face: .094" (2) diameter holes 13% open area. Backpan Screen: .040" (1) diameter holes 43% open area.

TADHF, TADSSHF Dimensional Information

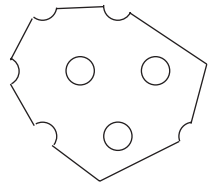
TADHF, TADSSHF, 24"x24" & 24"x48" PANEL, 2-WAY (180° DISCHARGE AIR PATTERN)



TADHF, TADSSHF, 24"x24" & 24"x48" PANEL, FACE VIEW



TADHF, TADSSHF, PERFORATED FACE DETAIL



PERF DETAIL - .094" (2) DIA HOLES ON 1/4" (6) STAGGERED CENTERS, 13% OPEN

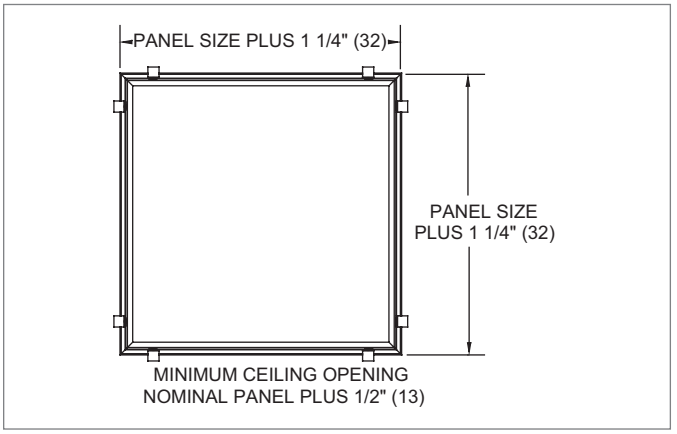
TADHF, TADSSHF, 2-WAY AVAILABLE SIZES

Panel Size	A	Duct Size
24" x 24" (610 x 610)	6 1/16" (154)	8" (203)
24" x 48" (610 x 1219)	6 13/16" (173)	10" (254)
24" x 48" (610 x 1219)	7 9/16" (192)	12" (305)

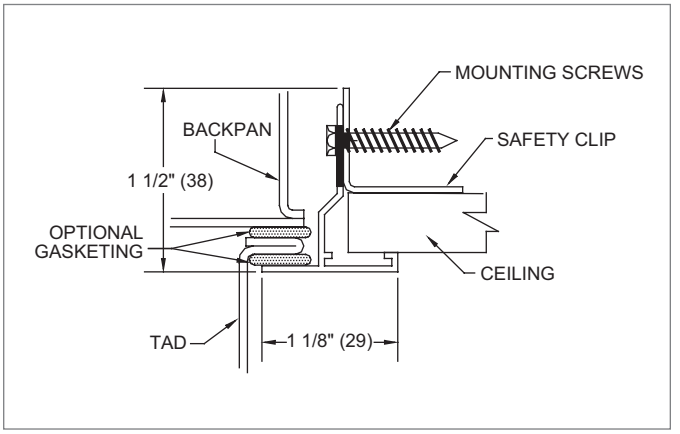
NOTES: Dimensions in parentheses are mm. Standard construction is aluminum. Stainless steel is available. Safety cables standard (4 per unit). Recommended filter: AAF AstroCel® II LPD Series 85 or equal. See page B3-6 for filter guidelines.
** AstroCel® is a registered trademark of American Air Filters.*

