BULLETIN FA201

May 1999

AXICO ANTI-STALL®

Controllable Pitch-In-Motion and Adjustable Pitch-At-Rest Vaneaxial Fans

Types FPAC, FPMC, FPDA

No stall at all.
AXICO ANTI-STALL®

Anti-stall ring with bypass vanes

Inlet bell designed exclusively for free inlet applications such as custom air handlers (duct configurations also available.)

Vane section provided with removable access panel to provide unimpeded access to fan impeller and blade actuator mechanism.

NEMA designed foot-mounted motor completely exposed for ease of service and accessibility.

Motor supported on structural base upstream of propeller.

Fan supported from a welded steel channel base (minimum 5" channel).

Note: Standard inlet guards have been removed for clarity.

AXICO ANTI-STALL® is the only controllable pitch vaneaxial fan designed to totally eliminate stall, system surging and increased noise levels often experienced by ordinary controllable pitch vaneaxial fans under unstable conditions.

Normal axial fans can be forced to perform within unstable working ranges when operating conditions are unfavorable. This can happen when the fan system is subjected to sudden or unexpected variations in pressure which can be caused by:

- dampers that close suddenly or fail to open
- hypersensitive automation control systems
- improper parallel fan starting sequences
- incorrect or optimistic pressure drop calculations
- clogged filters, etc.

When a fan operates in an unstable range the blades are submitted to sharp variations in pressure which will ultimately result in blade fatigue and eventual fan failure.

AXICO ANTI-STALL® provides a patented solution to solve the problems associated with fan stall in a simple, ingenious method, without the addition of any moving parts or expensive electronic controls. The secret lies in the small bypass vanes that are integrated into the chamber placed around the periphery of the fan impeller. The bypass vanes "catch" turbulent airflows produced at the tips of the blades, which normally cause stalling, and restore them to stability in the proper flow direction.

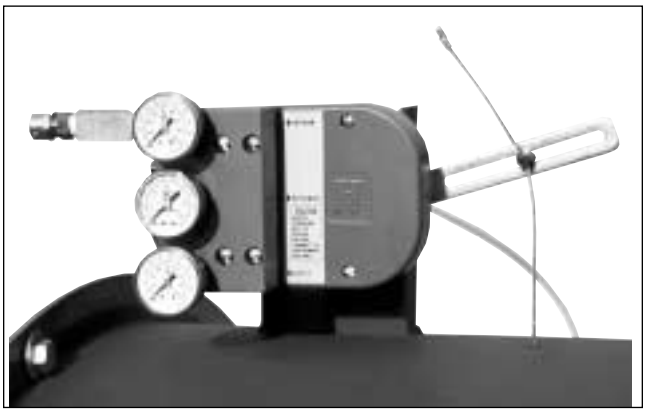
AXICO ANTI-STALL® has no stall area and no stall limit. While this means that the AXICO ANTI-STALL® can be selected directly at any point on the performance curves in this bulletin without consideration of any safety range against the possibility of stall, we strongly recommend selections be made toward the central part of the fan curve at the point of highest possible efficiency.

AXICO ANTI-STALL®
Variable Air Volume Control Flexibility

The AXICO ANTI-STALL® fan can easily be controlled to deliver the required flow or pressure in most situations by properly sizing the fan and then adjusting the blade angle of attack while fan is energized. Blade pitch control can be accomplished in the following ways.

FPAC

Variable air volume fan impeller is equipped with an internal pneumatic diaphragm and external Honeywell industrial-grade pilot positioner assembly to simultaneously vary the pitch angle of all blades identically while the fan impeller is rotating at motor speed. An 80 to 100 psi pneumatic supply air line is required for pitch actuation of this fan. These fans typically operate in a direct-acting mode in conjunction with the building automation temperature control system. The standard pneumatic pilot positioner receives a 3 to 15 psi control signal from the building automation system to modulate the fan blades. An optional electro-pneumatic positioner is available that will modulate blade pitch after receipt of an externally generated 4-20mA electronic control signal.

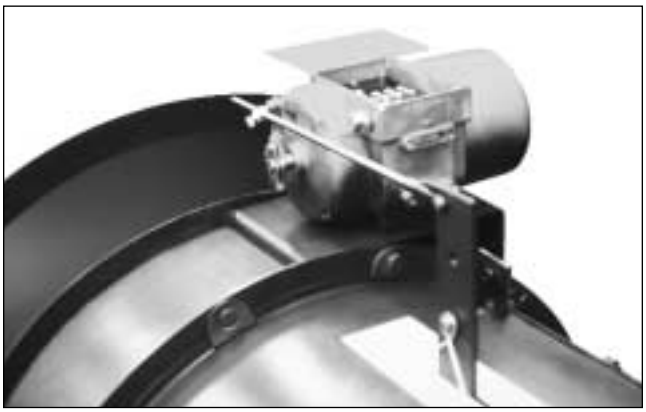


Pneumatic Controllable Pitch

FPMC

Variable air volume fan impeller is equipped with a mechanical linkage system that will simultaneously actuate the pitch angle of all blades via one of three basic options:

1. A manual lever arm with locking quadrant mounted external to the fan housing.
2. A right-angle gear box with manual handwheel mounted external to the fan housing
3. A lever arm with electric motor actuator mounted external to the fan housing and capable of automatic remote pitch actuation responding to either a 4-20mA or a 135 ohm electronic control signal received from the building-automated temperature control system.



Electric Controllable Pitch

FPDA

Constant air volume fan impeller is equipped with mechanically-fixed, individually manually-adjustable blades that may only be re-pitched when the fan is stopped. This fan may be operated with a variable frequency drive unit to vary the rotational speed of the impeller and thereby vary the air volume produced while maintaining the ANTI-STALL® characteristics of the unit.

Manual Adjustable Pitch

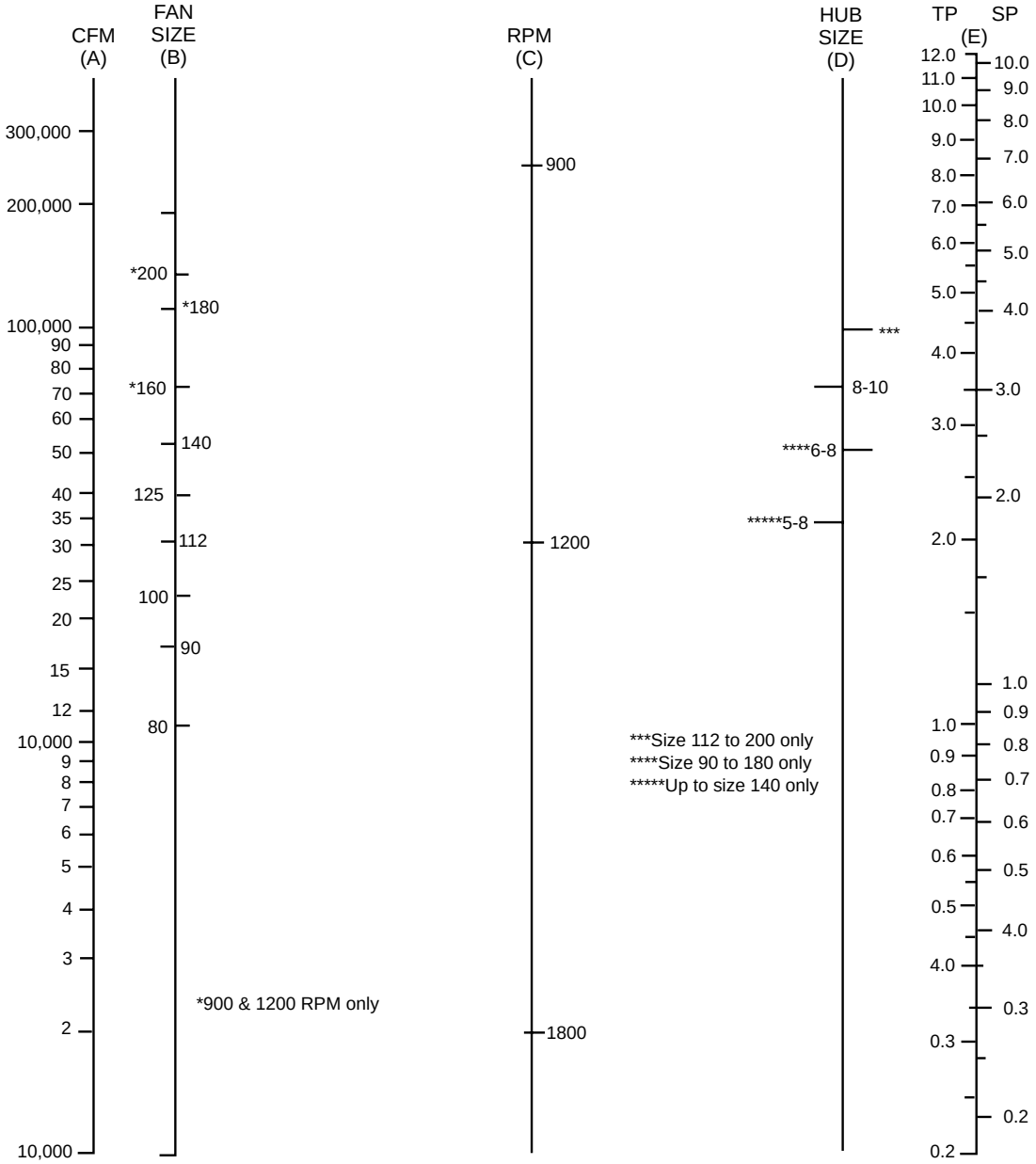
View of AXICO ANTI-STALL® fan from discharge. Honeywell industrial-gauge pilot positioner with closed-loop feedback cable is shown standardly mounted on top of straightening vane section. Bolt-on vane section allows 360° rotation to allow simple field adjustment for improved jobsite accessibility of pilot positioner.

Similar view of fan discharge with standard access panel removed. Every AXICO ANTI-STALL® fan includes a 17.75" long by 90° of fan circumference access panel located in straightening vane section. Total service accessibility is provided by this exclusive feature.

As can be seen in this close-up of the inlet bell continuously welded to the patented ANTI-STALL® ring, an exclusive AXICO® feature, ANTI-STALL® is accomplished by welded bypass vanes without the use of any extra moving parts or electronic "black boxes."

A close-up of the pneumatic controllable pitch impeller mechanism viewed through the standard access panel. Pneumatic supply air (80 to 100 psi) is introduced to the diaphragm through the rotary union (center of photo with feedback cable attached) inflating the pneumatic piston forcing the spider arms to move away from the hub and increase the blade angle of attack.

Fan Selection Process



Step 1. Draw a line from the appropriate CFM on vertical axis marched CFM (A) to the appropriate RPM on vertical axis marked RPM (C). The point at which this line intersects the vertical axis marked FAN SIZE (B) indicates the most appropriate fan size given that RPM and CFM. As an example, a line drawn between 60,000 CFM and 1800 RPM intersects the fan size line almost precisely in the middle of the area noted as 112. Based upon this, it is probable that a size 112 fan is the best selection. The same line intersects the fan size line at the border between size 125 and size 100. This indicates that a 125 is probably oversized and a 100 is probably undersized. There may be circumstances where these selections should be investigated. If that is the case, you should consult your local sales representative.

Step 2. Having now selected the fan, one must now select the hub and blade combination which is appropriate. Draw a line from the vertical axis RPM (C) to the vertical axis marked TP/SP (E). In the example shown we have a given value of 4.25" of static pressure. Be sure that you use the same fan speed in selecting the hub and blade as you have used in selecting the fan. In this case, we draw the line from 1800 RPM to 4.25" static pressure and it intersects the HUB SIZE vertical axis (D) close to the middle of the zone marked 5-8. This would indicate that the probable selection for 60,000 CFM and 4.25" static pressure is 112-5-8. Note that the same line intersected the hub size vertical axis almost at the 6-8 junction. This indicates that the pressure is probably low so that utilization of a 6 hub with 8 blades will result in relatively low efficiencies.

Aspects of Fan Selection

AXICO ANTI-STALL® fans are characterized by completely stable high efficiency operation over an extremely wide operating range. The risk of stall (surging, instability, etc.) encountered in conventional vaneaxial fan designs has been completely eliminated. Fan performance in this publication is presented as Total Pressure versus CFM at standard air density (0.075 lbs/ft^3). The maximum blade angles presented in the published performance curves are the maximum angles for which the fan is designed.

For **controllable pitch in-flight** fans in variable volume situations the maximum design load should ideally be selected to the right and slightly above the peak efficiency ring so that normal operation at modulated partial loads will result in operation at areas of highest efficiency on the fan curve.

Fans with **manually adjustable pitch blades** for applications in either constant volume or variable speed (frequency) systems should ideally be chosen for normal operation within the peak efficiency ring of the fan curve to insure the highest possible energy savings throughout the complete range of operation.

The pressure/flow characteristic of the fan is presented as a total pressure rise between the fan inlet and the fan outlet, providing that the fan is connected to ductwork of the same diameter as the fan. The curves are applicable to either a free or a duct connection at the fan inlet and no provision is made for less than ideal fan inlet conditions within the performance curves. The outlet side of the fan is often connected to a conical regain diffuser that is in turn connected to ductwork or a discharge plenum. Various system requirements and layouts result in numerous combinations of standard or compact fan designs often used in conjunction with a variety of discharge options (ductwork, outlet transitions, C-D diffusers, acoustic diffusers, etc.). The pressure regain and or applicable discharge connection losses for any instance other than that of a fan connected directly to fan diameter discharge ductwork requires the inclusion of these losses in all presentations of Total Pressure.

The following explanation of the performance curves, associated fan laws and formulas should be used to determine and analyze various aspects of fan performance.

