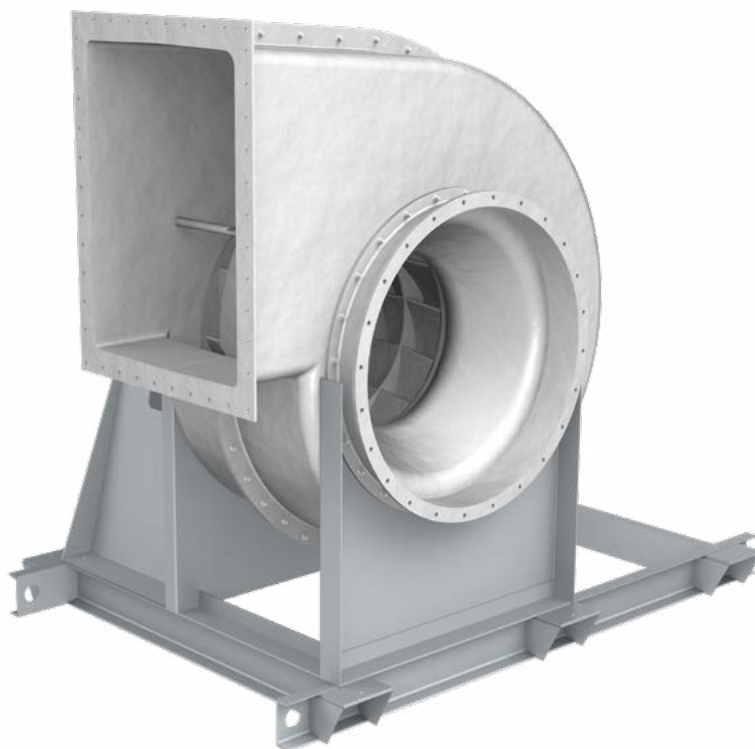




INDUSTRIAL PROCESS AND
COMMERCIAL VENTILATION SYSTEMS

BACKWARD CURVED HIGH PRESSURE COMPOSITE FANS

Model BCSF





Overview

BCSF

The Model BCSF fan from Twin City Fan & Blower is a backward curved industrial fan designed for handling particulate free, corrosive or caustic air in high pressure applications where conventional steel and stainless steel fans are not suitable.

Model BCSF is designed so all parts exposed to the airstream are constructed of, or protected with, high-quality corrosion resistant materials to avoid material breakdown from most chemicals.

Model BCSF features a wide impeller and housing, producing a high volume of air at a lower velocity, therefore the need for an expansion evasé is eliminated.

Typical Applications Include

Fume Control, Fume Exhausting, Odor Control, Oil Mist Emissions, Pollution/Emissions Control, Process Control (Heating or Cooling), Scrubbers

Typical Industries Include

Fertilizer, Metal/Mineral Processing, Pulp and Paper, Petrochemical, Pharmaceutical, Water and Wastewater Treatment

Arrangements

Available in Arrangements 1, 8, 9, 9F and 10
Direct Drive & Belt Driven Configurations

Impeller Types

Backward Curved

Standard Construction

Class FG

Optional Construction

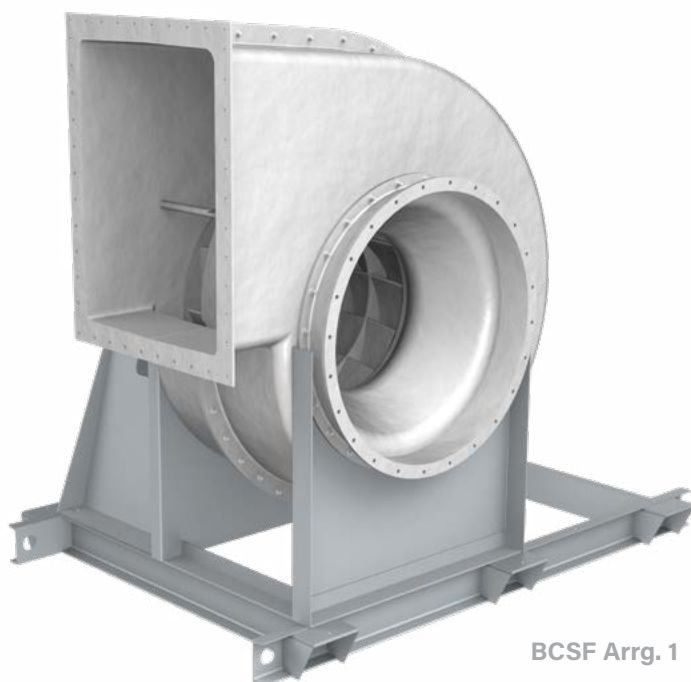
Class CF, ASTM D4167

Certifications

AMCA Sound/Air and FEI

Sizes and Performance

- 16.5" to 60" impeller diameters
- Airflow to 151,000 CFM
- Static pressure to 34" w.g.
- Airstream temperature to 200° F



BCSF Arrg. 1



BCSF Impeller



Twin City Fan & Blower, a Twin City Fan Company, certifies that the Model BCSF High Pressure Composite fans shown herein are licensed to bear the AMCA Seal. Certified performance data may be found in Twin City Fan & Blower's Fan Selector software.



Scan the QR code to search Twin City Fan & Blower's AMCA-certified products.



For complete product performance, drawings and available accessories, download our Fan Selector software at tcf.com.

Overview

BCSF

The Model BCSF industrial fan, with its backward-curved impeller, is designed to provide long-lasting, efficient performance for corrosive applications.

Suitable for indoor and outdoor applications, the BCSF is an ideal choice for applications in municipal and private sectors.

Impeller Designs

The BCSF features a non-overloading impeller design suitable for applications requiring large volumes of air at moderate to high pressures. The high efficiency impeller features backward curved blades of single thickness affixed to the rim.

Fiberglass & Carbon Fiber Impeller Options

Impellers are available in fiberglass (Class FG) and carbon fiber (Class CF) construction. For other specific impeller materials of construction, please consult Twin City Fan & Blower for material suitability and compatibility to the airstream.

The composite impeller is constructed of a premium quality, corrosion resistant vinyl ester resin, reinforced with fiberglass or carbon fiber and other proprietary materials for minimal weight and optimum strength.

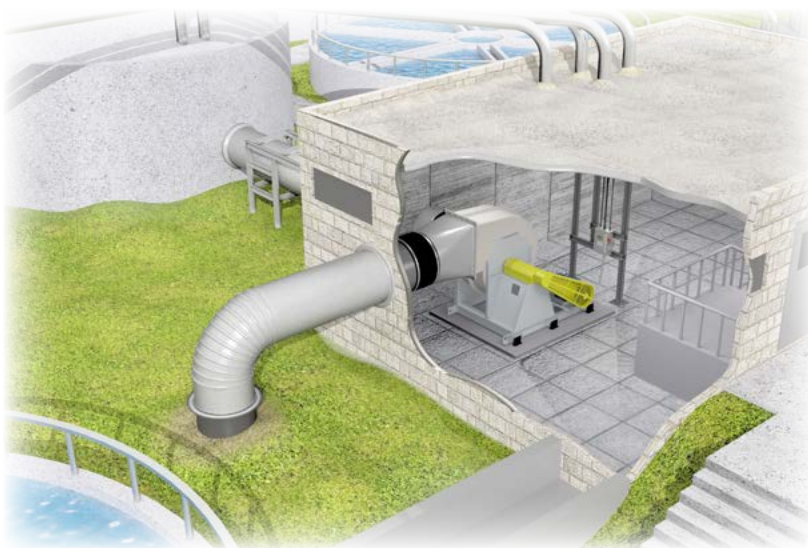
A conical shroud (rim) makes the BCSF less susceptible to performance losses associated with poor inlet conditions. All steel hubs, shaft and stainless steel fasteners are encapsulated for corrosion resistance. All BCSF impellers and shafts are statically and dynamically balanced as an assembly to grade G6.3 per ANSI S2.19 for smooth operation prior to assembly of the fan, followed by a final balance of the entire fan assembly.

Energy Regulations

Twin City Fan & Blower supports energy efficiency regulations enacted by the Department of Energy (DOE) and energy commissions of specific states. The selection and application of fan products is a significant part of these regulations. Engineers and specifiers must understand how to apply Twin City Fan & Blower products to their specific applications to meet efficiency requirements. Twin City Fan & Blower has made significant investments in product testing to assure users will receive the most efficient products available. Developments in the Fan Selector software are in place to help aide in product selection to meet the efficiency requirements as stipulated in the regulations. Visit tcf.com for the latest on fan energy efficiency regulations.



Microchip Processing



Wastewater Treatment



Housing

Housings are constructed of premium quality, fiberglass reinforced resin composite in a manner ensuring a smooth airpath surface. Coupled with aerodynamically designed inlet cones the BCSF housings provide high efficiency and smooth airflow through the fan.

All housings utilize external, structural components for mounting. Mild steel structural components are mechanically fastened to the encapsulated hardware to prevent bleed-through corrosion. The mild steel bearing pedestal and non-airstream contact parts are epoxy coated for corrosion resistance. The exterior of the housing is coated with a UV resistant coating. Outlet flanges for duct connection and lifting lugs are standard.

Sizes 165 to 365 are field rotatable to one of five (5) discharge positions.

Fire Retardant Resin

Standard on the BCSF, fire retardant resin reduces the resin's tendency to burn, attaining a flame spread rating of 25 or less in accordance with the ASTM E-84 testing method.

Shaft

Shafts are AISI 1045 hot-rolled steel accurately turned, ground, polished and ring-gauged for accuracy. Shaft areas exposed to the airstream are encapsulated to prevent corrosion. Shafts are generously sized for first critical speed of at least 1.43 times the maximum speed. Stainless steel shafts available.

Bearings

Bearings are heavy-duty, grease-lubricated, anti-friction ball or roller, self-aligning, pillow block type and are selected for minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM.

Shaft Sleeve

A fiberglass shaft sleeve encapsulates the standard mild steel shaft, protecting it from the airstream environment. The sleeve is bonded to the back plate of the impeller and extends through the opening of the housing. The fiberglass shaft sleeve is only available with standard shaft seal.

Round Inlet Collar

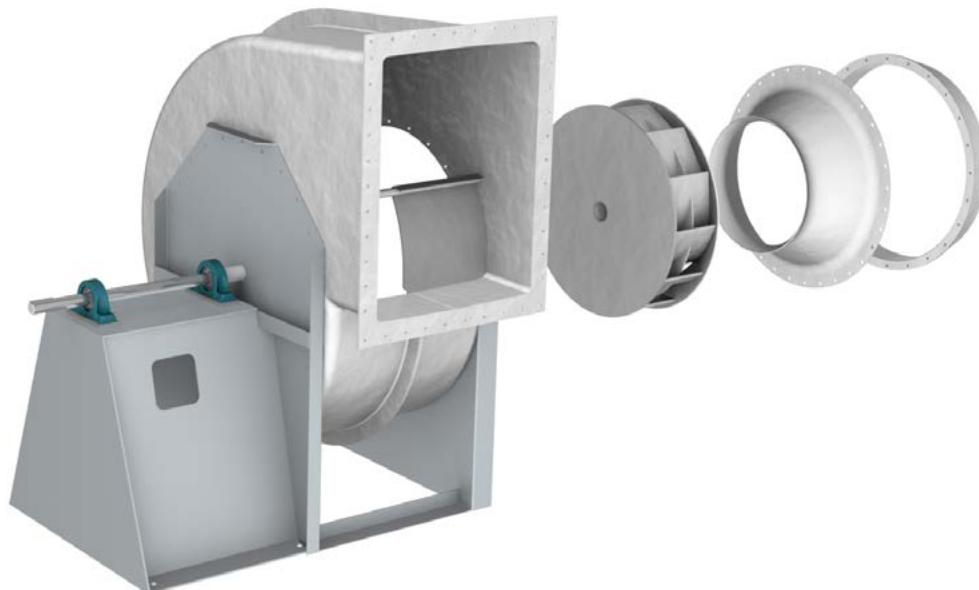
Fiberglass inlet collar (stub) for connecting to customer-supplied round duct or flexible inlet connector.

Shaft Seal

A shaft seal reduces leakage and protects the bearings from a contaminated airstream. Standard seals are constructed of Tetraglas compressed between an aluminum cover plate and the fan housing. The standard shaft seal is not gas tight. Special seals are available for low leakage applications requiring more protection.

Mechanical Run Test & Final Vibration Check

All fans are assembled for a mechanical run test as well as final balance prior to shipment. Vibration readings are taken on both fan bearings in the axial, horizontal and vertical directions at the specified speed. Fans are balanced to 0.15 in/sec. peak or less.



Spark Resistant Construction

Spark resistant construction for fiberglass fans is recommended when the fan is handling explosive fumes. Although fiberglass and carbon fiber are non-sparking materials, they can build and retain a static charge that can be potentially hazardous. With spark resistant construction, the fan is statically grounded by graphite impregnation to reduce a static charge buildup.

ASTM D4167 Construction

Fans constructed to meet ASTM D4167 include spark resistant construction, surface veil for the airstream and rotor assembly balanced to grade G6.3.