TAD, TADSS, TADHF, TADSSHF Mounting Details

TAD, TADSS, SURFACE MOUNT FRAME, FACE VIEW

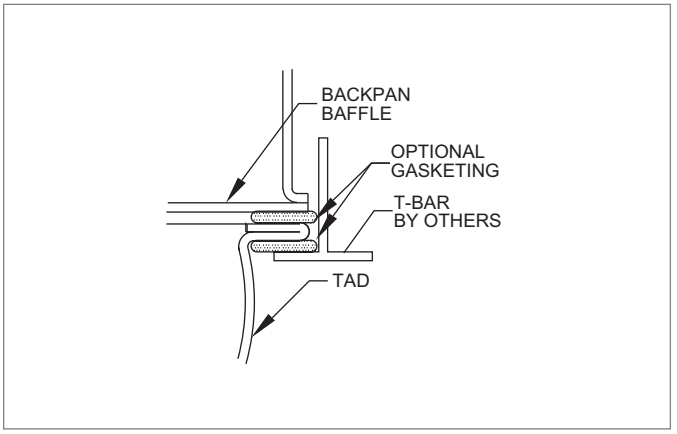


TAD, TADSS, SURFACE MOUNT FRAME DETAIL



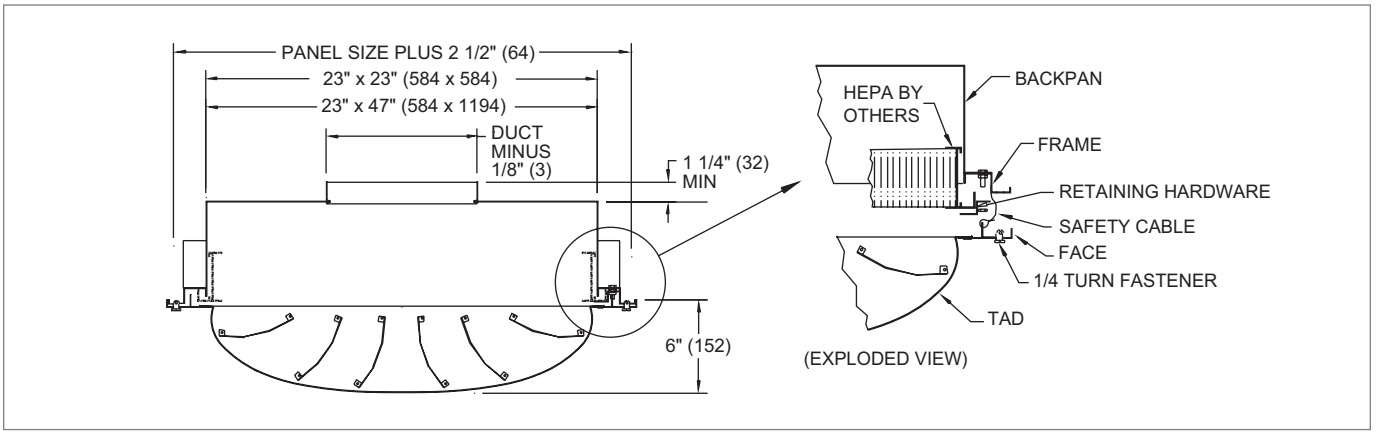
NOTES: Dimensions in parentheses are mm. Surface mount to hard ceiling. Mounting frame screws and security clips are shipped loose for field installation. Mounting frame construction is aluminum (Model 5HCF23). Mounting frame finish is British White. Mounting frame is not available with models TADHF or TADSSHF.

TAD, TADSS, SURFACE MOUNT FRAME, FACE VIEW



NOTES: Dimensions in parentheses are mm. Optional gaskets are shipped loose for field installation.

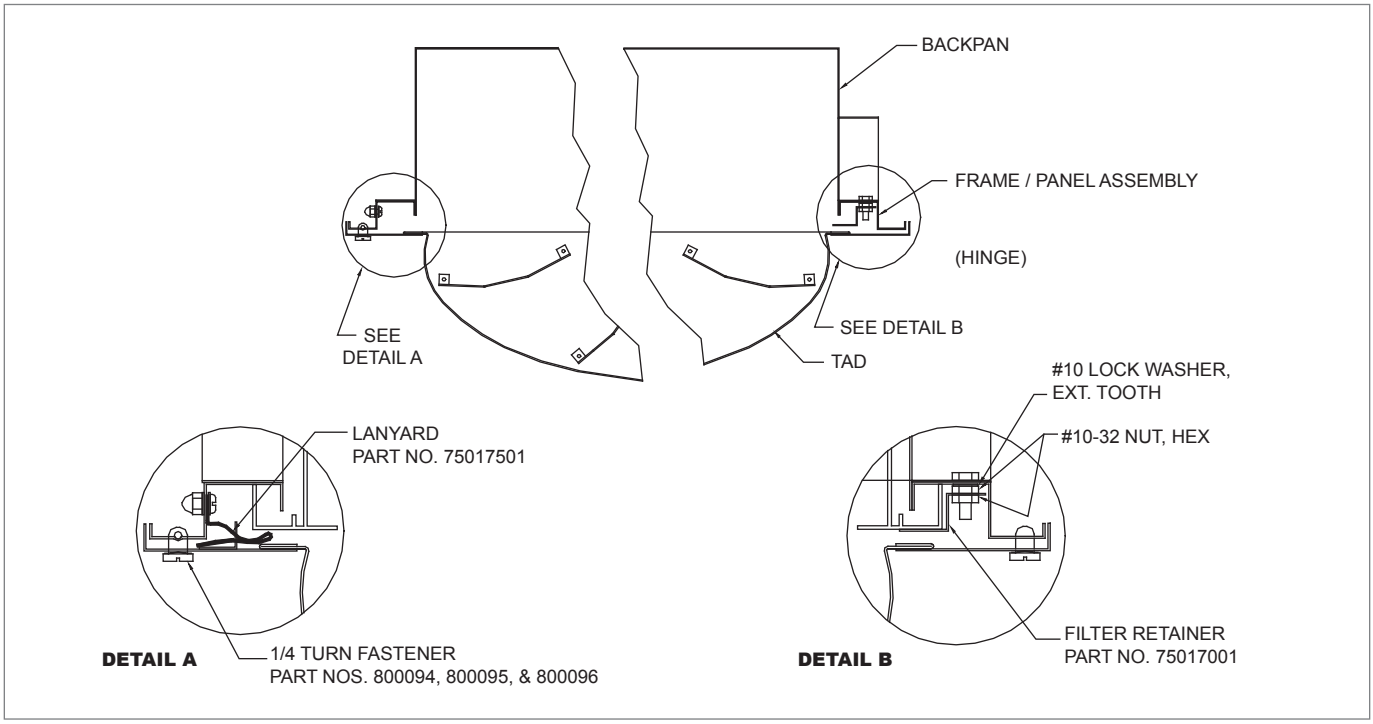
TADHF, TADSSHF, SURFACE MOUNT FRAME, FACE VIEW



NOTES: Dimensions in parentheses are mm. Surface mount to hard ceilings. Not designed for use in lay-in T-bar applications. 1/4 Turn fasteners (on four sides) release face even when TADHF is installed side-by-side.

