

GreenJet

Models GJ-AU and GJ-AB

Unidirectional and Bidirectional



BUILDING VALUE IN AIR.

 **GREENHECK**
Building Value in Air.

September
2010

The GreenJet series includes a range of fans to accommodate your needs for parking garage ventilation. Available in both the unidirectional series (GJ-AU) and the bidirectional series (GJ-AB). Both series come standard with inlet and outlet silencers, inlet guard, mounting feet and aluminum die cast propellers and blades. The GJ-AU series features a true airfoil design propeller which is designed to move high volumes of air at a high efficiency in a smaller diameter fan. The GJ-AB series features a 100% reversible, highly efficient, airfoil blade design.



The Basic Principles of a GreenJet fan are that it provides the *right amount of ventilation* in the *right location* at the *right time*, and the *right price*. GreenJet fans are used in conjunction with main exhaust fans and sometimes supply air fans (when ramps, entrances, etc. are not sufficient to supply the fresh air). The GreenJet fans are used to move the air to the intake of the main exhaust fans which then move this air out of the space.

Right Amount of Ventilation

GreenJet fans are typically used in conjunction with a CO (carbon monoxide) monitoring system and are available with 2-speed motors as a standard option. The fan can be cycled from off to low speed to high speed using the CO sensor to modify its operation. Several fans can be grouped together on one CO sensor or each fan can be individually controlled. The fans are constantly changing speed throughout the day based on the quality of air in the area.

Right Location

Computational Fluid Dynamics (CFD) is used to locate the fans in the parking garage in order to provide the ventilation at the right location in the garage. This ensures that fans are located where they are needed.

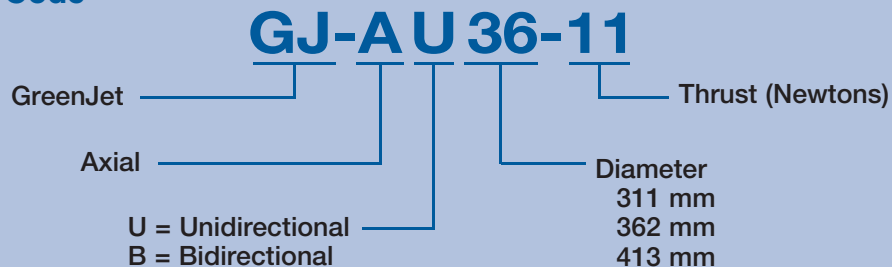
Right Time

With the use of the CO sensors and a good control system, the fans only need to operate when required. They also can be operated during a fire from a remote control station to utilize the correct fans facilitating the exhaust of smoke from the building in the most efficient manner.

Right Price

The GreenJet fan does not require any expensive ductwork or control dampers to be installed within the ventilation system. This allows the fans to operate more efficiently than the traditional system and also eliminates the system loss of the ductwork, further improving the efficiency of the system.

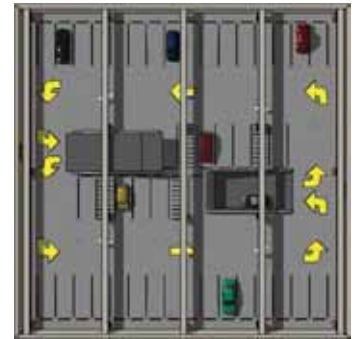
Model Number Code



Normal Operation

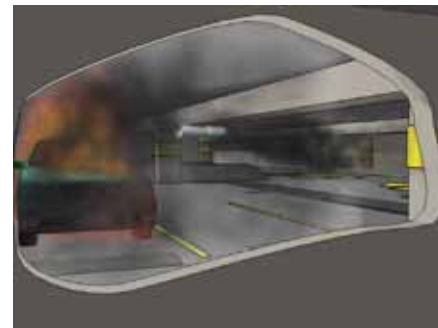
GreenJet technology draws air into one end of the fan and discharges it at a high velocity at the other end in order to pass the air to the next GreenJet fan. These fans are arranged to direct the air to a main exhaust fan that removes the air from the parking garage. The make-up air is then provided through the entrance and exit ramps or through a dedicated supply fan. This process allows the fans to remove the contaminated air from the parking garage without the use of costly and unsightly ductwork in the garage.

These fans can be used with CO sensors to increase the speed of the fan automatically on the rise in CO levels within the space. This feature allows for the fans to start, speedup and stop based on the actual air conditions. The strong advantage of these types of fans is that they are moving the bad air out while leaving the good air in place.