Special Width & Diameter Construction

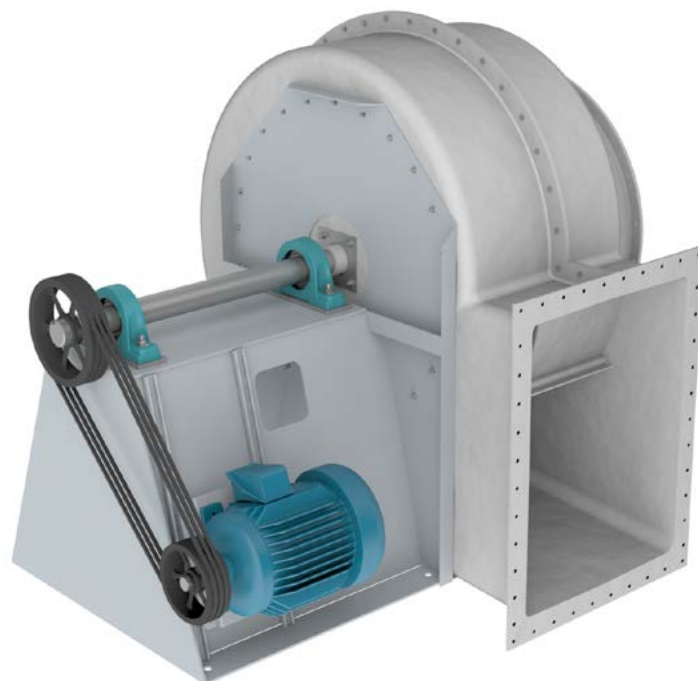
Variations in impeller widths (50% to 100%) are available to match designed performance at motor speeds for the greatest efficiency for any given application.

Special Materials

Please contact Twin City Fan & Blower to ensure a suitable material is selected for the specific application.

Vinyl Ester — Provides increased corrosion resistance to stronger acids, chlorine and oxidizing agents. For use in industrial applications such as chemical and water treatment plants and commercial applications where urban or salt air corrosion exists.

Surface Veil — A single layer of synthetic veil on specific airstream parts is available to increase chemical resistance. A second layer is available if necessary for the application. Consult Twin City Fan & Blower for application information.



BCSF Arrg. 9



Installations



Paper Machine Exhaust



Scrubber Fan



Wastewater Treatment
Odor Control

Arrangement 1

Arrangement 1 fans are available in either direct drive (see Arrangement 8 below) or belt driven installations. The belt driven configuration allows the motor to be mounted in any of the four standard motor positions shown on page 7. The choice of a belt driven installation provides greater performance flexibility with the use of belts and sheaves of differing sizes.



Arrangement 8

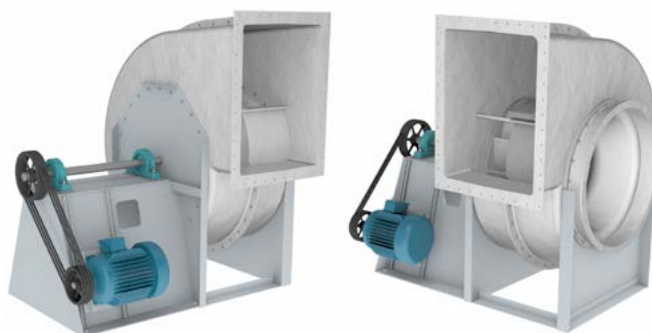
Arrangement 8 fans use a fan shaft and motor direct coupled via a flexible coupling. The integral motor subbase is fabricated of heavy-gauge steel and securely reinforced for rigidity. Twin City Fan & Blower can supply impellers in a variety of diameters and differing widths to give the greatest efficiency for any given application. If desired, an Arrangement 1 fan can be set up for direct drive. This requires a concrete motor pedestal to be built in the field.



Arrangement 9

Arrangement 9 fans include a motor slide base mounted on the side of the motor pedestal. The motor and drive can be installed at the factory or field installed. Refer to dimensional data on pages 16-17 for maximum motor frame sizes on Arrangement 9 fans.

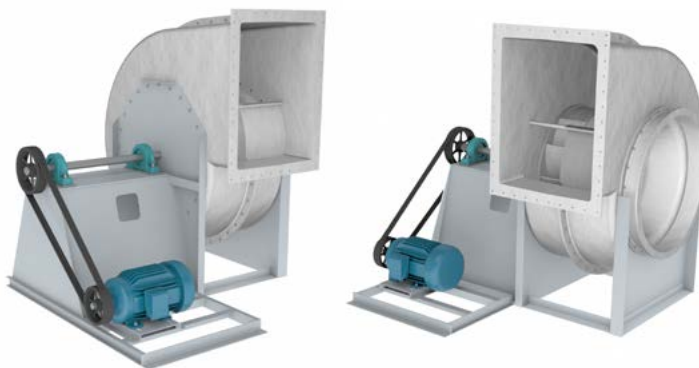
Unless otherwise specified, the motor will be installed on the left (L) side of the pedestal on CW fans and on the right (R) side on CCW fans.



Arrangement 9F

Arrangement 9F is available when an Arrangement 9 requires a motor that is too large to mount on the bearing pedestal. The fan frame is extended to accommodate the motor, for horizontal mounting, similar to an Arrangement 1 fan. Arrangement 9F is not suitable for mounting vibration isolators directly under the fan.

Unless otherwise specified, the motor will be installed on the left (L) side of the pedestal on CW fans and on the right (R) side on CCW fans. Arrangement 9F requires a separate subbase when vibration isolation is required.

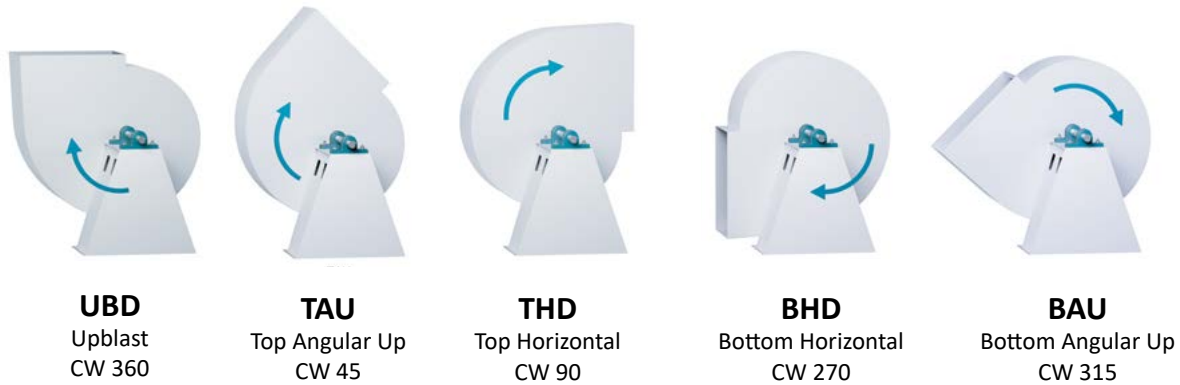


Arrangement 10

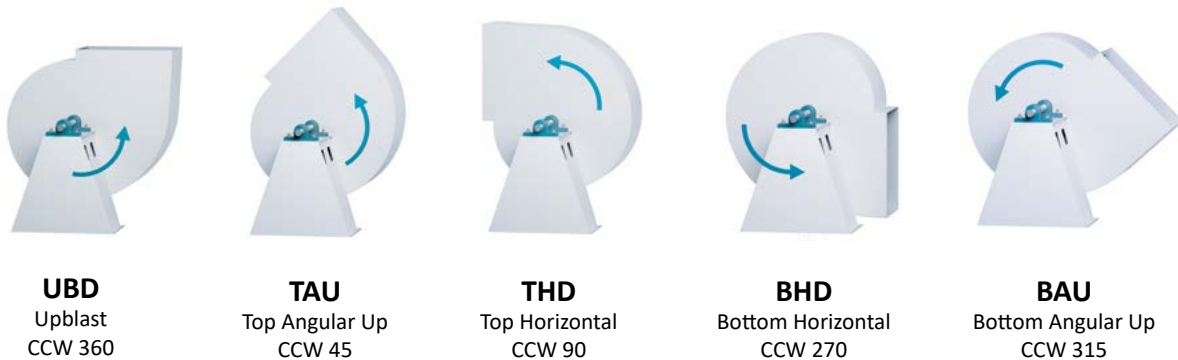
Arrangement 10 fans are suitable for roof or outdoor installations. An optional weather cover, provides complete weather protection for motor, shaft, bearings and drives. This arrangement available on sizes up through 365. Refer to dimensional data on page 20 for maximum motor frame sizes on Arrangement 10 fans.



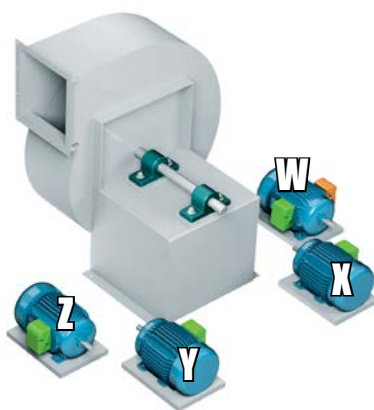
CLOCKWISE (CW) - ROTATION & DISCHARGE (ROTATION VIEW FROM DRIVE SIDE)



COUNTER CLOCKWISE (CCW) - ROTATION & DISCHARGE (ROTATION VIEW FROM DRIVE SIDE)