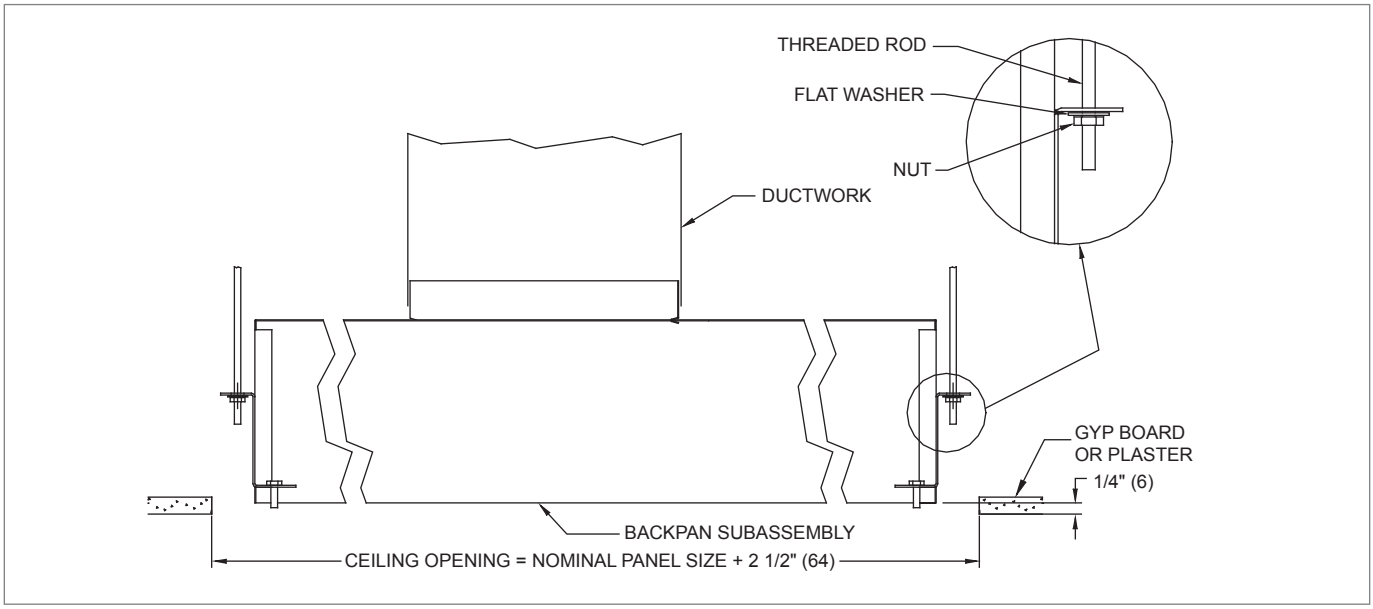
TADHF, TADSSHF Installation Details

TADHF/TADSSHF INSTALLATION STEP 1: PREPARE



NOTES: Remove TADHF from crate and separate from packing material. Open the face of the unit by releasing the 1/4 turn fasteners. The fasteners are located on the sides of the face. Unhook the lanyard from the lanyard clip (See Detail A). Remove the face subassembly. Set aside for re-installation. Note that if you have access to the plenum space, you may now hang the unit with the frame in place. Skip the necessary steps below. If you do not have access to the space, continue with the following steps. Remove the filter retainer, assembly hardware, and subassembly. Set aside for re-installation.

