



INDUSTRIAL PROCESS AND  
COMMERCIAL VENTILATION SYSTEMS

# AXIFAN VANEAXIAL FANS

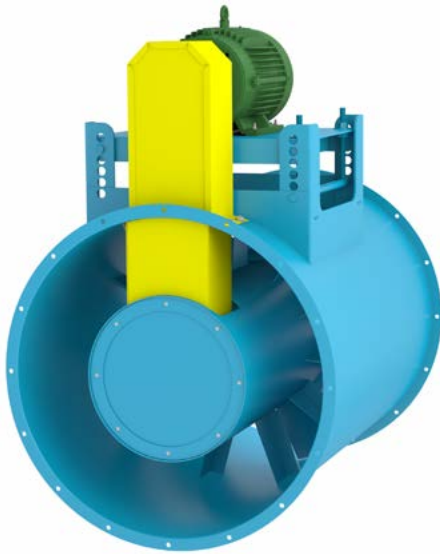
TCVS | TCVSSH



# VANEAXIAL FANS



Model TCVS



## Overview

### TCVS | TCVSSH

For applications requiring extensive corrosion resistance or operation at higher temperatures than standard, the Arrangement 9 Model TCVS AXIFAN is the perfect choice. Standard construction is good for operation to 200°F; fans can be customized to handle up to 500°F. Steel construction is standard, all stainless steel construction is available. Driven by either a fixed or adjustable V-belt drive system, the exact point of rating can be achieved. A future change in rating can be accomplished through a simple sheave change.

#### Typical Applications Include

Data Center Exhaust, General HVAC, Generator Room Ventilation, Swimming Pool Exhaust, Kitchen Exhaust, Dishwasher Exhaust, Elevator Shaft Exhaust/Pressurization, Emergency Smoke Exhaust, Stairwell Pressurization

#### Configurations

Vertical and Horizontal Mount

#### Impeller Type

Steel

#### Optional Construction

Clamshell Construction, Swingout Construction, AMCA Type C Spark Resistant, Stainless Steel Construction

#### Certifications

UL 705 Listed for Electrical, UL Listed for Smoke Control Systems

#### Model Nomenclature

Model TCVS AXIFAN Arrangement 9 model numbers are represented as follows. Refer to the "Hub-To-Tip Ratio" section on page 4 for an explanation of hub-to-tip ratios.

36 B 6

Approximation of Hub-To-Tip Ratio  
Where: 3 ≅ 40%, 4 ≅ 43%, 5 = 50%  
6 ≅ 57%, 7 ≅ 66%

B = Belt Driven (Arr. 9)

Fan Diameter (inches)

Model TCVS is available with the UL/cUL 705 listing for electrical, File No. E158680.



Model TCVSSH is UL/cUL listed for Smoke Control Systems as standard, File No. MH-29313, 500°F for 4 hours and 1000°F for 15 minutes.



For complete product performance, drawings and available accessories, download our Fan Selector software at [tcf.com](http://tcf.com).

## Overview

### TCVS | TCVSSH

#### General HVAC Fans

##### **Model TCVS**

The TCVS Vaneaxial Fan is designed for highly corrosive environments and high temperature applications where an aluminum impeller is not suitable. Standard construction can accommodate operation to 200°F (93°C) and can be customized to handle up to 500°F (260°C). Steel construction is standard on this unit and is also available in stainless steel.

The TCVS's steel impellers are manufactured with a spun steel hub. Steel blades are welded to the hub and can be attached at precise angles ranging from 30° to 50°.

##### **Sizes and Performance**

12" to 54" impeller diameters  
Airflow to 80,000 CFM  
Static pressure to 4" w.g.



#### Smoke & Heat Applications

##### **Model TCVSSH**

The TCVSSH Vaneaxial Fan is designed to remove smoke from buildings in the event of a fire. The TCVSSH units are UL listed for Smoke Control Systems - 500°F (260°C) for 4 hours and 1000°F (537°C) for 15 minutes.

##### **Sizes and Performance**

12" to 54" impeller diameters  
Airflow to 80,000 CFM  
Static pressure to 4" w.g.



Hotel Elevator and Conference Room Application



## Energy Regulations

Twin City Fan & Blower supports energy efficiency regulations enacted by the U.S. Department of Energy (DOE) and specific states. The selection and application of fan products is a significant part of these regulations. Engineers and specifiers must understand how to apply TCF products to their specific applications to meet applicable DOE and state regulatory requirements. Twin City Fan & Blower has made significant investments in product testing and development to provide efficient products. Developments in Twin City Fan & Blower's Fan Selector software are in place to aid your decision in product selection to assist with meeting the efficiency requirements as stipulated in the applicable regulations.



## Housing

Fan housings are constructed of continuously-welded, heavy-gauge steel for strength and rigidity. Flanges on both the inlet and outlet are integrally rolled and punched for attachment to ductwork or accessories.

## Shafts

Fan shafts are ground and polished 1045 steel sized to allow the rotating assembly to operate a minimum of 43% below the first critical speed.

## Bearings

Cast iron, re-greasable flange mounted ball or roller type bearings have a minimum L-10 life of 40,000 hours. This is equivalent to an average life of 200,000 hours. Extended lubrication lines terminate at the housing exterior.

## Drive Isolated from Airstream

The shaft and bearing assembly is mounted within the inner cylinder to isolate these components from the high velocity airstream. The V-belt drive assembly is extended through a two-piece belt fairing. The belt fairing is an aerodynamically designed tube, designed to maximize fan efficiency, minimize air blockage and reduce noise generation.

## Motors

A variety of single- and three-phase motors is available in open drip-proof (ODP), explosion-proof (EXP) and totally enclosed fan cooled (TEFC) enclosures. An adjustable mounting platform pivots to allow infinite belt tension adjustment.

## Hub-to-Tip Ratio

AXIFAN impellers are manufactured from one of four hub sizes. Hubs are machined and cut to the specified diameter for a job. Blades are die-formed stamped steel and custom cut to their specified size. Fabricating impellers from custom sized blades and hubs allows the creation of impellers with an infinite range of hub-to-tip ratios. Since each hub-to-tip ratio has a slightly different pressure/efficiency characteristic, the freedom of having several impellers with different hub-to-tip ratios for a set diameter allows maximum efficiency at the required point of rating. For additional hub-to-tip ratios refer to the Twin City Fan & Blower Fan Selector Software.

## Guide Vanes

Model TCVS vaneaxial fans are fitted with straightening guide vanes. The vanes are aerodynamically placed within the housing on the discharge side of the impeller. Vanes are stationary and welded to both the inner and outer cylinders. The straightening effect of the vanes aids in minimizing turbulence downstream from the fan thereby recovering rotative energy imparted to the air by the impeller.

