

TBG AND TBGB LANDFILL TURBO BLOWERS

Landfill management is no longer a matter of individual landfill operating practices, but is quickly becoming a matter of appropriate, sophisticated response to tremendous pressure from citizens and public agencies to allay concerns and fears about landfills. Several states have already instituted a series of regulations that require all landfill operators, governmental or private, to seriously address these issues. Similar controls and regulations establishing modern landfill management principles are expected to eventually blanket the country.

There are, however, benefits to be reaped that go beyond landfills becoming a "good neighbor". An increasing number of landfill operators are now finding it economically beneficial to recover energy from the landfill gas captured by the gas control system.

Whether the landfill operation requires only the ability to dispose of landfill gas by flaring or is intended for full-scale recovery and treatment and subsequent energy generation, Hauck's line of fiberglass, sealed-shaft TBG and TBGB Landfill Turbo Blowers fill a vital need in the selection of the proper gas control system components.

The Hauck Landfill Turbo Blower places the wells and piping manifolds under vacuum and conveys the gas withdrawn from the wells to the flaring or treatment station via a system of header pipelines. The highly efficient shaft-seal design of the landfill blowers provides the increased gas-sealing integrity required for an application of this nature. The availability of both direct drive and belt-drive versions allows the operator to more closely tailor his blower selection to his needs. Where higher pressure requirements must be satisfied, TBG direct drive blowers can be used in series or the selection can be made from Hauck's line of TBGB belt-drive landfill blowers. If the landfill operation is expected to continue over a relatively long period of time with a varying or changing rate of landfill gas generation, the belt-drive models permit, by means of sheaves and belt changes, adapting the blower to these changing conditions. For operations where the pressure/volume requirements are "low" and the projected capacity and lifespan of the landfill is relatively fixed and short-term, the direct drive Hauck TBG blower provides that same degree of reliability and stability at an even more economical cost.

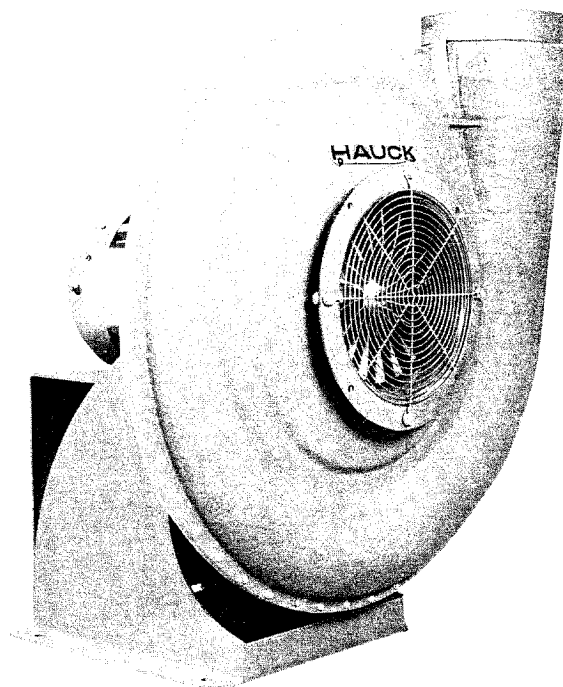


Fig. 1 - A Hauck TBG Landfill Turbo Blower

FEATURES

- CORROSION & ABRASION RESISTANT
- NON-SPARKING
- HIGHLY EFFECTIVE SHAFT SEAL
- WIDE SELECTION OF PRESSURE RANGES & SCFM SIZES
- DIRECT DRIVE & BELT DRIVE MODELS

All Hauck Landfill Turbo Blowers have the integral molded scroll design and turbine-bladed impeller that provides increased efficiency in a highly corrosion resistant fiberglass casing with an integrated molded rubber lining. The blowers produce efficiencies up to 50% over conventional blowers, efficiencies that mean savings in both initial and operating costs. Hauck Landfill Turbo Blowers can frequently meet your pressure and volume requirements with a smaller horsepower than conventional blower equipment. Because of the increased efficiency, power consumption is reduced by several horsepower, reducing initial and operating costs. Mill and Chemical and high efficiency motors are available. Precisely balanced impellers

help eliminate vibrations which can significantly shorten the operating life of a blower. The construction and design of the Hauck Landfill Blowers can be most appreciated from the fact that many landfill operators report operating lifetimes of the Hauck blowers at 2-3 times that of conventional blowers.