SP = Static Pressure

VP = Velocity Pressure

Pv = Velocity pressure in fan diameter duct

PvD = Velocity pressure in diffuser diameter duct

DL = Discharge Loss

TP = Total Pressure

TE = Total Efficiency

bHP = Brake Horsepower

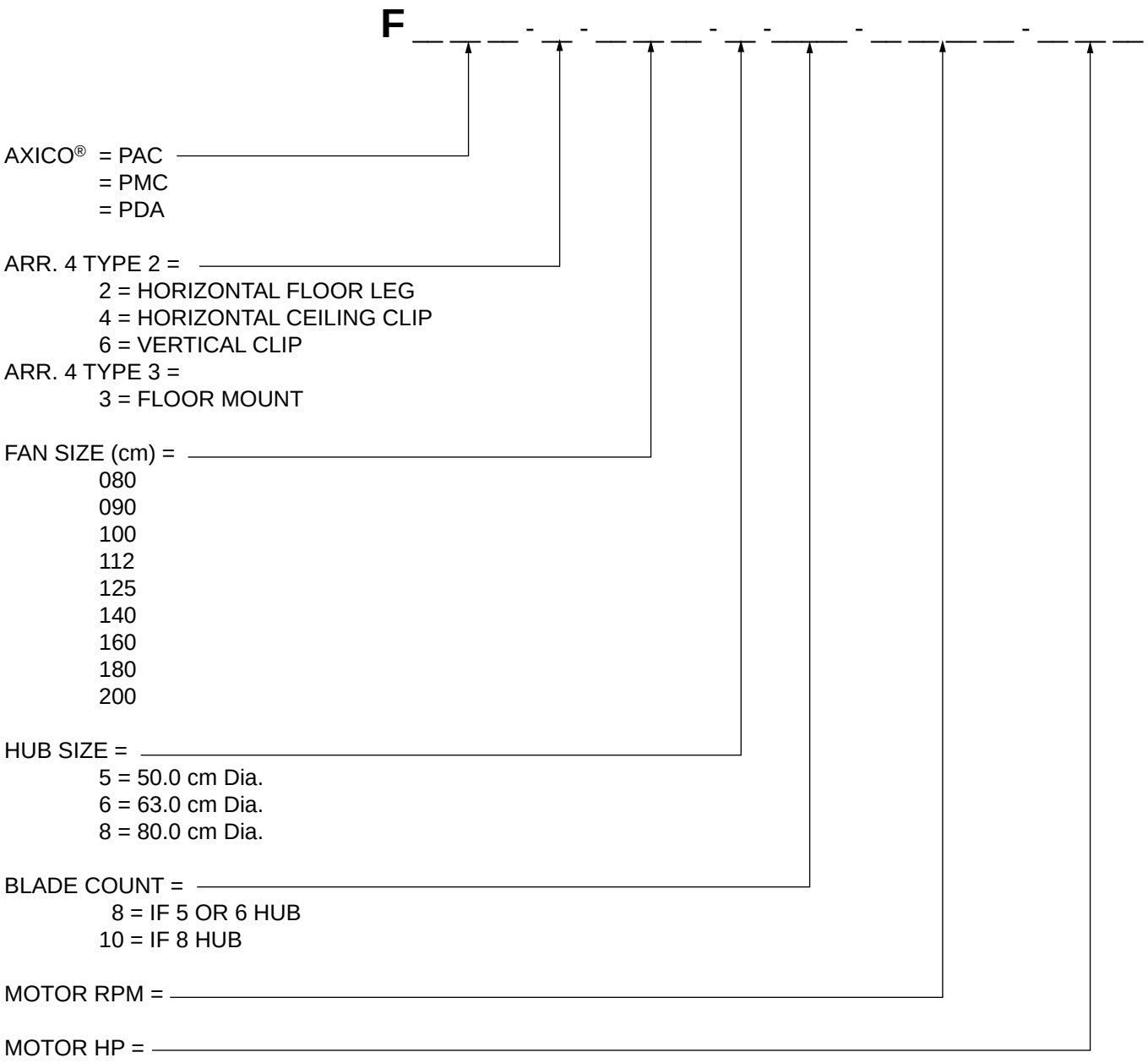
$TP = SP + VP + DL$

$$bHP = \frac{CFM \times TP}{6356 \times TE}$$

Physical Data

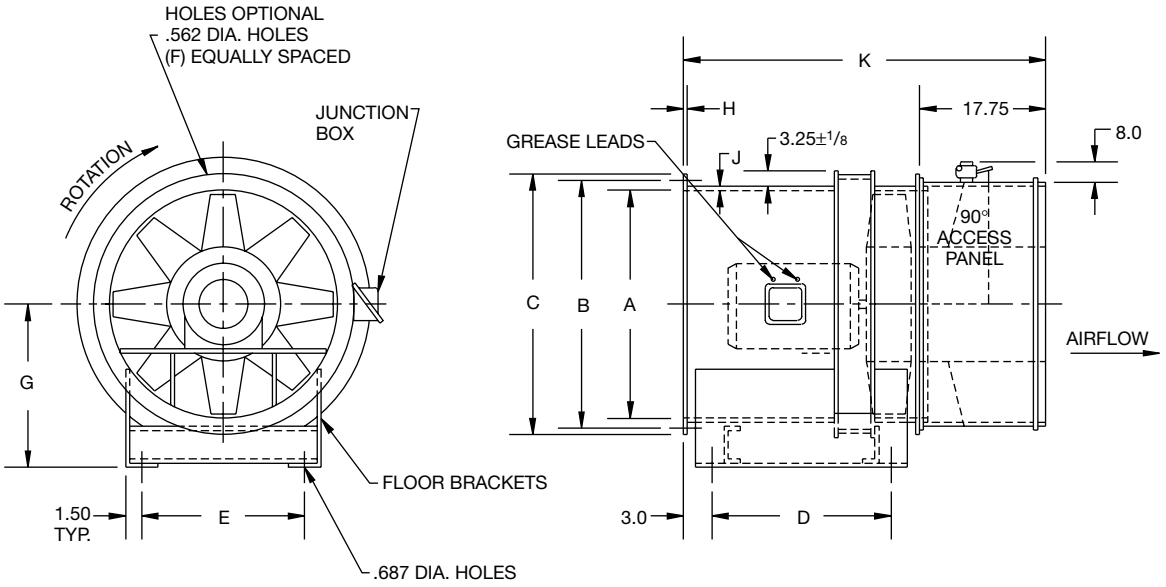
FAN MODEL NUMBER	FAN I.D. (IN.)	FAN AREA (SQ. FT.)	6-HUB 19.68 IN. DIA. AREA (SQ. FT.)	6-HUB 24.80 IN. DIA. AREA (SQ. FT.)	8-HUB 31.50 IN. DIA. AREA (SQ. FT.)	NET FREE ANNULUS (SQ. FT.)
080-5	31.50	5.41	2.11	—	—	3.30
090-5	35.43	6.85	2.11	—	—	4.74
090-6	35.43	6.85	—	3.35	—	3.50
100-5	39.37	8.45	2.11	—	—	6.34
100-6	39.37	8.45	—	3.35	—	5.10
112-5	44.09	10.60	2.11	—	—	8.49
112-6	44.09	10.60	—	3.35	—	7.25
112-8	44.09	10.60	—	—	5.41	5.19
125-5	49.21	13.21	2.11	—	—	11.10
125-6	49.21	13.21	—	3.35	—	9.86
125-8	49.21	13.21	—	—	5.41	7.80
140-5	55.12	16.57	2.11	—	—	14.46
140-6	55.12	16.57	—	3.35	—	13.22
140-8	55.12	16.57	—	—	5.41	11.16
160-6	63.00	21.65	—	3.35	—	18.30
160-8	63.00	21.65	—	—	5.41	16.24
180-6	70.87	27.39	—	3.35	—	24.04
180-8	70.87	27.39	—	—	5.41	21.98
200-8	78.74	33.82	—	—	5.41	28.41

Model Number Designation



NOTES:
1. Motor frame size must be specified in the body of the order and will no longer be indicated within the model number.
2. Blade pitch setting must be indicated in the body of the order.

FPAC With Pneumatic Actuation (Arr. 4 Type 2)



FAN SIZE	A	B	C	D	E	F	G	H	J	K	APPROX. WT. (LBS.)*
080	31.50	33.38	34.50	23.00	23.00	12	22.00	0.250	0.250	47.00	760
090	35.42	37.31	38.43	30.00	25.00	12	24.00	0.250	0.250	54.00	825
100	39.37	41.25	42.37	30.00	28.00	12	26.00	0.250	0.250	54.00	895
112	44.09	45.97	47.09	34.00	31.00	16	28.00	0.250	0.250	58.00	1010
125	49.21	51.09	52.21	34.00	35.00	16	33.00	0.250	0.250	58.00	1150
140	55.12	57.37	59.12	34.00	39.00	24	36.00	0.250	0.250	58.00	1310
160	63.00	65.25	67.00	34.00	45.00	24	40.00	0.250	0.250	58.00	1475
180	70.87	73.37	74.87	34.00	50.00	30	43.00	0.250	0.250	58.00	1570
200	78.74	81.24	83.34	34.00	56.00	30	47.00	0.250	0.250	58.00	1755

*SHIP WEIGHT LESS MOTOR

Technical Specification — FPAC (Arr. 4 Type 2)

Fans, where indicated on drawings and schedules, shall be of the direct driven, anti-stall, variable pitch, vaneaxial type with the fan blade angle being continuously controlled while the fan is operating. Fans shall be manufactured by Twin City Fan Companies, Ltd., Minneapolis, Minnesota, under license from ABB, Inc., and shall be of the size and capacity as indicated in the fan schedules.

Fans shall be of ANTI-STALL® design, thereby automatically maintaining stabilized airflow, irrespective of the system resistance. Fan performance shall remain stable through the entire range of flow and pressure exhibited by the fan performance curve regardless of system resistance, thus never permitting the fan to operate in a stall condition. ANTI-STALL® shall be a permanent, integral, aerodynamic feature of the fan case construction and shall be accomplished without the introduction of any moving parts, electrical peripheral controls, or other accessory items.

Fans not equipped with ANTI-STALL® casings must be furnished with a factory installed and wired active electronic stall sensing system that shall be capable of constantly monitoring system operation and initiating immediate fan system stoppage upon any stall detection.

Fans shall be Arrangement 4 Type 2, having the fan impeller mounted directly on the shaft of the drive motor and enclosed completely within the fan casing. The motor shall be positioned and mounted upstream of the fan impeller which shall be immediately followed by a straightening vane section having specifically designed stationary vanes capable of converting the swirl of velocity pressure created by the fan blades into static pressure with the highest possible efficiency.

Fans shall consist of a fan housing with removable vane section. During fabrication the concentricity of the fan casing and the vane section shall be insured through the use of specialized welding jigs and fixtures.

Fan casings shall be welded from a single sheet of hot-rolled ¼" thick carbon steel plate with end flanges integrally rolled mechanically from the fan casing sheet steel to insure concentricity and alignment of the flanges. A hot-rolled carbon steel motor base support (⅜" thick for NEMA 143T-286T frame motors, ½" thick for NEMA 324T-365T frame motors, ⅝" thick for NEMA 404T-405T, ¾" thick for NEMA 444T and larger frame motors) shall be welded into the inlet end of the fan casing and shall be designed and braced to support the foot-mounted NEMA T-frame drive motor while imposing minimum sound propagation to the fan impeller. The fan casing shall be continuously welded to a dimensionally stable spun carbon steel anti-stall section.

Fan casings shall be fitted with floor mounting legs or suspension hanging clips as shown on the installation drawings. Fan mounting legs shall be fabricated from carbon steel plate and shall be suitably cross braced and welded to the 12-gauge core and inner periphery of the vane section. The vane section shall be provided with a removable 17¾" wide access panel that will allow unimpeded service access to the fan impeller and blade actuation mechanism for a minimum of 90° of the fan circumference. The discharge of the vane section shall be a reinforced tube arranged for the attachment of a flexible connection to prevent the transmission of vibration to the downstream ductwork or plenum.

Fan impeller shall have aluminum hub and blades. The hub shall be cast of heat treated A356-T6 aluminum alloy and the blades shall be high pressure die-cast of A380 aluminum alloy. Fan blades shall be designed for maximum efficiency and shall be airfoil shaped, varying in twist and width from base to tip. Impeller blade tip to fan casing clearance shall be within tolerance to meet the certified performance of the fan.

The center of the hub shall be equipped with the blade operating mechanism. A pneumatic cylinder with diaphragm shall be furnished with linkage to operate the fan blades. The fan blade angle shall be variable to allow controlled modulation of airflow from zero to maximum design point while the fan is energized. Field adjustable mechanical stops shall be furnished for setting the maximum allowable blade pitch angle to prevent overloading of the driver motor. The pneumatic cylinder shall be equipped with a rotary air seal or coupling to allow the introduction of supply operating air, and shall have a position sensing device to give positive indication of blade position and eliminate hysteresis.

The internal pneumatic operator shall be factory installed complete with piping to a positioning device mounted external to the vane section. Air pressure to the pneumatic operator shall be greater than 80 psig and less than 100 psig. The positioning device shall be linear direct acting wherein 3 psig control signal requests minimum blade pitch angle and can be infinitely increased until a 15 psig control signal is reached requesting the maximum blade pitch angle. The standard fan operating system shall be such that interruption of either the control signal or the supply air, or both, shall immediately return the blades to the minimum pitch/flow position.

The fan impeller assembly 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. In addition, direct drive fan impellers shall be balanced on their motor shaft after final assembly in the fan casing, in the manufacturing facility, no higher than the following velocity values, filter-in, at the fan test speed:

Fan Application Category	**Rigidly Mounted (in./s)**	**Flexibly Mounted (in./s)**
BV-3	0.15	0.20

Final test room vibration levels in the axial, vertical, and horizontal planes shall be recorded and a written copy shall be available upon request.

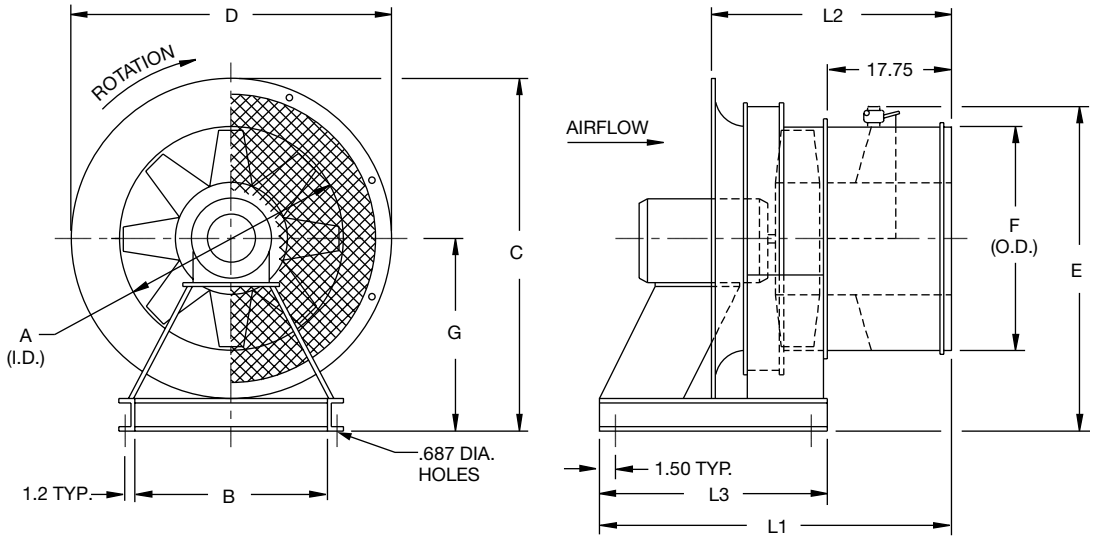
The fan impeller shall be secured to the motor shaft by a key and keyway, and by a locking bolt threaded into the motor shaft. All recommended lubrication and maintenance shall be accomplished without removal and disassembly of the fan impeller.

Fan motors shall be manufactured in accordance with current applicable standards of IEEE, NEC and NEMA. They shall be foot-mounted, NEMA standard T-frame, totally enclosed, continuous duty, ball bearing type with Class "F" insulation system and 1.15 service factor. Electrical wire leads of the motor shall be extended through an airtight vinyl coated flexible metal conduit and terminate in a suitably sized conduit motor box mounted on the exterior of the fan casing. External grease fittings with extended grease leads shall be mounted on the exterior of the fan case for lubrication of the motor bearings on all motors that are manufactured with grease fittings. All motor bearings shall provide 200,000 hours L-50 average life as defined by AFBMA. Other than drilling and tapping the motor shaft to accept the impeller locking bolt, no other modification shall be required to the NEMA standard foot-mounted motor.

The units, after fabrication, shall be cleaned and chemically pretreated by a phosphatizing process and shall be painted inside and out with an alkyd primer and finish painted with an air-dry exterior grade acrylic enamel.

Fan performance data is the result of laboratory tests performed in an AMCA registered laboratory using applicable portions of AMCA 210 for airflow and Standard 300 for sound power levels.

FPAC With Pneumatic Actuation (Arr. 4 Type 3)



FAN SIZE	A	B	C	D	E	F	G	L1	L2	L3	APPROX. WT. (LBS.)*
080	31.50	28.00	48.50	41.50	51.75	31.71	28.00	47.00	33.25	29.13	820
090	35.42	30.00	52.70	45.40	55.95	35.64	30.00	48.00	33.25	30.70	895
100	39.37	34.00	56.70	49.40	59.95	39.58	32.00	49.00	33.25	31.70	955
112	44.09	37.00	62.05	54.10	65.30	44.30	35.00	56.00	33.25	38.18	1080
125	49.21	42.00	71.60	63.20	73.00	49.42	40.00	60.00	33.25	42.25	1225
140	55.12	45.00	78.55	69.10	79.95	55.33	44.00	60.00	33.25	42.25	1420
160	63.00	48.00	85.50	77.00	86.90	63.21	47.00	60.00	33.25	42.25	1540
180	70.87	53.00	93.45	84.90	94.85	71.08	51.00	60.00	33.25	42.25	1655
200	78.74	58.00	100.35	92.70	101.75	78.95	54.00	60.00	33.25	42.25	1815

*SHIP WEIGHT LESS MOTOR

Technical Specification — FPAC (Arr. 4 Type 3)

Fans, where indicated on drawings and schedules, shall be of the direct driven, anti-stall, variable pitch, vaneaxial type with the fan blade angle being continuously controlled while the fan is operating. Fans shall be manufactured by Twin City Fan Companies, Ltd., Minneapolis, Minnesota, under license from ABB, Inc., and shall be of the size and capacity as indicated in the fan schedules.

Fans shall be of Anti-Stall® design, thereby automatically maintaining stabilized airflow, irrespective of the system resistance. Fan performance shall remain stable through the entire range of flow and pressure exhibited by the fan performance curve regardless of system resistance, thus never permitting the fan to operate in a stall condition. Anti-Stall® shall be a permanent, integral, aerodynamic feature of the fan case construction and shall be accomplished without the introduction of any moving parts, electrical peripheral controls, or other accessory items.

Fans not equipped with Anti-Stall® casings must be furnished with a factory installed and wired active electronic stall sensing system that shall be capable of constantly monitoring system operation and initiating immediate fan system stoppage upon any stall detection.

Fans shall be Arrangement 4 Type 3, having the fan impeller mounted directly on the shaft of the drive motor while the motor is supported on a structural steel base upstream of the fan impeller and external to the fan casing. Fans shall be designed exclusively for free inlet horizontal airflow applications, incorporating an aerodynamically designed spun carbon steel inlet bell continuously welded to a one-piece 3⁄16" thick spun carbon steel Anti-Stall® fan casing. The inlet bell and fan casing assembly shall be rigidly supported by a welded structural carbon steel floor mounting base fabricated of a minimum of 5" channel which shall also support a fabricated and welded hot-rolled carbon steel motor base (3⁄8" thick for NEMA 143T-286T frame motors, 1⁄2" thick for NEMA 324T-365T frame motors, 5⁄8" thick for

NEMA 404T-405T, ¾" thick for NEMA 444T and larger frame motors) designed to impose minimum and sound propagation to the fan impeller.

A bolted, protective wire screen shall be furnished at the fan inlet. The drive motor shall be positioned at the fan inlet and shall be a standard NEMA foot-mounted T-frame type completely exposed for ease of service and accessibility.

Fans shall consist of a fan casing immediately followed by a bolted, removable straightening vane section having specifically designed stationary vanes capable of converting the swirl of velocity pressure created by the fan blades into static pressure with the highest possible efficiency. During fabrication the concentricity of the fan casing and the vane section shall be insured through the use of specialized welding jigs and fixtures.

The removable straightening vane section shall attach to the fan casing with a bolted flange. The carbon steel vanes shall be accurately cut, roll-formed, and welded to a central core using jigs and fixtures to insure exact location and thus provide optimum fan performance. There shall be a minimum of 11 guide vanes fabricated of 12-gauge carbon steel welded to the 12-gauge core and inner periphery of the vane section. The vane section shall be provided with a removable 17¾" wide access panel that will allow unimpeded service access to the fan impeller and blade actuation mechanism for a minimum of 90° of the fan circumference. The discharge of the vane section shall be a reinforced tube arranged for the attachment of a flexible connection to prevent the transmission of vibration to the downstream ductwork or plenum.

Fan impeller shall have aluminum hub and blades. The hub shall be cast of heat treated A356-T6 aluminum alloy and the blades shall be high pressure die-cast of A380 aluminum alloy. Fan blades shall be designed for maximum efficiency and shall be airfoil shaped, varying in twist and width from base to tip. Impeller blade tip to fan casing clearance shall be within tolerance to meet the certified performance of the fan.

The center of the hub shall be equipped with the blade operating mechanism. A pneumatic cylinder with diaphragm shall be furnished with linkage to operate the fan blades. The fan blade angle shall be variable to allow controlled modulation of airflow from zero to maximum design point while the fan is energized. Field adjustable mechanical stops shall be furnished for setting the maximum allowable blade pitch angle to prevent overloading of the driver motor. The pneumatic cylinder shall be equipped with a rotary air seal or coupling to allow the introduction of supply operating air, and shall have a position sensing device to give positive indication of blade position and eliminate hysteresis.