High Temperature Smoke Removal

During a fire, the GreenJet system is extremely flexible in operation to control the fire. Once a fire is detected in the facility, the GreenJet fans in the applicable area are switched to high speed as are the main smoke exhaust fans. The GreenJet fans quickly isolate the smoke in the area and direct it on the shortest path to the inlet ports for the main exhaust fans in order to remove the smoke from the building. This action provides full smoke control for the garage and allows the emergency response teams better access to the facility.



Motor Specification Details

Motor Size (kW)	Poles	Frame Size	Full Load Amps (380 / 400 / 415V)	Starting Amps	Size 31	Size 36	Size 41
0.55	4	801	1.5 / 1.5 / 1.4	4.5	✓	✓	✓
0.75	4	802	2.1 / 2.0 / 1.9	4.8	✓	✓	✓
1.10	4	90S	2.9 / 2.7 / 2.6	4.5	✓	✓	✓
1.50	4	90L	3.7 / 3.5 / 3.4	4.7	✓	✓	✓
2.20	4	100L1	5.2 / 4.9 / 4.8	5.5			✓
0.75	2	801	1.8 / 1.7 / 1.7	5.5	✓	✓	✓
1.10	2	802	2.6 / 2.4 / 2.3	5.5	✓	✓	✓
1.50	2	90S	3.4 / 3.2 / 3.1	6.0	✓	✓	✓
2.20	2	90L	4.8 / 4.6 / 4.4	6.0	✓	✓	✓
0.55/0.11	2/4	801	1.4 / 1.3 / 1.2	5.5	✓	✓	✓
0.75/0.15	2/4	802	1.8 / 1.7 / 1.7	5.5	✓	✓	✓
1.10/0.20	2/4	90S	2.6 / 2.4 / 2.3	5.5	✓	✓	✓
1.50/0.20	2/4	90L	3.4 / 3.2 / 3.1	6.0	✓	✓	✓
2.20/0.37	2/4	100L1	4.8 / 4.6 / 4.4	6.0			✓

All motors are available as 380, 400 and 415V, 50 Hz motors and are DOL Start only.
All motors have temperature ratings of 300°C/1 hr, 250°C/2 hr, 150°C/5 hr

Selection Process

The process for specifying and selecting the GreenJet fan is customized for our customers needs. It is important for our customers to work closely with their Greenheck representative to ensure the proper selection of equipment. Although many parameters must be considered in the ventilation design for a parking garage, Greenheck has developed a short list of items that the customer should consider during this design process. With this information, a CFD analysis can be provided of the entire parking structure showing the proposed location and final quantity and size of GreenJet fans required.