The Hauck TBG and TBGB Landfill Turbo Blowers must be installed and operated in an outdoor environment. The TBG and TBGB Landfill Turbo Blowers should never be operated indoors or in an enclosed location.

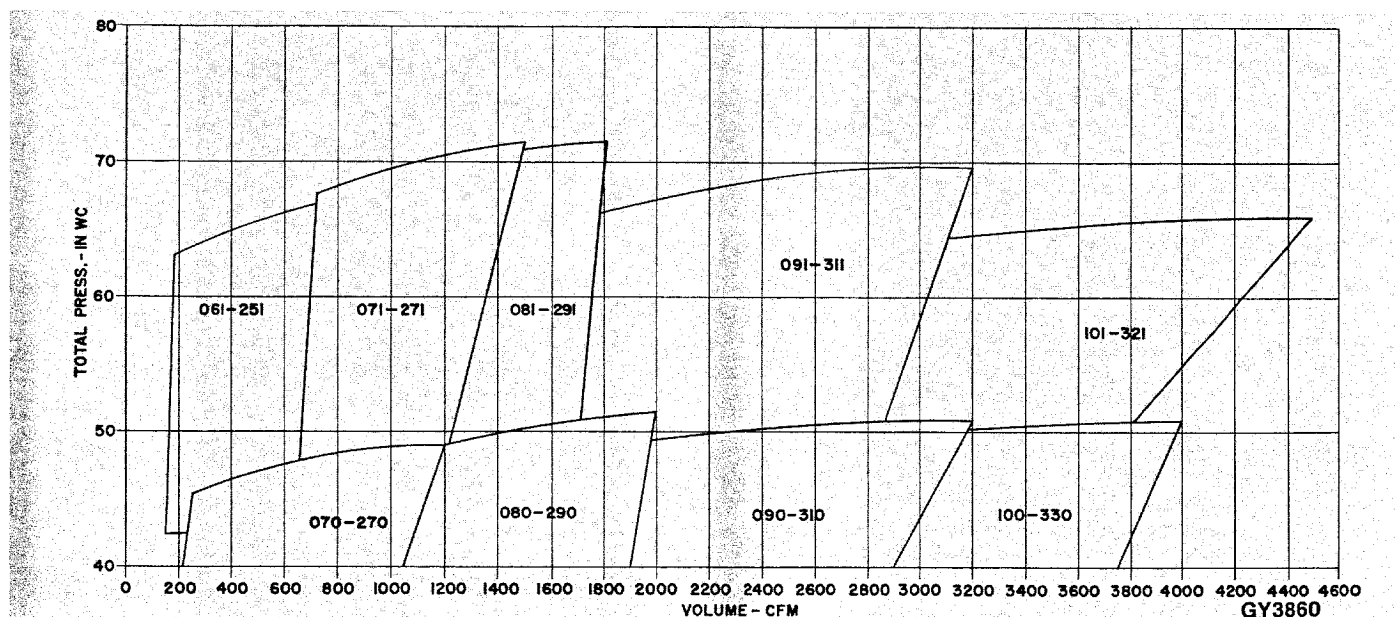
An exclusive line of transition pieces and intake adapters are available to facilitate piping.

CAPACITIES

TBG DIRECT DRIVE BLOWERS

Blower Model No.	SCFM	Peak Total Pressure (In. wc)	Horse-power
TBG-24-5	235	39.5	5.0
TBG-24-7.5	500	40.9	6.8
TBG-24-10	900	41.6	9.5
TBG-24-15	1200	42.9	12.5
TBG-24-25	2000	46.1	18.5
TBG-24-40	3000	46.6	28.0
TBG-24-50	4500	45.0	42.0
TBG-32-10	350	60.1	6.25
TBG-32-20	500	73.1	12.0
TBG-32-30	1500	61.3	20.0
TBG-32-50	2600	62.5	32.0
TBG-32-60	3000	67.5	42.0
TBG-32-75	3600	63.5	48.0
TBG-32-100	7000	56.4	88.0
TBG-32-150	8000	63.0	107.0

TBGB BELT DRIVE SELECTION CHART



SELECTION EXAMPLES

DIRECT DRIVE BLOWER SELECTION EXAMPLE

Requirement - A direct drive blower located at mean sea level to deliver 8000 cfm landfill gas with 30" wc vacuum pressure at its inlet and 15" wc positive pressure at its discharge. The temperature of the gas at the inlet is 120°F. The gas has a specific gravity of 0.92 at 14.7 psia and 70°F. (standard conditions):