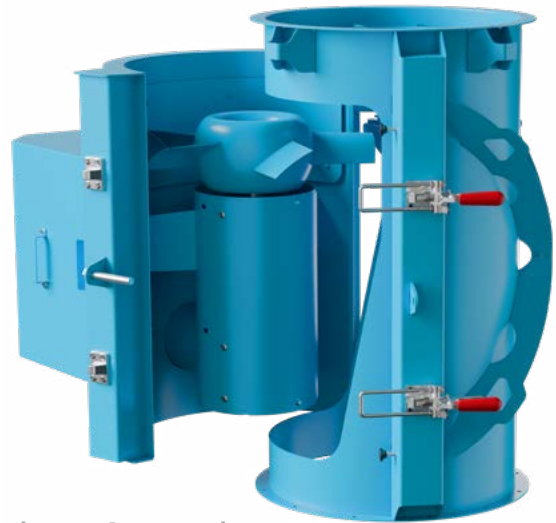
## AXIFAN Steel Impeller

AXIFAN steel impellers are manufactured with a spun steel hub. Steel blades are welded to the hub and can be attached at precise angles ranging from 30° to 50°. This ability to customize blade angles provides the highest efficiency for a given performance.



## Swingout Construction

Swingout construction provides easy access to the fan for cleaning and general maintenance without removing it from the ductwork. When quickopen clamp latches are released, the door swings out on heavy-duty hinges to provide out of the airstream access to the impeller for cleaning. For additional access to the shaft and bearings, a split inner cylinder is provided. Available in sizes 21-60. See dimensional data on page 13 for motor frame size limits.



Swingout Construction

## Clamshell Construction

Clamshell construction is ideal for applications that need regular cleaning. Depending on the size, one door (sizes 18-36) or two doors (sizes 42-60) are secured with quick access latches. These doors open outward and allow access to the internal components of the fan. As standard, there is an access door on the inner cylinder, allowing easy access to clean around the bearings. It is essential to follow proper safety precautions during cleaning. If bearing, shaft or impeller replacement is required, the fan should be removed from the ductwork or roof to facilitate safe replacement of parts. If replacement of these parts while ducted or on the roof is required, it is recommended to use swingout construction.



Clamshell Construction

## Roof Ventilator Package

The TCVS roof ventilator package provides excellent, cost-effective, general purpose ventilation for both industrial and commercial applications. The roof ventilator package is available in multiple configurations providing a versatile solution for any application. Fitting the TCVS with a stack cap makes this a powerful roof exhaust fan. When fitted with a heavy-duty hood and optional filter, the TCVS will make an ideal supply roof ventilator.

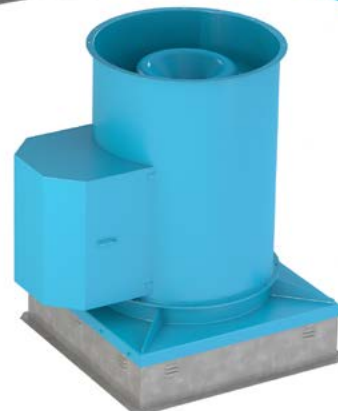
## High Moisture Modification

A shaft seal and added gaskets to the bearing housing protect the rotor assembly from damage due to moisture ingress. Ideal for steam and high humidity applications