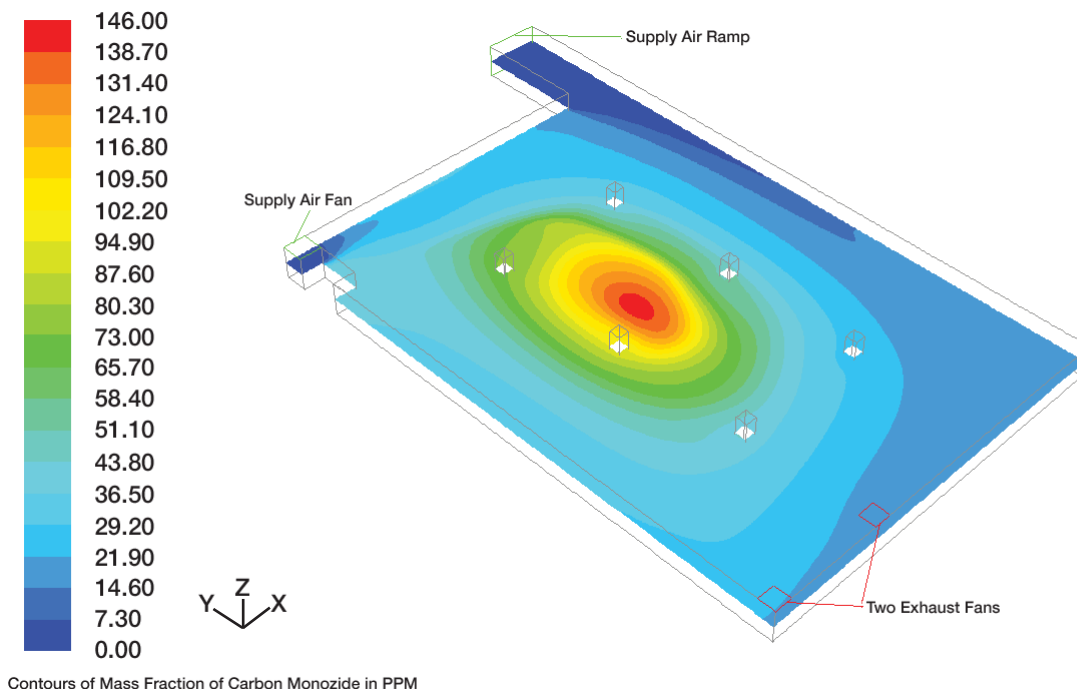
Design Check List

- Design standards (ASHRAE, British Standard, local code, etc)
- Air changes per hour: Normal ventilation mode & Emergency exhaust mode
- Airflow strategy (east to west, north to south, etc)
- Control strategy: CO extract, Smoke only extract or Both CO and Smoke extract
- Location of ramps, wall openings, fresh air and exhaust air vent shafts
- Location of obstructions in the parking garage (lobbies, elevators shafts, etc)
- Area and volume of garage
- Ceiling height of garage
- Preliminary location of GreenJet fans

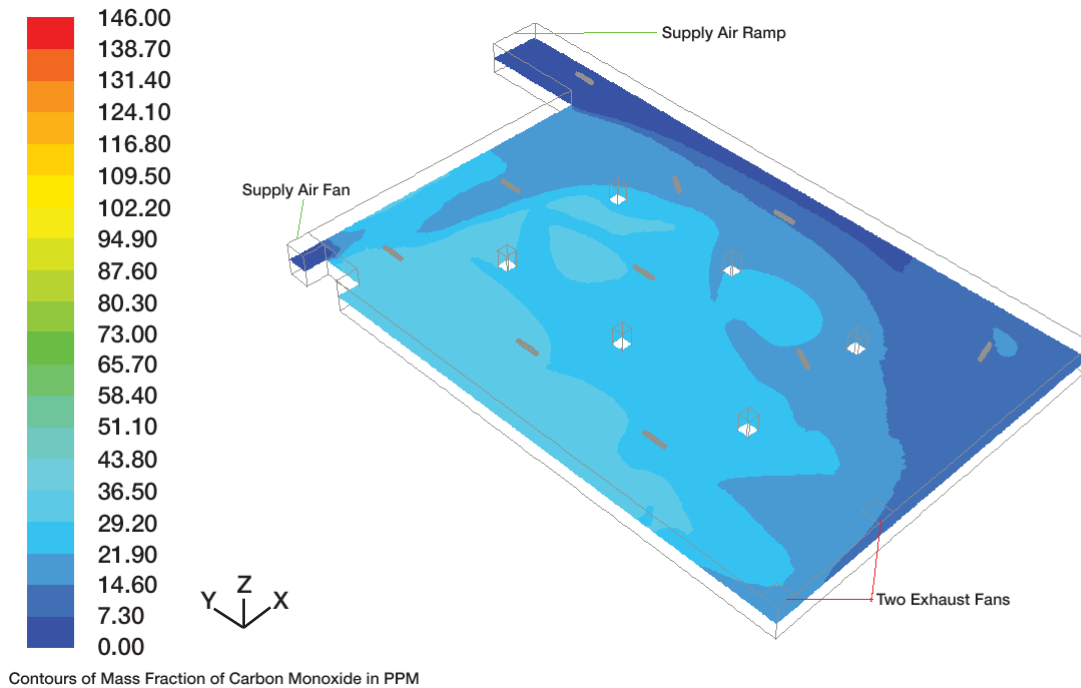
CFD Analysis Example

The CFD (Computational Fluid Dynamics) portion of any project is of extreme importance. This analysis can help the end user accurately place each of the GreenJet fans for optimal movement of the air in his facility during normal operation as well as during emergency operation.