MOTOR POSITIONS



Arrangement 1

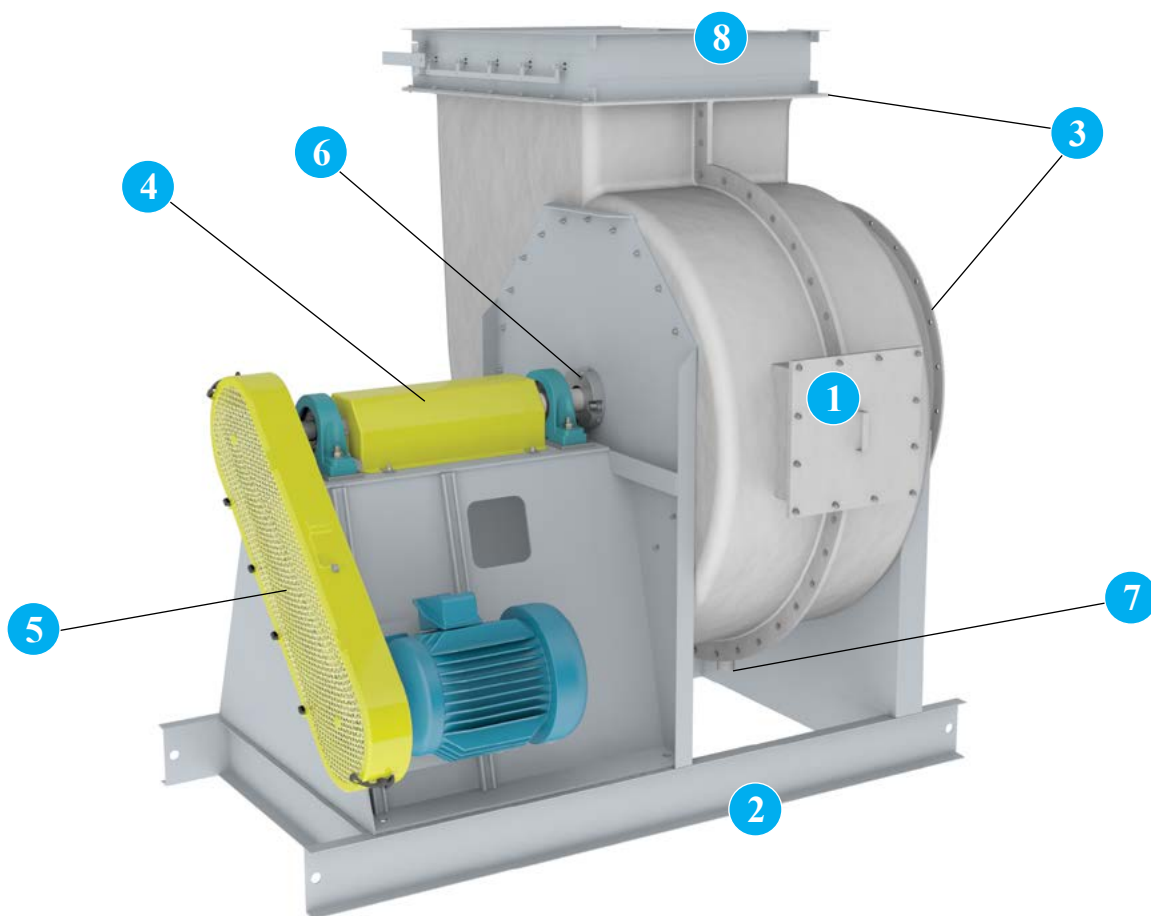


Arrangement 9

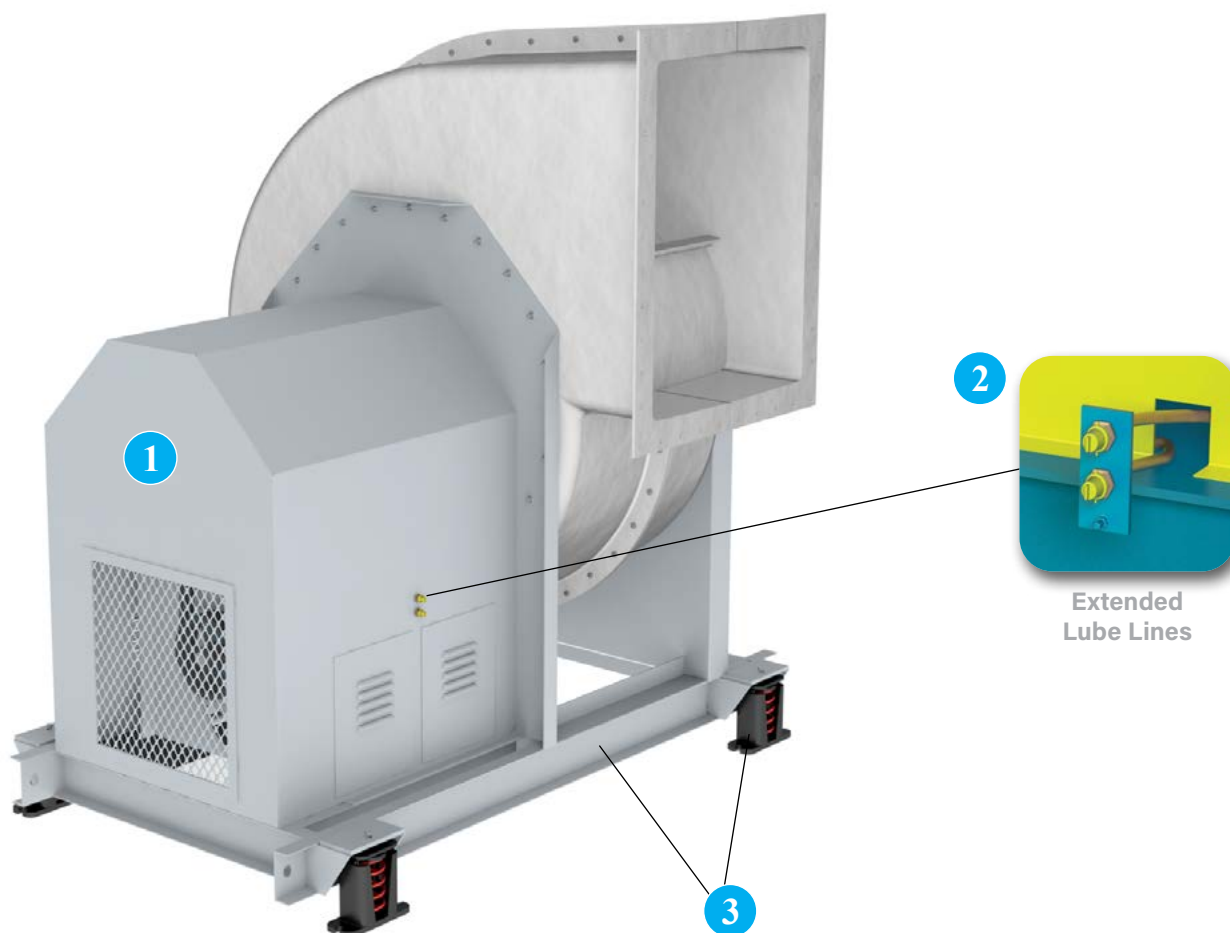


Arrangement 9F





- 1 Bolted Access Doors** Bolted access door allows for inspection and maintenance of internal fan components.
- 2 Unitary Base** A structural steel base provides common support to fan, motor and drive including guards. This style of base is designed for use without isolators and requires adequate foundation integrity for proper operation.
- 3 Inlet/Outlet Flange** Inlet and outlet flanges allow for duct mounting. Non-drilled outlet flanges are integrated into the housings as standard. Drilled bolt pattern is available. Inlet flange, drilled or undrilled, is bolted on in lieu of the standard inlet collar.
- 4 Shaft Guard (Exposed Bearings)** Shaft guard is designed to allow access to the bearings and protect personnel from the moving drive parts. A shaft guard with bearings fully guarded is also available.
- 5 Quick Access Belt Guard** Belt guard protects personnel from the moving drive parts. OSHA and quick access guards are available. Arrangement 10 offers a standard belt guard.
- 6 Shaft Seal, Double Lip-Type** A double lip shaft seal significantly reduces leakage of the contaminated airstream. The optional double-lip type shaft seal utilizes either Viton® (fluoroelastomer) or Teflon™ (fluoropolymer) seal element. The seal is positioned in fiberglass reinforced case and mounted to the housing. Double-lip shaft seals require a 316 stainless steel or Hastelloy® shaft sleeve or a solid 316 stainless steel shaft. Fiberglass shaft sleeves are not available for double-lip shaft seals. Consult Twin City Fan & Blower for shaft seal element chemical compatibility.
- 7 Housing Drain** A fiberglass drain coupling mounted to the lowest point of the housing allows drainage of condensate from fan housing.
- 8 Opposed Blade Outlet Damper** Outlet dampers add resistance to the fan by shifting the operating point to the left of the rating point. The horsepower savings depends on the relative position on the fan curve and is usually much less than other methods. Opposed blade dampers are recommended for systems where volume is modulated over the entire range. Opposed blade outlet dampers are available in epoxy coated mild steel or FRP.



1 Weather Cover An easily removable weather cover is available for Arrangement 10 fans. The weather cover provides complete protection for the motor, fan bearings and V-belt drive.

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 base.

3 Isolation Base w/ Spring Isolator A structural steel base minimize the transmission of sound vibration from the fan to the building structure and provides common support to fan, motor and drive including guards. This style of base is designed for use with isolators and requires adequate foundation integrity for proper operation.

Other Options/Accessories Include:

- Detached Inlet Box
- Inlet Box Drain
- Inlet Box Access Door
- Inertia Base
- Parallel-Blade Outlet Damper
- Extended Life Bearings
- Shaft/Bearing Guard
- 316 Stainless Steel Shaft (No Sleeve)
- Stainless Steel Nameplate

Table 1. Maximum RPM, Impeller Weights and WR² (moment of inertia in lb-ft²)

FAN SIZE	M1								M2			
	CLASS FG				CLASS CF				CLASS CF			
	MAX. RPM		WEIGHT (LB)	WR ² (LB-FT ²)	MAX. RPM		WEIGHT (LB)	WR ² (LB-FT ²)	MAX. RPM		WEIGHT (LB)	WR ² (LB-FT ²)
	50-70% Width	71-100% Width			50-70% Width	71-100% Width			50-70% Width	71-100% Width		
165	3702	3402	22	4	4000	3909	18	4	—	—	—	—
182	3363	3091	42	8	4000	3572	36	6	—	—	—	—
200	3086	2836	44	10	3693	3294	38	8	—	—	—	—
222	2782	2557	68	20	3350	2987	60	14	—	—	—	—
245	2534	2329	74	26	3067	2735	62	18	4000	3791	64	20
270	2302	2115	84	38	2801	2497	70	26	3650	3425	72	30
300	2073	1905	94	56	2536	2262	76	38	3269	3067	80	42
330	1884	1731	125	88	2317	2066	98	60	2959	2776	105	66
365	1681	1545	160	140	2092	1865	130	92	2649	2485	135	100
402	1505	1383	185	210	1894	1689	145	140	2380	2233	150	150
445	1343	1234	300	370	1709	1523	240	260	2131	1999	250	280
490	1202	1104	340	540	1547	1380	265	360	1917	1816	275	390
542	1069	982	485	960	1385	1234	385	650	1706	1600	395	700
600	952	874	545	1360	1253	1117	420	890	1535	1440	440	980

Table 2. Shaft and Bearing Data

FAN SIZE	ARRANGEMENT 1		ARRANGEMENT 9 & 9F		ARRANGEMENT 10		ARRANGEMENT 8			
	SHAFT DIAMETER	BEARINGS	SHAFT DIAMETER	BEARINGS	SHAFT DIAMETER	BEARINGS	RPM	MOTOR HP	SHAFT DIAMETER	BEARINGS
165	1.938	HDB	1.938	HDB	1.688	HDB	3550	15	1.938	HDB
	1.938	HDB	1.938	HDB	1.688	HDB	3550	10	1.938	HDB
182	2.188	HDB	2.188	HDB	1.938	HDB	3550	20	2.188	HDB
	2.188	HDB	2.188	HDB	1.938	HDB	3550	15	2.188	HDB
200	2.188	RB	2.188	RB	1.938	RB	3550	30	2.188	HDB
	2.188	RB	2.438	HDB	1.938	RB	3550	25	2.188	HDB
222	2.438	HDB	2.438	RB	2.188	RB	1775	7.5	2.438	HDB
	2.438	RB	2.688	HDB	2.188	RB	3550	40	2.438	HDB
245	2.438	HDB	2.438	RB	2.188	RB	1775	15	2.438	HDB
	2.688	RB	2.688	RB	2.188	RB	1775	75	2.688	HDB
270	2.688	RB	2.688	RB	2.188	RB	1775	20	2.688	HDB
	2.938	RB	2.938	RB	2.188	RB	1775	15	2.938	HDB
300	2.688	RB	2.688	RB	2.188	RB	1775	40	2.688	HDB
	2.938	RB	2.938	RB	2.438	RB	1775	25	2.938	HDB
330	2.938	RB	2.938	RB	2.438	RB	1775	60	2.938	HDB
	2.938	RB	2.938	RB	2.438	RB	1775	40	2.938	HDB
365	3.438	RB	3.438	RB	2.438	RB	1775	100	3.438	HDB
	3.438	RB	3.438	RB	2.688	RB	1775	60	3.438	HDB
402	3.438	RB	3.438	RB	—	—	1775	150	3.438	HDB
	3.438	RB	3.438	RB	—	—	1775	100	3.438	HDB
445	3.938	RB	3.938	RB	—	—	1180	75	3.938	HDB
	3.938	RB	3.938	RB	—	—	1775	200	3.938	HDB
490	3.938	RB	3.938	RB	—	—	1180	125	3.938	HDB
	3.938	RB	3.938	RB	—	—	1775	300	3.938	HDB
542	4.438	RB	4.438	RB	—	—	1180	200	3.938	HDB
	4.438	RB	4.438	RB	—	—	1180	150	3.938	HDB
600	4.938	RB	4.938	RB	—	—	1180	300	3.938	RB
	4.938	RB	4.938	RB	—	—	1180	250	3.938	RB

NOTES:

HDB = Heavy-Duty Ball Bearing

RB = Unit Roller Bearing

Table 3. Bare Fan Weights (lb)

FAN SIZE	M1										M2				
	CLASS FG					CLASS CF					CLASS CF				
	ARR. 1	ARR. 8	ARR. 9	ARR. 9F	ARR. 10	ARR. 1	ARR. 8	ARR. 9	ARR. 9F	ARR. 10	ARR. 1	ARR. 8	ARR. 9	ARR. 9F	ARR. 10
165	265	354	350	344	280	249	332	334	328	264	—	—	—	—	—
182	334	446	451	434	361	314	419	431	414	341	—	—	—	—	—
200	344	459	442	439	365	321	428	419	416	342	—	—	—	—	—
222	430	574	542	537	437	401	535	513	508	408	—	—	—	—	—
245	482	643	574	587	477	448	598	540	553	443	450	600	542	555	445
270	565	754	680	714	541	521	695	636	670	497	524	699	639	673	500
300	654	872	762	773	632	602	803	710	721	580	606	808	714	725	584
330	787	1050	940	953	778	722	963	875	888	713	727	970	880	893	718
365	1036	1382	1291	1305	881	958	1278	1213	1227	803	963	1284	1218	1232	808
402	1596	2128	1958	1921	—	1513	2018	1875	1838	—	1520	2027	1882	1845	—
445	2098	2798	2370	2337	—	1987	2650	2259	2226	—	1996	2662	2268	2235	—
490	2350	3134	2559	2582	—	2215	2954	2424	2447	—	2226	2968	2435	2458	—
542	2875	3834	3004	3084	—	2700	3600	2829	2909	—	2713	3618	2842	2922	—
600	3451	4602	3579	3662	—	3239	4319	3367	3450	—	3259	4346	3387	3470	—

CORROSIVE AGENT	STANDARD CONSTRUCTION (°F)	ALL VINYLESTER AIRSTREAM (°F)
Acetaldehyde	120 (Fumes Only)	120 (Fumes Only)
Acetic Acid to 10%	180	210
Acetic Acid to 50%	90	180
Acetic Acid to 100%	Not Recommended	Not Recommended
Acetic Acid, Glacial	Not Recommended	Not Recommended
Acetic Acid: HCl	Recommended	Recommended
Acetic Anhydride	Not Recommended	Not Recommended
Acetic: H ₂ O ₂ (Peracetic Acid)	Recommended	Recommended
Acetone to 10%	Not Recommended	180
Acetyl Chloride	Not Recommended	Recommended
Acrylic Acid to 25%	Consult Factory	100
Acrylonitrile (20%)	Not Recommended	100 ²
Aluminum Chloride	*120	*210
Aluminum Fluoride	No Data	80 (Veil Recommended)
Aluminum Potassium Sulfate	160	210
Aluminum Sulfate	240	210
Ammonia, Dry to 100%	Consult Factory	100
Ammonia, Vapors to 40%	Consult Factory	180
Ammonium Bicarbonate to 50%	140	160
Ammonium Carbonate	120	150
Ammonium Chloride	*200	*210
Ammonium Hydroxide to 5%	90 (Veil Recommended)	180 (Veil Recommended)
Ammonium Hydroxide to 10%	90 (Veil Recommended)	150 (Veil Recommended)
Ammonium Hydroxide to 29%	Consult Factory	100 (Veil Recommended)
Ammonium Nitrate	200	220
Ammonium Persulfate	150	180
Ammonium Phosphate	150	210
Ammonium Sulfate	200	220
Ammonium Sulfite	Consult Factory	150
Amyl Acetate	Consult Factory	Consult Factory
Amyl Alcohol	Consult Factory	120
Aniline to 20%	Consult Factory	100
Aniline Sulfate to 25%	150	210
Antimony Pentachloride	Consult Factory	100
Arsenious Acid	Consult Factory	180
Barium Carbonate	180 (Veil Recommended)	180
Barium Chloride	200	210
Barium Hydroxide to 10%	Consult Factory	150
Barium Sulfide	Consult Factory	180
Benzaldehyde	Not Recommended	Not Recommended
Benzene	Not Recommended	Not Recommended
Benzene Sulfonic Acid to 25%	Consult Factory	150
Benzoic Acid	Consult Factory	210
Benzyl Alcohol	Not Recommended	Not Recommended
Benzyl Chloride	Not Recommended	Not Recommended
Boric Acid	180	210
Bromine, Dry Gas	Recommended	100
Bromine, Moist Gas	Recommended	100
Butyl Alcohol	Consult Factory	120
Butylene Oxide	Not Recommended	Not Recommended
Butyric Acid to 50%	150	210
Butyric Acid up to 50%	Consult Factory	80
Calcium Chlorate	180	220
Calcium Chloride	240	210
Calcium Hydroxide to 15%	No Data, Veil Recommended	180 (Veil Recommended)
Calcium Hypochlorite	Consult Factory	Consult Factory
Calcium Sulfate	*200	*210