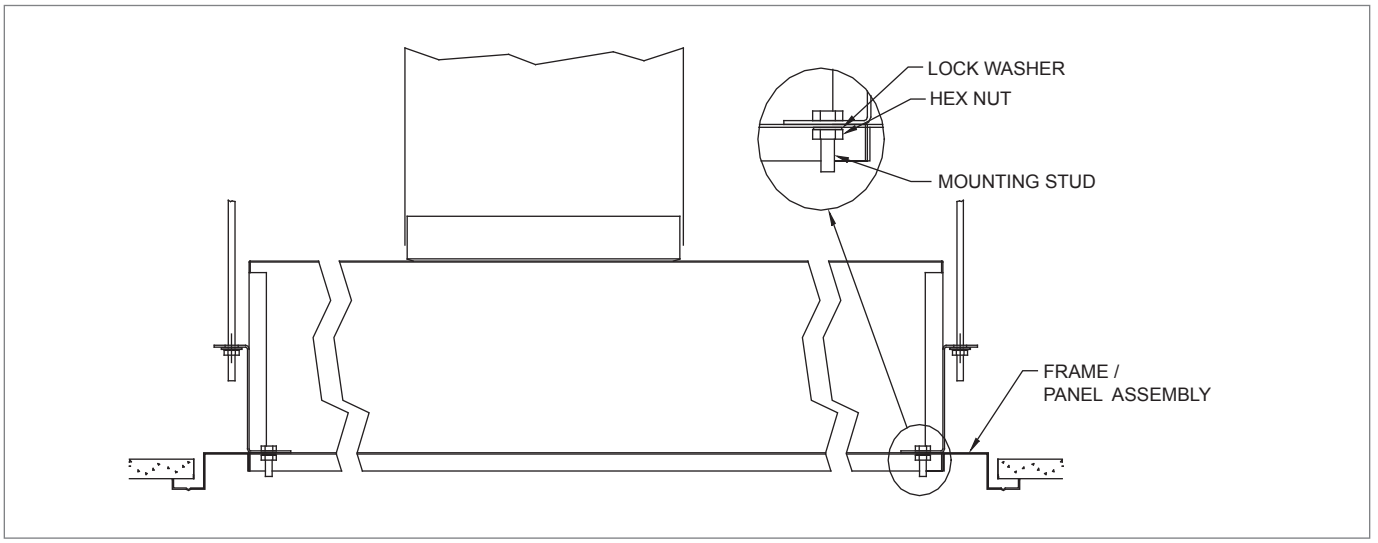
TADHF/TADSSHF INSTALLATION STEP 2: HANG BACKPAN



NOTES: Lift the backpan assembly into the ceiling opening and locate on the pre-installation hanger rods. Attach with flat washer and nut. (Hanger rods and hardware are by others.) Adjust to locate the edge of the backpan within approximately 1/4" (6) of the finished ceiling surface. Fasten and seal duct work as required. (Duct work and hardware are by others.)

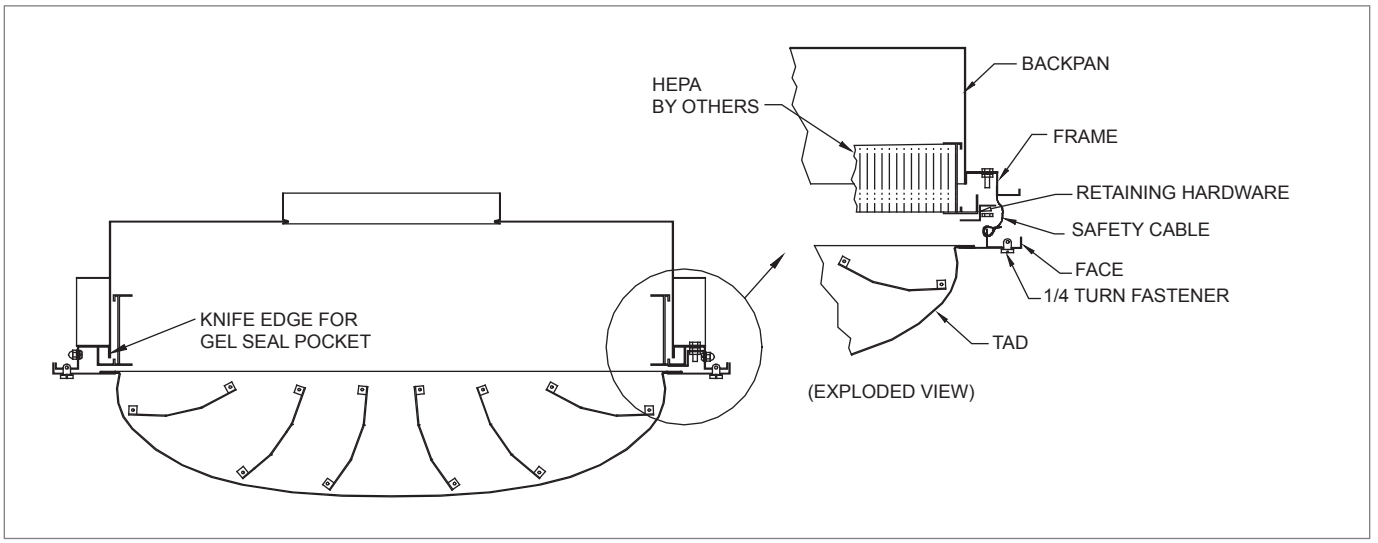
TADHF, TADSSHF Installation Details (Continued)

TADHF, TADSSHF INSTALLATION STEP 3: INSTALL FRAME



NOTES: Reinstall frame / panel assembly on mounting studs in the backpan hanger brackets. Remove frame and readjust backpan as required. Reinstall the hex nuts and lock washers that were set aside from Step 1, making sure the frame/panel assembly is snug against the ceiling.

TADHF, TADSSHF INSTALLATION STEP 4: COMPLETE INSTALL



NOTES: Install appropriate size and model HEPA filter into the backpan. The backpan perimeter must seat into the gel channel in accord with the filter manufacturer's instructions. Reinstall the filter retainer that was set aside in Step 1. Reinstall the face subassembly that was set aside in Step 1. Use care while orienting the TAD in the desired direction. Rehook lanyards over the lanyard clips, being sure that the snap is completely engaged. Close the unit by capturing the frame with the 1/4 turn fasteners. Rotate the head 90° until you feel the pin completely seat.