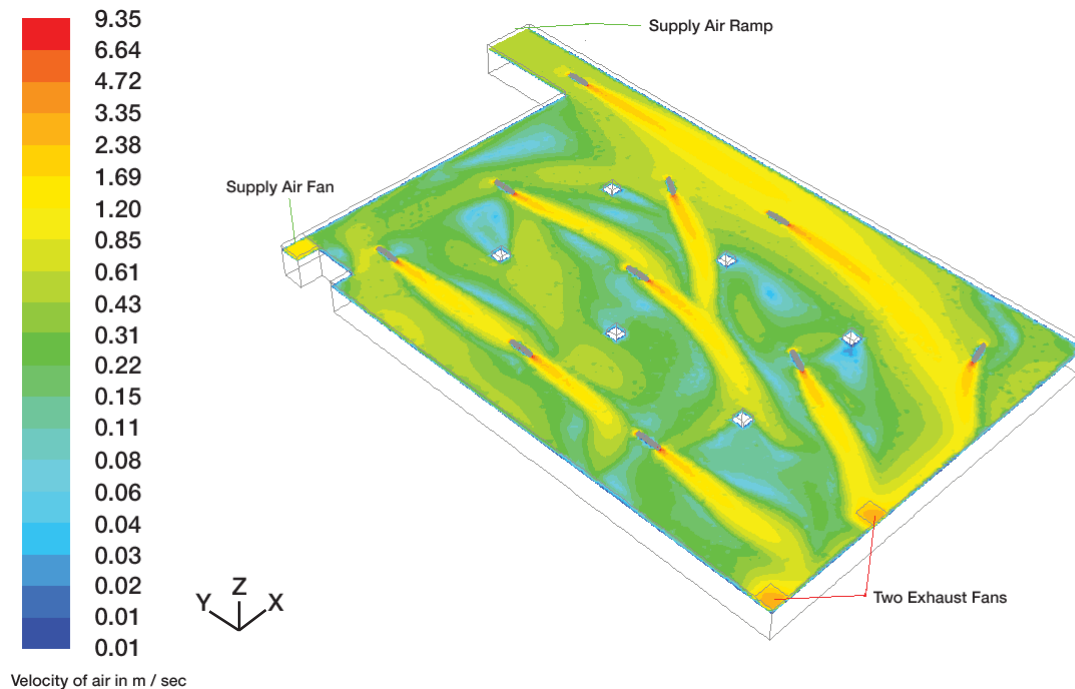
Below is a CFD analysis performed in a parking garage showing the CO (carbon monoxide) concentration levels throughout the garage if no GreenJet fans were employed. This example is a typical garage with supply air entering via the car ramp as well as a dedicated supply fan. Exhaust fans are placed on the opposite end of the facility to remove the air. This image depicts a high concentration of dangerous CO in the center of the facility.



Through the simple installation of several high performance GreenJet fans in this same structure, the CO levels can be brought to acceptable and relatively equal levels throughout the facility. The CFD image shown below depicts the impact of the GreenJet fan installation on this parking garage.

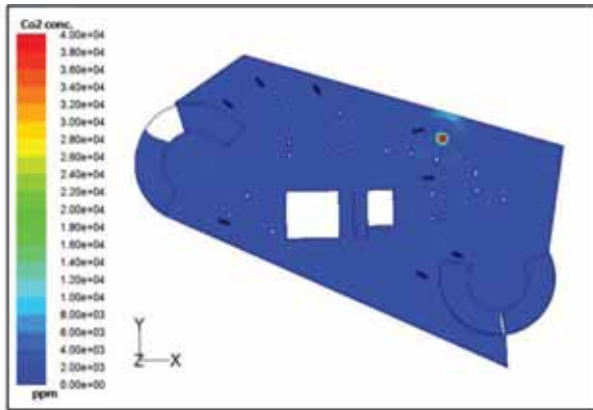


The air velocity throughout the facility is also analyzed and the impact of the GreenJet fans are readily apparent on air movement as shown in the image below.