The internal pneumatic operator shall be factory installed complete with piping to a positioning device mounted external to the vane section. Air pressure to the pneumatic operator shall be greater than 80 psig and less than 100 psig. The positioning device shall be linear direct acting wherein 3 psig control signal requests minimum blade pitch angle and can be infinitely increased until a 15 psig control signal is reached requesting the maximum blade pitch angle. The standard fan operating system shall be such that interruption of either the control signal or the supply air, or both, shall immediately return the blades to the minimum pitch/flow position.

The fan impeller assembly 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. In addition, direct drive fan impellers shall be balanced on their motor shaft after final assembly in the fan casing, in the manufacturing facility, no higher than the following velocity values, filter-in, at the fan test speed:

Fan Application Category	**Rigidly Mounted (in./s)**	**Flexibly Mounted (in./s)**
BV-3	0.15	0.20

Final test room vibration levels in the axial, vertical, and horizontal planes shall be recorded and a written copy shall be available upon request.

The fan impeller shall be secured to the motor shaft by a key and keyway, and by a locking bolt threaded into the motor shaft. All recommended lubrication and maintenance shall be accomplished without removal and disassembly of the fan impeller.

Fan motors shall be manufactured in accordance with current applicable standards of IEEE, NEC and NEMA. They shall be foot-mounted, NEMA standard T-frame, open drip-proof (ODP), continuous duty, ball bearing type with Class "B" insulation system and 1.15 service factor. Motor electrical wire leads shall be fully accessible within the standard motor conduit box furnished by the motor manufacturer. External grease fittings with extended grease leads shall be mounted on the motor pedestal of the fan case for lubrication of the motor bearings on all motors that are manufactured with grease fittings. All motor bearings shall provide 200,000 hours L-50 average life as defined by AFBMA. Other than drilling and tapping the motor shaft to accept the impeller locking bolt, no other modification shall be required to the NEMA standard foot-mounted motor.

The units, after fabrication, shall be cleaned and chemically pretreated by a phosphatizing process and shall be painted inside and out with an alkyd primer and finish painted with an air-dry exterior grade acrylic enamel.

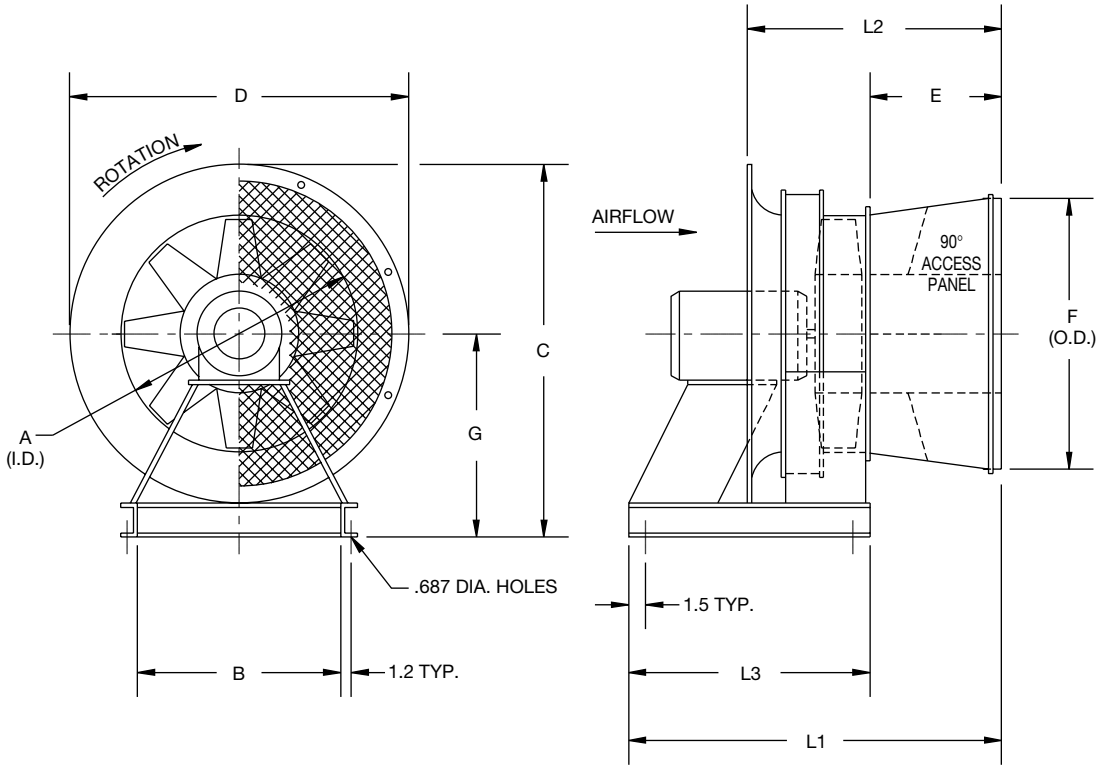
Fan performance data is the result of laboratory tests performed in an AMCA registered laboratory using applicable portions of AMCA 210 for airflow and Standard 300 for sound power levels.

FPDA Compact Design (Arr. 4 Type 3)

The **AXICO ANTI-STALL® Compact Design Fan** is offered to save valuable floor space within the confines of central station air handling units and/or mechanical equipment rooms.

By placing the motor before the fan impeller and combining the standard straightening vane section with an aerodynamically designed static regain diffuser we have designed a vaneaxial fan requiring the minimum amount of floor space.

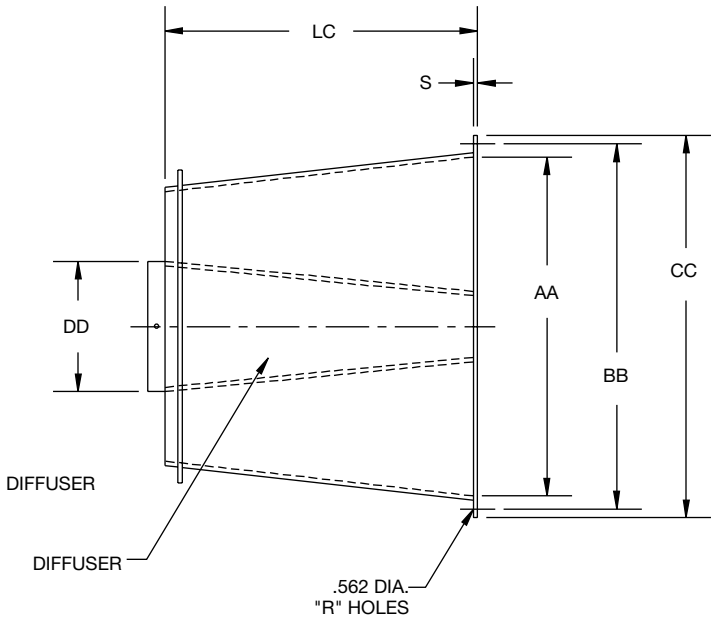
The compact nature of this design minimizes construction costs by allowing valuable floor space to be used for other purposes. The **AXICO ANTI-STALL® Compact Design Fan** provides a vaneaxial fan capable of saving valuable energy while, at the same time, delivering relatively low outlet discharge velocities.



FAN SIZE	A	B	C	D	E	F	G	L1	L2	L3	APPROX. WT. (LBS.)*
080	31.50	28.00	48.50	41.50	21.65	35.43	28.00	50.78	37.15	29.13	910
090	35.43	30.00	52.70	45.40	21.65	39.37	30.00	52.35	37.15	30.70	1000
100	39.37	34.00	56.70	49.40	21.65	44.09	32.00	53.35	37.15	31.70	1080
112	44.09	37.00	62.05	54.10	21.65	49.21	35.00	59.83	37.15	38.18	1230
125	49.21	42.00	71.60	63.20	21.65	55.12	40.00	63.90	39.15	42.25	1405
140	55.12	45.00	78.55	69.10	29.53	63.00	44.00	71.78	47.03	42.25	1655
160	63.00	48.00	85.50	77.00	29.53	70.87	47.00	71.78	47.03	42.25	1880
180	70.87	53.00	93.45	84.90	29.53	78.74	51.00	71.78	47.03	42.25	2055
200	78.74	58.00	100.35	92.70	29.53	83.85	54.00	71.78	47.03	42.25	2415

*SHIP WEIGHT LESS MOTOR

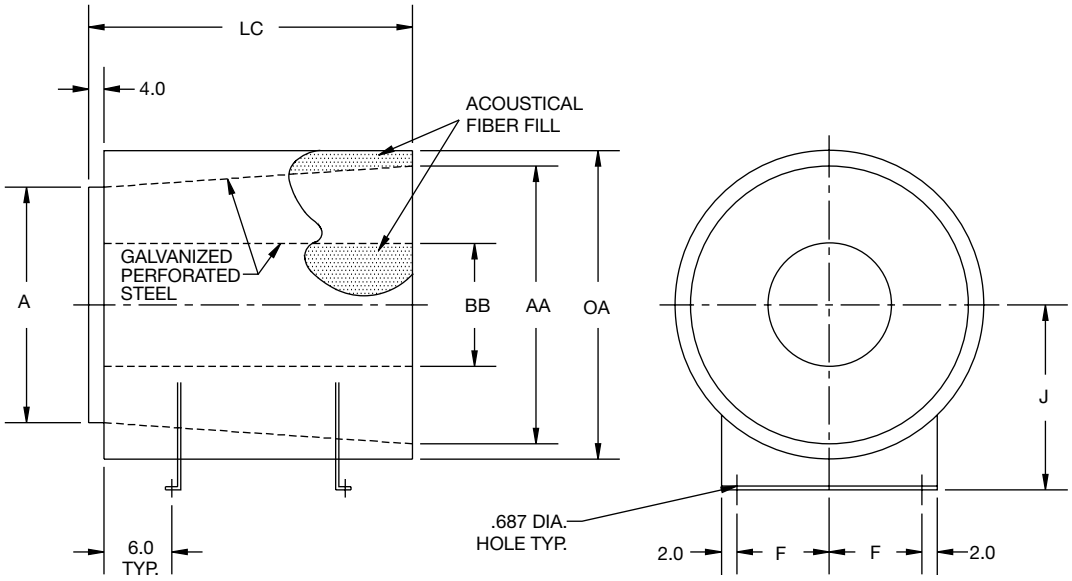
C-D Diffuser



All Type C-D diffusers ship in two sections for field mounting per drawing #100712.

FAN MODEL	ANNULAR AREA, SQ. FT.		AA	BB	CC	DD	LC	R	S	WT. LBS.
	INLET	OUTLET								
080-5	3.63	7.65	38.00	39.50	41.10	17.80	36.00	16	.188	97
090-5	5.50	9.39	42.00	43.50	45.10	17.80	36.00	16	.188	105
090-6	3.85	8.86	42.00	43.50	45.10	23.12	36.00	16	.188	115
100-5	6.68	12.34	48.00	49.50	51.12	17.80	36.00	16	.188	133
100-6	5.48	11.81	48.00	49.50	51.12	23.12	36.00	16	.188	142
112-5	8.82	15.70	54.00	55.50	57.12	17.80	42.00	24	.188	163
112-6	7.62	15.37	54.00	55.50	57.12	23.12	42.00	24	.188	175
112-8	5.72	14.45	54.00	55.00	57.12	29.59	42.00	24	.188	183
125-5	11.42	19.43	60.00	61.50	63.12	17.80	46.00	24	.188	224
125-6	10.22	19.23	60.00	61.50	63.12	23.12	46.00	24	.188	238
125-8	8.33	18.40	60.00	61.50	63.12	29.50	46.00	24	.188	252
140-5	14.78	25.00	68.00	70.00	72.15	17.80	56.00	24	.250	307
140-6	13.58	25.00	68.00	70.00	72.15	23.12	56.00	24	.250	331
140-8	11.69	24.46	68.00	70.00	72.15	29.59	56.00	24	.250	353
160-6	18.67	31.29	76.00	78.00	80.15	23.12	56.00	24	.250	367
160-8	16.76	30.74	76.00	78.00	80.15	29.59	56.00	24	.250	390
180-6	24.40	42.02	88.00	90.00	92.21	23.12	66.00	24	.250	615
180-8	22.51	41.82	88.00	90.00	92.21	29.59	66.00	24	.250	639
200-8	28.93	45.75	92.00	94.00	96.21	29.59	66.00	24	.250	679

Acoustic Diffuser



FAN MODEL	A	AA	OA	BB	F	J	LC	WT LBS.
080-5	31.50	40.00	48.00	23.43	14.00	26.00	38.00	429
090-5	35.43	44.00	52.00	18.11	16.00	28.00	38.00	417
090-6	35.43	44.00	52.00	23.43	16.00	28.00	38.00	465
100-5	39.37	48.00	56.00	18.11	18.00	30.00	38.00	432
100-6	39.37	48.00	56.00	23.43	18.00	30.00	38.00	500
112-5	44.09	54.00	62.00	18.11	20.00	33.00	42.00	567
112-6	44.09	54.00	62.00	23.43	20.00	33.00	42.00	597
112-8	44.09	54.00	62.00	29.92	20.00	33.00	42.00	641
125-5	49.21	60.00	68.00	18.11	23.00	38.00	46.00	762
125-6	49.21	60.00	68.00	23.43	23.00	38.00	46.00	792
125-8	49.21	60.00	68.00	29.92	23.00	38.00	46.00	837
140-5	55.12	70.00	78.00	18.11	25.00	41.00	60.00	1093
140-6	55.12	70.00	78.00	23.43	25.00	41.00	60.00	1133
140-8	55.12	70.00	78.00	29.92	25.00	41.00	60.00	1190
160-6	63.00	80.00	88.00	23.43	29.00	46.00	68.00	1417
160-8	63.00	80.00	88.00	29.92	29.00	46.00	68.00	1482
180-6	70.87	90.00	98.00	23.43	34.00	51.00	76.00	2089
180-8	70.87	90.00	98.00	29.92	34.00	51.00	76.00	2155
200-8	78.74	96.00	104.00	29.92	38.00	54.00	84.00	2459

Attenuation in Acoustical Diffuser

SIZE	ATTENUATION , dB							
	CENTER BAND FREQUENCY, HZ							
	63	125	250	500	1000	2000	4000	8000
080-5	1	6	11	20	23	22	10	11
090-5	1	6	9	10	21	26	12	10
090-6	1	7	12	15	25	25	17	10
100-5	1	7	10	12	19	16	10	10
100-6	1	7	11	15	21	20	13	10
112-5	2	6	13	15	18	14	10	10
112-6	2	7	12	12	20	17	10	10
112-8	2	7	13	14	23	12	14	10
125-5	2	7	12	13	17	13	10	10
125-6	2	7	12	13	19	13	10	10
125-8	2	7	13	14	21	18	11	10
140-5	2	7	13	14	16	11	10	10
140-6	2	7	13	15	19	12	10	10
140-8	2	7	13	16	21	14	10	10
160-6	2	7	14	15	17	11	10	10
160-8	2	7	14	16	16	12	10	10
180-6	2	7	13	15	15	10	10	10
180-8	2	7	14	16	17	10	10	10
200-8	2	7	14	16	15	10	10	10

Technical Specification — Acoustic Diffuser

Fans shall be provided with acoustic diffusers mounted at the fan inlet and/or discharge as indicated on the drawings and schedules. Acoustic diffusers shall be specifically designed by the fan manufacturer for use with their vaneaxial fans; shall serve a dual function providing efficient static regain capability while acting as a broad-band acoustical silencer; and shall be a standard cataloged accessory offering with both published static regain and noise attenuation values in eight (8) octave bands.

Acoustic diffusers shall be of the same length and diameters as standard non-attenuating diffusers and shall be fabricated of galvanized sheet steel. A cylindrical core of perforated galvanized steel packed with acoustical fill insulation shall be properly sized to match the hub of the vaneaxial impeller and centrally supported via airflow straightening vanes. The exterior of the acoustic diffuser shall have a straight cylindrical outer skin of galvanized sheet steel mated to an inner cone manufactured of perforated galvanized sheet steel to form an attenuating jacket of acoustical fill insulation varying from a minimum of 9 inches thickness at the inlet to 4 inches minimum thickness at the discharge.

Attenuating acoustical fill material shall be inorganic, vermin-resistant, and moisture-resistant glass fiber insulation and shall have a flame spread rating of 25 or less when tested per ASTM-E84. Acoustical fill material shall be completely encased in a polymer covering so that no portion of the material is exposed to the airstream and shall be packed into the perforated core and outer jacket of the acoustic diffuser and sufficiently compressed to eliminate voids and insure the specified levels of attenuation.