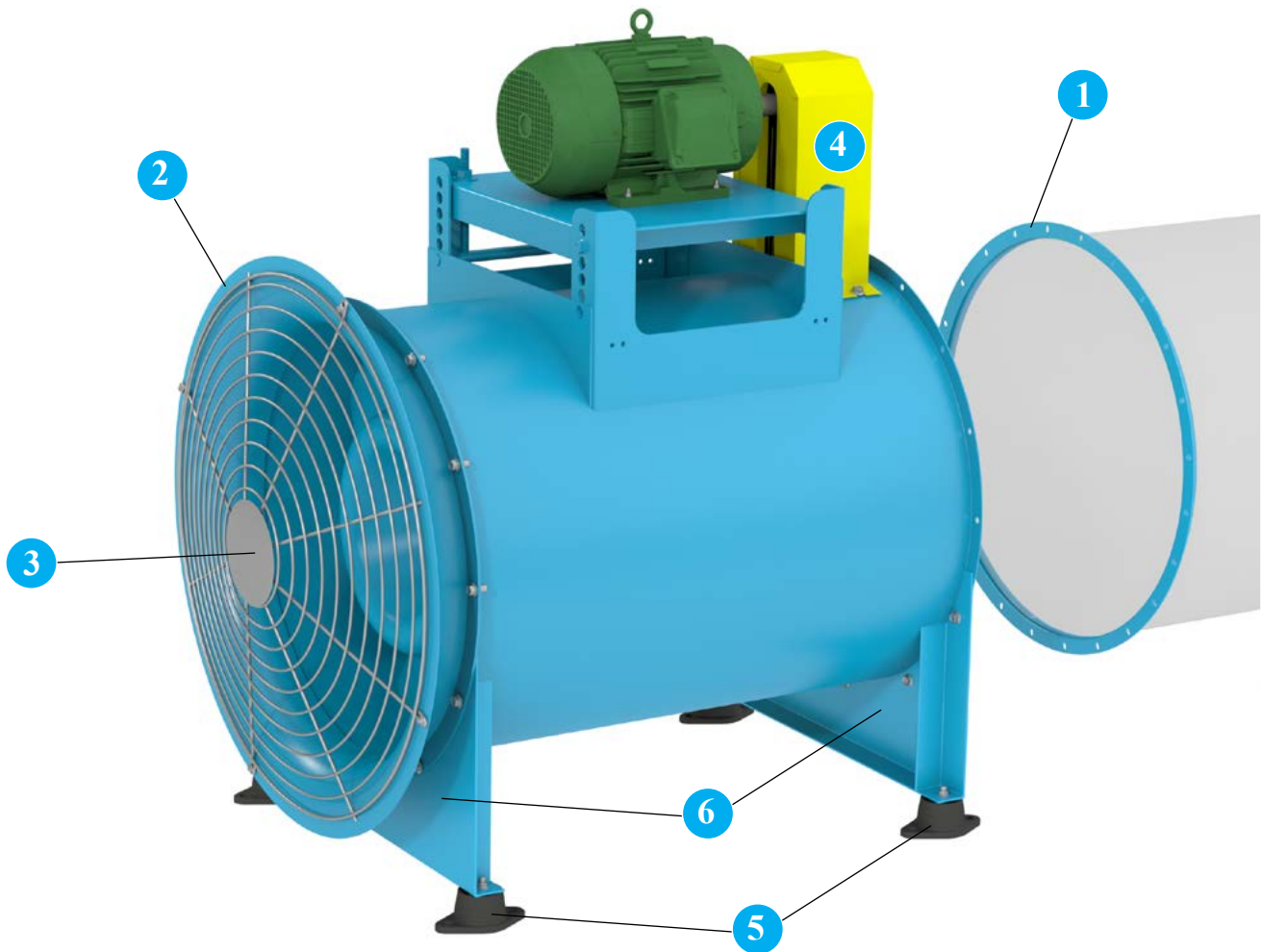


## Other Optional Construction

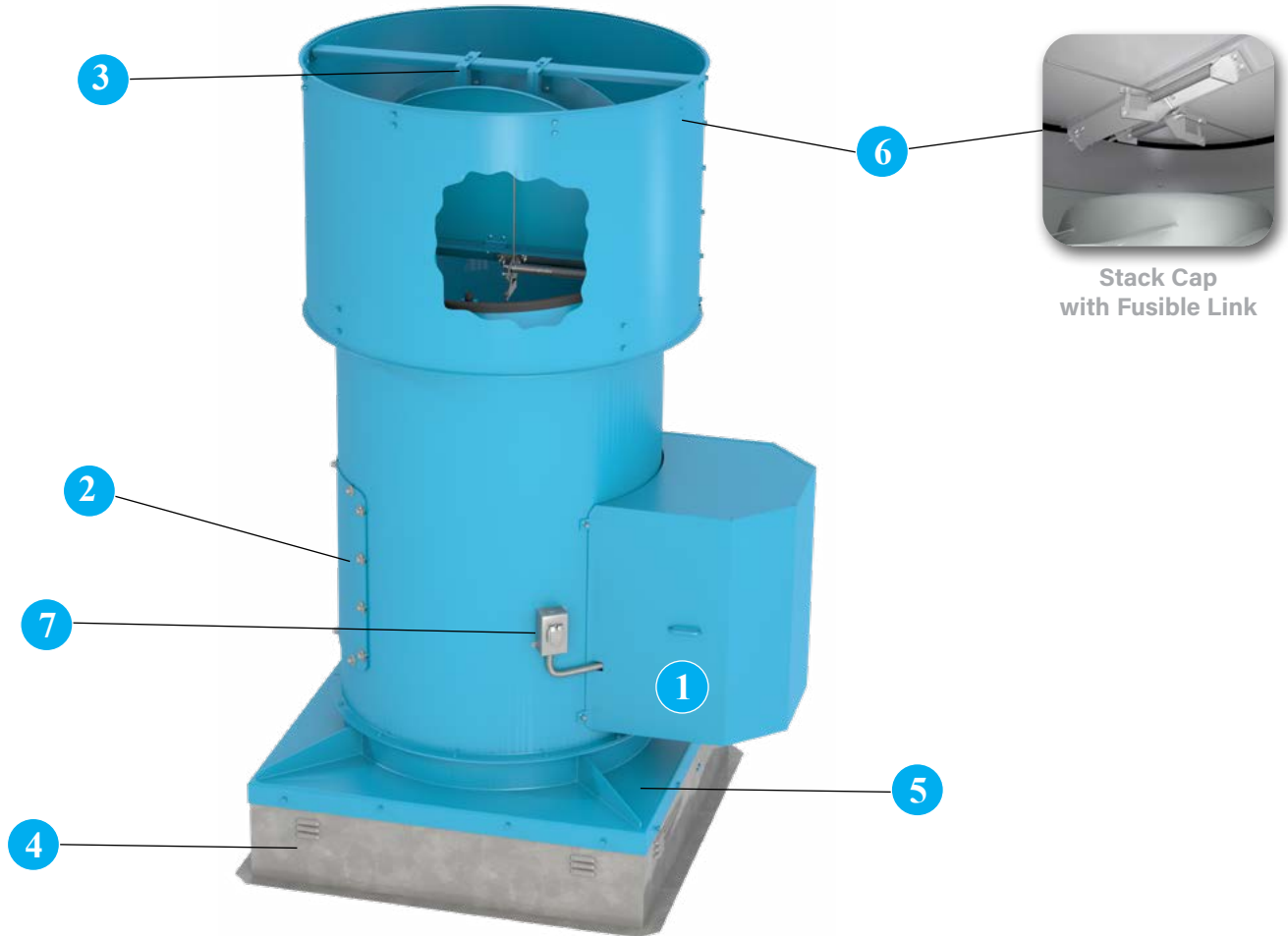
- High Temperature
- AMCA Type C Spark Resistant