TAD, TADSS, TADHF, TADSSHF Operational Balancing Data

**TAD, TADSS, TADHF, TADSSHF,
12”x48”, 1-WAY (90˚ DISCHARGE AIR PATTERN)**

FPM (m/s)	CFM (L/s)	Ps "WG (Pa)
600 (2.4)	250 (118)	0.015 (3)
800 (2.8)	300 (142)	0.025 (6)
925 (4.3)	400 (189)	0.050 (12)
1075 (5.6)	500 (236)	0.070 (17)

**TAD, TADSS, TADHF, TADSSHF,
24”x24”, 1-WAY (90˚ DISCHARGE AIR PATTERN)**

FPM (m/s)	CFM (L/s)	Ps "WG (Pa)
550 (2.8)	250 (118)	0.015 (3)
650 (3.3)	300 (142)	0.025 (6)
950 (4.8)	400 (189)	0.050 (12)
1250 (6.4)	500 (236)	0.090 (22)

**TAD, TADSS, TADHF, TADSSHF,
24”x24”, 2-WAY (180˚ DISCHARGE AIR PATTERN)**

FPM (m/s)	CFM (L/s)	Ps "WG (Pa)
740 (3.76)	300 (142)	0.030 (7)
950 (4.8)	400 (189)	0.050 (12)
1250 (6.4)	500 (236)	0.080 (19)

**TAD, TADSS, TADHF, TADSSHF,
24”x48”, 1-WAY (90˚ DISCHARGE AIR PATTERN)**

FPM (m/s)	CFM (L/s)	Ps "WG (Pa)
600 (3.0)	500 (236)	0.020 (5)
800 (4.1)	600 (283)	0.030 (7)
925 (4.7)	700 (330)	0.040 (10)
1075 (5.5)	800 (378)	0.060 (14)
1300 (6.6)	900 (425)	0.080 (19)
1550 (7.9)	1000 (472)	0.100 (24)

**TAD, TADSS, TADHF, TADSSHF,
24”x48”, 2-WAY , (180˚ DISCHARGE AIR PATTERN)**

FPM (m/s)	CFM (L/s)	Ps "WG (Pa)
760 (3.9)	600 (283)	0.030 (7)
900 (4.6)	700 (330)	0.035 (8)
1020 (5.2)	800 (378)	0.040 (10)
1140 (5.8)	900 (425)	0.055 (13)
1250 (6.4)	1000 (472)	0.070 (17)

The TAD offers an easy way of determining the airflow rate for balancing.

TAD flow rates can be determined by removing the flow port button, centered on the face, measuring the velocity in the flow port hole with an Alnor model 6000-P velometer (or similar device), and consulting the FPM and CFM charts below.

Once the system has been balanced, the cleanliness of the TAD and the filters can be determined by the static pressure chart. This chart shows the TAD interior static pressure which can be measured with a static pressure probe. If pressure readings drop, this may indicate airflow to the TAD has been reduced. If the system is no longer generating sufficient airflow, the filter needs replacing or the backpan distribution screen needs to be cleaned.

TAD, TADSS, TADHF, TADSSHF Performance Data

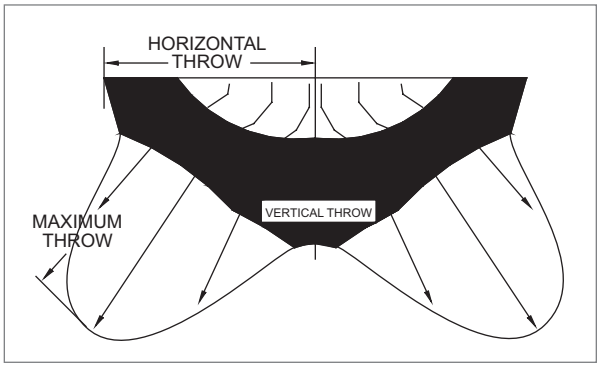
Because the TAD is a radial diffuser, traditional methods of presenting diffuser data are not sufficient to document the TAD's performance. The data below gives terminal velocities in both the horizontal and vertical directions along with maximum throw listed. Krueger has additional data on room air motion, ADPI, Computational Fluid Dynamics Analysis, etc., available upon request. Data shown below is for TAD units with optional backpan.