1. The Specific Gravity Table (table 1) indicates a factor of 0.85 for 120°F. and 30" wc vacuum.
2. The Elevation Factor Table (table 3) indicates a factor of 1.0.
3. The corrected specific gravity is 0.78 ($0.92 \times 0.85 \times 1.0$).
4. The Vacuum Rating Factor Table (table 2) indicates a factor of 1.08 for 30" wc vacuum.
5. The pressure from the inlet to discharge of the blower is 45" wc peak pressure (30" wc vacuum pressure + 15" wc positive pressure).
6. Corrected peak pressure is 48.6" wc ($45" \text{ wc blower peak pressure} \times 1.08$).
7. Design peak pressure is 62.3" wc ($48.6" \text{ wc} / 0.78$).
8. Using the Capacity Table on page 2, select model TBG-32-150, with a capacity of 8000 cfm at 63.0" wc peak pressure, requiring 107 horsepower at standard air temperature (70°F.)
9. Multiplying the horsepower and pressure shown by the corrected specific gravity yields 84 horsepower and 49.3" wc required for the landfill gas.
10. The proper selection will deliver 8000 cfm landfill gas at 49.3" wc at 120°F. at mean sea level with a 100 horsepower motor. Select a TBG-32-150 blower with a 100 horsepower motor unless unit must start up with cold air, in which case use of a 125 horsepower motor is required.