Roof Ventilator Package



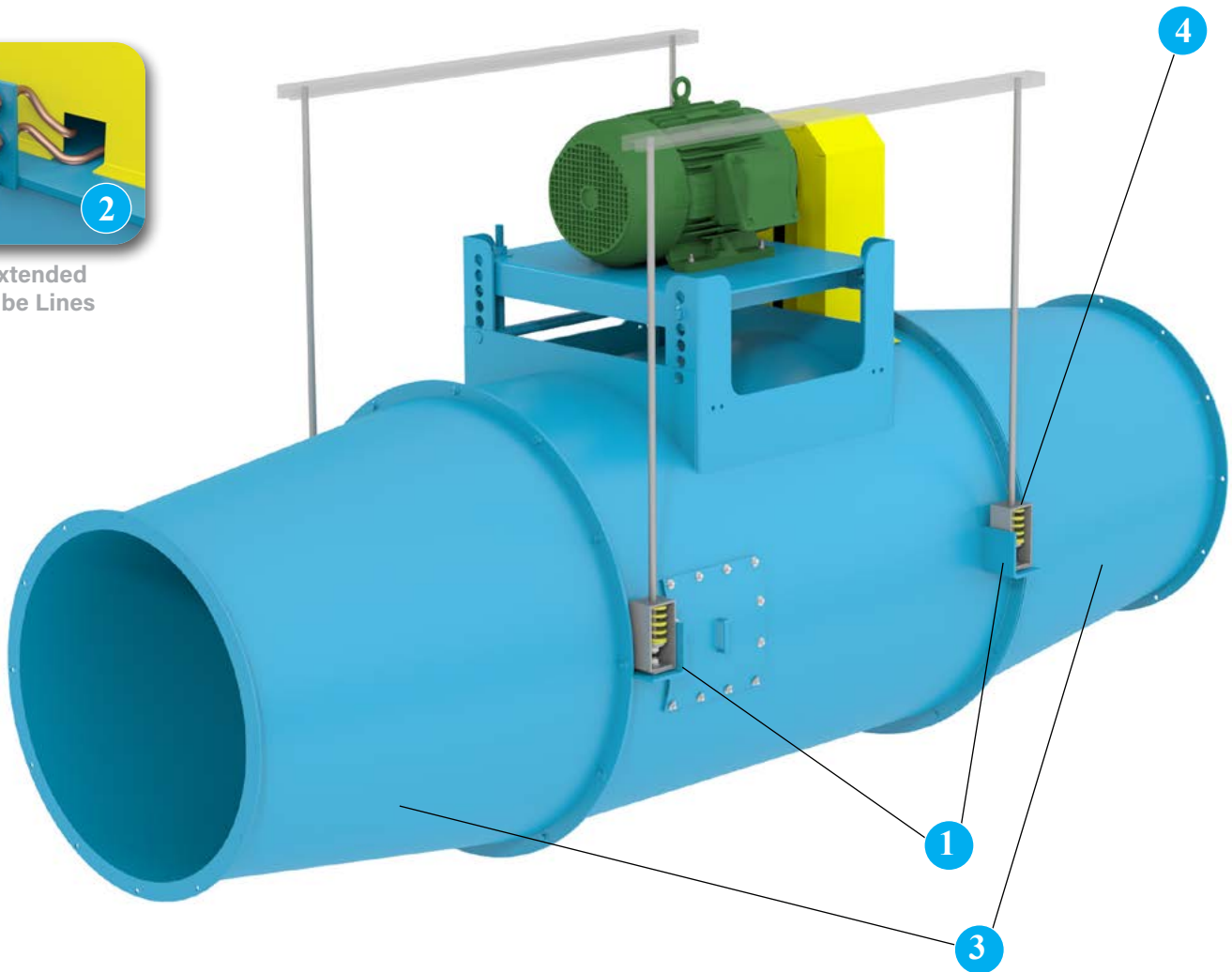
- 1 Companion Flanges** For ease of installation of adjacent ductwork, companion flanges can be provided. Flanges are rolled angle rings, drilled to match the fan's inlet or outlet flange.
- 2 Inlet Bell** An inlet bell is recommended to minimize entrance losses for installations where the inlet of the fan is nonducted. Inlet bell is flanged and punched to mate up with the standard flanged inlet.
- 3 Inlet/Outlet Screens** Safety screening can be provided for installation in the fan inlet or outlet.
- 4 Belt Guard** For Arrangement 9 belt driven fans, the belt guard encloses the motor sheave and V-belts. The guard is easily removable for inspection and maintenance.
- 5 Vibration Isolators Floor Mount** Rubber-in-shear type vibration isolation mounts are available to damper vibration and noise transmission in floor mounted installations. Also available in spring type construction.
- 6 Support Legs** For horizontal flow with floor mounting, support legs are welded to the fan flange with bolt holes aligned for connection of ductwork.



- 1 Weather Cover** For outdoor installations, the weather cover completely encloses the motor and V-belt drive from the elements and is provided with slots for ventilation. Weather covers are available for either horizontal or vertical flow fans. Standard accessory on vertical roof mounted configuration.
- 2 Bolted Access Door** Bolted access door allows for inspection and maintenance of internal fan components. Provided as standard.
- 3 Magnetic Damper Latches** Magnetic latches are available to hold stack cap butterfly dampers closed when not in operation.
- 4 Vented Roof Curb** Self-flashing style curbs with ventilation louvers allow ambient air in to cool and dilute grease- or smoke-laden airstreams.
- 5 Curb Cap** Attached to the fan's inlet flange for curb mounting. Standard accessory on vertical roof mounted configuration.
- 6 Stack Cap w/ Fusible Link** Units can be provided with a stack cap for rooftop mounting. Stack caps are designed for vertical discharge with butterfly type dampers to seal out the weather when the fan is shut off and minimal flow obstruction when the fan is operating. Butterfly dampers open with airflow (see *Stack Cap Limits* table on page 12). Stack caps meet snow load tests set forth by UL, IRI and SBCCI. Stack caps meet UL 793 requirements, providing a fusible link and spring assembly that forces the discharge butterfly dampers open when the fuse melts at 165°F. This provides gravity ventilation in case electricity to the ventilator is interrupted in a fire.
- 7 NEMA 3R Disconnect Switch** Disconnect switches offer superior environmental protection. From waterproofing to hazardous environments, know that you and your equipment are safe. Positive electrical shutoff during fan cleaning or maintenance provides additional safety and peace of mind. For more information about disconnect switches, see page 11.



Extended Lube Lines



**1 Suspension Clips** For horizontal flow with ceiling mounting, four clips of formed angle are welded to the fan housing for suspension via tie rods to the ceiling support structure.

**2 Extended Lube Lines** Allow for easy lubrication of bearings on belt driven units without disassembly by extending polyethylene lines from fan bearings to exterior of the guard.

**3 Inlet/Outlet Transition Cone** A round-to-round transition bolted to the inlet or discharge flange of the fan housing provides a smooth connection of the fan to larger or smaller ductwork. Cones are flanged on both ends and drilled to mate with the fan's flange. Cones are available with an access door if required. Outlet cones can be utilized to affect performance and transform velocity pressure into static pressure.

**4 Vibration Isolators** Spring type vibration isolation mounts are available to dampen vibration and noise transmission in floor mounted installations. Also available in rubber-in-shear type construction.

### Other Accessories Include:

- Minimum 2-Groove Drive
- Support Legs (Vertical)
- Shaft Seal

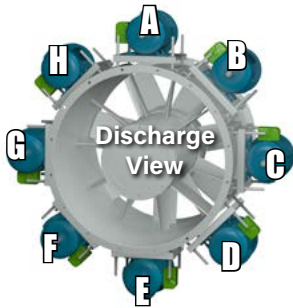


## Horizontal Construction

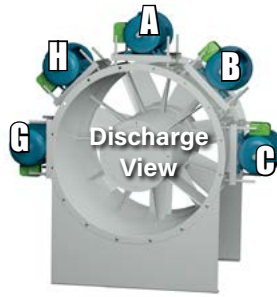
**Horizontal Base Mounted (HBM)** — Support legs are provided at each end of the fan for floor mounting.

**Horizontal Ceiling Hung (HCH)** — For duct mounted fans, four suspension clips are welded to the fan casing to allow ceiling suspension using rod hangers.

**Horizontal (HOR)** — For mounting configurations where support legs and suspension clips are not required.



**HCH**  
Horizontal  
Ceiling Hung



**HBM**  
Horizontal Base  
Mounted



**HOR**  
Horizontal  
Flange Mounted

## Vertical Construction

**Floor or Ceiling Mounted (VUI/VUO/VDI/VDO)** — Four vertical brackets are welded to either end of the fan housing. Bracket location is determined by airflow direction and support details (see below).

**Roof Mounted (VRM)** — A curb cap provides weathertight seal for roof curb mounted fans. A stack cap and weather cover are also available for the upblast style roof ventilator.