IP DATA: TAD, TADSS, TADHF, TADSSHF

	IP Data													
	Panel Size		Inlet	Neck	Air	Pt	Ps	ΔT	Throw,ft @ FPM					
Throw	W	L	Dia.	Vel	Flow				Horizontal		Max	Vertical		NC
Pattern	in	in	in	FPM	CFM	"WG	"WG	F	100	50	50	100	50	
180° Air Pattern	24"	48"	12"	765	600	0.094	0.06	-5	2	4	8	2	4	20
				1019	800	0.167	0.10		3	4	10	3	5	29
				1274	1000	0.261	0.16		4	6	11	4	7	37
	24"	48"	12"	765	600	0.094	0.06	-15	2	3	7	3	6	20
				1019	800	0.167	0.10		2	4	8	4	8	29
				1274	1000	0.261	0.16		3	6	10	5	9	37
90° Air Pattern	24"	48"	12"	765	600	0.099	0.06	-5	3	6	8	3	3	17
				1019	800	0.177	0.11		5	6	12	7	-	26
				1274	1000	0.276	0.18		6	8	15	8	-	34
	24"	48"	12"	765	600	0.099	0.06	-15	3	5	9	7	-	17
				1019	800	0.177	0.11		4	5	11	8	-	26
				1274	1000	0.276	0.18		4	7	14	9	-	34
180° Air Pattern	24"	24"	8"	860	300	0.111	0.07	-5	2	3	7	4	6	15
				1147	400	0.197	0.12		3	4	9	4	7	21
				1433	500	0.308	0.18		3	5	10	5	7	27
	24"	24"	8"	860	300	0.111	0.07	-15	2	3	6	7	9	15
				1147	400	0.197	0.12		2	3	8	8	-	21
				1433	500	0.308	0.18		2	4	9	9	-	27
90° Air Pattern	24"	24"	8"	860	300	0.118	0.07	-5	4	6	8	5	8	10
				1147	400	0.210	0.13		5	8	12	6	9	18
				1433	500	0.328	0.20		3	7	8	6	8	26
	24"	24"	8"	860	300	0.118	0.07	-15	4	5	7	6	9	10
				1147	400	0.210	0.13		4	6	9	7	-	18
				1433	500	0.328	0.20		5	7	11	8	-	26
90° Air Pattern	12"	48"	8"	860	300	0.229	0.18	-5	2	4	8	2	4	18
				1147	400	0.229	0.15		3	4	9	3	4	26
				1433	500	0.358	0.23		4	6	10	3	5	32
	12"	48"	8"	860	300	0.229	0.18	-15	2	3	7	2	5	18
				1147	400	0.229	0.15		2	4	8	4	7	26
				1433	500	0.358	0.23		3	6	9	5	8	32

NOTES: Air distribution within a space is strongly affected by the temperature difference between supply and room air (ΔT). In most cases, the unit supplies air colder than the room, typically at about -5°F ΔT. Return air should be exhausted with low sidewall return grilles for optimum performance. For maximum throw column, see isovel below.

TYPICAL ISOVEL



NOTES: Test cell dimensions 12'x12'x9'. Tested with optional backpan.

TAD, TADSS, TADHF, TADSSHF Performance Data

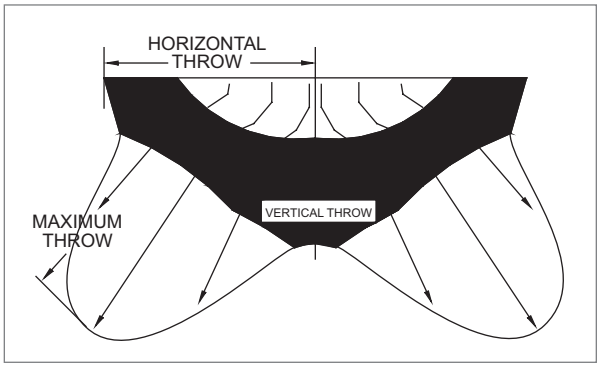
Because the TAD is a radial diffuser, traditional methods of presenting diffuser data are not sufficient to document the TAD's performance. The data below gives terminal velocities in both the horizontal and vertical directions along with maximum throw listed. Krueger has additional data on room air motion, ADPI, Computational Fluid Dynamics Analysis, etc., available upon request. Data shown below is for TAD units with optional backpan.

METRIC DATA: TAD, TADSS, TADHF, TADSSHF

	Metric Data													
	Panel Size		Inlet	Neck	Air	Pt	Ps	ΔT	Throw, m, @ m/s					
Throw	W	L	Dia.	Vel	Flow				Horizontal		Max	Vertical		NC
Pattern	mm	mm	mm	m/s	L/s	Pa	Pa	C	0.5	0.25	0.25	0.5	0.25	
180° Air Pattern	610	1219	305	3.88	283	23.5	14.4		0.6	1.2	2.4	0.6	1.2	20
				5.18	378	41.5	25.4	-2.8	0.9	1.2	3.0	0.9	1.5	29
				6.47	472	65.0	39.8		1.2	1.8	3.3	1.2	2.1	37
	610	1219	305	3.88	283	23.5	14.4		0.6	0.9	2.1	0.9	1.8	20
				5.18	378	41.5	25.4	-8.3	0.6	1.2	2.4	1.2	2.4	29
				6.47	472	65.0	39.8		0.9	1.8	3.0	1.5	2.7	37
90° Air Pattern	610	1219	305	3.88	283	24.8	15.7		0.9	1.8	2.4	0.9	0.9	17
				5.18	378	44.0	27.9	-2.8	1.5	1.8	3.6	2.1	-	26
				6.47	472	68.8	43.6		1.8	2.4	4.6	2.4	-	34
	610	1219	305	3.88	283	24.8	15.7		0.9	1.5	2.7	2.1	-	17
				5.18	378	44.0	27.9	-8.3	1.2	1.5	3.3	2.4	-	26
				6.47	472	68.8	43.6		1.2	2.1	4.3	2.7	-	34
180° Air Pattern	610	610	203	4.37	142	27.7	16.2		0.6	0.9	2.1	1.2	1.8	15
				5.83	189	49.1	28.6	-2.8	0.9	1.2	2.7	1.2	2.1	21
				7.28	236	76.7	44.8		0.9	1.5	3.0	1.5	2.1	27
	610	610	203	4.37	142	27.7	16.2		0.6	0.9	1.8	2.1	2.7	15
				5.83	189	49.1	28.6	-8.3	0.6	0.9	2.4	2.4	-	21
				7.28	236	76.7	44.8		0.6	1.2	2.7	2.7	-	27
90° Air Pattern	610	610	203	4.37	142	29.4	17.9		1.2	1.8	2.4	1.5	2.4	10
				5.83	189	52.3	31.9	-2.8	1.5	2.4	3.6	1.8	2.7	18
				7.28	236	81.7	49.8		0.9	2.1	2.4	1.8	2.4	26
	610	610	203	4.37	142	29.4	17.9		1.2	1.5	2.1	1.8	2.7	10
				5.83	189	52.3	31.9	-8.3	1.2	1.8	2.7	2.1	-	18
				7.28	236	81.7	49.8		1.5	2.1	3.3	2.4	-	26
90° Air Pattern	305	1219	203	4.37	142	57.1	45.6		0.6	1.2	2.4	0.6	1.2	18
				5.83	189	57.0	36.6	-2.8	0.9	1.2	2.7	0.9	1.2	26
				7.28	236	89.2	57.3		1.2	1.8	3.0	0.9	1.5	32
	305	1219	203	4.37	142	57.1	45.6		0.6	0.9	2.1	0.6	1.5	18
				5.83	189	57.0	36.6	-8.3	0.6	1.2	2.4	1.2	2.1	26
				7.28	236	89.2	57.3		0.9	1.8	2.7	1.5	2.4	32