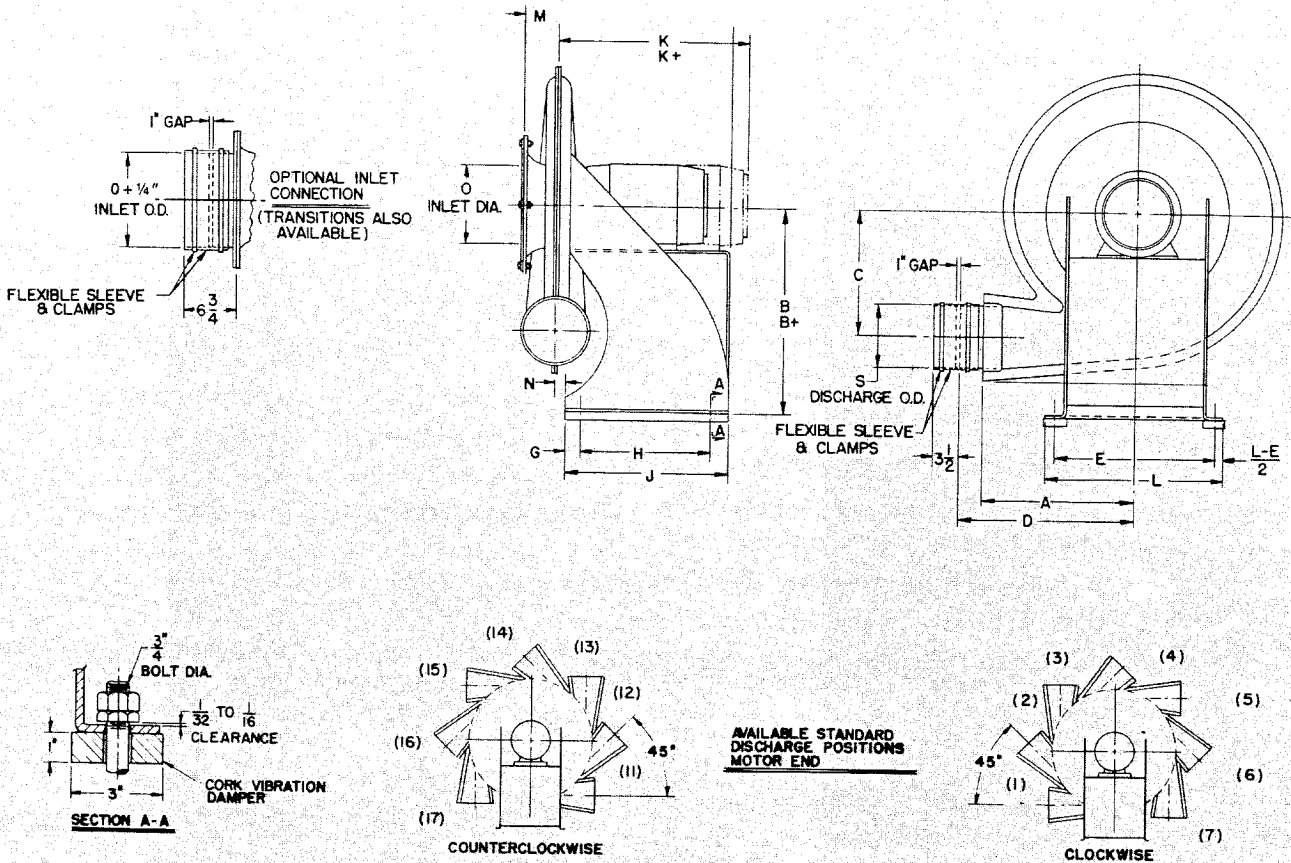
BELT DRIVE BLOWER SELECTION EXAMPLE

Requirement - A belt drive blower located at 3500' elevation to deliver 3000 cfm landfill gas with 20" wc vacuum pressure at its inlet and 25" wc positive pressure at its discharge. The temperature of the gas at the inlet is 110°F. The gas has a specific gravity of 0.90 at 14.7 psia and 70°F. (standard conditions):

1. The Specific Gravity Table (table 1) indicates a factor of 0.88 for 110°F. and 20" wc vacuum.
2. The Elevation Factor Table (table 3) indicates a factor of 0.875.
- *3. Corrected specific gravity is 0.693 ($0.90 \times 0.88 \times 0.875$).
4. The Vacuum Rating Factor Table (table 2) indicates a factor of 1.05 for 20" wc vacuum.
5. The pressure from the inlet to the discharge of the blower is 45" wc pressure (20" wc vacuum pressure + 25" wc positive pressure).
6. Corrected pressure is 47.25" wc (blower pressure of 45" wc $\times 1.05$).
7. Design pressure is 68.2" wc ($47.25" \text{ wc} / 0.693$).
8. Using the Capacity table on page 2 (TBGB Belt Drive selection chart), plot the intersection of 68.2" wc and 3000 cfm to select model TBGB-9-091-311.
9. Using Landfill Blowers Application Sheet GJ72, refer to the performance chart for model TBGB-9-091-311. Select blower requirements for 3000 cfm at 68.2" wc pressure = 4150 RPM and 46 MHP at standard air temperature (70°F.)
10. Multiplying the MHP shown by corrected specific gravity yields 32 MHP required for the landfill gas.
11. The proper selection will deliver 3000 cfm landfill gas at 110°F. and 20" wc vacuum at the inlet, 25" wc positive pressure at the discharge at 3500' elevation, with a speed of 4150 RPM and MHP of 32.

* Note: When the landfill gas density in lb/cu. ft. at operating condition is known, use this value divided by the standard air density of 0.075 lb/cu. ft. for the corrected specific gravity in step 3 of both examples above.