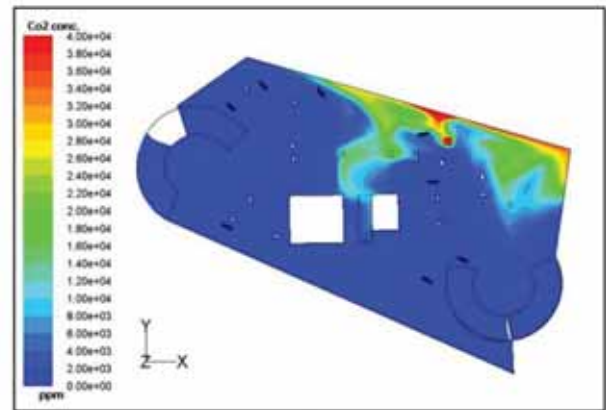


1. Smoke Control during a fire

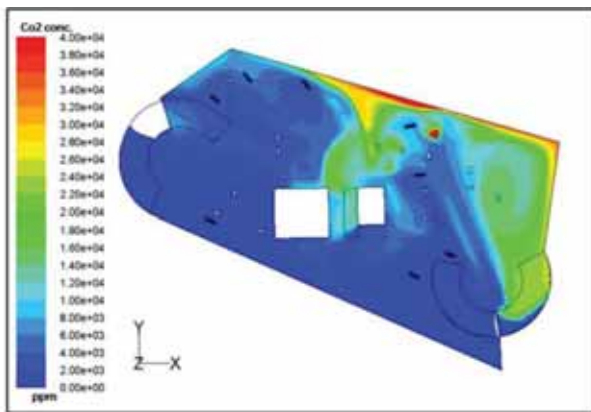
- Keeps the smoke in a specific area rather than dispersing it during a fire
- Allows the smoke to be removed in the most direct path
- This CFD simulation below depicts how the smoke is contained and directed in specific areas during the outbreak of a fire



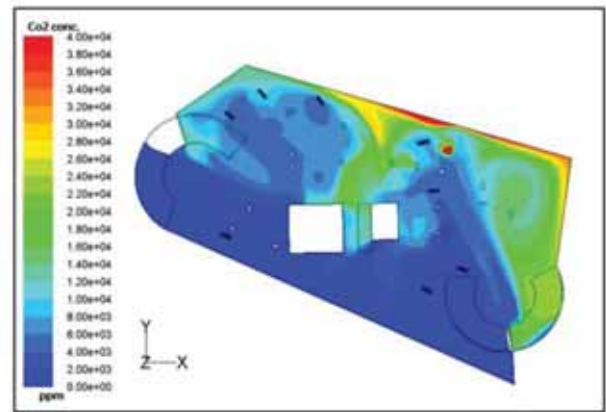
T = 1 min.



T = 2 min.



T = 4 min.



T = 6 min.

2. Installation/Building construction costs

- Faster/less expensive installation costs when compared to ducted systems
- Easy access for maintenance
- Increased headroom when compared to ducted systems
- Easy to modify parking garage design during future garage expansions
- Lower emergency power costs (wiring, control panels, starters, etc) due to the fan not having to operate at high static pressure losses (due to elimination of ductwork)

3. Lower operating costs

- No duct pressure to overcome translates into less power
- No ductwork maintenance/cleaning is required
- Fans are easily accessible for maintenance

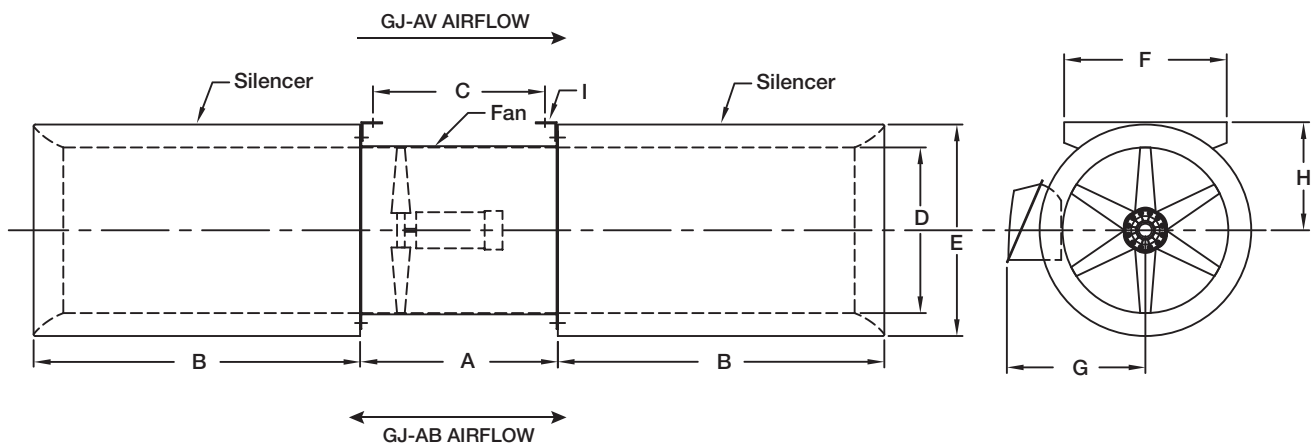
4. Improved Air quality

- With a CFD analysis, fans are able to be optimally placed to provide good air quality in every area of the structure