NOTES: Air distribution within a space is strongly affected by the temperature difference between supply and room air (ΔT). In most cases, the unit supplies air colder than the room, typically at about -2.8°C ΔT. Return air should be exhausted with low sidewall return grilles for optimum performance. For maximum throw column, see isovel below.

TYPICAL ISOVEL



NOTES: Test cell dimensions 12'x12'x9'. Tested with optional backpan.

TAD, TADSS Suggested Specification & Configuration

TAD, TADSS
The non-aspirating, radial displacement diffuser shall be a Krueger model TAD (aluminum) or TADSS (stainless steel) of the sizes shown on the plans or outlet schedule. The unit shall be configured to allow one of two means for providing uniform discharge flow over the face of the unit. These shall be either a factory backpan or a customer supplied HEPA filter.

The diffuser shall be capable of increasing the space particle removal rate, three times over laminar flow diffusers without increasing the supply air quantity, as determined by tests using laser particle count technology.

Provide for each diffuser, where required, a distribution plenum with internal spreading means and an inlet collar.

The diffuser shall have a flow measuring tap for ease of balancing.

The face of the diffuser shall have a free area not exceeding 15% to ensure true non-aspirating flow.

PERFORMANCE
The diffuser shall meet the following performance criteria: The air diffuser shall be tested for sound generation and pressure drop in accordance with the ANSI/ASHRAE 70. Room air velocities shall be determined in accordance with ASHRAE Standard 113.

STANDARD FINISH
The paint finish shall be #44 British White, powder coat paint, baked at 425°F. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 60 – 70%, pencil hardness per ASTM D3363-92A of H – 2H, crosshatch adhesion per ASTM D3359-83 of 5B, salt spray per ASTM B117-9048 of 1000 hours, humidity per ASTM D2247-92 of 1000 hours and conical mandrel per ASTM D522 of 1/8” conical bend, no cracking shows.

ANTIMICROBIAL FINISH
The paint finish shall be powder coat paint, baked at 425°F. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 55 – 65%, pencil hardness per ASTM D3363-92A of H – 2H, crosshatch adhesion per ASTM D3359-83 of 5B, salt spray per ASTM B117-9048 of 1000 hours, humidity per ASTM D2247-92 of 1000 hours and conical mandrel per ASTM D522 of 1/8” conical bend, no cracking shows.

1. **SERIES: (XXXXX)**
   TAD - Aluminum Total Air Diffuser
   TADSS - Stainless Steel Total Air Diffuser

2. **DISCHARGE AIR PATTERN: (X)**
   1 - 1-Way
   2 - 2-Way

3. **PANEL: (XX)x(XX)**
   12”x48” *
   24”x24”
   24”x48”

4. **FINISH: (XX)**
   01 - Mill
   10 - Alumican
   35 - Black
   44 - British White

Backpan is not included with models TAD and TADSS; it must be ordered separately.

** Only available on 1-way discharge air pattern.*

SAMPLE CONFIGURATION: TAD - 2 - 24x48 - 44

TAD Backpan Suggested Specification & Configuration

1. **SERIES: (XXX XXXXXXX)**
   TAD Backpan - Total Air Diffuser Backpan

2. **INLET: (XX)**
   8" - For 12"x48" or 24"x24" Panel Sizes
   10" - For 24"x48" Panel Size
   12" - For 24"x48" Panel Size

3. **PANEL: (XX)x(XX)**
   12"x48"
   24"x24"
   24"x48"

4. **CONSTRUCTION: (X)**
   1 - Steel
   2 - Aluminum
   3 - Stainless Steel

5. **FINISH: (XX)**
   01 - Mill
   10 - Alumican
   35 - Black
   44 - British White

Backpan is required with models TAD and TADSS unless it is mounted on HEPA filter (by others). Backpan is not required with models TADHF or TADSSHF. For volume regulation, use manually adjustable upstream damper.