DIMENSIONS — TBG

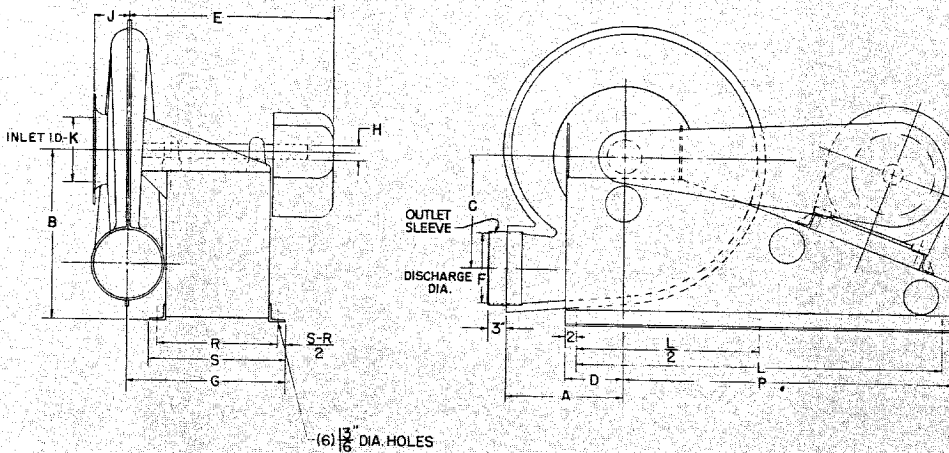


CATALOG NUMBER	VOLUME (CFM)	HP	MOTOR FRAME	A	B +	C	D	E	G	H	J	K +	L	M	N	O	S
TBG-24-5	235	5	184T	18	23	15 5/8	21	17	2	11	15	15	19 1/2	3	1 1/4	10	6 1/4
TBG-24-7.5	500	7 1/2	213T	18	23 3/4	15 5/8	21	17	2	11	15	17 7/8	19 1/2	3	1 1/4	10	6 1/4
TBG-24-10	900	10	215T	20	23 3/4	16 1/4	23	17	2	11	15	19 1/2	19 1/2	3 3/4	1 1/4	12	8 1/4
TBG-24-15	1200	15	254T	20	26 1/4	16 1/4	23	21	2 1/8	17	21 1/4	23 1/8	23 1/2	3 3/4	1 1/4	12	8 1/4
TBG-24-25	2000	25	284TS	22 3/4	27	18 1/4	25 3/4	21	2 1/8	17	21 1/4	24 7/8	23 1/2	4 3/8	1 3/8	12	10 1/4
TBG-24-40	3000	40	324TS	20 1/4	28	19	23 1/4	21	2 1/8	17	21 1/4	27 3/8	23 1/2	5	1 5/8	12	10 1/4
TBG-24-50	4500	50	328TS	20 1/4	29 1/2	19 7/8	23 1/4	22 1/2	2 1/2	19	24	28 5/8	25	6 1/8	1 7/8	14	12 1/4
TBG-32-10	350	10	215T	19	28 7/8	19	21 1/2	25 5/8	2	11 13/16	15 3/4	19 3/4	29 5/8	4 1/4	2	8	4 1/4
TBG-32-20	500	20	256T	19	32 9/16	19	21 1/2	25 5/8	1 7/8	17 3/4	21 1/2	25 3/16	29 5/8	4 1/4	2 1/8	8	4 1/4
TBG-32-30	1500	30	286TS	21 7/8	33 5/16	22 1/8	24 3/8	25 5/8	1 7/8	17 3/4	21 1/2	26 9/16	29 5/8	4 1/4	2 1/8	8	8 1/4
TBG-32-50	2600	50	326TS	24	36 3/8	22 5/8	26 1/2	25 5/8	2 3/4	21 11/16	27 9/16	28 9/16	29 5/8	5 3/8	1 7/8	10	10 1/4
TBG-32-60	3000	60	364TS	24	37 3/8	22 5/8	26 1/2	25 5/8	2 3/4	21 11/16	27 9/16	30 3/16	29 5/8	5 3/8	1 7/8	10	10 1/4
TBG-32-75	3600	75	365TS	23 1/8	37 3/8	23 5/16	25 5/8	25 5/8	2 3/4	21 11/16	27 9/16	31 5/16	29 5/8	6 3/8	2	12	12 1/4
TBG-32-100	7000	100	405TS	25	39	24 1/2	27	28 3/8	3	27	33	36	30 7/8	7 3/4	2 7/8	18	18 1/4
TBG-32-150	8000	150	445TS	25	40	24 1/2	27	28 3/8	3	27	33	41 3/8	30 7/8	7 3/4	2 7/8	18	18 1/4

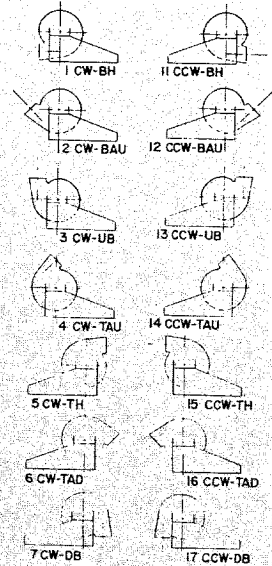
DIMENSIONS — TBGB

ARRANGEMENT 9

CW-BH Shown — See Table this page for available mounting positions.