CORROSIVE AGENT	STANDARD CONSTRUCTION (°F)	ALL VINYLESTER AIRSTREAM (°F)
Carbon Dioxide	250	250
Carbon Disulfide	Not Recommended	Not Recommended
Carbon Monoxide	200	250
Carbon Tetrachloride	Consult Factory	150
Carbonic Acid	Not Recommended	Not Recommended
Chlorinated Brine, pH>9 (Hypochlorite), Cl ₂ Sat'd	Consult Factory	180 (Double Veil Recommended)
Chlorine Dioxide	Consult Factory	Consult Factory
Chlorine Gas, Dry	Consult Factory	Consult Factory
Chlorine Gas, Wet	Consult Factory	Consult Factory
Chlorine Water	*125	*200
Chloroacetic Acid to 25%	Consult Factory	*120
Chloroacetic Acid 25% to 50%	Consult Factory	*100
Chlorobenzene	Not Recommended	Not Recommended
Chloroform	Not Recommended	Fumes Only
Chlorosulfonic Acid	Not Recommended	Not Recommended
Chlorotoluene	Not Recommended	80° (Fumes Only)
Chrome-Plating Bath	Consult Factory	Recommended
Chromic Acid to 20%	Consult Factory	150
Chromic Acid + Sulfuric	Recommended	Recommended
Citric Acid	Recommended	210
Copper Chloride	*220	*220
Copper Cyanide	Consult Factory	210
Copper Nitrate	Recommended	210
Copper Sulfate	Recommended	210
Cyclohexane	Consult Factory	120
Dichlorobenzene	Not Recommended	Not Recommended
Dichloroethylene	Not Recommended	Not Recommended
Dichlorophenoxyacetic Acid	Consult Factory	120
Dichloropropane	Not Recommended	Not Recommended
Dichlorotoluene	Not Recommended	120
Diesel Fuel	Recommended	180
Diethyl Ether	Not Recommended	Not Recommended
Diethyl Ketone	Not Recommended	Not Recommended
Diethylbenzene	No Data	100
Diisobutyl Ketone	Not Recommended	Not Recommended
Diisobutylene	No Data	100
Dimethyl Sulfide	Not Recommended	Not Recommended
Dimethyl Sulfoxide to 20%	Consult Factory	100 (Fumes Only)
Dimethylformamide	Not Recommended	Not Recommended
Dipropylene Glycol	Consult Factory	180
Dodecene	Not Recommended	150
Dodecylbenzenesulfonic Acid: H ₂ SO ₄ : H ₂ O: Oil	Consult Factory	200
Esters, Fatty Acid	Recommended	180
Ethyl Acetate	Not Recommended	Consult Factory
Ethyl Acrylate	Not Recommended	Not Recommended
Ethyl Alcohol	Consult Factory	Consult Factory
Ethyl Benzene	Not Recommended	80
Ethyl Chloride	Not Recommended	Not Recommended
Ethyl Ether	Not Recommended	Not Recommended
Ethylene Chlorohydrin	Consult Factory	120
Ethylene Dibromide	Not Recommended	Not Recommended
Ethylene Dichloride	Not Recommended	Not Recommended
Ethylene Glycol	210	210
Ethylene Oxide	Not Recommended	Not Recommended
Ethylenediamine Tetra Acetic Acid	Not Recommended	120
Ferric Chloride	*220	*210
Ferric Nitrate	170	210
Ferric Sulfate	200	210
Ferrous Chloride	Consult Factory	*210

No Data = No data has been collected for corrosive agent; Consult factory.

* = Special Shaft and hardware required; Consult factory.

Agents without a temperature limit assume ambient (70 °F) conditions. If higher temperatures are required, consult factory. Concentration levels are by weight unless otherwise stated.

CORROSIVE ATMOSPHERE GUIDE

CORROSIVE AGENT	STANDARD CONSTRUCTION (°F)	ALL VINYLESTER AIRSTREAM (°F)
Ferrous Nitrate	160	210
Ferrous Sulfate	Consult Factory	210
Flue Gas, (wet)	Consult Factory	180
Fluoboric Acid	*90 (Double Veil Recommended)	210 (Double Veil Recommended)
Fluorine Gas	Not Recommended	120 (Double Veil Recommended)
Fluosilicic Acid	Veil Recommended	Veil Recommended
Formaldehyde	Consult Factory	120
Formic Acid up to 10%	150	180
Fuel Oil	Consult Factory	180
Furfural to 10%	Consult Factory	100 (Fumes Only)
Gasoline, No Lead, No Methanol	Consult Factory	120
Gasoline, Aviation	Consult Factory	180
Glycerine	200	210
Glycolic Acid	Consult Factory	100
Heptane	120	210
Hexachloroethane	Not Recommended	Not Recommended
Hexamethylenetetramine to 40%	Consult Factory	100
Hexane	Consult Factory	160
Hydrazine	Not Recommended	Not Recommended
Hydrobromic Acid to 25%	*160	*180
Hydrochloric Acid	Consult Factory	Consult Factory
Hydrocyanic Acid to 10%	170	210
Hydrofluoric Acid to 10%	*100 (Double Veil Recommended)	*150 (Double Veil Recommended)
Hydrogen	Recommended	Recommended
Hydrogen Bromide, Dry	Recommended	180
Hydrogen Chloride	Consult Factory	Consult Factory
Hydrogen Fluoride, Vapor	*90 Veil Recommended)	*180 (Veil Recommended)
Hydrogen Peroxide to 30%	100	150
Hydrogen Sulfide to 5%	Consult Factory	Consult Factory
Hydroxyacetic Acid	Consult Factory	100
Hypochlorous Acid to 10%	90	100
Iodine Vapor	Consult Factory	150
Isobutyl Alcohol to 20%	No Data	150
Isopropyl Alcohol	No Data	120
Isopropyl Amine	No Data	100
Kerosene	120	180
Lactic Acid	Consult Factory	*210
Lead Acetate	160	210
Linseed Oil	Consult Factory	210
Lithium Carbonate	Not Recommended	180 (Veil Recommended)
Lithium Chloride	Consult Factory	180
Lithium Hydroxide	Not Recommended	180 (Veil Recommended)
Lithium Hypochlorite	Consult Factory	Consult Factory
Magnesium Carbonate	160	180
Magnesium Chloride	Consult Factory	210
Magnesium Hydroxide	Consult Factory	210
Magnesium Sulfate	200	210
Maleic Acid	170	180
Mercapto Acetic Acid	Not Recommended	Not Recommended
Mercuric Chloride	*210	*210
Mercurous Chloride	210	210
Mercury	Consult Factory	210
Methacrylic Acid to 25%	Consult Factory	100
Methyl Alcohol to 5%	Consult Factory	20 (Fumes Only)
Methyl Bromide to 10%	Consult Factory	80 (Fumes Only)
Methyl Chloride	Consult Factory	Consult Factory
Methyl Ethyl Ketone	Not Recommended	Not Recommended
Methylene Chloride	Not Recommended	Not Recommended
Mineral Oil, Aliphatic	Recommended	210

CORROSIVE AGENT	STANDARD CONSTRUCTION (°F)	ALL VINYLESTER AIRSTREAM (°F)
Monochloroacetic Acid	Consult Factory	120 (Fumes Only)
Monochlorobenzene	Not Recommended	Not Recommended
Monoethanolamine	Not Recommended	Not Recommended
Naphtha	180	180
Naphthalene	130	210
Nickel Chloride	220	210
Nickel Nitrate	220	210
Nickel Sulfate	220	210
Nitric Acid to 5%	170	150
Nitric Acid 5% to 20%	Consult Factory	120
Nitrobenzene	Not Recommended	Not Recommended
Nitrogen	Recommended	Recommended
Oleic Acid	200	210
Oleum	Not Recommended	Not Recommended
Olive Oil	Recommended	Recommended
Oxalic Acid	Consult Factory	120
Ozone	Consult Factory	Consult Factory
Palmitic Acid	Consult Factory	Consult Factory
Perchloric Acid to 10%	Consult Factory	150 (Fumes Only)
Perchloroethylene	Consult Factory	80
Phenol (Carbolic Acid)	Not Recommended	Not Recommended
Phenol Sulfonic Acid	Not Recommended	Not Recommended
Phosphoric Acid	*210 (Veil Recommended)	*210 (Veil Recommended)
Phosphorous Acid to 70%	Consult Factory	180
Phosphorous Oxichloride	NR	No Data
Phosphorous Trichloride	NR	No Data
Phthalic Acid	Consult Factory	210
Phthalic Anhydride	*150	*210
Picric Acid (Alcoholic)	Not Recommended	Not Recommended
Polyvinyl Acetate Emulsions	Consult Factory	120
Polyvinyl Alcohol	Consult Factory	180
Potassium Bicarbonate to 10%	Consult Factory	150 (Veil Recommended)
Potassium Carbonate to 10%	Consult Factory	150 (Double Veil Recommended)
Potassium Chloride	200	210
Potassium Cyanide	Consult Factory	Consult Factory
Potassium Dichromate	200	210
Potassium Ferricyanide	200	210
Potassium Hydroxide to 25%	Consult Factory	150 (Double Veil Recommended)
Potassium Nitrate	200	210
Potassium Permanganate	150	210
Potassium Persulfate	90	210
Potassium Sulfate	200	210
Propionic Acid to 50%	Consult Factory	180
Propionyl Chloride	Not Recommended	Not Recommended
Propylene Glycol	Recommended	210
Pulp and Paper Mill Blow Down Gases	Consult Factory	Consult Factory
Pyridine	Not Recommended	Not Recommended
Rayon Spin Bath (Fumes)	Consult Factory	140
Selenious Acid	No Data	210
Silver Nitrate	200	210
Sodium Acetate	150	210
Sodium Benzoate	Consult Factory	180
Sodium Bicarbonate to 10%	140 (Veil Recommended)	180 (Veil Recommended)
Sodium Bisulfate	200	210
Sodium Borate	Consult Factory	210
Sodium Bromide	Consult Factory	210
Sodium Carbonate to 35%	Consult Factory	180 (Veil Recommended)
Sodium Chlorate	90	210

No Data = No data has been collected for corrosive agent; Consult factory.

* = Special Shaft and hardware required; Consult factory.

Agents without a temperature limit assume ambient (70 °F) conditions. If higher temperatures are required, consult factory. Concentration levels are by weight unless otherwise stated.

CORROSIVE AGENT	STANDARD CONSTRUCTION (°F)	ALL VINYLESTER AIRSTREAM (°F)
Sodium Chloride	200	210
Sodium Chlorite	Consult Factory	Consult Factory
Sodium Cyanide	100	210
Sodium Dichromate	160	210
Sodium Ferricyanide	Consult Factory	210
Sodium Flouride	Consult Factory	180 (Veil Recommended)
Sodium Hydroxide	Consult Factory	180 (Veil Recommended)
Sodium Hypochlorite pH>11 (active Chlorine) to 18%	Consult Factory	180 (Double Veil Recommended)
Sodium Hypochlorite (active Chlorine) 18% to 21%	Consult Factory	100 (Double Veil Recommended)
Sodium Hypochlorite (active Chlorine) >18%	Not Recommended	Not Recommended
Sodium Nitrate	Consult Factory	210
Sodium Nitrite	Consult Factory	210
Sodium Silicate	Consult Factory	210
Sodium Sulfate	180	210
Sodium Sulfide	90	210
Sodium Sulfite	Consult Factory	210
Sodium Tetraborate	180	180
Sodium Tripolyphosphate	125	210
Sodium Xylenesulfonate	Recommended	Recommended
Sorbitol Solutions	Consult Factory	160
Stannic Chloride	*180	*210
Stannous Chloride	*200	*210
Stannous Fluoride: Hydrofluoric Acid	Not Recommended	120 (Veil Recommended)
Steam Vapor	180	180
Stearic Acid	200	210
Styrene	Not Recommended	Not Recommended
Sulfamic Acid to 25%	150	150
Sulfate Liquors	Consult Factory	200
Sulfonated Detergents	Consult Factory	160
Sulfite Liquors	Consult Factory	200
Sulfur Dioxide, Dry	Consult Factory	210
Sulfur Dioxide, Wet	Consult Factory	180
Sulfur Trioxide, Dry	Consult Factory	210
Sulfur Trioxide, Wet	Consult Factory	210
Sulfur, Wettable, Fungicide	Consult Factory	180
Sulfuric Acid to 25%	Consult Factory	*210
Sulfuric Acid to 50%	Consult Factory	*180