TAD BACKPAN

Provide where indicated on the drawings, a Krueger Model TAD Backpan designed for the non-aspirating, radial displacement diffusers (TAD/TADSS). The diffuser backpan shall be optimized and sized to provide correct airflow into the diffuser and shall have a 43% free area baffle screen to ensure airflow is equalized over the entire face of the diffuser. The diffuser backpan shall have a hanger tab at all four corners to permit its attachment to the overhead structure. The backpan shall be replaceable separately from the diffuser and be available with optional foam gasket to seal between the backpan and the diffuser. The backpan shall be available in steel, stainless steel or aluminum.

PERFORMANCE

The manufacturer shall provide published performance data for the diffuser in printed or electronic format. The diffuser shall be tested in accordance to the data standards at the time of product introduction or ANSI/ASHRAE Standard 70.

STANDARD FINISH

The paint finish shall be #44 British White, powder coat paint, baked at 425°F. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 60 – 70%, pencil hardness per ASTM D3363-92A of H – 2H, crosshatch adhesion per ASTM D3359-83 of 5B, salt spray per ASTM B117-9048 of 1000 hours, humidity per ASTM D2247-92 of 1000 hours and conical mandrel per ASTM D522 of 1/8" conical bend, no cracking shows.

ANTIMICROBIAL FINISH

The paint finish shall be powder coat paint, baked at 425°F. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 55 – 65%, pencil hardness per ASTM D3363-92A of H – 2H, crosshatch adhesion per ASTM D3359-83 of 5B, salt spray per ASTM B117-9048 of 1000 hours, humidity per ASTM D2247-92 of 1000 hours and conical mandrel per ASTM D522 of 1/8" conical bend, no cracking shows.

SAMPLE CONFIGURATION: TAD BACKPAN - 12 - 24x48 - 2 - 44

TADHF, TADSSHF Suggested Specification & Configuration

TADHF, TADSSHF
The non-aspirating, radial displacement diffuser designed to be fitted with a HEPA filter shall be a Krueger model TADHF of the sizes shown on the plans or outlet schedule.

The diffuser shall be of such a design to permit the HEPA filter, by others, to be removed from, or installed into, the backpan on an unobstructed path without the need to have access above the ceiling. The backpan shall also permit the seal on the HEPA filter to be the gel pocket type.

The diffuser shall be capable of increasing the space particle count removal rate three times of a laminar flow diffuser of the same rated capacity as determined by tests using laser particle count technology.

The diffuser backpan shall be optimized and sized to provide correct airflow into HEPA filter.

The diffuser backpan shall have a hanger tab at all four corners to permit its attachment to the overhead structure.

The face of the diffuser shall be completely removable for sanitizing. The face shall be secured with quarter turn fasteners and shall have safety cables to prevent its accidental dropping during removal of the face.

The face of the diffuser shall have a free area not exceeding 15% to ensure true non-aspirating flow.

PERFORMANCE
The diffuser shall be tested for sound generation and pressure drop in accordance with ANSI/ASHRAE Standard 70. The diffuser shall be tested for room air velocities in accordance with ASHRAE Standard 113. The manufacturer shall be able to provide published performance data in printed or electronic format.

STANDARD FINISH
The paint finish shall be #44 British White, powder coat paint, baked at 425°F. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 60 – 70%, pencil hardness per ASTM D3363-92A of H – 2H, crosshatch adhesion per ASTM D3359-83 of 5B, salt spray per ASTM B117-9048 of 1000 hours, humidity per ASTM D2247-92 of 1000 hours and conical mandrel per ASTM D522 of 1/8" conical bend, no cracking shows.

ANTIMICROBIAL FINISH
The paint finish shall be powder coat paint, baked at 425°F. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 55 – 65%, pencil hardness per ASTM D3363-92A of H – 2H, crosshatch adhesion per ASTM D3359-83 of 5B, salt spray per ASTM B117-9048 of 1000 hours, humidity per ASTM D2247-92 of 1000 hours and conical mandrel per ASTM D522 of 1/8" conical bend, no cracking shows.

1. SERIES: (XXXXXXX)
TADHF - Aluminum Total Air Diffuser
Includes HEPA Filter Brackets and Compatible Backpan
TADSSHF - Stainless Steel Total Air Diffuser
Includes HEPA Filter Brackets and Compatible Backpan

2. DISCHARGE AIR PATTERN: (X)
1 - 1-Way (90˚)
2 - 2-Way (180˚)

3. INLET: (XX)
8" - For 24"x24" Panel Size
10" - For 24"x48" Panel Size
12" - For 24"x48" Panel Size

4. PANEL: (XX)x(XX)
24"x24"
24"x48"

5. FINISH: (XX)
01 - Mill
10 - Alumican
35 - Black
44 - British White

HEPA filter provided by others.

SAMPLE CONFIGURATION: TADSSHF - 2 - 10 - 24x48 - 35