AVAILABLE STANDARD
DISCHARGE POSITIONS
DRIVE END



**DO NOT USE FOR CONSTRUCTION PURPOSES -
CERTIFIED DIMENSIONS AVAILABLE AT TIME OF ORDER.**

MODEL NUMBER TBAB9-	SHAFT SIZE	A	B	C	D	E	F	G	H	J	K	L	P	R	S	KEYWAY	MINIMUM SHEAVE DIA.*	
061-251-E	1 ¹⁵ / ₁₆	18	29 ³ / ₄	15 ⁵ / ₈	9 ¹ / ₄	28 ¹ / ₄	6 ¹ / ₄	23 ¹ / ₄	1 ¹⁵ / ₁₆	3	10	51 ¹ / ₂	46 ¹ / ₄	19	21 ¹ / ₄	1/2 × 1/2 × 2 ⁵ / ₈	5.6	
070-270-B	1 ¹ / ₂	20	27 ³ / ₈	16 ¹ / ₄	9 ¹ / ₄	22 ¹⁵ / ₁₆	8 ¹ / ₄	19 ¹ / ₁₆	1 ¹ / ₂	3 ³ / ₄	12	49	43 ³ / ₄	14 ¹³ / ₁₆	17 ¹ / ₁₆	3/8 × 3/8 × 2 ¹ / ₂	3.3	
070-270-C	1 ¹¹ / ₁₆		28 ⁵ / ₈			29 ¹ / ₂		23 ¹ / ₄	1 ¹¹ / ₁₆			51 ¹ / ₂	46 ¹ / ₄	19	21 ¹ / ₄	1/2 × 1/2 × 2 ⁵ / ₈	5.6	
071-271-E	1 ¹⁵ / ₁₆		29 ³ / ₄			29 ³ / ₄		23 ¹ / ₂	1 ¹⁵ / ₁₆							3/8 × 3/8 × 2 ¹ / ₂		
080-290-C	1 ¹¹ / ₁₆	22 ³ / ₄	28 ⁵ / ₈	29 ⁵ / ₈		23 ³ / ₈	1 ¹¹ / ₁₆	1/2 × 1/2 × 2 ⁵ / ₈										
080-290-E	1 ¹⁵ / ₁₆		29 ³ / ₄	18 ¹ / ₄		29 ⁷ / ₈	23 ⁵ / ₈	2 ³ / ₁₆	3/8 × 3/8 × 2 ¹ / ₂									
081-291-E	2 ³ / ₁₆		30 ³ / ₈	29 ¹³ / ₁₆		23 ⁹ / ₁₆	2 ³ / ₁₆	1/2 × 1/2 × 3 ¹ / ₄										
081-291-F	2 ³ / ₁₆		30 ³ / ₈	29 ¹³ / ₁₆	23 ⁹ / ₁₆	2 ³ / ₁₆	1/2 × 1/2 × 2 ⁵ / ₈											
090-310-E	1 ¹⁵ / ₁₆	20 ¹ / ₄	29 ³ / ₄	19	10	33 ³ / ₄	12	28	2 ⁷ / ₁₆	6 ¹ / ₈	14	64	58	21 ⁵ / ₈	24 ¹ / ₄	1/2 × 1/2 × 3 ¹ / ₄		5.6
090-310-F	2 ³ / ₁₆		30 ³ / ₈						2 ¹ / ₂							1/2 × 1/2 × 2 ⁵ / ₈		
091-311-G	2 ⁷ / ₁₆		30 ¹ / ₈						2 ⁷ / ₁₆							1/2 × 1/2 × 3 ¹ / ₄		
091-311-J	2 ¹¹ / ₁₆		30 ⁹ / ₁₆						2 ¹ / ₂							5/8 × 5/8 × 2 ³ / ₄		
100-330-G	2 ⁷ / ₁₆	21 ¹ / ₁₆	30 ¹ / ₈	19 ⁷ / ₈	34	28 ¹ / ₄	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	6 ¹ / ₈	14	64	58	21 ⁵ / ₈	24 ¹ / ₄	5/8 × 5/8 × 2 ³ / ₄		
100-330-H&J	2 ¹¹ / ₁₆		30 ⁹ / ₁₆													5/8 × 5/8 × 2 ¹ / ₁₆		
101-321-J	2 ¹¹ / ₁₆															5/8 × 5/8 × 2 ¹ / ₁₆		

* CAUTION—MINIMUM SHEAVE SHOWN REFERS TO BLOWER MINIMUM SHEAVE PITCH DIA.
DO NOT USE SHEAVES OF LESS DIA. THAN SHOWN.