**Vertical (VUN/VDN)** — For mounting configurations where support brackets are not required.



**VUS**  
Vertical Upblast  
with Stack Cap



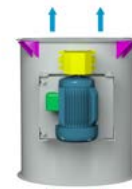
**VUH**  
Vertical Upblast  
with Hood and  
Curb Cap



**VDH**  
Vertical Downblast  
with Hood and Curb  
Cap



**VUI**  
Vertical Discharge Up,  
Floor Mount Support  
Brackets On Inlet



**VUO**  
Vertical Discharge Up,  
Ceiling Hung Support  
Brackets On Outlet



**VUN**  
Vertical Up  
No Brackets



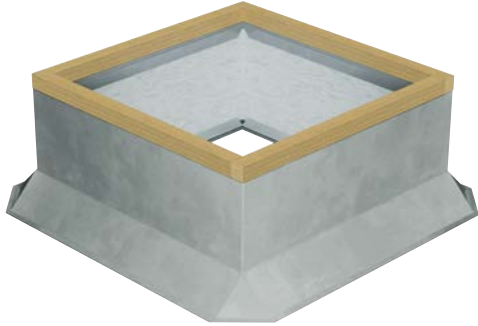
**VDI**  
Vertical Discharge Down,  
Ceiling Hung Support  
Brackets On Inlet



**VDO**  
Vertical Discharge Down, Floor  
Mount Support  
Brackets On Outlet



**VDN**  
Vertical Down  
No Brackets



## Canted Roof Curbs

- Constructed of galvanized steel with continuously-welded seams
- Large 3" built-in 45° cant to accommodate roofing material to top of curb. Cant is beveled at corners for better support of roofing material
- Wood nailer (1 1/2") secured to top ledge
- Lined with 1 1/2" fiberglass fire-resistant, sound-absorbing insulation
- Damper shelf standard
- Options: Aluminum construction, burglar security bars, metal liner (galvanized or aluminum), special heights up to 24"



## Self-Flashing & Straight-Sided Roof Curbs

- Constructed of galvanized steel with continuously-welded seams
- Wide base plate (flashing) to ensure watertight seal to roof
- Top ledge covered with 3/16" polystyrene gasket (self-flashing) for weather seal and to reduce metal-to-metal conducted noise
- Wood nailer secured to top ledge (straight-sided)
- Lined with 1 1/2" fiberglass fire-resistant, sound-absorbing insulation
- Damper shelf standard
- Straight-sided roof curbs are constructed with the same features as the self-flashing curbs, but are one dimensional to allow for field supplied cants and roofing material to be brought up to the top of the curb
- Options: Aluminum construction, burglar security bars, metal liner (galvanized or aluminum), special heights up to 24", single- or double-pitched curbs for sloping roofs



## Self-Flashing Vented Roof Curbs

### For High Temperature Applications

- Completely assembled unit, easier to install and less expensive than a field constructed curb
- Constructed of galvanized steel with continuously-welded seams and wide base flashing for watertight seal to roof
- Meets NFPA-96 code requirements
- Top ledge covered with 3/16" polystyrene gasket
- Furnished with ventilation slots



## Curb Adapters

- Constructed of galvanized steel with continuously-welded seams
- Top ledge covered with 3/16" polystyrene gasket to reduce metal-to-metal conducted noise and act as a weather seal
- Available in enlarger or reducer (shown) models

Disconnect switches provide positive electrical shutoff during fan cleaning or maintenance.

### **NEMA 1 Disconnect Switch**

A NEMA 1 disconnect switch is available shipped loose for field mounting and wiring or factory mounted and wired with ODP or TEFC motors. For indoor applications.



NEMA 1  
Disconnect Switch



NEMA 3R  
Disconnect Switch

### **NEMA 3R Disconnect Switch**

A NEMA 3R, rain proof, disconnect is available shipped loose for field mounting and wiring or factory mounted and wired externally.

### **NEMA 4 Disconnect Switch**

A NEMA 4, water and dust tight, disconnect is available shipped loose for field mounting and wiring or factory mounted and wired externally.



NEMA 4  
Disconnect Switch

### **NEMA 7/9 Disconnect Switch**

A NEMA 7/9 disconnect switch is recommended on fans with explosion proof motors. The NEMA 7/9 switch is designed for use with fans operating in hazardous environments. Available shipped loose for field mounting and wiring. (Not shown.)



## INSTALLATION PHOTOS



Refinery Vapor Dispersion



Exhaust for Digester  
Gas Compressor Facility



Air Compressor Heat Exhaust Fans

## Bare Fan Weights (lb)

FAN MODEL	12B7	15B6	18B5	21B6	24B5	28B6	30B4	32B5	36B6	42B3	48B4	54B3
TCVS	76	95	109	170	215	251	318	409	692	655	1004	1089

## Accessory Weights (lb)

FAN SIZE	BELT GUARD	WEATHER COVER	INLET/ OUTLET SCREEN	INLET BELL	INLET/ OUTLET CONE	COMPANION FLANGE	SUPPORT LEGS		STACK CAP	CURB CAP
							HORIZ. FLOW	VERT. FLOW		
12	4	7	3	8	9	5	10	10	30	15
15	6	11	3	10	11	8	12	10	40	16
18	8	18	4	12	16	10	12	10	55	17
21	10	21	5	13	21	11	20	10	65	23
24	11	23	7	20	30	13	24	17	78	26
28	12	26	8	22	40	15	32	17	98	34
30	13	29	9	24	48	16	40	17	110	40
32	14	32	10	25	54	17	47	17	120	45
36	16	34	11	52	82	19	58	17	165	51
42	18	40	13	62	100	25	83	19	230	64
48	21	45	18	70	114	33	97	19	288	72
54	25	56	24	76	128	37	126	26	384	82