AXICO ANTI-STALL®

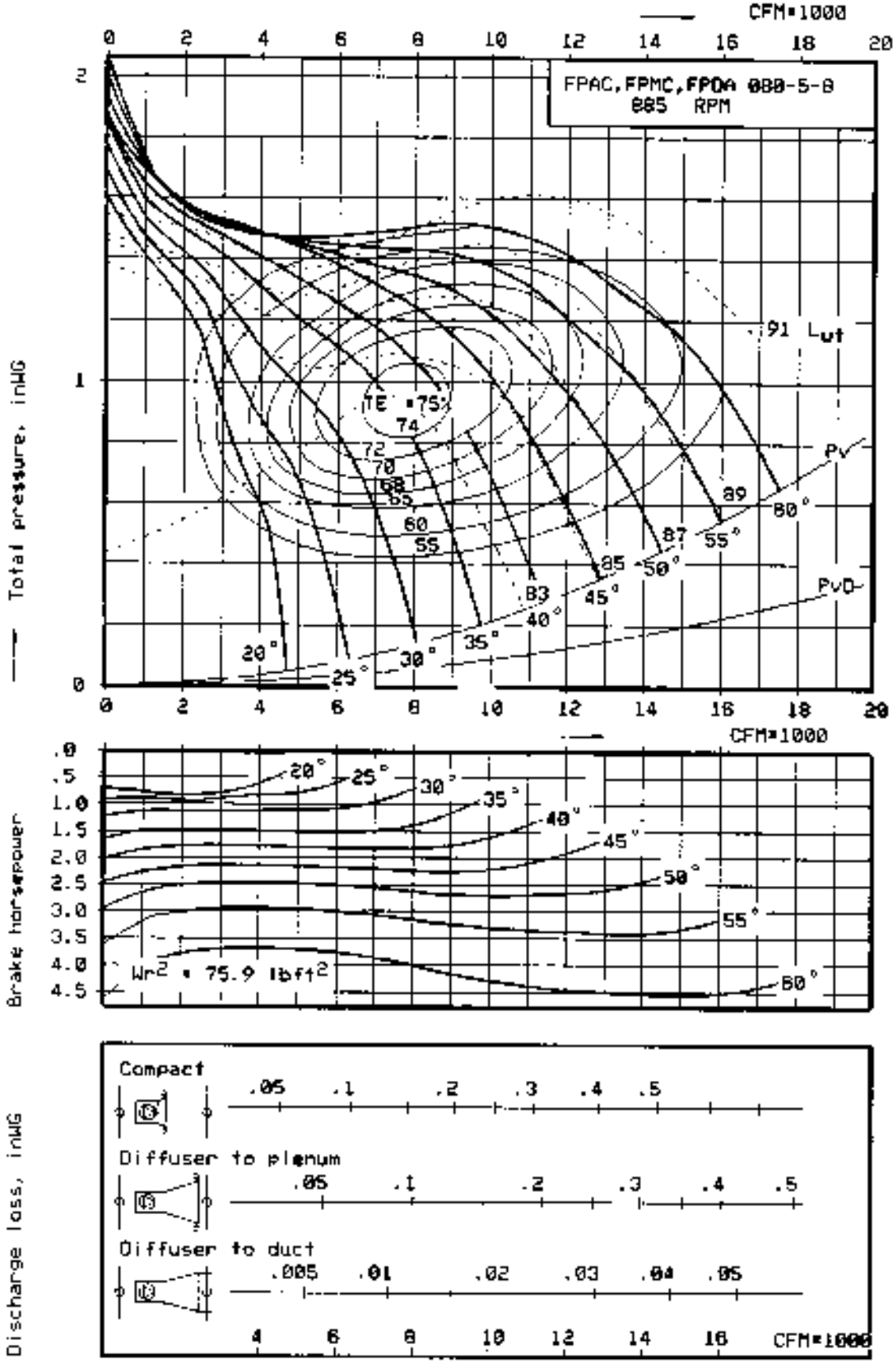
Fan chart is valid for a gas density of .075 lb/ft^3.

L_{wt}: Total sound power level dB(A)

P_V: Velocity pressure in fan diameter duct

P_{VD}: Velocity pressure in diffuser diameter duct

TE: Total efficiency



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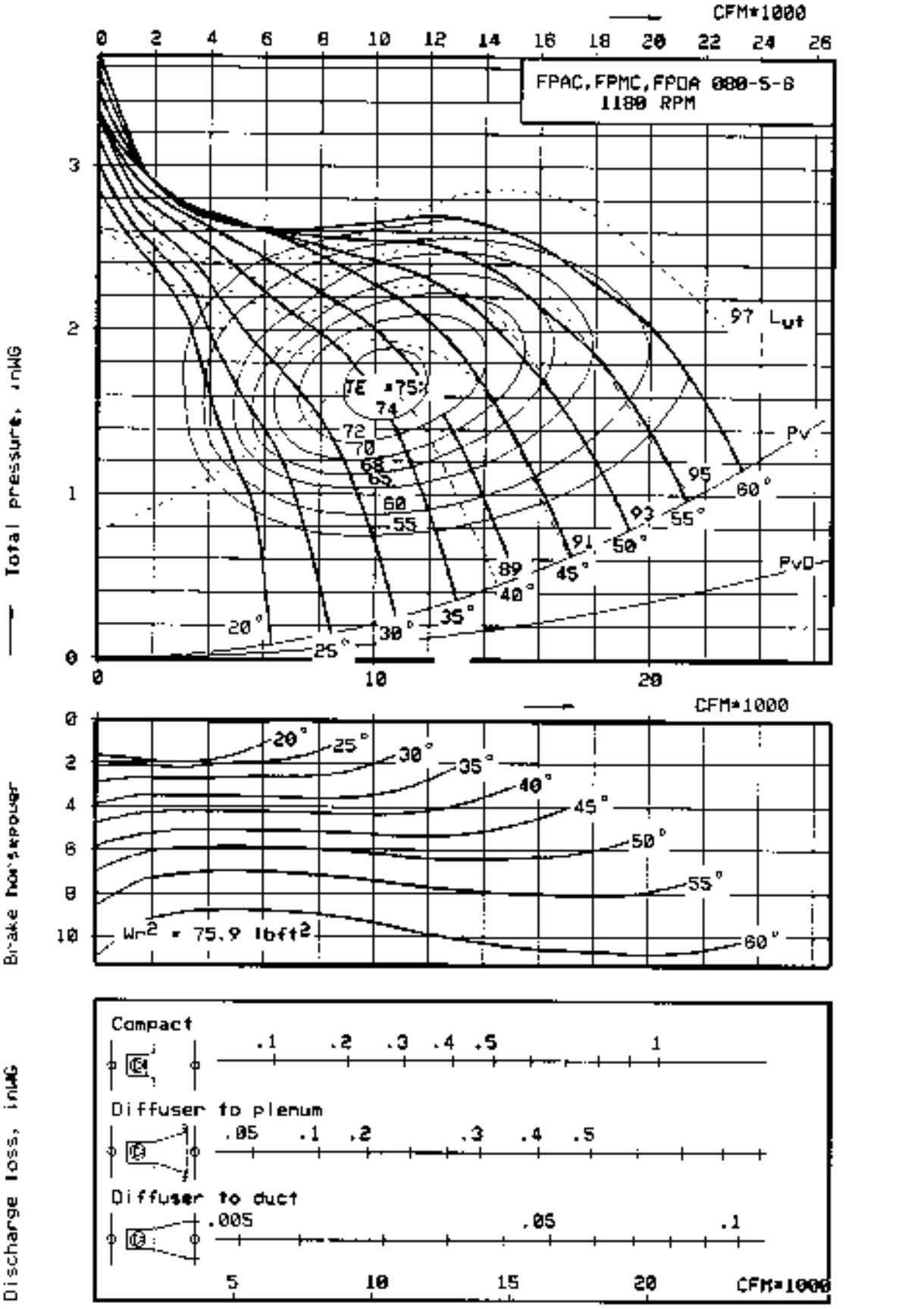

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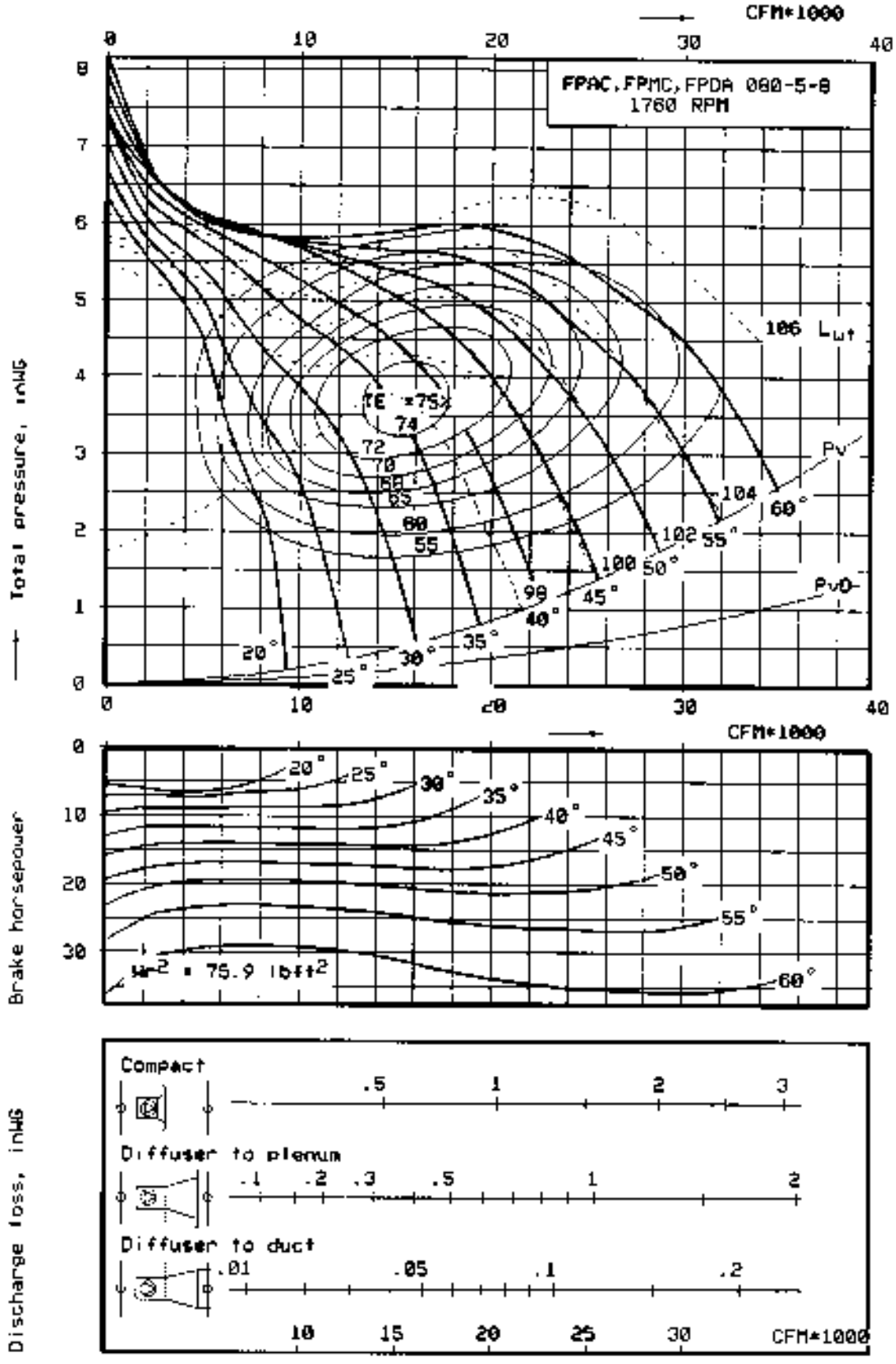

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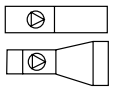

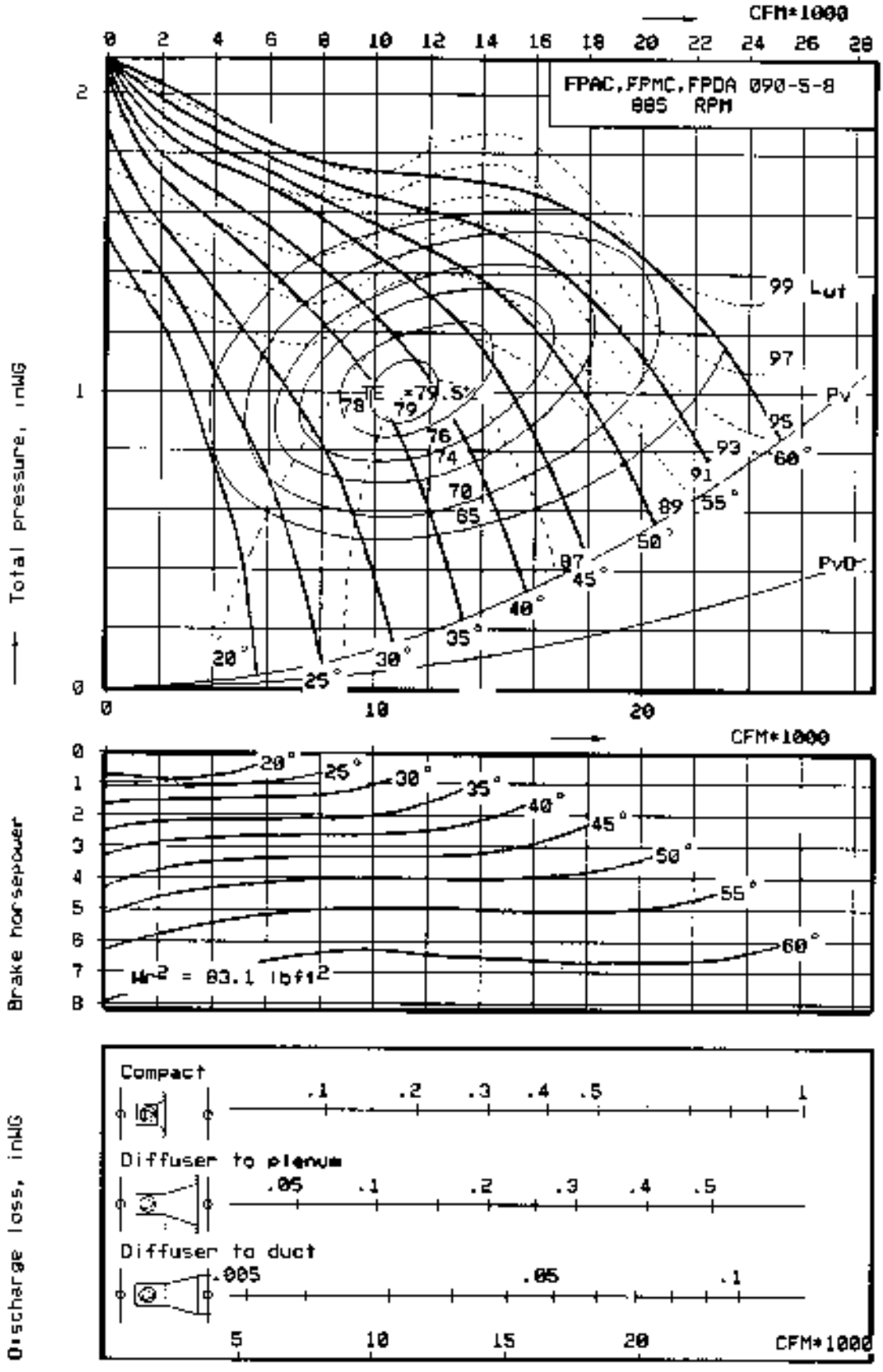

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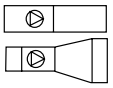