ENGINEERING INFORMATION

SPECIFIC GRAVITY FACTOR TABLE

INLET TEMPERATURE	Inlet Temp.	Vacuum Pressure at Inlet (Inches Water Column)									
	°F	0	10	20	30	40	50	60	70	80	90
	50	1.04	1.01	.99	.96	.94	.91	.89	.86	.84	.81
	60	1.02	.99	.97	.94	.92	.89	.87	.84	.82	.79
	70	1.00	.98	.95	.93	.90	.88	.85	.83	.80	.78
	80	.98	.96	.93	.91	.89	.86	.84	.81	.79	.76
	90	.96	.94	.92	.89	.87	.85	.82	.80	.77	.75
	100	.95	.92	.90	.88	.85	.83	.81	.78	.76	.74
	110	.93	.91	.88	.86	.84	.82	.79	.77	.75	.72
	120	.91	.89	.87	.85	.82	.80	.78	.76	.73	.71
	130	.90	.88	.85	.83	.81	.79	.77	.74	.72	.70
	140	.88	.86	.84	.82	.80	.77	.75	.73	.71	.69
	150	.87	.85	.83	.80	.78	.76	.74	.72	.70	.68
	160	.85	.83	.81	.79	.77	.75	.73	.71	.69	.67

Table 1

VACUUM RATING FACTOR TABLE

Inlet Vacuum Pressure Inches wc	Factor
0	1.00
10	1.03
20	1.05
30	1.08
40	1.11
50	1.14
60	1.17
70	1.21
80	1.25
90	1.28