## Motor Weights (lb)

FRAME	48	56	143T	145T	182T	184T	213T	215T	254T
ODP	7	11	33	44	71	82	124	144	185
TE	9	14	40	53	85	98	149	173	222

FRAME	256T	284T	286T	324T	326T	364T	365T
ODP	214	266	310	404	452	620	680
TE	257	319	372	485	542	744	816

## Housing Gauges

FAN SIZE	HOUSING GAUGE
12	14
15	12
18	12
21	12
24	10
28	10
30	10
32	10
36	10
42	7
48	7
54	7

## Stack Cap Limits

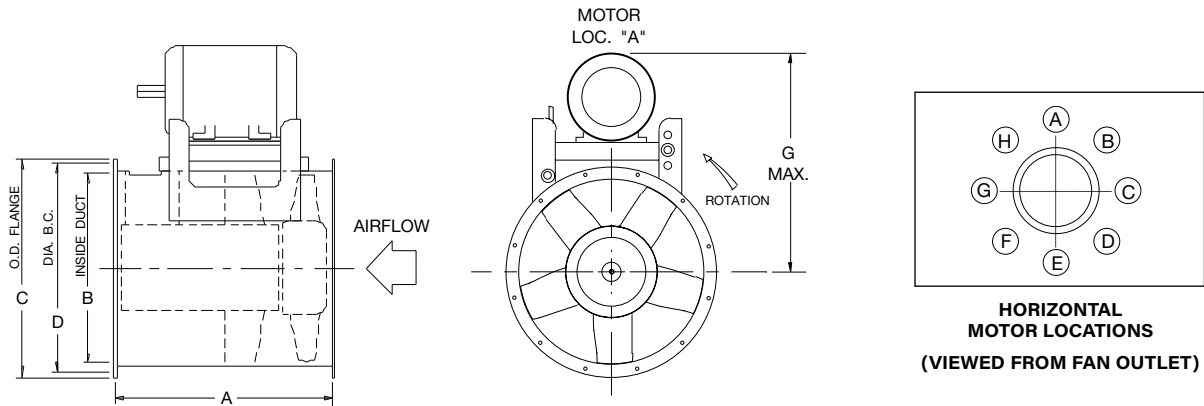
FAN SIZE	MINIMUM CFM TO OPEN		MAXIMUM CFM*
	STAINLESS	ALUMINUM	
12	1372	1049	2502
15	2132	1630	3887
18	3058	2339	5577
21	4163	3184	7592
24	5426	4150	9895
28	7400	5659	13494
30	8449	6461	15407
32	9644	7375	17586
36	12184	9317	22218
42	16650	12732	30361
48	21709	16601	39587
54	27404	20956	49972

**NOTE:** The terminal velocity of rain is approximately 2,000 feet per minute. Selections below this point are not recommended if rain entry into the building is a concern.

\* Ask about our extra heavy-duty stack cap if your CFM exceeds the maximum CFM.



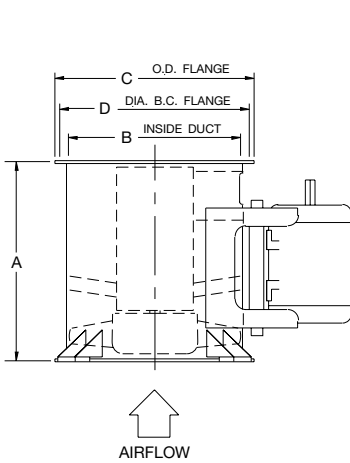
TCVS



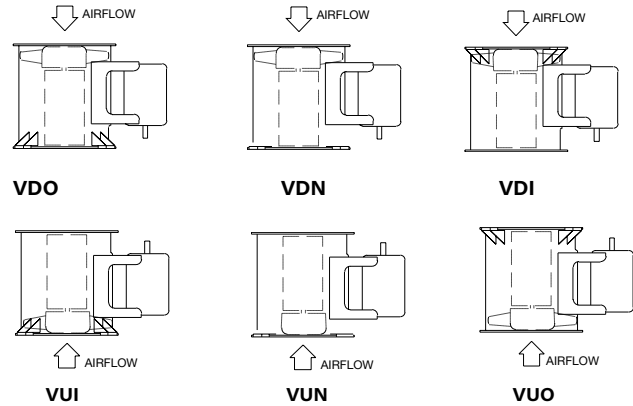
ARR. 9 - HORIZONTAL

HORIZONTAL DISCHARGES

HOR = Horizontal - No Clips or Legs    HCH = Horizontal Ceiling Hung with Suspension Clips    HBM = Horizontal Base Mounted with Support Legs



ARR. 9 - VERTICAL



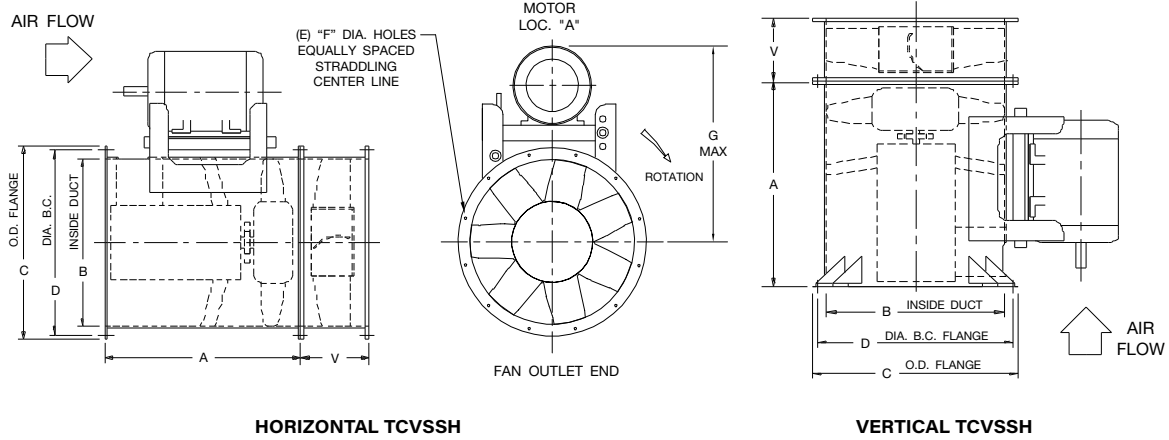
VERTICAL DISCHARGES

VDO = Vertical Down Floor Mounted With Legs    VUI = Vertical Up Floor Mounted With Legs  
 VDN = Vertical Down Discharge Without Legs    VUN = Vertical Up Discharge Without Legs  
 VDI = Vertical Down Ceiling Hung With Legs    VUO = Vertical Up Ceiling Hung With Legs

FAN SIZE	A		B	C	D	G (MAX.)	MAXIMUM MOTOR FRAME	SWINGOUT MAX MOTOR FRAME
	3-5	6-7						
12	NA	24.50	12.16	15.16	13.88	19.25	184T	—
15	NA	27.00	15.16	18.16	16.88	20.50	215T	—
18	24.50	28.00	18.16	21.16	19.88	27.50	215T	—
21	27.00	32.00	21.19	24.19	22.88	31.75	256T	256T
24	28.00	36.25	24.19	27.19	25.88	34.50	256T	256T
28	32.00	40.25	28.25	31.25	30.00	38.25	286T	286T
30	36.25	NA	30.25	33.25	32.00	39.75	286T	286T
32	36.25	47.00	32.25	35.25	34.00	41.00	286T	286T
36	40.25	53.25	36.25	39.25	38.00	45.25	326T	326T
42	47.00	NA	42.38	46.38	44.63	49.50	326T	326T
48	53.25	NA	48.38	52.38	50.63	53.25	365T	365T
54	53.25	NA	54.38	58.38	56.63	59.00	365T	365T

14685A  
14688A

DIMENSIONS ARE NOT TO BE USED FOR CONSTRUCTION. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.