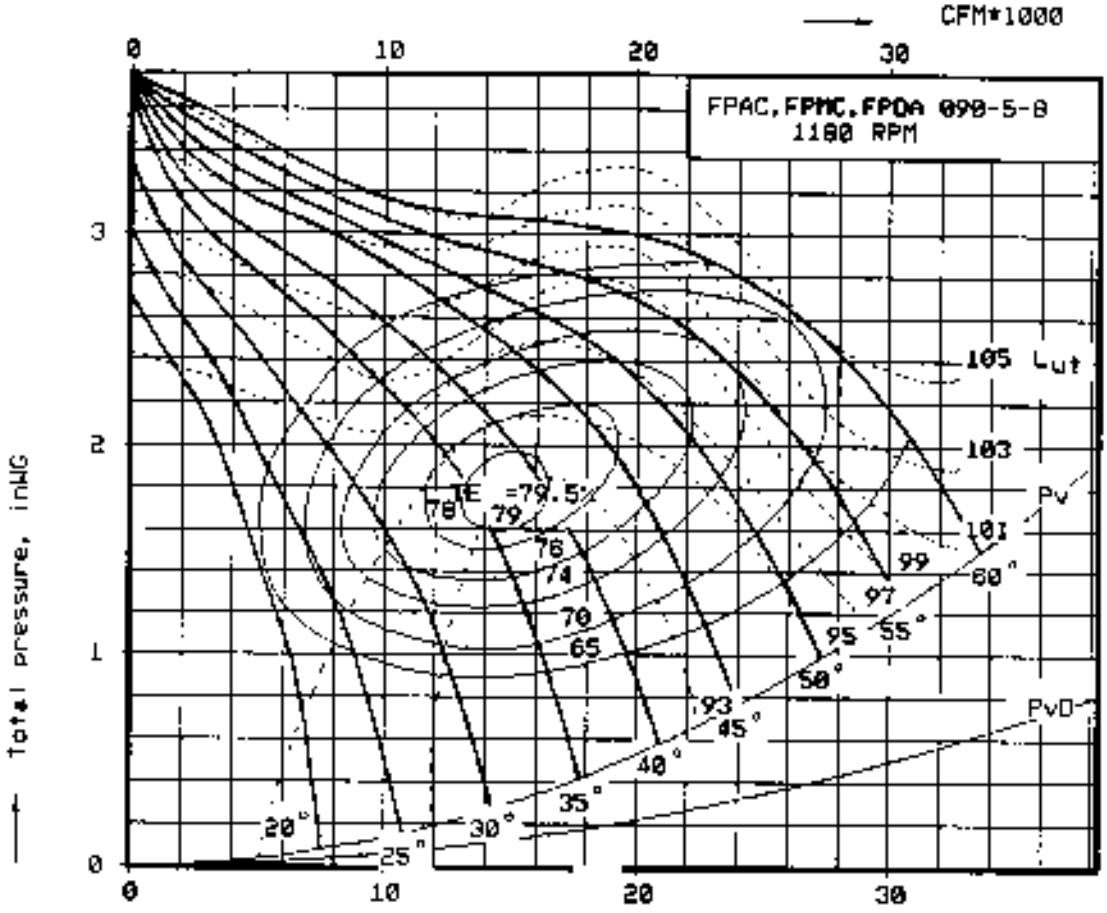

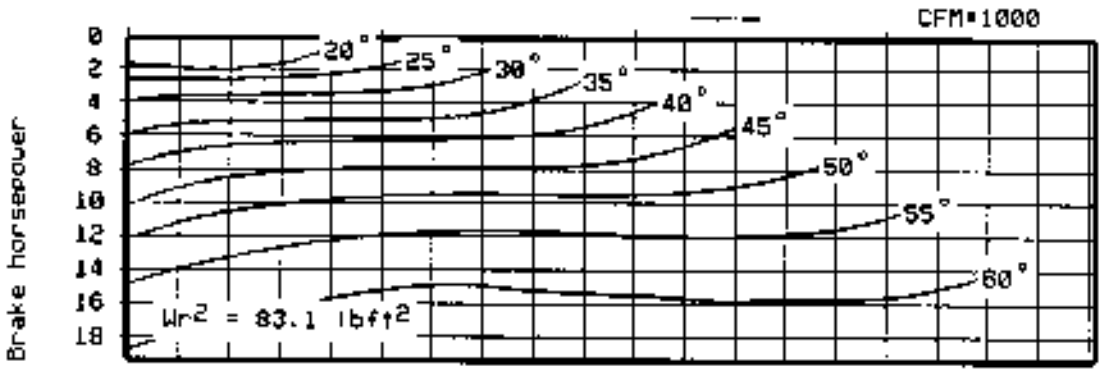

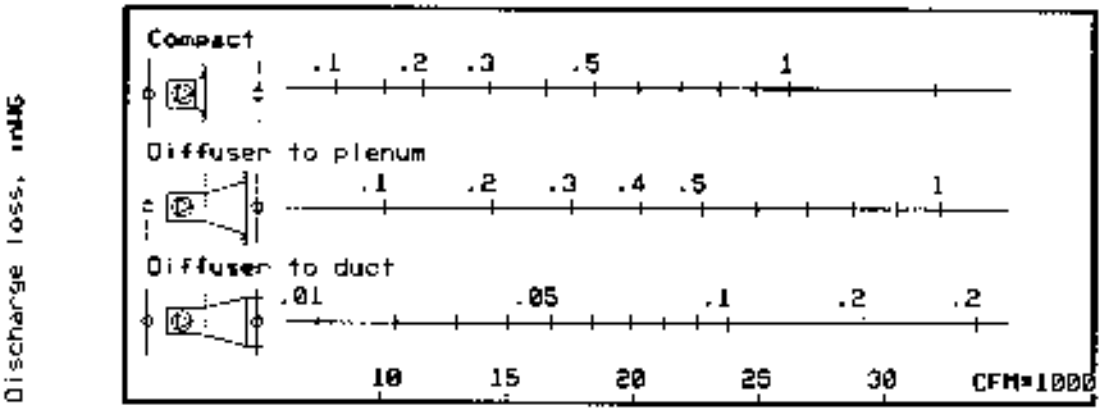

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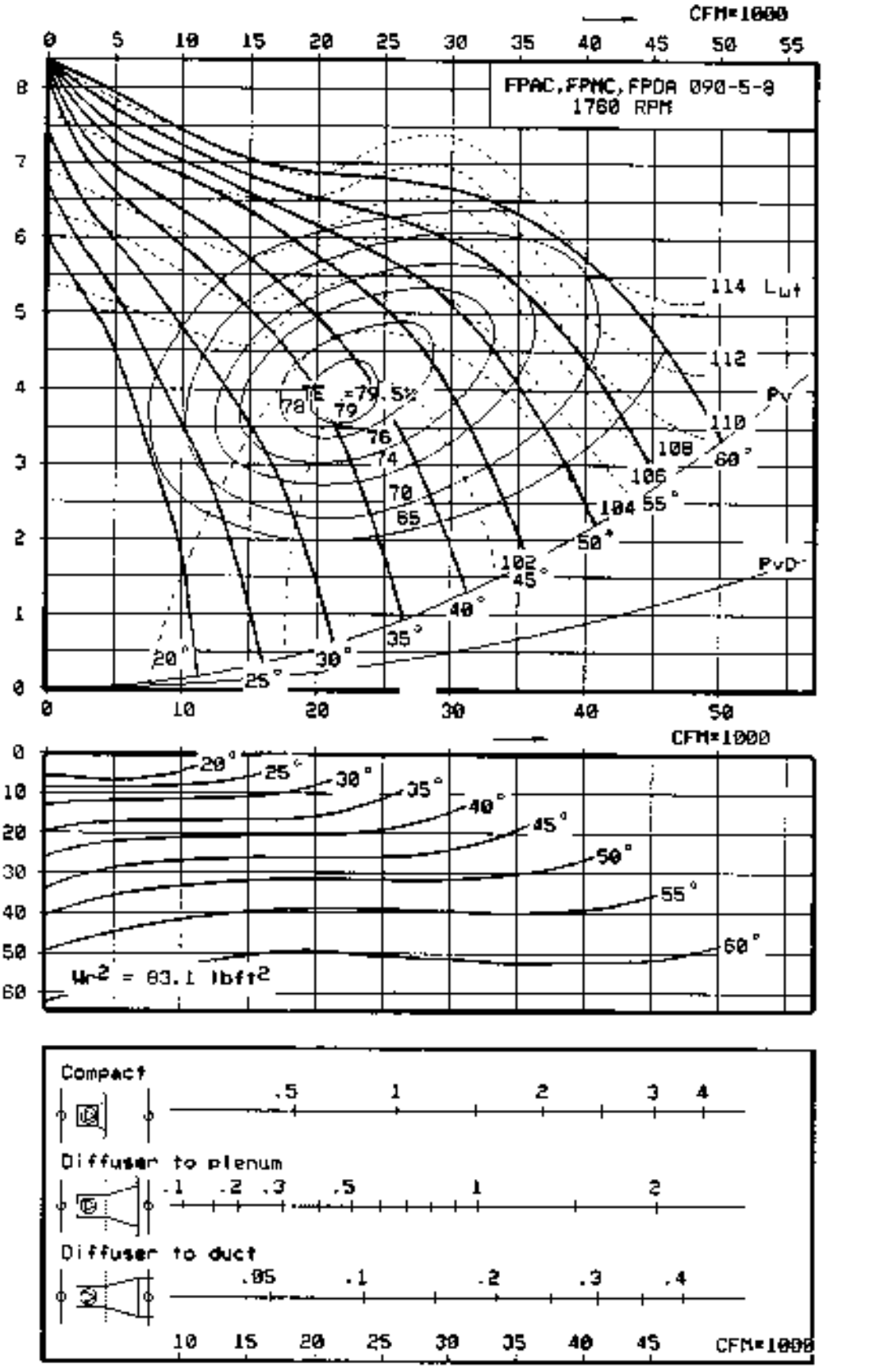

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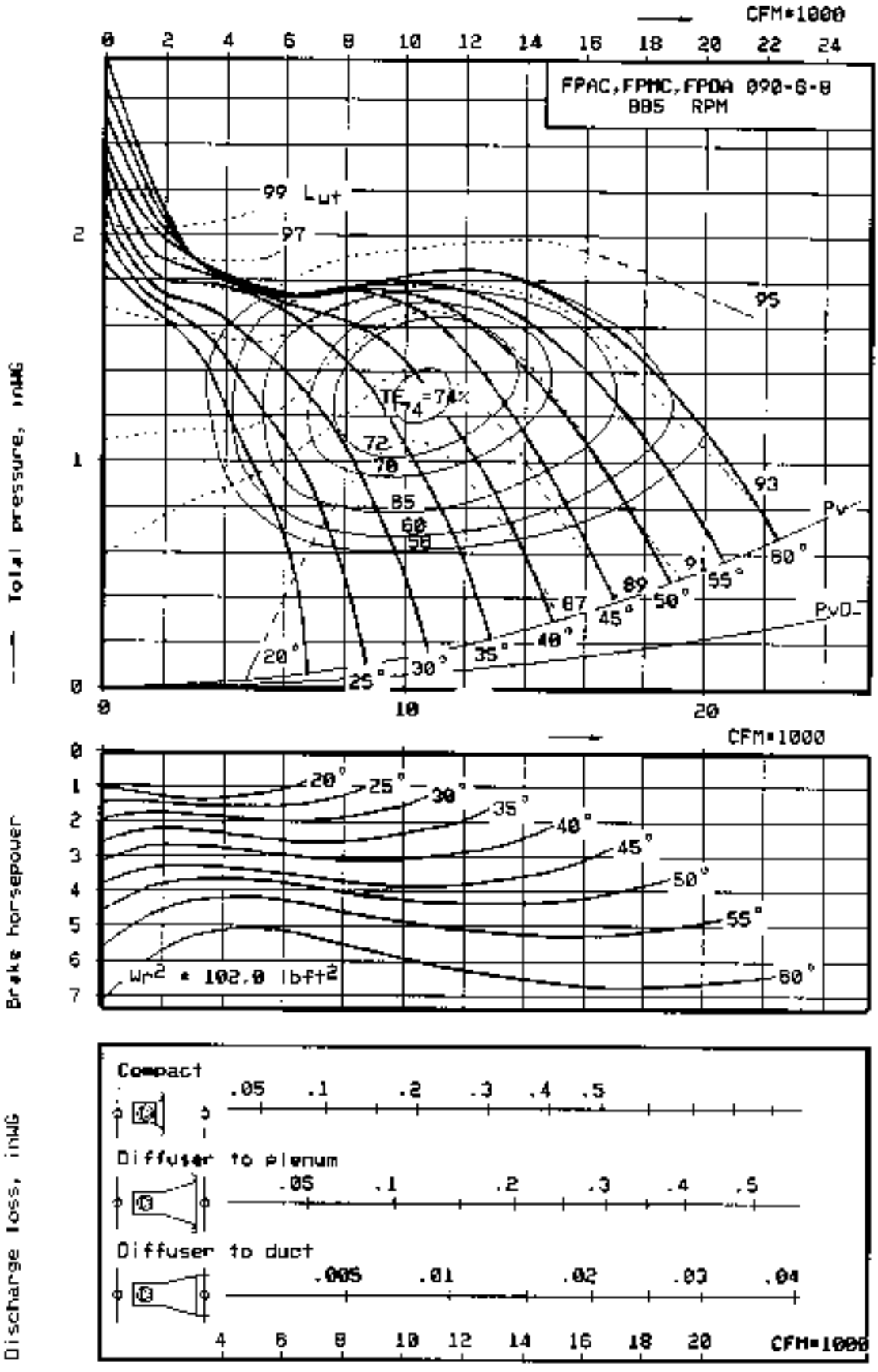

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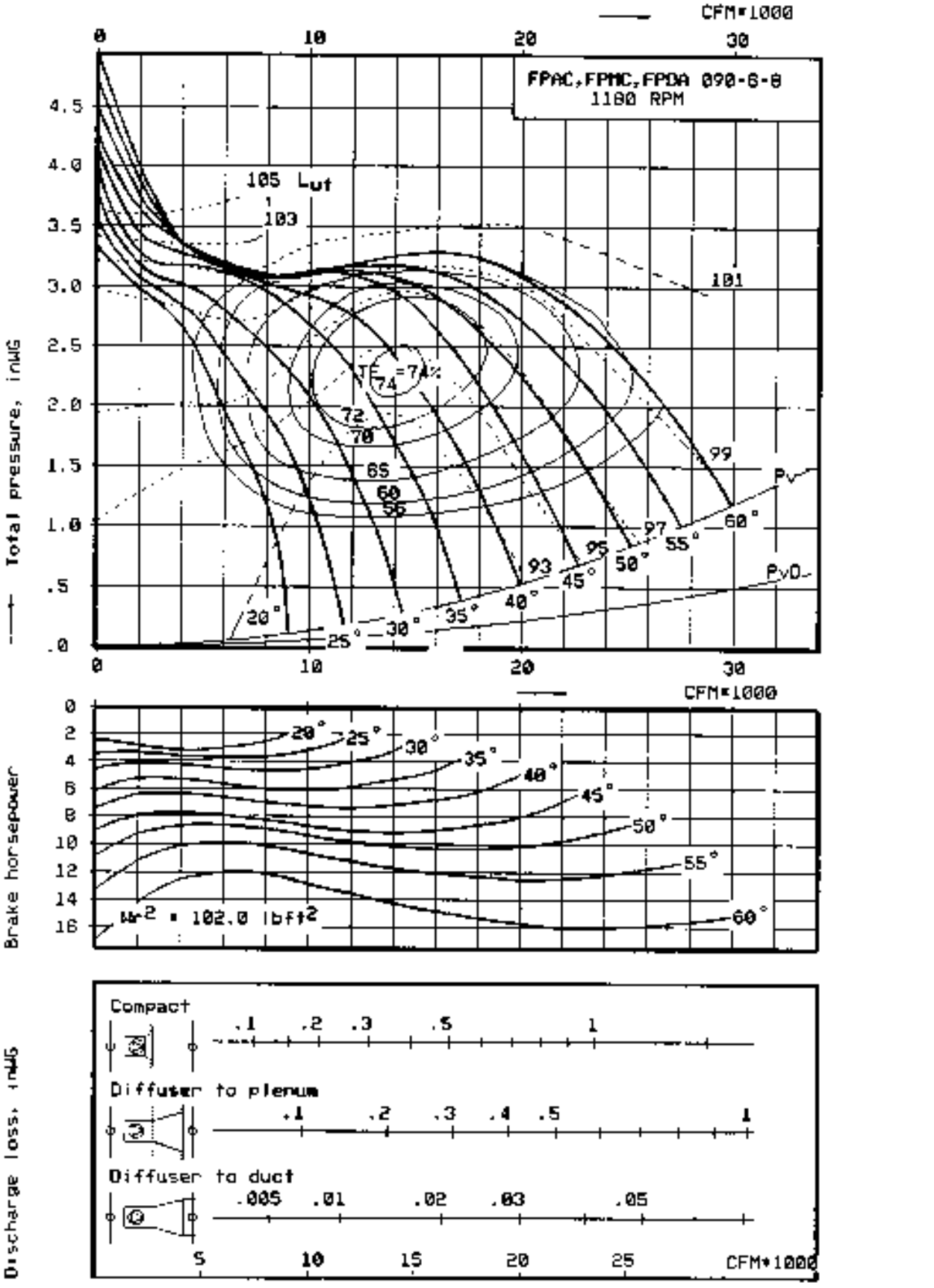

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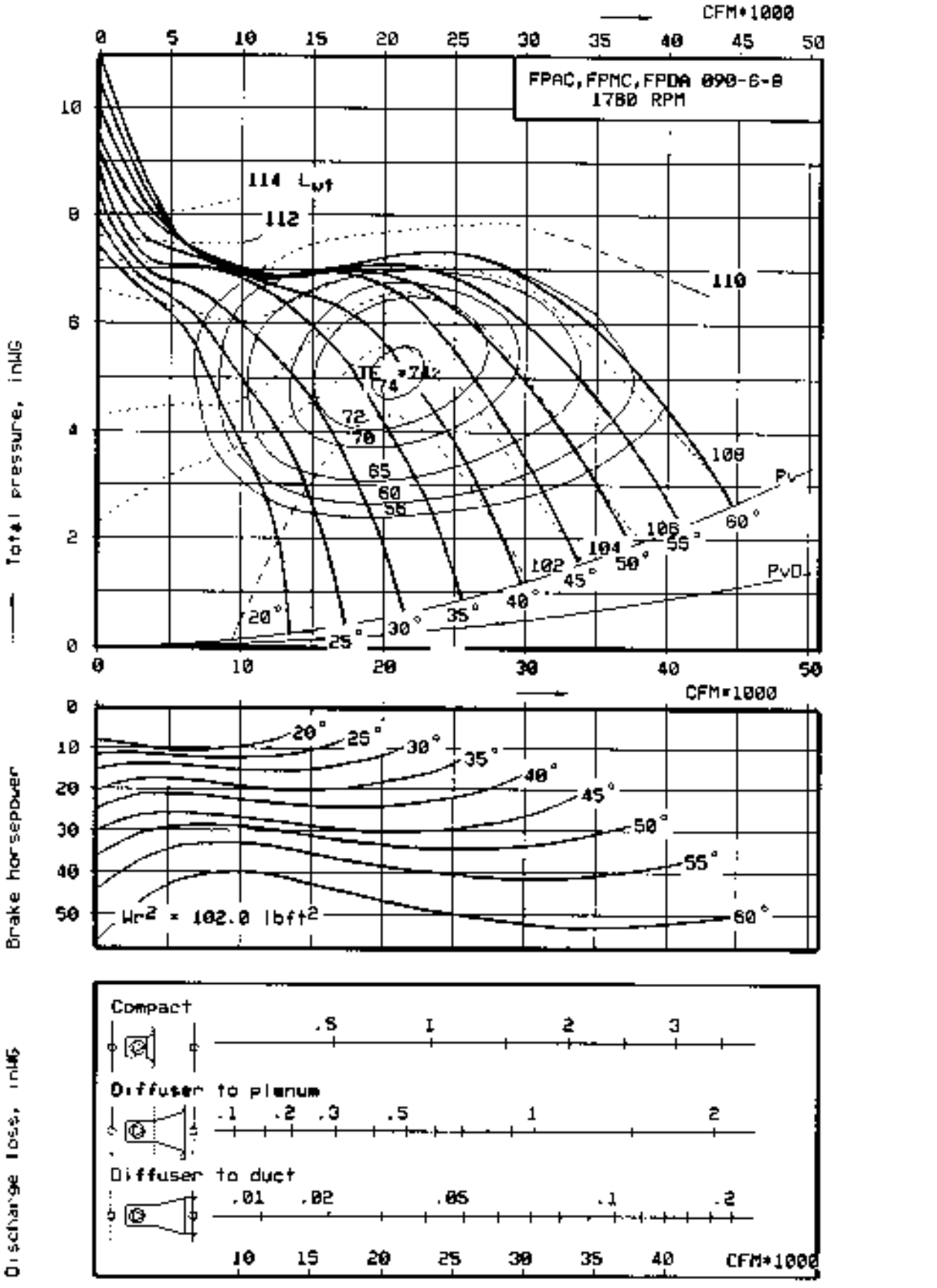