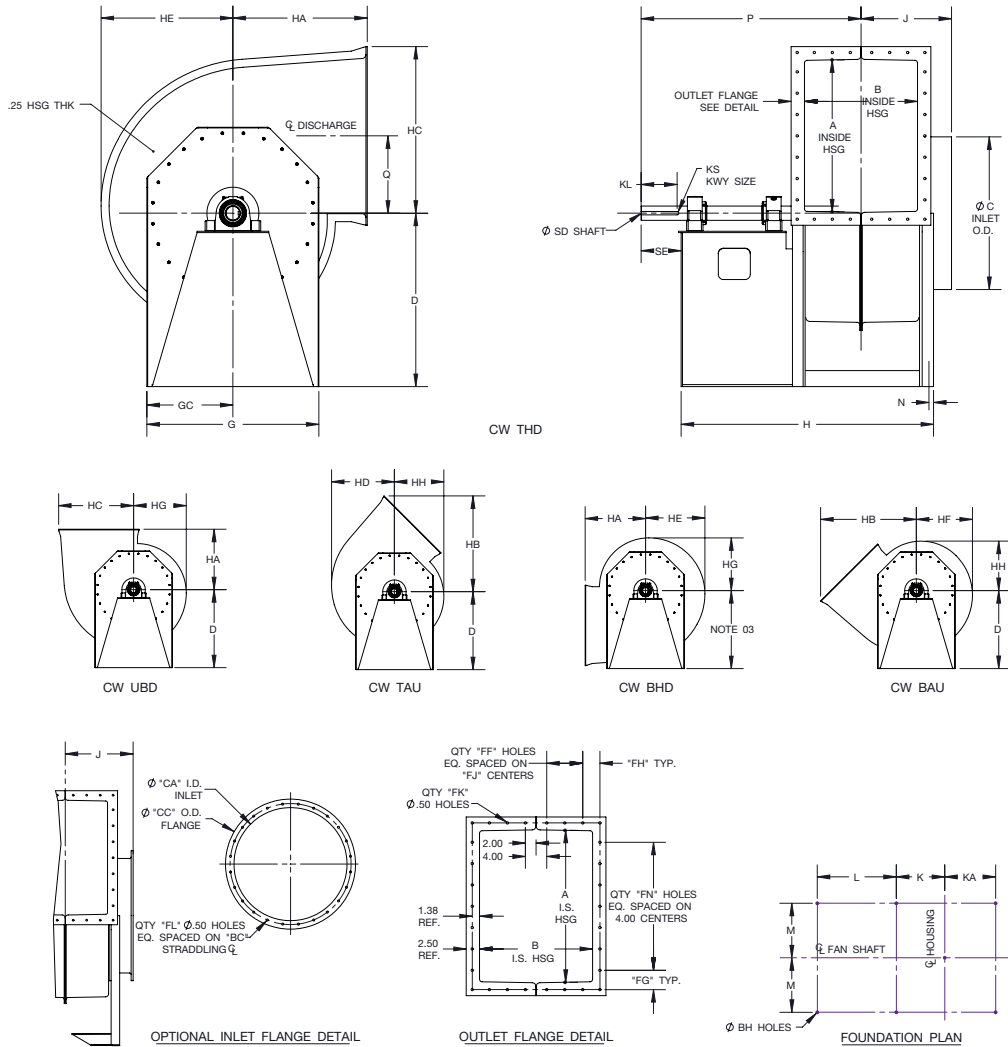
CORROSIVE AGENT	STANDARD CONSTRUCTION (°F)	ALL VINYLESTER AIRSTREAM (°F)
Sulfuric Acid to 70%	Consult Factory	*100
Sulfuric Acid to 80%	Consult Factory	Not Recommended
Sulfuric: Nitric Acids	Consult Factory	150
Sulfuric Acid/Phosphoric Acid to 25%/to 25%	Consult Factory	180
Sulfurous Acid to 10%	90	120
Tannic Acid	200	210
Tartaric Acid	210	210
Tetrachloroethane	No Data	100 (Fumes Only)
Tetrachloroethylene (perchloroethylene)	Consult Factory	80
Tetrachloropyridine	Consult Factory	80
Tetrapotassium Pyrophosphate to 60%	Consult Factory	130
Thionyl Chloride	Not Recommended	Not Recommended
Toluene	Consult Factory	80
Toluene Sulfonic Acid	Consult Factory	200
Trichloroethane	Not Recommended	100
Trichloroethylene	Not Recommended	Not Recommended
Trichloromonofluoromethane (FREON II)	Consult Factory	80
Trichloroacetic Acid to 50%	Consult Factory	*100
Triethanolamine	Consult Factory	120
Trimethylene Chlorobromide	Not Recommended	Not Recommended
Trisodium Phosphate to 50%	Consult Factory	210
Turpentine	Not Recommended	150
Urea to 50%	90	160
Urea-Ammonium-Nitrate	Consult Factory	Consult Factory
Vinegar	Recommended	210
Vinyl Chloride	Not Recommended	Not Recommended
Vinyltoluene	No Data	Recommended ³
Waste, Organic (H ₂ O-HCl, Cl ₂ Vapors)	Consult Factory	Consult Factory
Water, Deionized	180	180
Water, Demineralized	180	180
Water, Distilled	180	180
Water, Sea	180	180
Water, Steam Condensate	180	180
Xylene	Consult Factory	80
Zinc Chloride	200	*210
Zinc Hydrosulfite	Consult Factory	Consult Factory
Zinc Nitrate	180	210

No Data = No data has been collected for corrosive agent; Consult factory.

* = Special Shaft and hardware required; Consult factory.

Agents without a temperature limit assume ambient (70 °F) conditions. If higher temperatures are required, consult factory. Concentration levels are by weight unless otherwise stated.

Arrg. 1, Sizes 165 – 365 Rotatable



Notes:

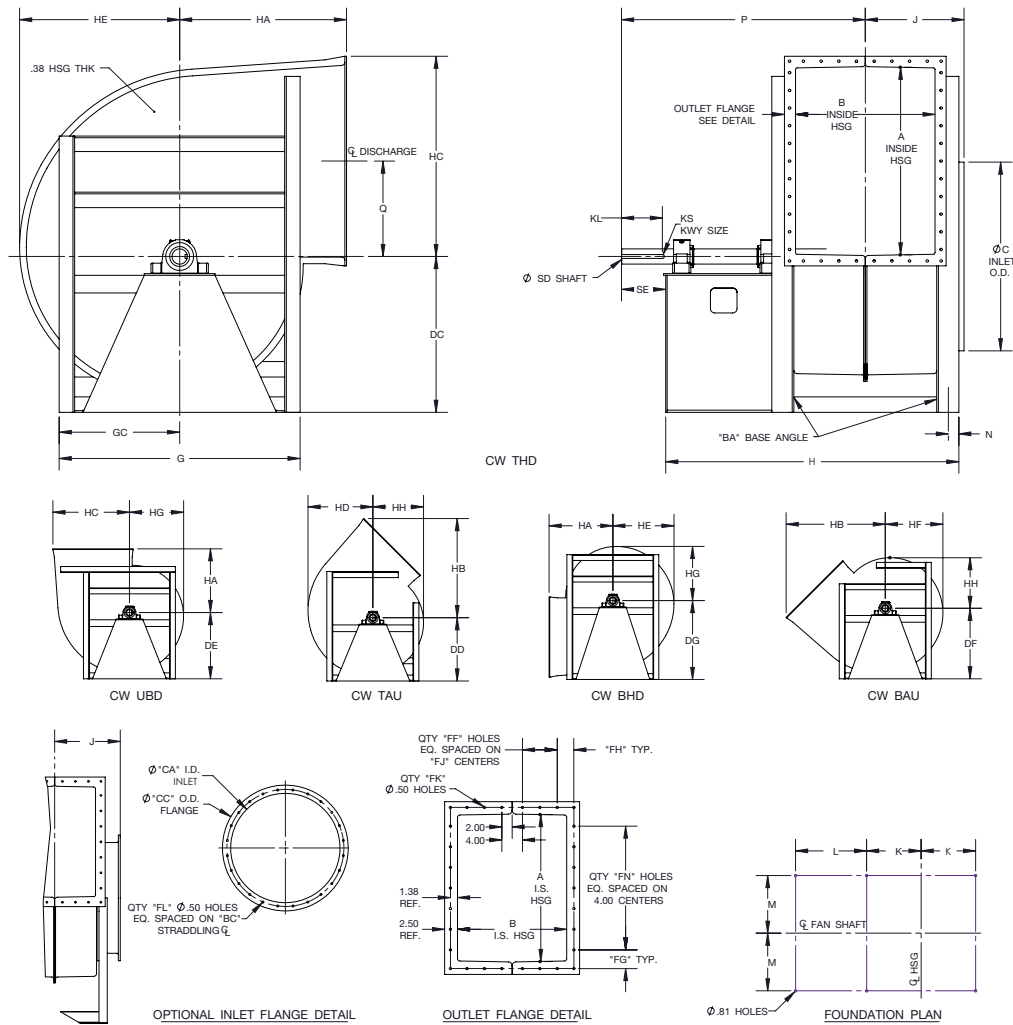
1. Outlet flanges are included on all discharges. Drilling is optional.
2. CW rotation is shown, CCW rotation is similar but opposite.
3. All units are rotatable to all positions shown using centerline height Dimension D, except sizes 300-365. Use Dimension DG for 300-365 when BHD discharge is required, otherwise Dimension D will be supplied.

FAN SIZE	A	B	BC	BH	C	CA	CC	D	DG	FF	FG	FH	FJ	FK	FL	FN	G	GC	H	HA
165	17.31	13.06	19.50	0.44	17.88	17.50	20.75	21.00	-	2	4.03	2.91	3.00	20	16	4	21.25	10.63	35.75	15.13
182	19.25	14.44	21.25	0.56	19.63	19.25	22.50	23.00	-	2	3.00	3.34	3.25	22	16	5	23.50	11.75	37.38	19.50
200	21.06	15.81	23.38	0.56	21.50	21.13	24.38	25.00	-	2	3.91	3.78	3.50	22	16	5	25.00	12.50	40.50	20.56
222	23.44	17.50	25.50	0.56	23.88	23.50	27.75	27.50	-	2	3.09	4.13	4.00	24	24	6	27.38	13.69	42.63	21.94
245	25.81	19.25	27.75	0.56	26.19	25.81	30.06	30.00	-	3	4.28	3.00	3.00	28	24	6	29.63	14.81	45.19	23.50
270	28.50	21.19	30.25	0.56	28.63	28.25	32.50	32.50	-	3	3.63	3.22	3.38	30	24	7	32.25	16.13	47.38	25.19
300	31.63	23.56	33.63	0.81	31.75	31.38	35.63	31.00	36.00	3	3.19	3.66	3.75	32	24	8	35.50	17.75	50.56	29.06
330	34.94	25.81	37.25	0.81	34.88	34.50	38.75	34.00	39.00	3	2.84	4.28	4.00	34	32	9	39.25	19.63	54.81	31.00
365	38.50	28.63	40.75	0.81	38.63	38.25	42.50	37.00	43.00	4	2.63	3.56	3.38	40	32	10	42.75	21.38	59.13	33.50

FAN SIZE	HB	HC	HD	HE	HF	HG	HH	J	K	KA	KL	KS	L	M	N	P	Q	SD	SE
165	24.88	20.06	16.44	15.63	14.75	14.00	13.13	12.94	8.06	8.69	5.00	.50 x .25	16.25	8.50	0.88	31.69	8.94	1.94	5.50
182	29.38	22.00	18.13	17.19	16.19	15.31	14.31	13.63	8.75	9.38	5.75	.50 x .25	16.50	9.13	0.88	33.63	9.88	2.19	6.50
200	31.38	23.81	19.88	18.81	17.69	16.69	15.56	14.31	9.44	10.06	5.75	.50 x .25	18.25	10.13	0.88	36.06	10.81	2.19	6.50
222	34.06	26.19	21.69	20.56	19.38	18.31	17.13	15.13	10.25	10.88	6.75	.63 x .31	18.75	11.25	0.88	38.38	12.00	2.44	7.50
245	36.81	28.56	23.75	22.50	21.25	20.00	18.69	16.00	11.13	11.75	6.75	.63 x .31	19.50	12.38	0.88	40.00	13.19	2.44	7.50
270	39.50	31.25	26.13	24.69	23.25	21.94	20.50	17.00	12.13	12.75	6.75	.63 x .31	19.75	13.63	0.88	41.31	14.50	2.69	7.50
300	44.88	34.38	28.75	27.19	25.63	24.19	22.63	18.19	13.38	14.00	6.75	.63 x .31	20.50	15.13	0.88	43.25	16.06	2.69	7.50
330	48.56	37.69	31.56	29.81	28.06	26.44	24.69	19.31	14.50	15.13	8.25	.75 x .38	22.50	16.63	0.88	47.88	17.75	2.94	9.00
365	52.88	41.25	34.88	32.94	31.00	29.19	27.25	20.69	15.88	16.50	9.25	.88 x .44	24.00	18.63	0.88	51.75	19.50	3.44	10.00

BC1000150-F

Arrg. 1, Sizes 402 – 600 Non-Rotatable



Notes:

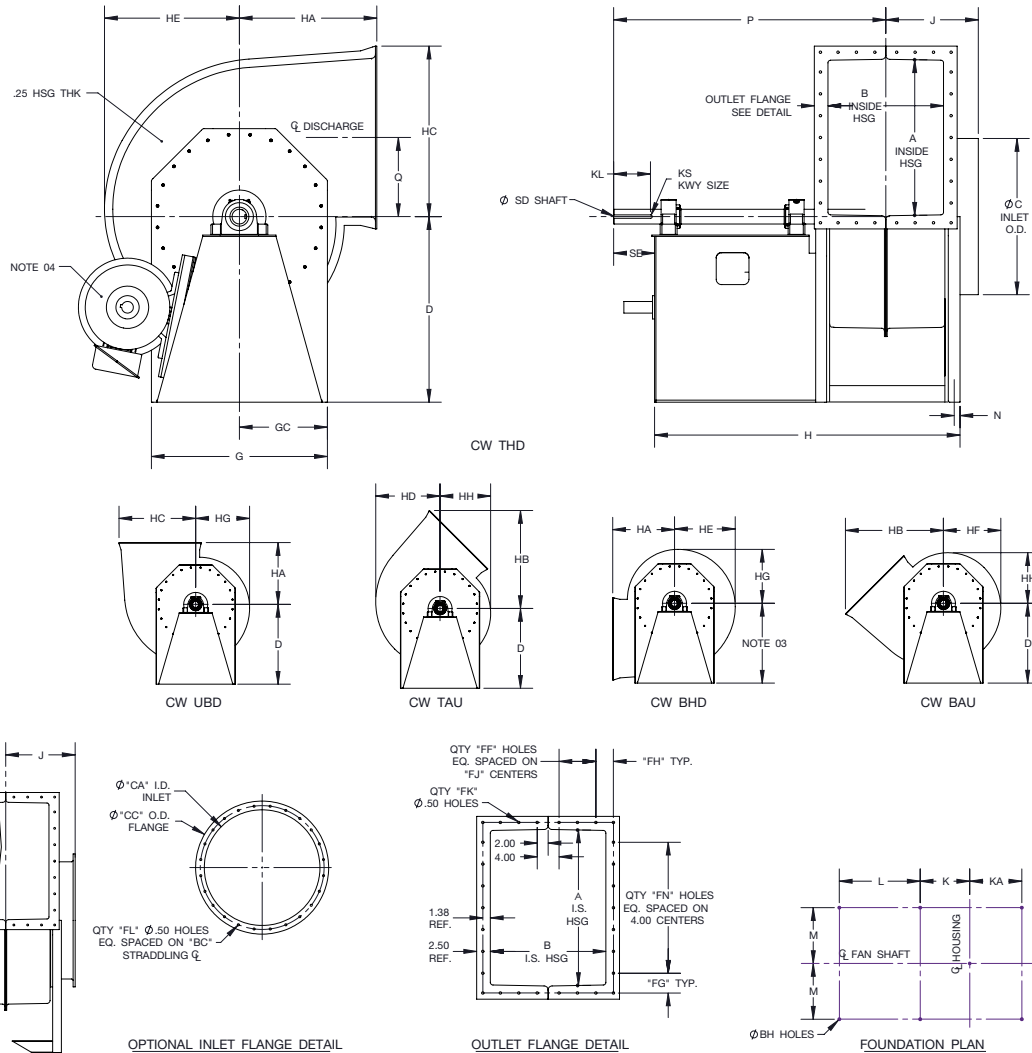
1. Outlet flanges are included on all discharges. Drilling is optional.
2. CW rotation is shown, CCW rotation is similar but opposite.

FAN SIZE	A	B	BA	BC	C	CA	CC	DC	DD	DE	DF	DG	FF	FG	FH	FJ	FK	FL	FN	G	GC
402	42.44	31.56	3.5 x 5.0	44.63	42.69	42.19	46.44	35.25	37.50	39.25	41.75	46.75	4	2.59	3.16	4.00	42.00	32.00	11	54.50	27.25
445	46.94	34.94	4.0 x 6.0	49.00	47.13	46.63	51.88	37.75	40.75	41.75	45.25	51.25	5	2.84	2.84	3.50	48.00	40.00	12	61.00	30.50
490	51.75	38.38	4.0 x 6.0	53.75	51.88	51.38	56.63	41.25	44.50	46.25	49.75	56.50	5	3.25	3.56	3.75	50.00	40.00	13	65.75	32.88
542	57.19	42.63	4.0 x 6.0	59.25	57.38	56.88	62.13	45.75	48.75	51.25	55.00	61.50	6	3.97	3.19	3.50	56.00	48.00	14	71.25	35.63
600	63.31	47.06	4.0 x 6.0	65.25	63.38	62.88	68.13	50.25	53.50	56.25	59.75	67.50	6	3.03	3.53	3.88	60.00	48.00	16	77.25	38.63

FAN SIZE	H	HA	HB	HC	HD	HE	HF	HG	HH	J	K	KL	KS	L	M	N	P	Q	SD	SE
402	66.31	37.75	58.80	45.31	38.44	36.25	34.19	32.13	30.06	22.38	18.81	9.25	.88 x .44	24.50	19.88	2.38	55.19	21.63	3.44	10.00
445	74.69	42.63	65.13	49.81	42.25	39.81	37.56	35.31	33.06	24.06	21.00	9.25	1.00 x .50	28.00	21.38	2.88	60.88	23.88	3.94	10.00
490	80.13	45.50	70.56	54.63	46.44	43.75	41.25	38.75	36.25	25.75	22.69	9.25	1.00 x .50	30.00	23.88	2.88	64.56	26.25	3.94	10.00
542	87.38	49.06	76.91	60.06	51.25	48.25	45.50	42.75	40.00	27.88	25.19	9.25	1.00 x .50	32.69	26.63	2.88	69.69	29.00	4.44	10.00
600	92.81	52.94	84.00	66.19	56.63	53.31	50.25	47.19	44.13	30.13	27.06	9.25	1.25 x .63	34.00	29.63	2.88	72.91	32.06	4.94	10.00

BC1000151-D

Arrg. 9, Sizes 165 – 365 Rotatable



Notes:

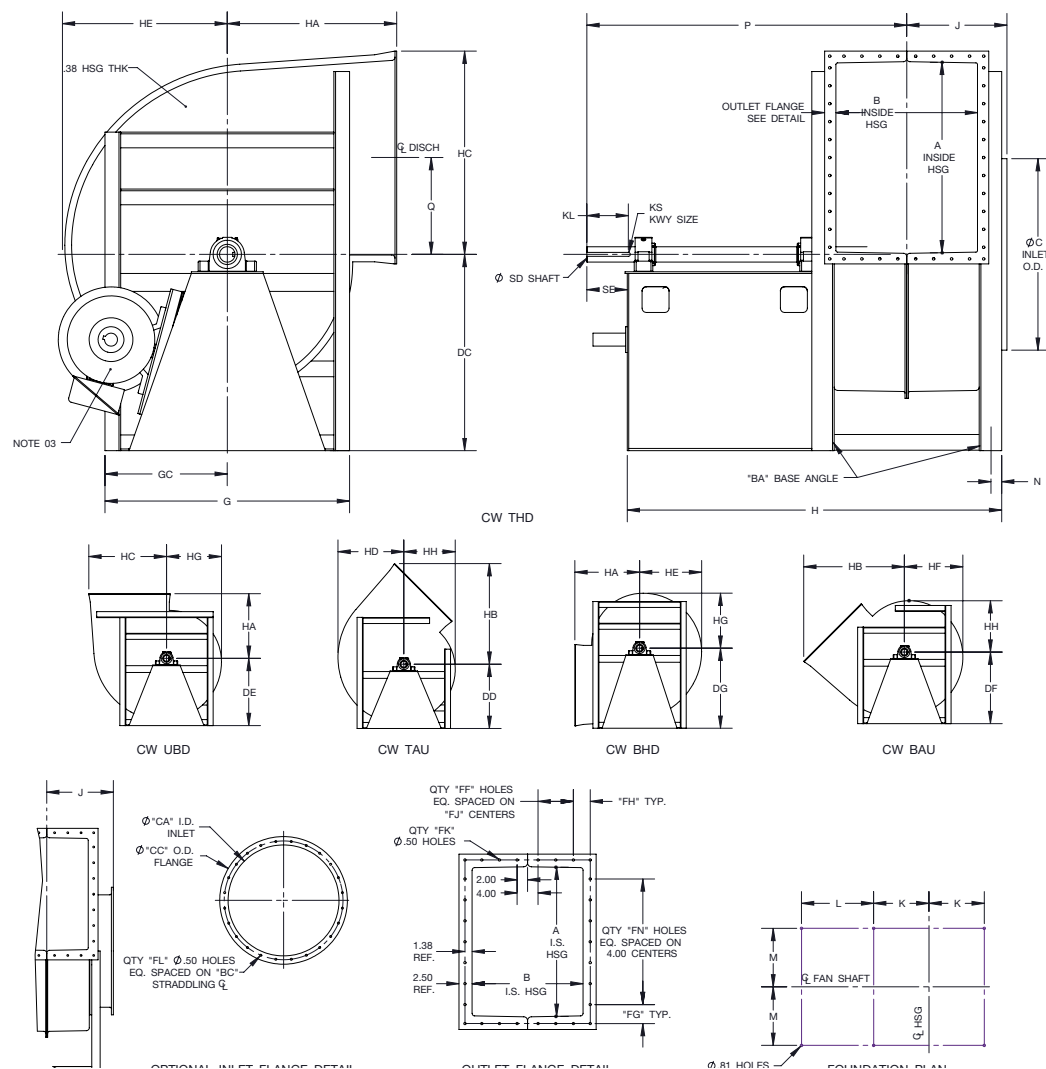
1. Outlet flanges are included on all discharges. Drilling is optional.
2. CW rotation is shown, CCW rotation is similar but opposite.
3. All units are rotatable to all positions shown using centerline height Dimension D, except sizes 300-365. Use Dimension DG for 300-365 when BHD discharge is required, otherwise Dimension D will be supplied.
4. Standard Arr. 9 motor location is on the left for CW rotation and on the right for CCW rotation (unless otherwise specified). Dimension FR is maximum motor frame.

FAN SIZE	A	B	BC	BH	C	CA	CC	D	DG	FF	FG	FH	FJ	FK	FL	FN	FR	G	GC	H
165	17.31	13.06	19.50	0.44	17.88	17.50	20.75	27.00	-	2	4.03	2.91	3.00	20	16	4	286T	21.25	10.63	46.13
182	19.25	14.44	21.25	0.56	19.63	19.25	22.50	30.50	-	2	3.00	3.34	3.25	22	16	5	326T	23.50	11.75	49.75
200	21.06	15.81	23.38	0.56	21.50	21.13	24.38	31.00	-	2	3.91	3.78	3.50	22	16	5	326T	25.00	12.50	51.13
222	23.44	17.50	25.50	0.56	23.88	23.50	27.75	33.75	-	2	3.09	4.13	4.00	24	24	6	365T	27.38	13.69	53.94
245	25.81	19.25	27.75	0.56	26.19	25.81	30.06	34.00	-	3	4.28	3.00	3.00	28	24	6	365T	29.63	14.81	55.38
270	28.50	21.19	30.25	0.56	28.63	28.25	32.50	34.00	-	3	3.63	3.22	3.38	30	24	7	365T	32.25	16.13	57.38
300	31.63	23.56	33.63	0.81	31.75	31.38	35.63	34.75	36.00	3	3.19	3.66	3.75	32	24	8	365T	35.50	17.75	60.81
330	34.94	25.81	37.25	0.81	34.88	34.50	38.75	37.75	39.00	3	2.84	4.28	4.00	34	32	9	405T	39.25	19.63	69.69
365	38.50	28.63	40.75	0.81	38.63	38.25	42.50	41.00	43.00	4	2.63	3.56	3.38	40	32	10	405T	42.75	21.38	78.81

FAN SIZE	HA	HB	HC	HD	HE	HF	HG	HH	J	K	KA	KL	KS	L	M	N	P	Q	SD	SE
165	15.13	24.88	20.06	16.44	15.63	14.75	14.00	13.13	12.94	8.06	8.69	5.00	.50 x .25	25.25	8.50	0.88	40.69	8.94	1.94	5.50
182	19.50	29.38	22.00	18.13	17.19	16.19	15.31	14.31	13.63	8.75	9.38	5.75	.50 x .25	27.50	9.13	0.88	44.63	9.88	2.19	6.50
200	20.56	31.38	23.81	19.88	18.81	17.69	16.69	15.56	14.31	9.44	10.06	5.75	.50 x .25	27.50	10.13	0.88	45.31	10.81	2.19	6.50
222	21.94	34.06	26.19	21.69	20.56	19.38	18.31	17.13	15.13	10.25	10.88	6.75	.63 x .31	28.63	11.25	0.88	48.25	12.00	2.44	7.50
245	23.50	36.81	28.56	23.75	22.50	21.25	20.00	18.69	16.00	11.13	11.75	6.75	.63 x .31	28.38	12.38	0.88	48.88	13.19	2.44	7.50
270	25.19	39.50	31.25	26.13	24.69	23.25	21.94	20.50	17.00	12.13	12.75	6.75	.63 x .31	28.38	13.63	0.88	49.88	14.50	2.69	7.50
300	29.06	44.88	34.38	28.75	27.19	25.63	24.19	22.63	18.19	13.38	14.00	6.75	.63 x .31	29.38	15.13	0.88	52.13	16.06	2.69	7.50
330	31.00	48.56	37.69	31.56	29.81	28.06	26.44	24.69	19.31	14.50	15.13	8.25	.75 x .38	36.00	16.63	0.88	61.38	17.75	2.94	9.00
365	33.50	52.88	41.25	34.88	32.94	31.00	29.19	27.25	20.69	15.88	16.50	9.25	.88 x .44	42.13	18.63	0.88	68.88	19.50	3.44	10.00

BC1000155-F

Arrg. 9, Sizes 402 – 600 Non-Rotatable



Notes:

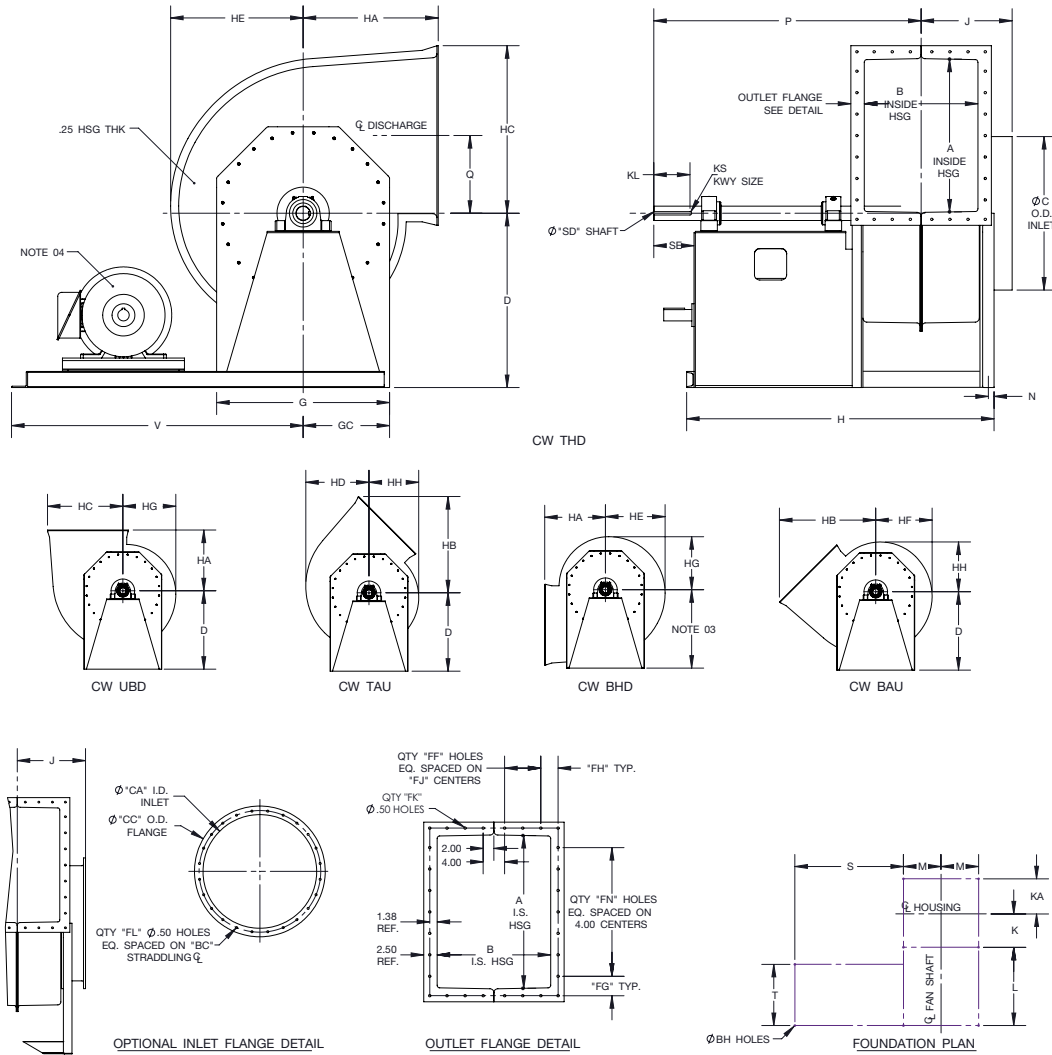
1. Outlet flanges are included on all discharges. Drilling is optional.
2. CW rotation is shown, CCW rotation is similar but opposite.
3. Standard Arr. 9F motor location is on the left for CW rotation units and on the right for CCW rotation (unless otherwise specified). Dimension FR is maximum motor frame.

FAN SIZE	A	B	BA	BC	C	CA	CC	DC	DD	DE	DF	DG	FF	FG	FH	FJ	FK	FL	FN	FR	G
402	42.44	31.56	3.5 x 5.0	44.63	42.69	42.19	46.44	43.75	43.75	43.75	43.75	46.75	4	2.59	3.16	4.00	42	32	11	405T	54.50
445	46.94	34.94	4.0 x 6.0	49.00	47.13	46.63	51.88	44.75	44.75	44.75	45.25	50.75	5	2.84	2.84	3.50	48	40	12	405T	61.00
490	51.75	38.38	4.0 x 6.0	53.75	51.88	51.38	56.63	44.75	44.75	46.25	49.75	55.50	5	3.25	3.56	3.75	50	40	13	405T	65.75
542	57.19	42.63	4.0 x 6.0	59.25	57.38	56.88	62.13	45.75	48.75	51.25	55.00	61.00	6	3.97	3.19	3.50	56	48	14	405T	71.25
600	63.31	47.06	4.0 x 6.0	65.25	63.38	62.88	68.13	50.25	53.50	56.25	59.75	66.50	6	3.03	3.53	3.88	60	48	16	405T	77.25

FAN SIZE	GC	H	HA	HB	HC	HD	HE	HF	HG	HH	J	K	KL	KS	L	M	N	P	Q	SD	SE
402	27.25	85.00	37.75	58.80	45.31	38.44	36.25	34.19	32.13	30.06	22.38	18.81	9.25	.88 x .44	41.63	19.88	2.38	72.31	21.63	3.44	10.00
445	30.50	90.00	42.63	65.13	49.81	42.25	39.81	37.56	35.31	33.06	24.06	21.00	9.25	1.00 x .50	41.75	21.38	2.88	74.63	23.88	3.94	10.00
490	32.88	93.44	45.50	70.56	54.63	46.44	43.75	41.25	38.75	36.25	25.75	22.69	9.25	1.00 x .50	41.75	23.88	2.88	76.31	26.25	3.94	10.00
542	35.63	97.69	49.06	76.91	60.06	51.25	48.25	45.50	42.75	40.00	27.88	25.19	9.25	1.00 x .50	41.75	26.63	2.88	78.44	29.00	4.44	10.00
600	38.63	102.13	52.94	84.00	66.19	56.63	53.31	50.25	47.19	44.13	30.13	27.06	9.25	1.25 x .63	41.75	29.63	2.88	80.69	32.06	4.94	10.00

BC1000156-D

Arr. 9F, Sizes 165 – 365 Rotatable



Notes:

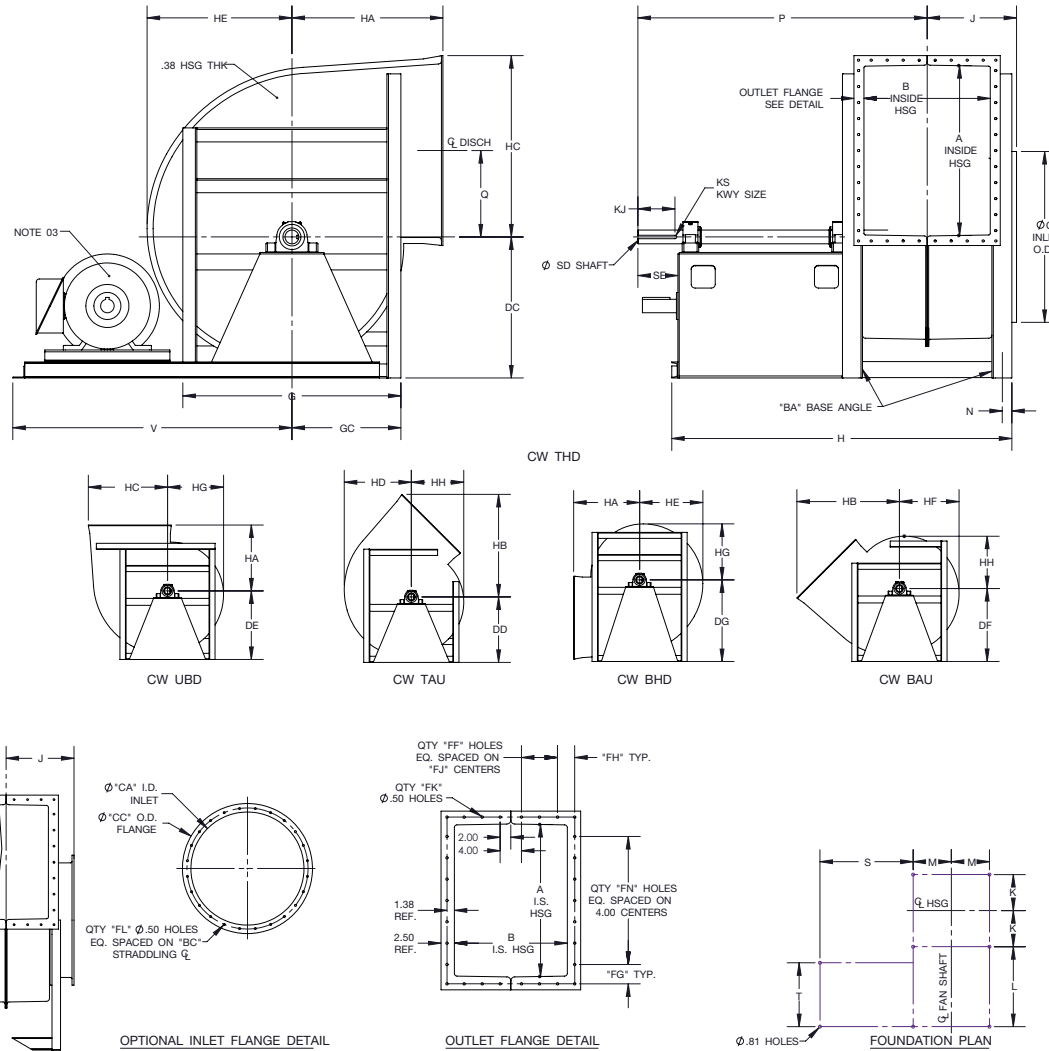
- Outlet flanges are included on all discharges. Drilling is optional.
- CW rotation is shown, CCW rotation is similar but opposite.
- All units are rotatable to all positions shown using centerline height Dimension D, except sizes 300-365. Use Dimension DG for 300-365 when BHD discharge is required, otherwise Dimension D will be supplied.
- Standard Arr. 9F motor location is on the left for CW rotation and on the right for CCW rotation (unless otherwise specified). Dimension FR is maximum motor frame.

FAN SIZE	A	B	BC	BH	C	CA	CC	D	DG	FF	FG	FH	FJ	FK	FL	FN	FR	G	GC	H	HA	HB
165	17.31	13.06	19.50	0.44	17.88	17.50	20.75	21.00	-	2	4.03	2.91	3.00	20.00	16	4	286T	21.25	10.63	46.13	15.13	24.88
182	19.25	14.44	21.25	0.56	19.63	19.25	22.50	23.00	-	2	3.00	3.34	3.25	22.00	16	5	326T	23.50	11.75	49.75	19.50	29.38
200	21.06	15.81	23.38	0.56	21.50	21.13	24.38	25.00	-	2	3.91	3.78	3.50	22.00	16	5	326T	25.00	12.50	51.13	20.56	31.38
222	23.44	17.50	25.50	0.56	23.88	23.50	27.75	27.50	-	2	3.09	4.13	4.00	24.00	24	6	365T	27.38	13.69	53.94	21.94	34.06
245	25.81	19.25	27.75	0.56	26.19	25.81	30.06	30.00	-	3	4.28	3.00	3.00	28.00	24	6	365T	29.63	14.81	55.38	23.50	36.81
270	28.50	21.19	30.25	0.56	28.63	28.25	32.50	32.50	-	3	3.63	3.22	3.38	30.00	24	7	365T	32.25	16.13	57.38	25.19	39.50
300	31.63	23.56	33.63	0.81	31.75	31.38	35.63	31.00	36.00	3	3.19	3.66	3.75	32.00	24	8	365T	35.50	17.75	60.81	29.06	44.88
330	34.94	25.81	37.25	0.81	34.88	34.50	38.75	34.00	39.00	3	2.84	4.28	4.00	34.00	32	9	405T	39.25	19.63	69.69	31.00	48.56
365	38.50	28.63	40.75	0.81	38.63	38.25	42.50	37.00	43.00	4	2.63	3.56	3.38	40.00	32	10	405T	42.75	21.38	75.81	33.50	52.88

FAN SIZE	HC	HD	HE	HF	HG	HH	J	K	KA	KL	KS	L	M	N	P	Q	S	SD	SE	T	V
165	20.06	16.44	15.63	14.75	14.00	13.13	12.94	8.06	8.69	5.00	.50 x .25	25.25	8.50	0.88	40.69	8.94	30.50	1.94	5.50	18.56	40.38
182	22.00	18.13	17.19	16.19	15.31	14.31	13.63	8.75	9.38	5.75	.50 x .25	27.50	9.13	0.88	44.63	9.88	35.25	2.19	6.50	20.81	45.75
200	23.81	19.88	18.81	17.69	16.69	15.56	14.31	9.44	10.06	5.75	.50 x .25	27.50	10.13	0.88	45.31	10.81	35.25	2.19	6.50	22.31	46.75
222	26.19	21.69	20.56	19.38	18.31	17.13	15.13	10.25	10.88	6.75	.63 x .31	28.63	11.25	0.88	48.25	12.00	39.38	2.44	7.50	22.81	52.00
245	28.56	23.75	22.50	21.25	20.00	18.69	16.00	11.13	11.75	6.75	.63 x .31	28.38	12.38	0.88	48.88	13.19	39.38	2.44	7.50	22.81	53.13
270	31.25	26.13	24.69	23.25	21.94	20.50	17.00	12.13	12.75	6.75	.63 x .31	28.38	13.63	0.88	49.88	14.50	39.38	2.69	7.50	22.19	54.38
300	34.38	28.75	27.19	25.63	24.19	22.63	18.19	13.38	14.00	6.75	.63 x .31	29.38	15.13	0.88	52.13	16.06	39.88	2.69	7.50	23.44	56.38
330	37.69	31.56	29.81	28.06	26.44	24.69	19.31	14.50	15.13	8.25	.75 x .38	36.00	16.63	0.88	61.38	17.75	45.00	2.94	9.00	30.00	63.00
365	41.25	34.88	32.94	31.00	29.19	27.25	20.69	15.88	16.50	9.25	.88 x .44	42.13	18.63	0.88	68.88	19.50	48.50	3.44	10.00	33.25	68.50

BC1000152-F

Arrg. 9F, Sizes 402 – 600 Non-Rotatable



Notes:

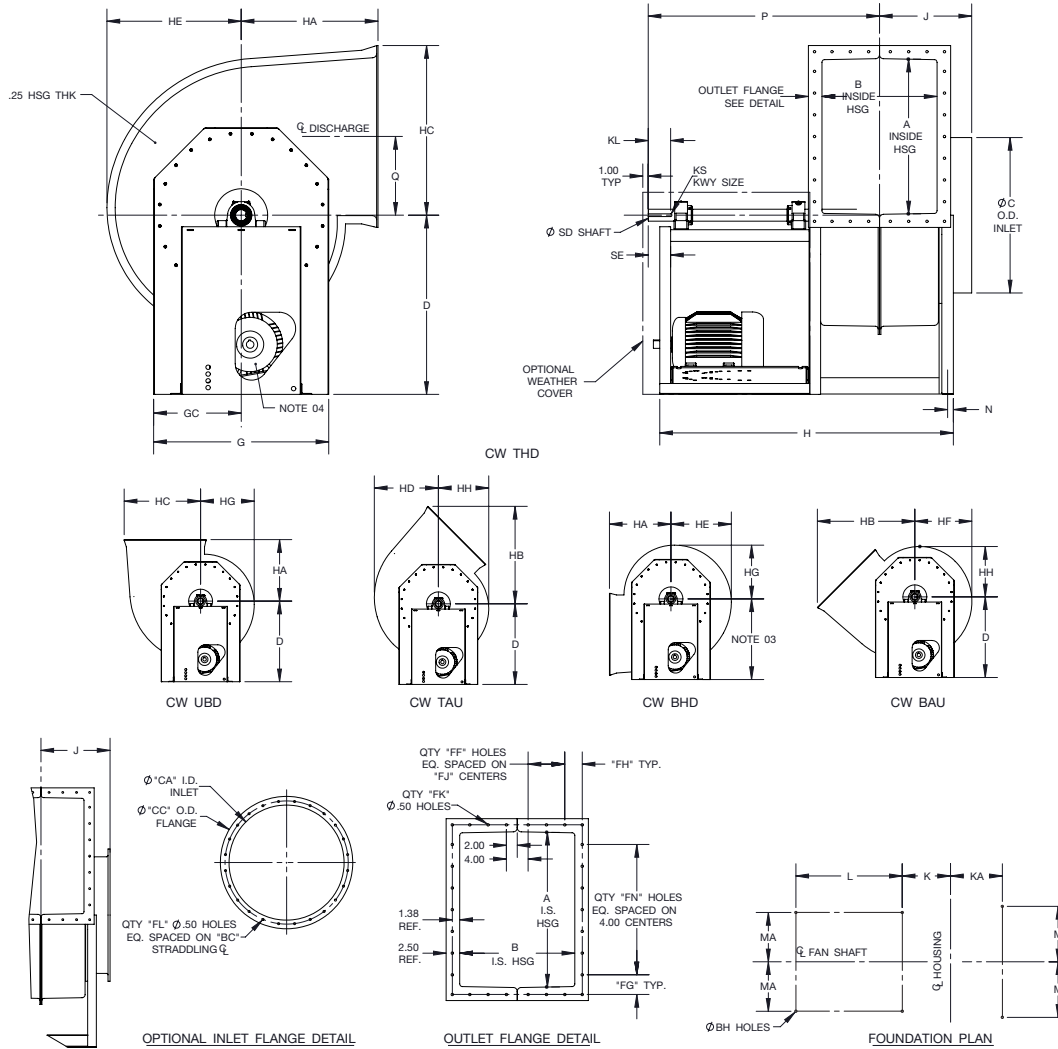
1. Outlet flanges are included on all discharges. Drilling is optional.
2. CW rotation is shown, CCW rotation is similar but opposite.
3. Standard Arr. 9F motor location is on the left for CW rotation units and on the right for CCW rotation (unless otherwise specified). Dimension FR is maximum motor frame.

FAN SIZE	A	B	BA	BC	C	CA	CC	DC	DD	DE	DF	DG	FF	FG	FH	FJ	FK	FL	FN	FR	G	GC	H
402	42.44	31.56	3.5 x 5.0	44.63	42.69	42.19	46.44	35.25	37.5	39.25	41.75	46.75	4	2.59	3.16	4.00	42	32	11	445T	54.50	27.25	85.00
445	46.94	34.94	4.0 x 6.0	49.00	47.13	46.63	51.88	37.75	40.75	41.75	45.25	51.25	5	2.84	2.84	3.50	48	40	12	445T	61.00	30.50	90.00
490	51.75	38.38	4.0 x 6.0	53.75	51.88	51.38	56.63	41.25	44.50	46.25	49.75	56.50	5	3.25	3.56	3.75	50	40	13	445T	65.75	32.88	93.44
542	57.19	42.63	4.0 x 6.0	59.25	57.38	56.88	62.13	45.75	48.75	51.25	55.00	61.50	6	3.97	3.19	3.50	56	48	14	445T	71.25	35.63	97.69
600	63.31	47.06	4.0 x 6.0	65.25	63.38	62.88	68.13	50.25	53.50	56.25	59.75	67.50	6	3.03	3.53	3.88	60	48	16	445T	77.25	38.63	102.13

FAN SIZE	HA	HB	HC	HD	HE	HF	HG	HH	J	K	KL	KS	L	M	N	P	Q	S	SD	SE	T	V
402	37.75	58.80	45.31	38.44	36.25	34.19	32.13	30.06	22.38	18.81	9.25	.88 x .44	41.63	19.88	2.38	72.31	21.63	48.50	3.438	10	33.25	69.75
445	42.63	65.13	49.81	42.25	39.81	37.56	35.31	33.06	24.06	21.00	9.25	1.00 x .50	41.75	21.38	2.88	74.63	23.88	48.50	3.938	10	33.25	71.25
490	45.5	70.56	54.63	46.44	43.75	41.25	38.75	36.25	25.75	22.69	9.25	1.00 x .50	41.75	23.88	2.88	76.31	26.25	48.50	3.938	10	33.25	73.75
542	49.06	76.91	60.06	51.25	48.25	45.50	42.75	40.00	27.88	25.19	9.25	1.00 x .50	41.75	26.63	2.88	78.44	29.00	48.50	4.438	10	33.25	76.50
600	52.94	84.00	66.19	56.63	53.31	50.25	47.19	44.13	30.13	27.06	9.25	1.25 x .63	41.75	29.63	2.88	80.69	32.06	48.50	4.938	10	33.25	79.50

BC1000153-D

Arrg. 10, Sizes 165 – 365 Rotatable



Notes:

1. Outlet flanges are included on all discharges. Drilling is optional.
2. CW rotation is shown, CCW rotation is similar but opposite.
3. All units are rotatable to all positions shown using centerline height Dimension D, except sizes 300-365. Use Dimension DG for 300-365 when BHD discharge is required, otherwise Dimension D will be supplied.
4. Dimension FR is maximum motor frame.

FAN SIZE	A	B	BC	BH	C	CA	CC	D	DG	FF	FG	FH	FJ	FK	FL	FN	FR	G	GC	H	HA
165	17.31	13.06	19.50	0.44	17.88	17.50	20.75	22.00	-	2	4.03	2.91	3.00	20.00	16	4	215T	21.25	10.63	39.00	15.13
182	19.25	14.44	21.25	0.56	19.63	19.25	22.50	24.00	-	2	3.00	3.34	3.25	22.00	16	5	256T	23.50	11.75	45.13	19.50
200	21.06	15.81	23.38	0.56	21.50	21.13	24.38	25.50	-	2	3.91	3.78	3.50	22.00	16	5	256T	25.00	12.50	46.50	20.56
222	23.44	17.50	25.50	0.56	23.88	23.50	27.75	28.00	-	2	3.09	4.13	4.00	24.00	24	6	256T	27.38	13.69	48.19	21.94
245	25.81	19.25	27.75	0.56	26.19	25.81	30.06	30.50	-	3	4.28	3.00	3.00	28.00	24	6	256T	29.63	14.81	49.94	23.50
270	28.50	21.19	30.25	0.56	28.63	28.25	32.50	33.00	-	3	3.63	3.22	3.38	30.00	24	7	286T	32.25	16.13	54.13	25.19
300	31.63	23.56	33.63	0.81	31.75	31.38	35.63	31.00	37.00	3	3.19	3.66	3.75	32.00	24	8	286T	35.50	17.75	56.56	29.06
330	34.94	25.81	37.25	0.81	34.88	34.50	38.75	34.00	40.00	3	2.84	4.28	4.00	34.00	32	9	326T	39.25	19.63	62.31	31.00
365	38.50	28.63	40.75	0.81	38.63	38.25	42.50	37.00	43.50	4	2.63	3.56	3.38	40.00	32	10	326T	42.75	21.38	65.13	33.50

FAN SIZE	HB	HC	HD	HE	HF	HG	HH	J	K	KA	KL	KS	L	M	MA	N	P	Q	SD	SE
165	24.88	20.06	16.44	15.63	14.75	14.00	13.13	12.94	7.56	8.69	2.88	.50 x .25	20.00	8.50	9.25	0.88	30.81	8.94	1.69	3.38
182	29.38	22.00	18.13	17.19	16.19	15.31	14.31	13.63	8.25	9.38	3.50	.50 x .25	24.75	9.13	10.88	0.88	36.38	9.88	1.94	4.00
200	31.38	23.81	19.88	18.81	17.69	16.69	15.56	14.31	8.94	10.06	3.50	.50 x .25	24.63	10.13	10.88	0.88	37.06	10.81	1.94	4.00
222	34.06	26.19	21.69	20.56	19.38	18.31	17.13	15.13	10.00	10.88	3.50	.63 x .31	23.88	11.25	11.13	0.88	37.88	12.00	2.19	4.00
245	36.81	28.56	23.75	22.50	21.25	20.00	18.69	16.00	10.88	11.75	3.50	.63 x .31	23.88	12.38	11.63	0.88	38.75	13.19	2.19	4.00
270	39.50	31.25	26.13	24.69	23.25	21.94	20.50	17.00	11.88	12.75	4.13	.63 x .31	26.13	13.63	12.13	0.88	42.63	14.50	2.19	4.63
300	44.88	34.38	28.75	27.19	25.63	24.19	22.63	18.19	13.38	14.00	4.13	.63 x .31	25.38	15.13	12.38	0.88	43.88	16.06	2.19	4.63
330	48.56	37.69	31.56	29.81	28.06	26.44	24.69	19.31	14.50	15.13	4.50	.75 x .38	28.88	16.63	14.13	0.88	48.88	17.75	2.44	5.25
365	52.88	41.25	34.88	32.94	31.00	29.19	27.25	20.69	15.88	16.50	4.50	.88 x .44	28.88	18.63	14.13	0.88	50.25	19.50	2.44	5.25

BC1000154-F



Model

BCSF

Fans shall be Model BCSF, Backward Curved High Pressure Composite Blowers, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

PERFORMANCE — Performance ratings shall conform to AMCA Standard 208 (fan energy index), 211 (air performance) and 311 (sound performance). Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and 300 (sound performance) in an AMCA accredited laboratory. Fans shall be licensed to bear the AMCA certified ratings seal for both air and sound, and fan energy index (FEI).

Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise beyond the peak efficiency to ensure quiet and stable operation. Fans shall have a non-overloading design with selflimiting horsepower characteristics and shall reach a peak in the normal selection area.

CONSTRUCTION — Fan housing shall be constructed of fire-retardant vinyl ester resin with ASTME-84 Class 1 flame spread of <25. Airstream surfaces shall be free from imperfections and irregularities to minimize airflow resistance and to prevent contamination build-up. Discharge flanges shall be provided for rigidity and duct connection. Housings shall be suitably braced to prevent distortion and vibration. Shaft hole openings sealed to minimize leakage. Inlet of housing shall be adequately sized to allow for impeller removal. All units are furnished with lifting lugs.

IMPELLER — BCSF backward curved impellers shall be single thickness, designed for maximum efficiency and quiet operation. Impeller shall be fabricated of a fire-retardant vinyl ester resin. Blades shall be continuously bonded to the rim and back plate. Impeller hub shall be completely encapsulated to insure corrosion protection. All impellers shall be statically and dynamically balanced.

SHAFT — Shafts shall be AISI 1045 hot rolled steel, accurately turned, ground, polished and ring-gauged for accuracy. Shafts shall be encased in a sleeve securely fixed and bonded to the impeller back plate. The sleeve shall extend out through the housing shaft hole for corrosion protection. 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 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.

DRIVE — Motor sheaves shall be cast iron, variable pitch on applications 20 HP and smaller, and fixed pitch on 25 HP and larger. Drives and belts shall be located external to the fan casing and rated for 150% of the required motor HP.

FINISH AND COATING — Exposed steel components excluding the shaft, shall be thoroughly degreased and deburred before application of a rust-preventative primer. After the steel structure is completely assembled, a finish coat of epoxy shall be applied to the entire assembly. The exposed portion of the fan shaft shall be coated with a petroleum-based rust protectant. The housing shall be coated with a suitable coating.

ACCESSORIES — When specified, accessories such as shaft seals, access doors, drains, inlet flanges, belt guards, shaft and bearing guards, outlet dampers, inlet boxes shall be provided by Twin City Fan & Blower to maintain onesource responsibility.

FACTORY RUN TEST — All fans prior to shipment shall be completely assembled and test run as a unit at the specified operating speed or maximum RPM allowed. 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.

GUARANTEE — The manufacturer shall guarantee the workmanship and materials for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first.

INDUSTRIAL PROCESS AND COMMERCIAL VENTILATION SYSTEMS

CENTRIFUGAL FANS | UTILITY SETS | PLENUM & PLUG FANS | INLINE CENTRIFUGAL FANS

MIXED FLOW FANS | TUBEAXIAL & VANEAXIAL FANS | WALL MOUNTED FANS | ROOF VENTILATORS

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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