HORIZONTAL TCVSSH

VERTICAL TCVSSH

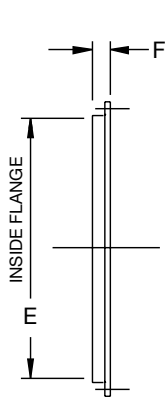
FAN SIZE	A		B	C	D	F	G (MAX.)	V		MAXIMUM MOTOR FRAME
	HUB RATIO							3-5	6-7	
	3-5	6-7								
12	NA	28.75	12.16	15.38	13.88	0.56	19.25	NA	10.50	184T
15	NA	28.75	15.16	18.38	16.88	0.56	20.50	NA	10.50	215T
18	28.75	33.75	18.16	21.16	19.88	0.56	27.50	10.50	10.50	215T
21	28.75	33.75	21.19	24.19	22.88	0.56	31.75	10.50	10.50	256T
24	33.75	42.00	24.19	27.19	25.88	0.56	34.50	10.50	10.50	256T
28	33.75	42.00	28.25	31.25	30.00	0.56	38.25	10.50	10.50	286T
30	42.00	NA	30.25	33.25	32.00	0.56	39.75	10.50	NA	286T
32	42.00	56.25	32.25	35.25	34.00	0.56	41.00	10.50	10.50	286T
36	42.00	56.25	36.25	39.25	38.00	0.56	45.25	10.50	10.50	326T
42	56.25	NA	42.38	46.38	44.63	0.69	49.50	10.50	NA	326T
48	56.25	NA	48.38	52.38	50.63	0.69	53.25	10.50	NA	365T
54	56.25	NA	54.38	58.38	56.63	0.69	59.00	10.50	NA	365T

1003106 1003108  
1003107 1003109

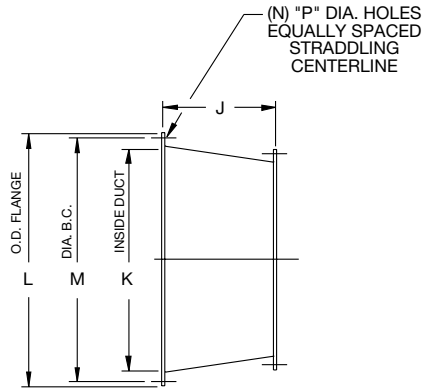
DIMENSIONS ARE NOT TO BE USED FOR CONSTRUCTION. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.



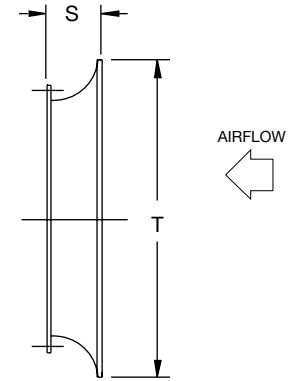
Accessories



COMPANION FLANGE



CONE



INLET BELL

FAN SIZE	COMPANION FLANGE		CONE						INLET BELL		FAN AREA (FT <sup>2</sup> )	CONE AREA (FT <sup>2</sup> )
	E	F	J	K	L	M	N	P	S	T		
12	12.16	1.50	8.50	15.16	18.44	16.88	8	0.44	2.52	15.19	0.81	1.25
15	15.16	1.50	8.50	18.16	21.44	19.88	8	0.44	3.12	19.77	1.25	1.80
18	18.16	1.50	8.50	21.19	24.50	22.88	8	0.44	3.71	23.72	1.80	2.45
21	21.19	1.50	8.50	24.19	27.50	25.88	12	0.44	4.31	27.67	2.45	3.19
24	24.19	1.50	11.50	28.25	31.56	30.00	12	0.44	4.96	31.63	3.19	4.35
28	28.25	1.50	11.50	32.25	35.56	34.00	12	0.44	5.75	36.90	4.35	5.67
30	30.25	1.50	17.00	36.25	39.56	34.00	12	0.44	NA	NA	4.99	7.17
32	32.25	1.50	11.50	36.25	39.56	38.00	12	0.44	6.54	42.17	5.67	7.17
36	36.25	1.50	17.00	42.38	46.81	44.63	16	0.56	7.39	47.44	7.17	9.80
42	42.38	2.00	17.00	48.38	52.81	50.63	16	0.56	8.59	55.34	9.80	12.77
48	48.38	2.00	17.00	54.38	58.69	56.63	16	0.56	9.76	63.25	12.77	16.13
54	54.38	2.00	17.00	60.38	64.94	63.38	20	0.56	10.98	71.16	16.13	19.88

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DIMENSIONS ARE NOT TO BE USED FOR CONSTRUCTION. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.





## Model TCVS

Fans shall be Model TCVS Vaneaxial, fixed pitch, steel AXIFAN impeller, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota. Fans shall be Arrangement 9, V-belt driven with the impeller mounted on a separate shaft and bearings supported completely within an enclosed tube isolated from the high velocity airstream.

**PERFORMANCE** — Fans shall be tested and rated in accordance with industry accepted test codes and shall be guaranteed by the manufacturer to deliver rated published performance levels. Model TCVS shall be available UL/CUL 705 listed.

**HOUSING** — Fan housings shall be welded of hot rolled steel. Inlet and outlet flanges are standard.

Housings shall be fitted with mounting legs, hanging clips or flange mounted as shown on the drawings. Fan mounting legs and clips shall be fabricated from minimum steel plate suitably braced to ensure stability and rigidity.

**GUIDE VANES** — On Model TCVS fans the housing shall be fitted with aerodynamically designed stationary straightening guide vanes on the air discharge side of the impeller. The guide vanes shall be welded to both the inner cylinder and the fan housing interior. Guide vanes function to aid in the elimination of swirl and turbulence downstream of the fan thereby recovering rotational energy losses, improving efficiency and static pressure capability, and reducing fan noise generation.

**IMPELLER** — The impeller shall be a fabrication consisting of die-formed stamped steel blades of single-surface airfoil shape welded to a spun steel central hub. Precise blade attachment shall be ensured through the use of welding jigs and fixtures. The ability to provide various factory-set blade angles ranging from 30° to 50° allows the highest possible latitude in selection and provides fan operation at the highest possible efficiency. All impellers are statically and dynamically balanced prior to assembly. Fans with motors and drives mounted by Twin City Fan & Blower are test run as a complete assembly and rechecked for balance at the specified operating speed.