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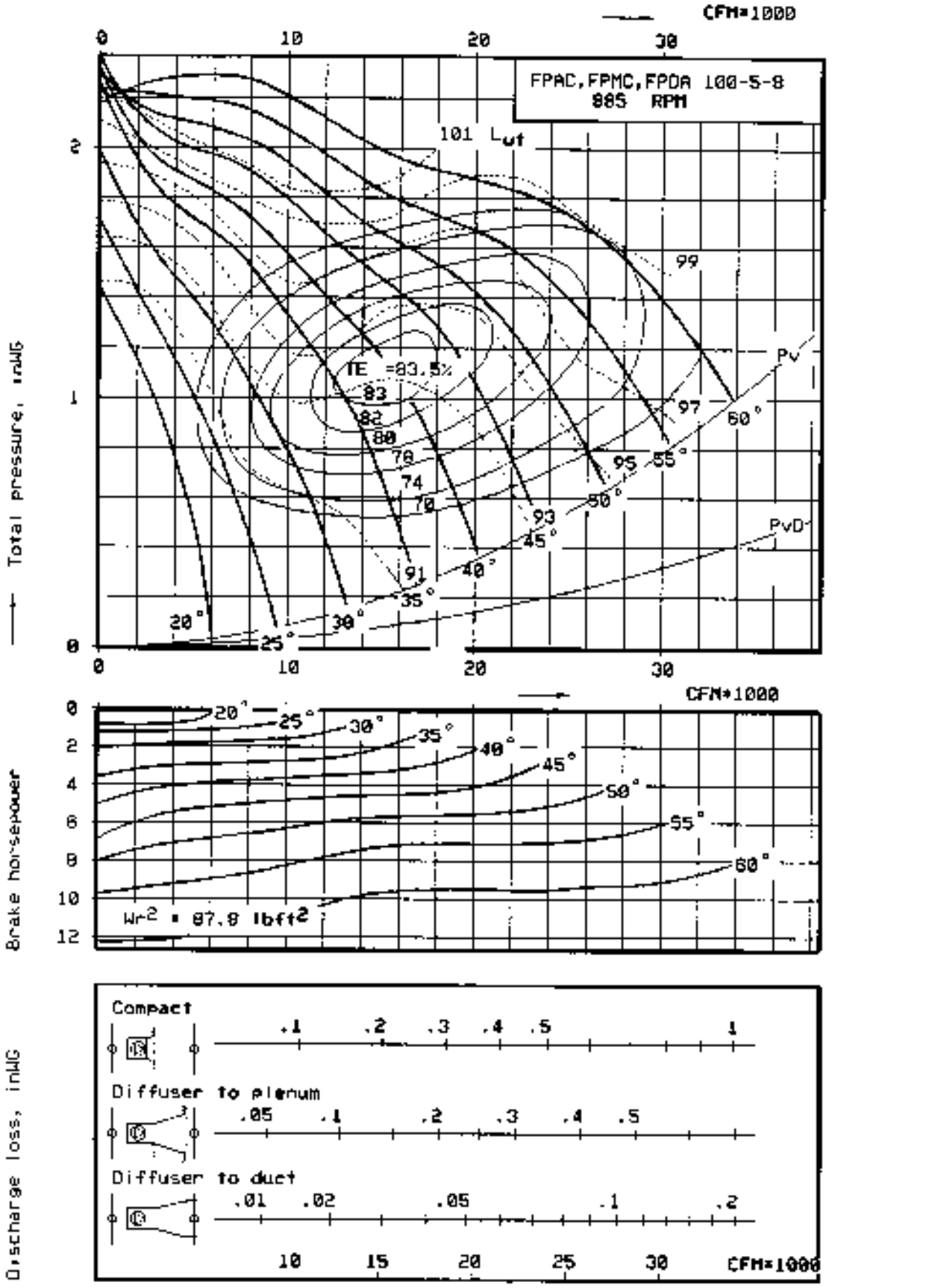

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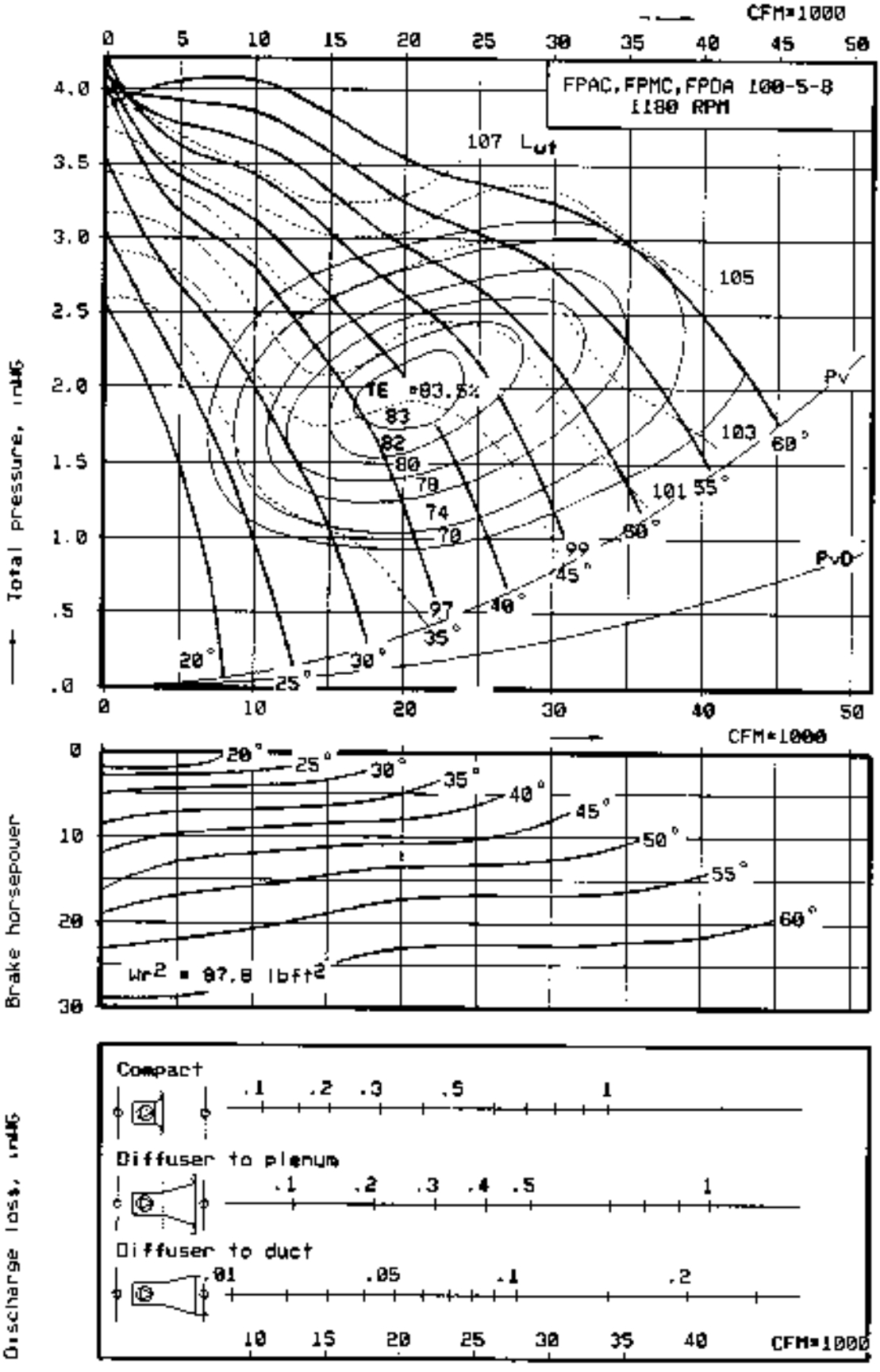

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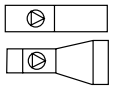

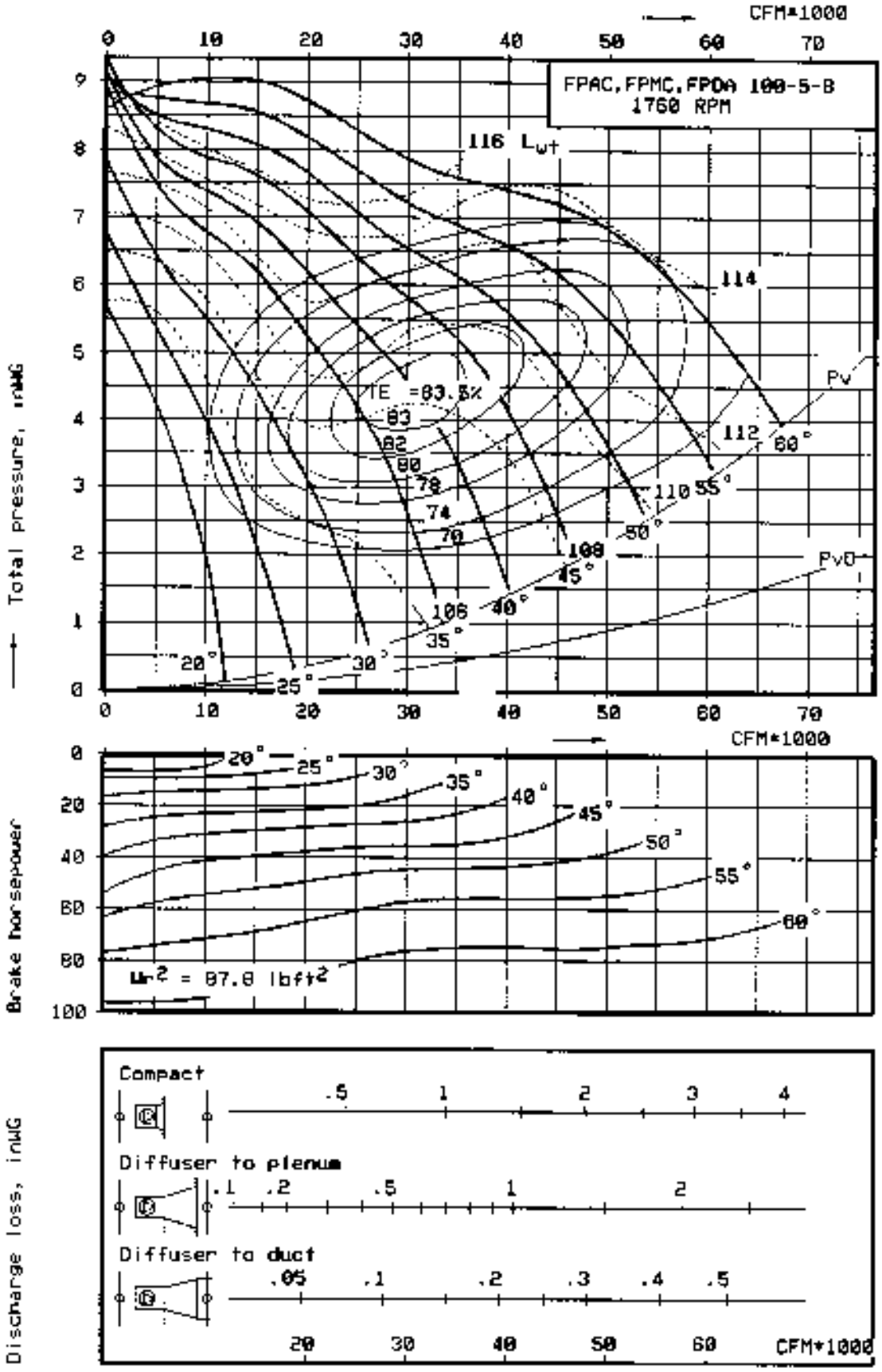

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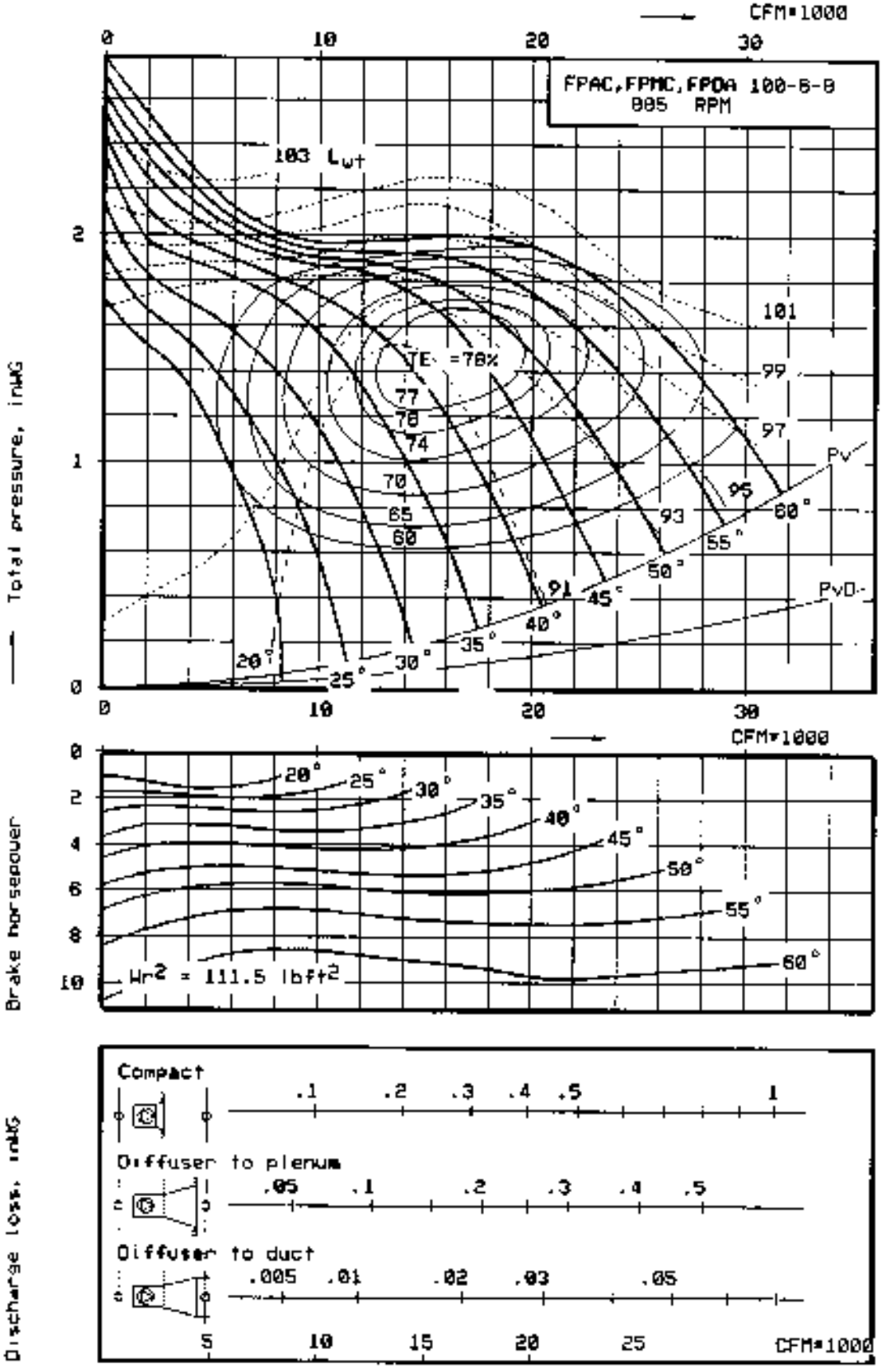

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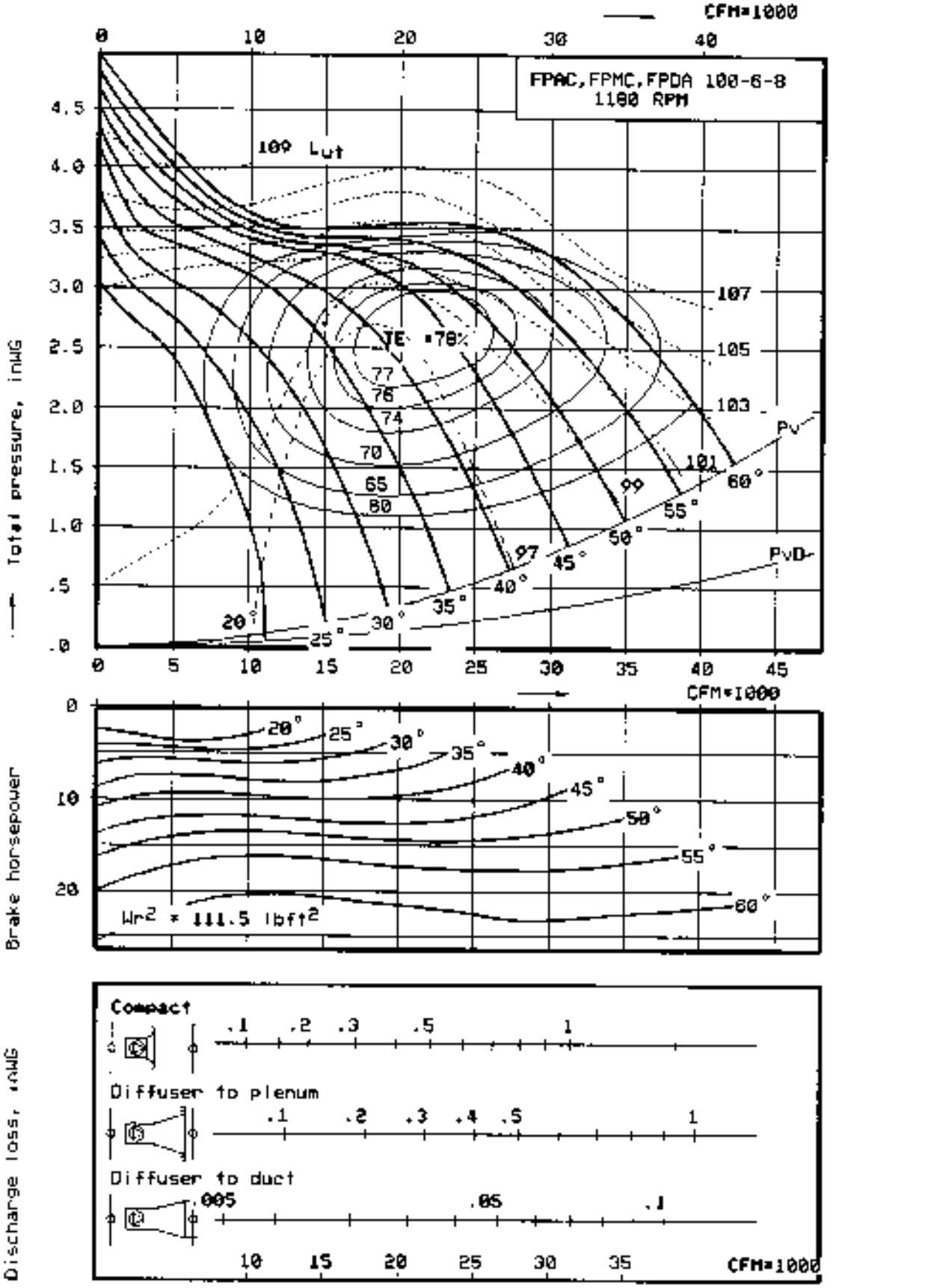