	Unit	1425 RPM					2840 RPM					2840/1425 RPM
		Airflow CMH	Thrust (N)	kW	Motor Size	dBA	Airflow CMH	Thrust (N)	kW	Motor Size	dBA	kW
Unidirectional	GJ-AU31	1600	3	0.03	0.55	43	3200	12	0.24	0.75	60	0.75/0.15
		2250	6	0.08	0.55	47	4500	25	0.67	0.75	65	0.75/0.15
	GJ-AU36	2950	8	0.09	0.55	50	5900	32	0.72	0.75	71	0.75/0.15
		3350	10	0.13	0.55	49	6700	42	1.04	1.1	70	1.1/0.2
		3750	13	0.17	0.55	48	7500	51	1.37	1.5	68	1.5/0.25
		4000	14	0.20	0.55	48	8000	57	1.58	2.2	68	2.2/0.37
	GJ-AU41	4400	13	0.12	0.55	49	8800	53	0.98	1.1	66	1.1/0.2
		4700	15	0.17	0.55	49	9400	62	1.35	1.5	67	1.5/0.25
		5300	20	0.26	0.55	51	10600	80	2.08	2.2	69	2.2/0.37
		6000	25	0.37	0.55	53	12000	101	2.93	3	71	3.0/0.55
Bidirectional	GJ-AB31	1400	2	0.02	0.55	40	2800	9	0.14	0.75	57	0.75/0.15
		2000	5	0.06	0.55	43	4000	19	0.48	0.75	61	0.75/0.15
	GJ-AB36	2300	5	0.03	0.55	48	4600	19	0.28	0.75	69	0.75/0.15
		2950	8	0.09	0.55	49	5900	32	0.69	0.75	70	0.75/0.15
		3300	10	0.11	0.55	50	6600	39	0.92	1.1	70	1.1/0.2
	GJ-AB41	3650	10	0.09	0.55	47	7300	38	0.71	0.75	67	0.75/0.15
		4100	12	0.13	0.55	48	8200	48	1.02	1.1	68	1.1/0.2
		4700	15	0.18	0.55	50	9400	61	1.44	1.5	70	1.5/0.25

NOTE: Air testing was done in accordance with AMCA Publication 211
 Sound testing was done in accordance with AMCA Publication 311
 dBA is inlet sound, 1.5 meters from the source

Dimensional Data



Size	A	B	C	D	E	F	G	H	I	Weight* (kg)
31	381	622	325	311	411	311	255	211	12	65
36	432	724	376	362	462	362	280	236	12	69
41	483	826	427	413	513	413	306	262	12	77

Dimensions shown in millimeters.

*Weight includes a 1.5 x 4 pole motor.

Specifications

GreenJet fans shall be of the direct drive axial type with cast aluminum airfoil propellers.

The casing shall be constructed of continuously welded steel and include integral punched inlet and outlet flanges to prevent air leakage. The casing and motor base shall be constructed from precision laser cut and formed members of heavy gauge steel to prevent vibration and rigidly support the motor. Motor support brackets shall be welded to fan casing for increased strength. The entire fan section shall be coated using a hot-dipped galvanizing process.

Blades shall be airfoil design. Hub and blades shall be a high strength cast aluminum alloy. Blade pitch shall be manually adjustable without removing the fan casing. Rotors to be statically and dynamically balanced.

The silencers shall be two fan diameters long and shall be fitted with an integral inlet bell on both the inlet and outlet of the fan to provide a streamlined low profile design. The silencers shall be manufactured of galvanized material and fitted with 50mm of acoustic insulation which is held in place using a galvanized wire

mesh screen on the interior of each silencer.

Fan performance ratings shall conform to AMCA Standard 210 (meets BS848 part 1). Fans must be tested in accordance with AMCA Standard 300-96.

Fan shall be model GJ as manufactured by Greenheck Kunshan Co., Ltd., a 100% wholly owned subsidiary of Greenheck Fan Corporation, USA.



Building Value in Air

Greenheck delivers value to mechanical engineers by helping them solve virtually any air quality challenges their clients face with a comprehensive selection of

top quality, innovative air-related equipment. We offer extra value to contractors by providing easy-to-install, competitively priced, reliable products that arrive on time.

And building owners and occupants value the energy efficiency, low maintenance and quiet dependable operation they experience long after the construction project ends.

Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.



- USA Phone: 1.715.359.6171
- Shanghai, China Phone: 86.21.5169-9698
- Beijing, China Phone: 86.10.5867-7693
- Kunshan, China Phone: 86.512.5736-6666 • greenheck.com.cn