**SHAFT** — Shafts shall be AISI 1045 hot rolled steel, accurately turned, ground, polished and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

**BEARINGS** — Bearings shall be heavy-duty, grease lubricated, anti-friction flange ball or roller, self-aligning, pillow block type and selected for a minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM. All bearings shall be provided with pre-filled factory extended lubrication lines terminating at the housing exterior to facilitate bearing relubrication without gaining access inside the ductwork.

**DRIVE** — The fan shall be equipped with a (fixed/adjustable) pitch V-belt drive selected to operate the fan at the correct operational RPM. The V-belt drive shall consist of cast iron sheaves and anti-static conducting belts and shall be selected with a (1.2/1.5) service factor based upon the required brake horsepower of the fan.

The complete fan shaft and bearing assembly shall be mounted within a steel fabricated inner cylinder. The V-belt drive assembly shall be extended through a two-piece belt fairing. The belt fairing shall be an aerodynamically shaped tube designed to maximize fan efficiency, minimize air blockage and reduce noise generation. The belt fairing shall be welded continuously to both the inner cylinder that houses the fan shaft and bearings and the fan housing, thus protecting and completely isolating the V-belt components from the direct blast of the airstream.

**MOTOR** — Fan motors shall be manufactured in accordance with current applicable standards of IEEE and NEMA and, where applicable, shall meet current EPACT standards. They shall be foot-mounted, NEMA standard, (ODP, TEFC, Explosion-Proof), continuous-duty, ball bearing type with class ("B"/"F") insulation and of cast iron construction when commercially available.

**FINISH AND COATING** — The entire fan assembly, excluding the shaft, shall be properly washed and pretreated before application of a rust-preventative primer, if called out on the order. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly, if called out on the order. The fan shaft shall be coated with a petroleum-based rust protectant. Aluminum components shall be unpainted.

**ACCESSORIES** — When specified, accessories shall be provided by Twin City Fan & Blower to maintain one source responsibility.

**FACTORY RUN TEST** — All fans with motors and drives mounted by Twin City Fan & Blower shall be completely assembled and test run as a unit at the specified operating speed prior to shipment. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 "Balance Quality and Vibration Levels for Fans" to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.





## Model TCVSSH

Fans shall be Model TCVSSH Vaneaxial, fixed pitch, steel AXIFAN impeller, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota. Fans shall be Arrangement 9, V-belt driven with the impeller mounted on a separate shaft and bearings supported completely within an enclosed tube isolated from the high velocity airstream.

**PERFORMANCE** — Fans shall be tested and rated in accordance with industry accepted test codes and shall be guaranteed by the manufacturer to deliver rated published performance levels. Model TCVSSH shall be UL listed for Smoke Control Systems (500°F for 4 hours and 1000°F for 15 minutes).

**HOUSING** — Fan housings shall be welded of hot rolled steel. Inlet and outlet flanges are standard.

Housings shall be fitted with mounting legs, hanging clips, or flange mounted as shown on the drawings. Fan mounting legs and clips shall be fabricated from minimum steel plate suitably braced to ensure stability and rigidity. Model TCVSSH shall include a belt tube for the protection of belts and drive components from the airstream and a bolted access door.

**GUIDE VANES** — On Model TCVSSH fans the housing shall be fitted with aerodynamically designed stationary straightening guide vanes on the air discharge side of the impeller. The guide vanes shall be welded to both the inner cylinder and the fan housing interior. Guide vanes function to aid in the elimination of swirl and turbulence downstream of the fan thereby recovering rotational energy losses, improving efficiency and static pressure capability and reducing fan noise generation.

**IMPELLER** — The impeller shall be a fabrication consisting of die-formed stamped steel blades of single-surface airfoil shape welded to a spun steel central hub. Precise blade attachment shall be ensured through the use of welding jigs and fixtures. The ability to provide various factory-set blade angles ranging from 30° to 50° allows the highest possible latitude in selection and provides fan operation at the highest possible efficiency. All impellers are statically and dynamically balanced prior to assembly. Fans with motors and drives mounted by Twin City Fan & Blower are test run as a complete assembly and rechecked for balance at the specified operating speed.

**SHAFT** — Shafts shall be AISI 1045 hot rolled steel, accurately turned, ground, polished and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

**BEARINGS** — Bearings shall be heavy-duty, grease lubricated, anti-friction flange ball or roller, self-aligning, pillow block type and selected for a minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM. All bearings shall be provided with pre-filled factory extended lubrication lines terminating at the housing exterior to facilitate bearing relubrication without gaining access inside the ductwork.

**DRIVE** — The fan shall be equipped with a (fixed/adjustable) pitch V-belt drive selected to operate the fan at the correct operational RPM. The V-belt drive shall consist of cast iron sheaves and anti-static conducting belts and shall be selected with a (1.2/1.5) service factor based upon the required brake horsepower of the fan.

The complete fan shaft and bearing assembly shall be mounted within a steel fabricated inner cylinder. The V-belt drive assembly shall be extended through a two-piece belt fairing. The belt fairing shall be an aerodynamically shaped tube designed to maximize fan efficiency, minimize air blockage and reduce noise generation. The belt fairing shall be welded continuously to both the inner cylinder that houses the fan shaft and bearings and the fan housing, thus protecting and completely isolating the V-belt components from the direct blast of the airstream. Model TCVSSH shall be equipped with a two-groove drive minimum.

**MOTOR** — Fan motors shall be manufactured in accordance with current applicable standards of IEEE and NEMA and, where applicable, shall meet current EPACT standards. They shall be foot-mounted, NEMA standard, (ODP, TEFC, Explosion-Proof), continuous-duty, ball bearing type with class ("B"/"F") insulation and of cast iron construction when commercially available.

**FINISH AND COATING** — The entire fan assembly, excluding the shaft, shall be properly washed and pretreated before application of a rust-preventative primer, if called out on the order. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly, if called out on the order. The fan shaft shall be coated with a petroleum-based rust protectant. Aluminum components shall be unpainted.

**ACCESSORIES** — When specified, accessories shall be provided by Twin City Fan & Blower to maintain one source responsibility.

**FACTORY RUN TEST** — All fans with motors and drives mounted by Twin City Fan & Blower shall be completely assembled and test run as a unit at the specified operating speed prior to shipment. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 "Balance Quality and Vibration Levels for Fans" to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

# INDUSTRIAL PROCESS AND COMMERCIAL VENTILATION SYSTEMS

CENTRIFUGAL FANS | UTILITY SETS | PLENUM & PLUG FANS | INLINE CENTRIFUGAL FANS  
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CENTRIFUGAL ROOF & WALL EXHAUSTERS | CEILING VENTILATORS | GRAVITY VENTILATORS | DUCT BLOWERS  
RADIAL BLADED FANS | RADIAL TIP FANS | HIGH EFFICIENCY INDUSTRIAL FANS | PRESSURE BLOWERS  
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