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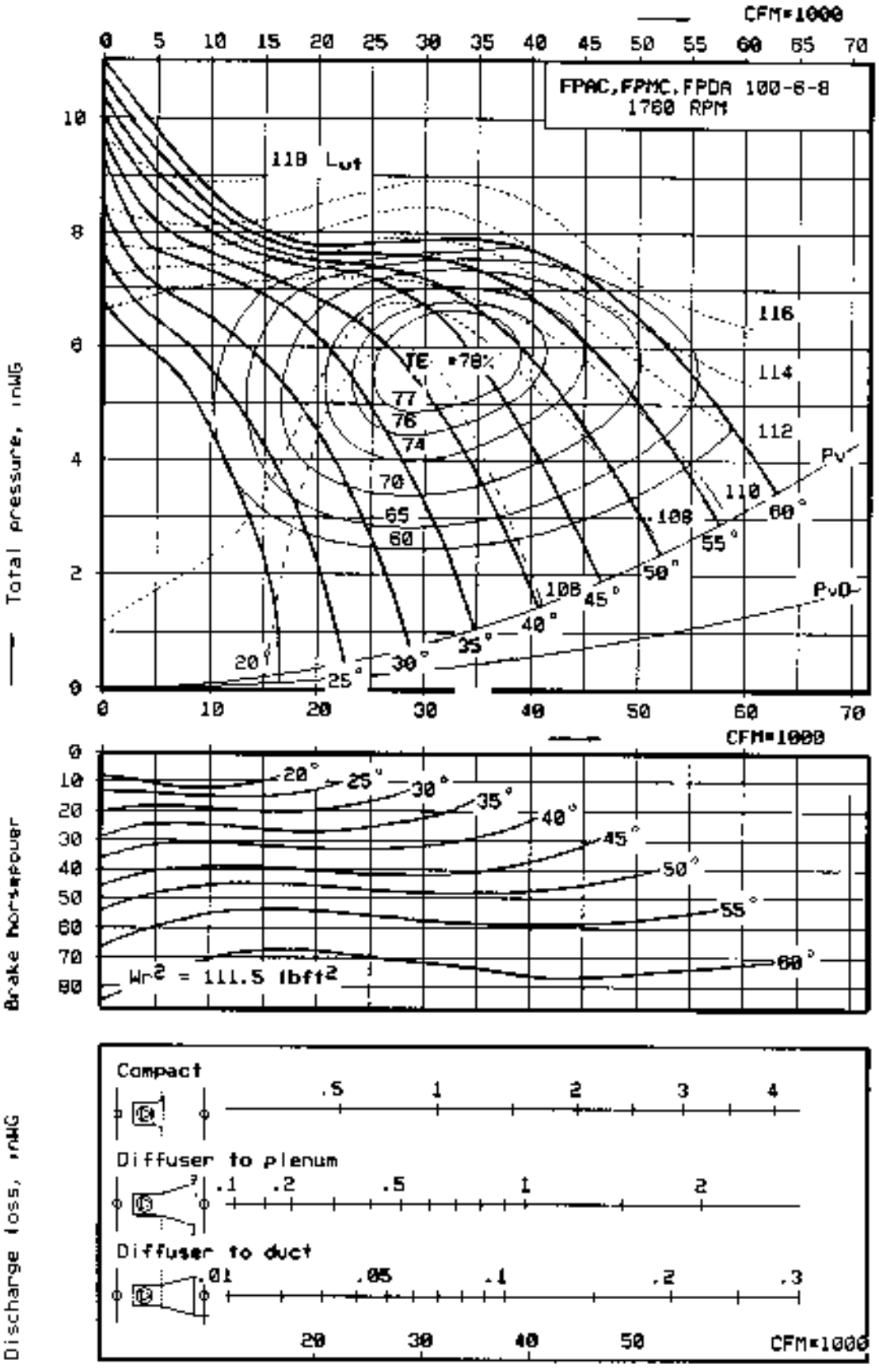

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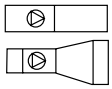

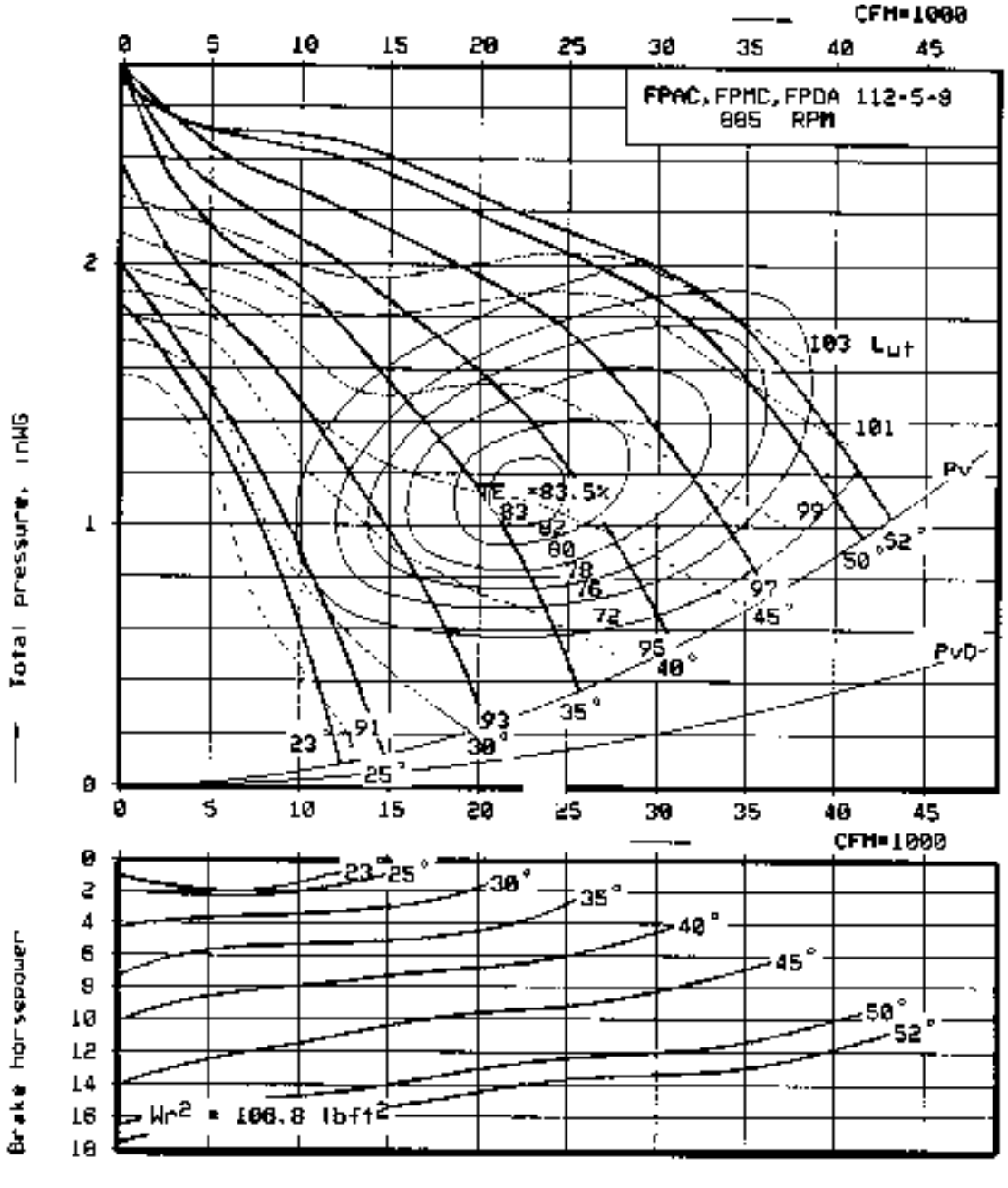

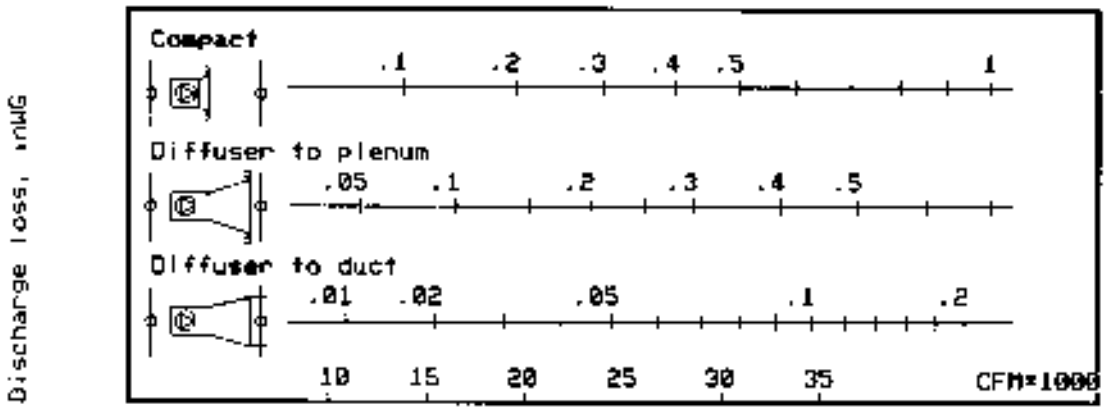

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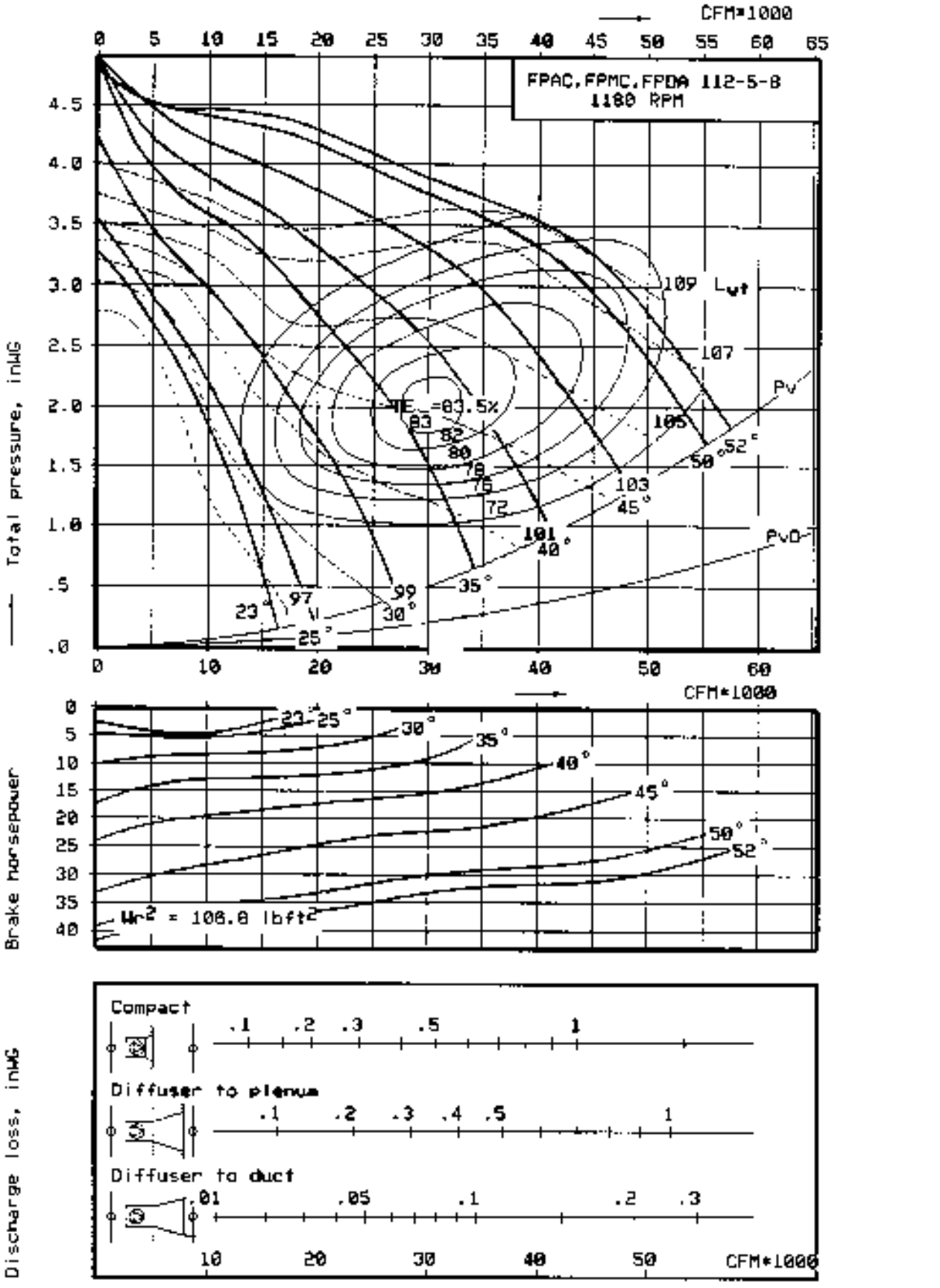

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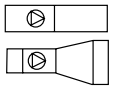