Table 2

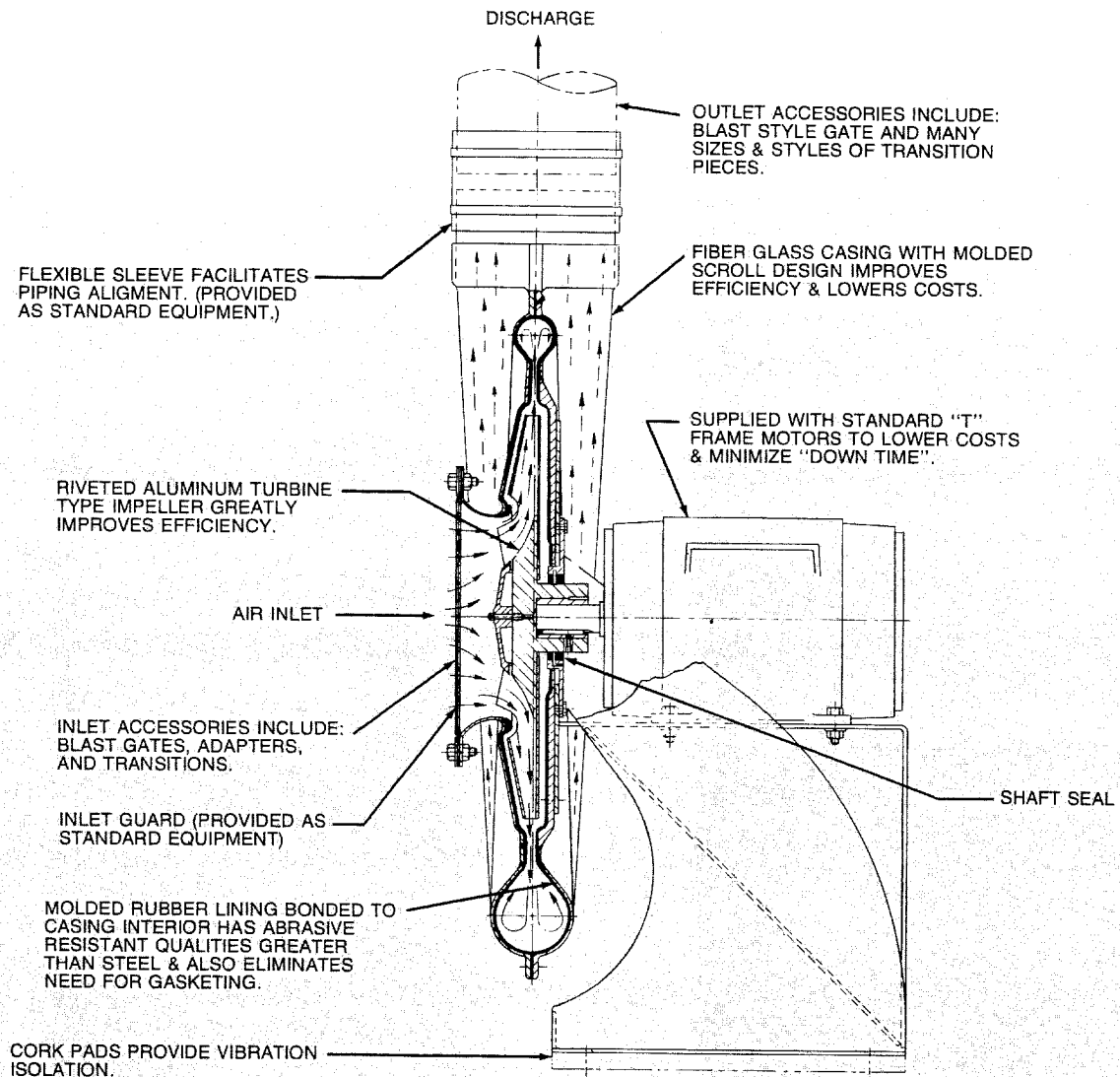
ELEVATION FACTOR TABLE

Elevation Above Mean Sea Level	Factor
0'	1.00
1000'	0.96
2000'	0.93
3000'	0.89
4000'	0.86
5000'	0.83

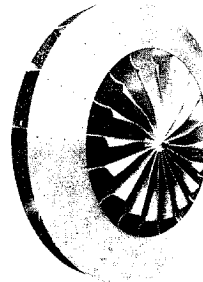
Table 3

Performance ratings in this data sheet have been calculated for (1) standard air density of 0.075 lb/cu.ft., (2) standard temperature of 70°F., (3) specific gravity of 1.0, (4) 29.92 mm Hg barometric pressure, (5) atmospheric pressure at the inlet, and (6) blower peak total pressure. When the gas density is other than standard and the blower inlet pressure is less than atmospheric (i.e., a vacuum), corrections for pressure and horsepower must be made.

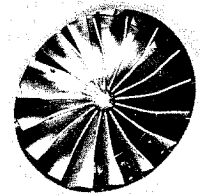
CONSTRUCTION



- Lighter weight, corrosion resistance and precisely molded involute scroll design are all made possible with the fiberglass casing. In addition, the molded rubberized lining provides abrasion resistance greater than steel and a super smooth surface for reduced frictional losses. Maximum inlet temperature 200°F.
- The riveted, heavy gauge aluminum turbine type impeller utilizes a curved blade design which "scoops" landfill gas into the blower inlet and improves efficiency.
- If a motor replacement is ever necessary, standard shaft "T" frame motors can be purchased locally and eliminate "down time" awaiting a special motor.



**TURBINE DESIGN
IMPELLER**
(Pat. No. 3,472,967)



**INLET TURNING
RING SEAL**
(Pat. No. 3,572,963)

The exclusive curved impeller with built-in inducer is coupled with a patented inlet turning ring seal to produce operating efficiencies heretofore unobtainable in Turbo Pressure Blowers.

ACCESSORIES AND OPTIONS



TRANSITIONS, INTAKE ADAPTERS (Accessories)

All sizes and types of transition pieces are available to facilitate connecting the blower outlet to the system piping. The transition inlet is designed to fit the blower sleeve while the outlet is available with flanged, welded, threaded, or straight connections. An inlet adaptor is available, complete with gasket and necessary fasteners.

HIGH EFFICIENCY MOTORS (Option)

MILL AND CHEMICAL MOTORS (Option)

BLAST GATES (Accessory)

ORDERING INFORMATION

DIRECT DRIVE BLOWERS

The following information is required:

1. Catalog Number: From TBG Capacity table.
2. Discharge Position: From Dimensions drawing. (No. 1 position supplied if not specified.)
3. Motor Type: T-frame: TEFC (standard), High Efficiency (Option), Mill and Chemical (Option).
4. Accessories Desired.

Notes:

1. Motors up to 60 HP 230-460V, 3 phase, 60 Hz 3600 RPM T-frame; Motors 60 HP and higher, 460V only.
2. Select accessories compatible with blower inlet and outlet sizes.

BELT DRIVE BLOWERS:

The following is required:

1. Catalog Number: From TBGB Selection Chart (See Capacity table).
2. Discharge Position: From Dimensions drawing. (No. 1 position supplied if not specified.)
3. Motor Type: T-Frame: TEFC (standard), High Efficiency (Option), Mill and Chemical (Option).
4. Accessories Desired.
5. Performances Data: CFM, Pressure, RPM, and MHP (See Application Sheet GJ72).
6. Special Operating Conditions (altitude, etc.)
7. Function- Brief description of system and blower function.

Notes:

1. Motors up to 60 HP 230-460V, 3 phase, 60Hz 1800 or 3600 RPM T-frame; Motors 60 HP and higher, 460V only.
2. Arrangement 9 standard.
3. Select accessories compatible with blower inlet and outlet sizes.