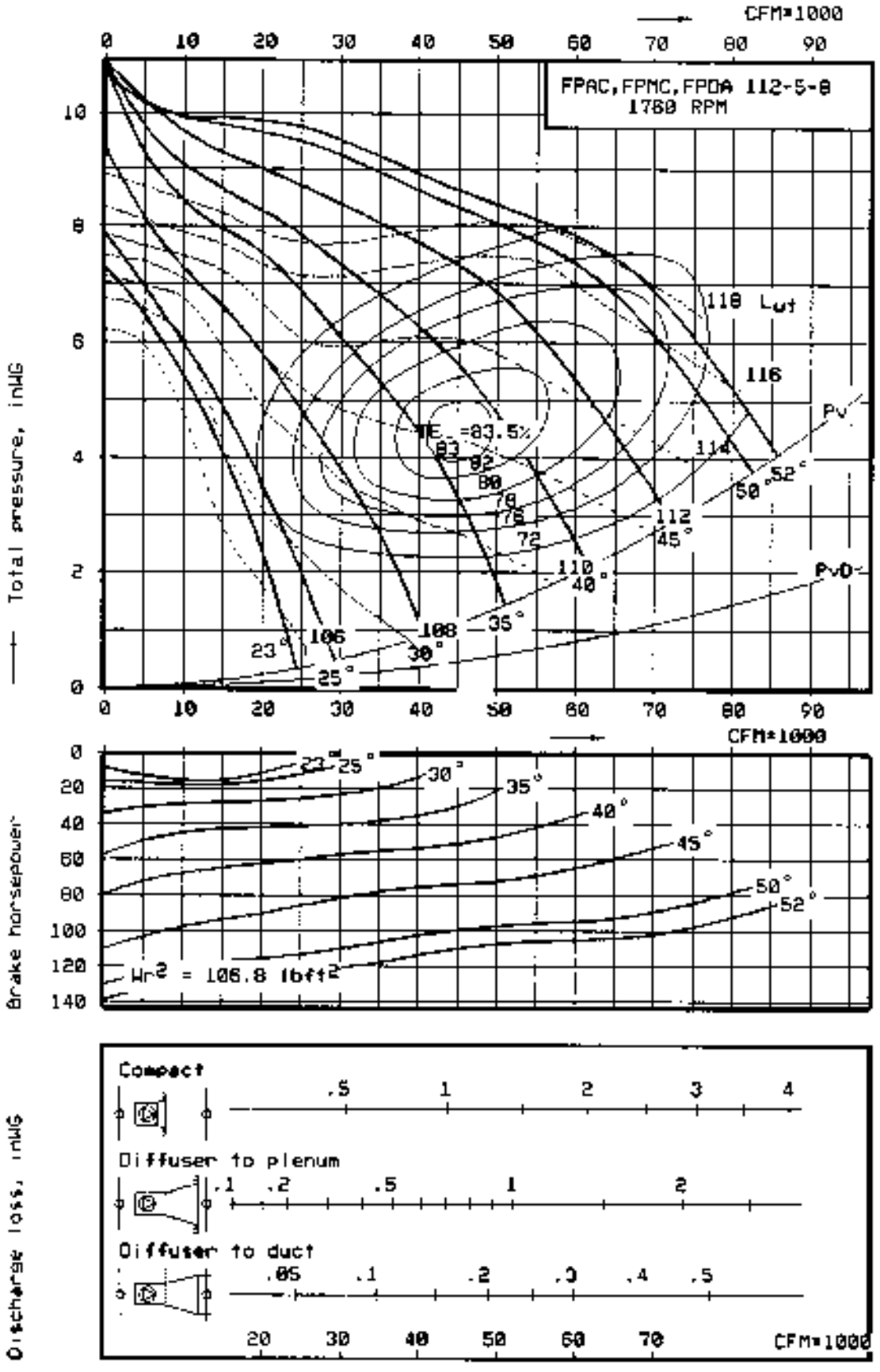

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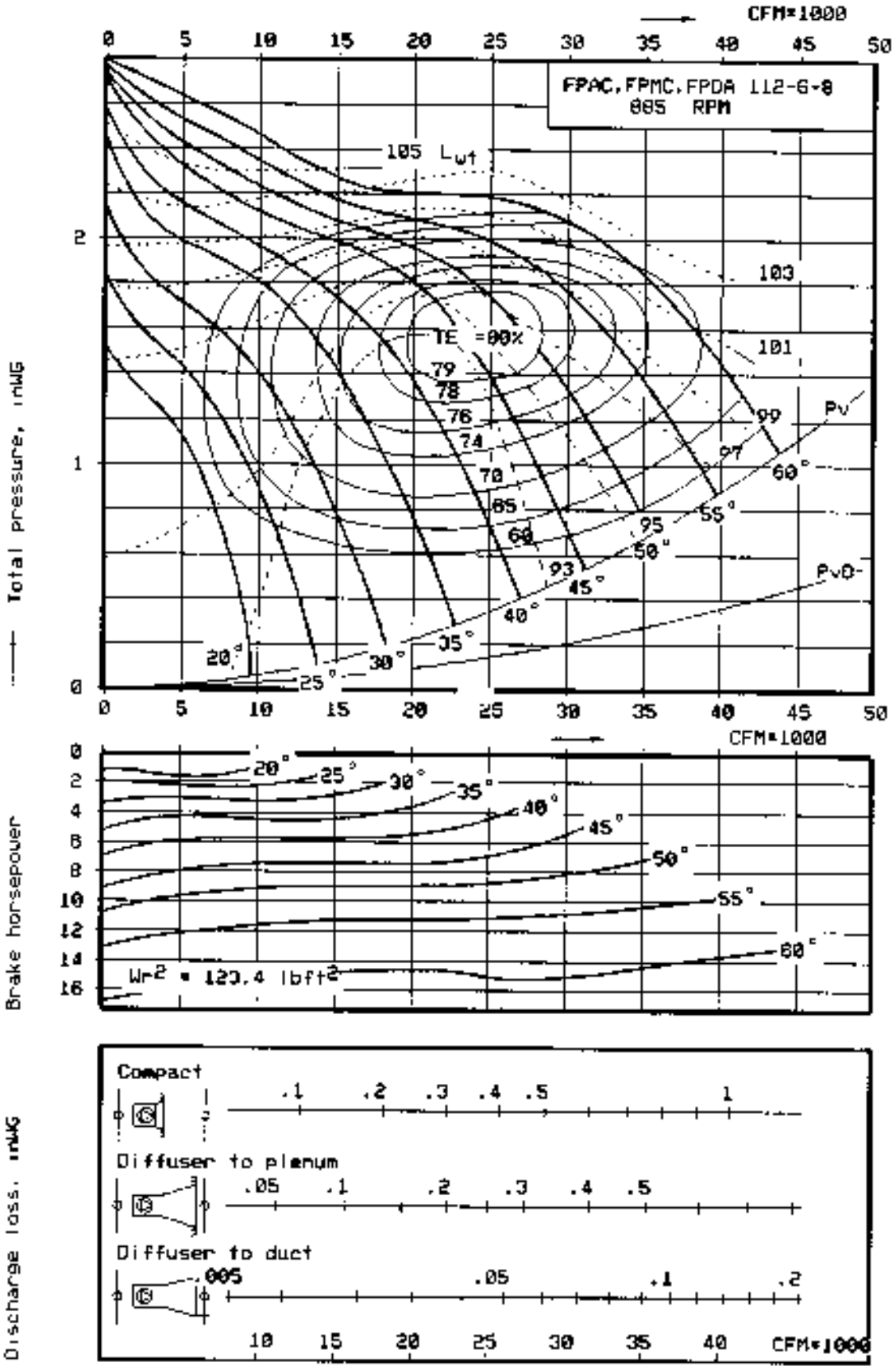

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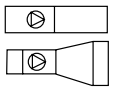

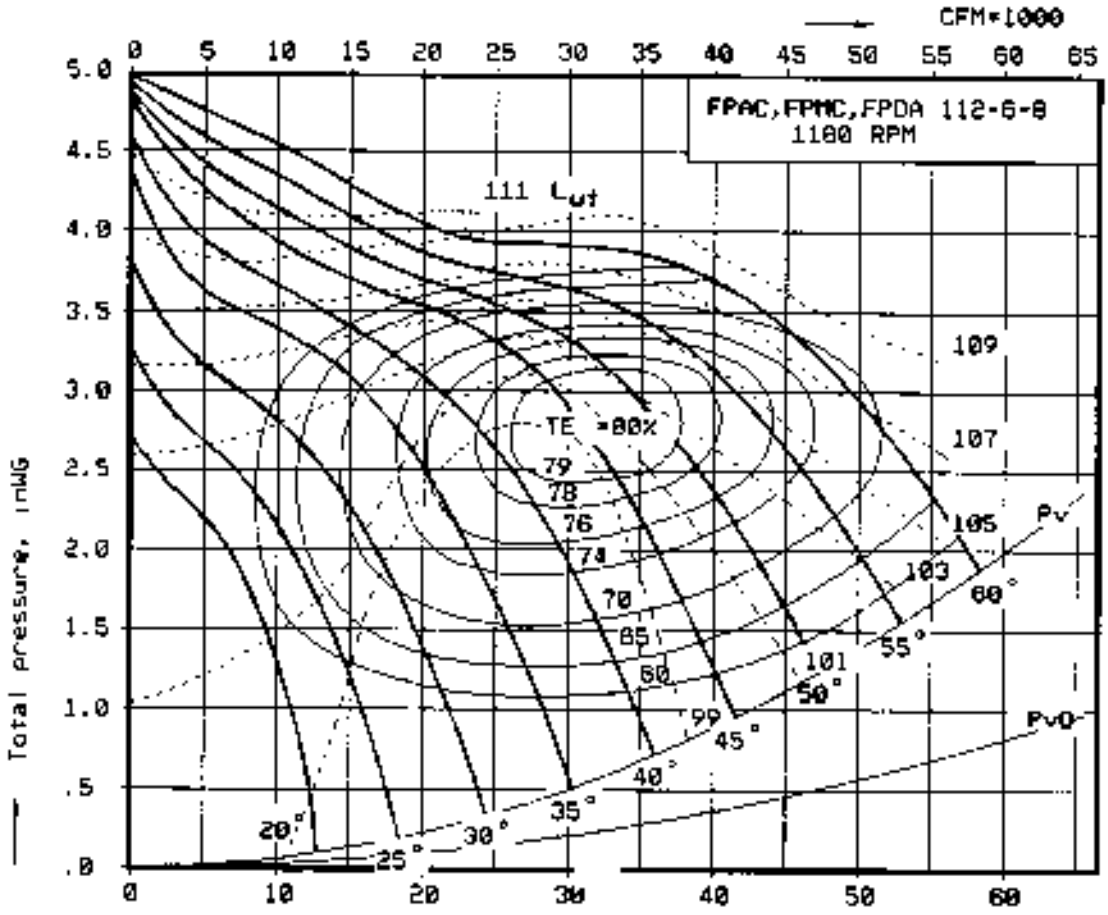

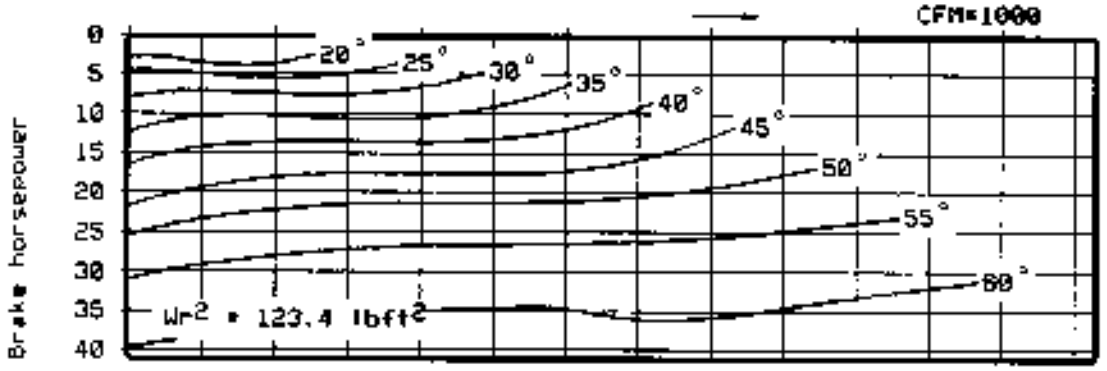

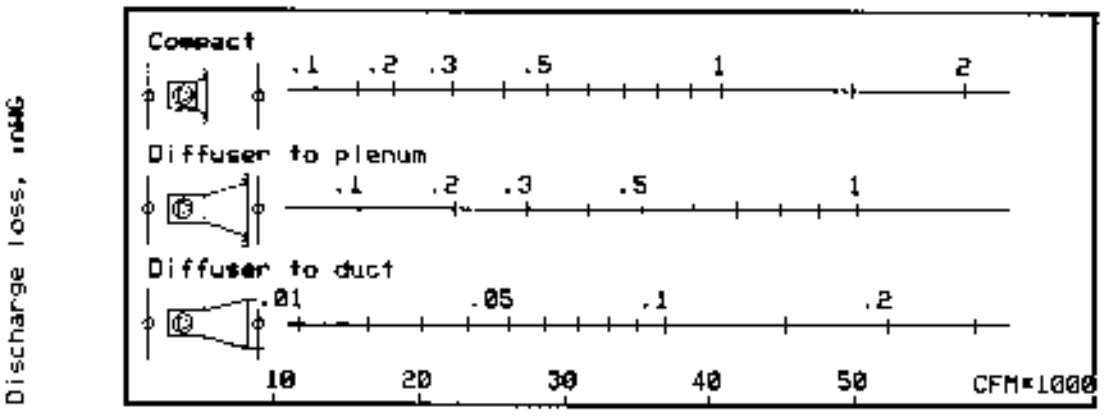

AXICO ANTI-STALL®

Fan chart is valid for a gas density of .075 lb/ft^3.

L_{wt}: Total sound power level dB(A)

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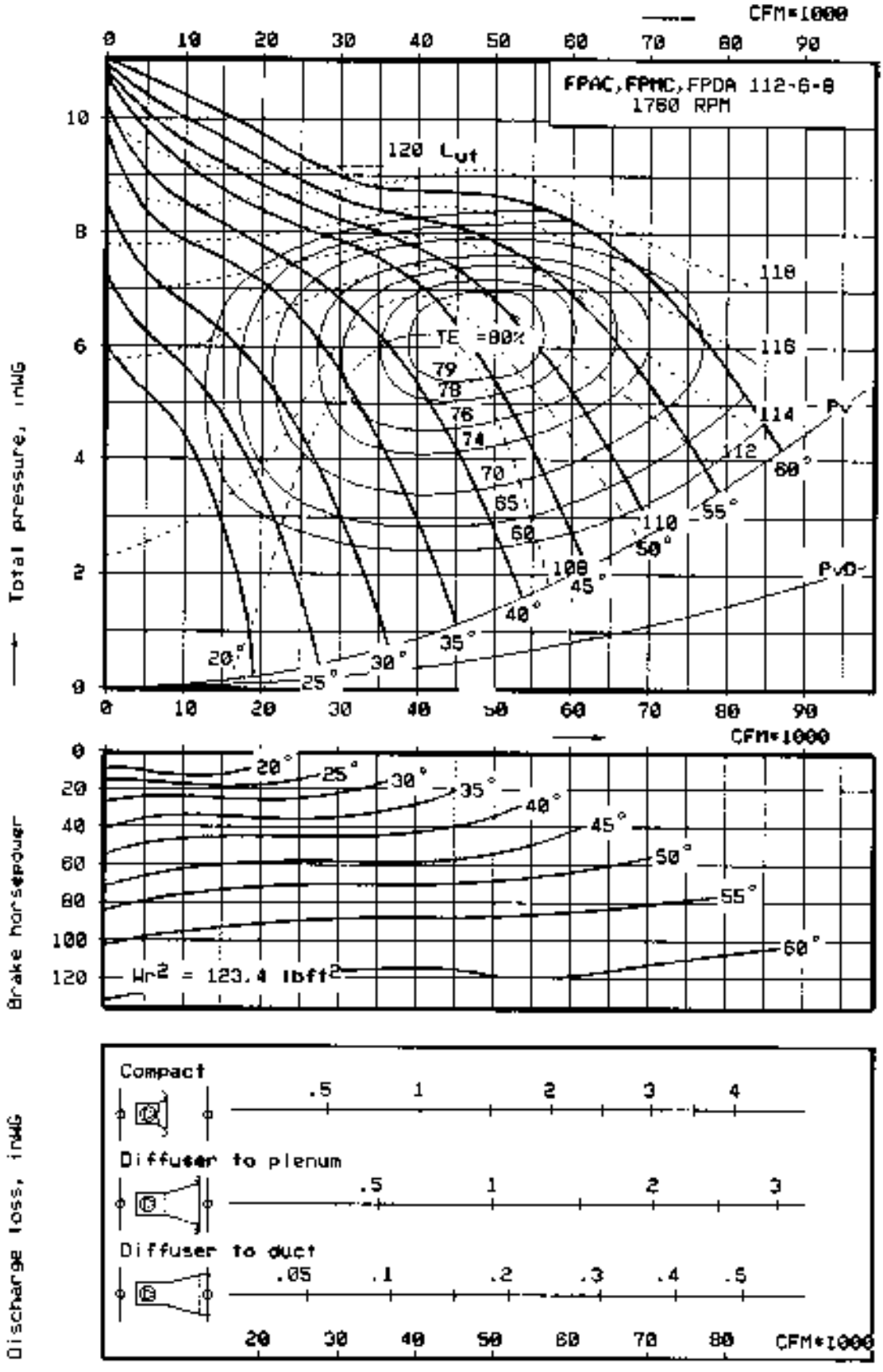

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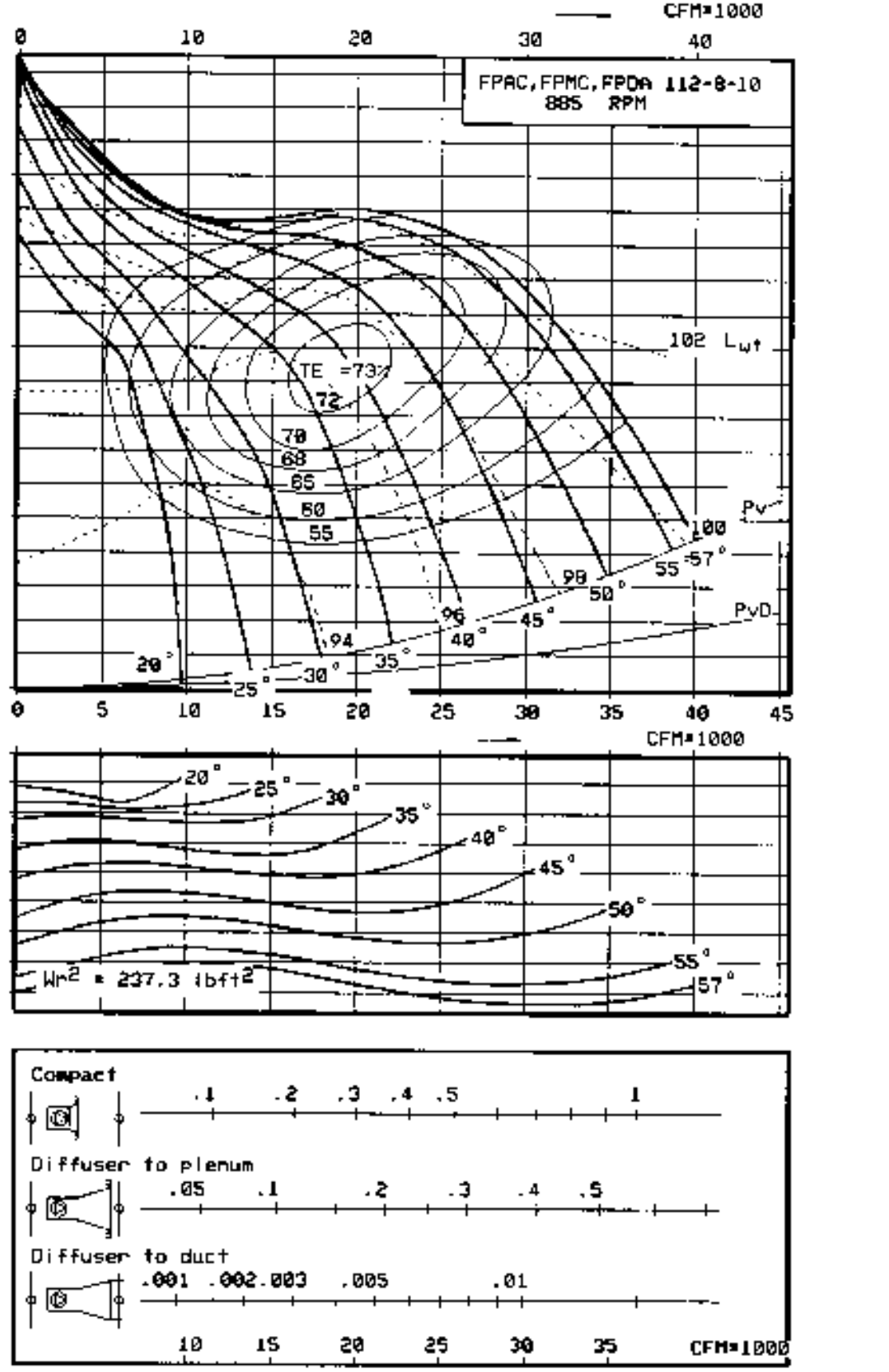

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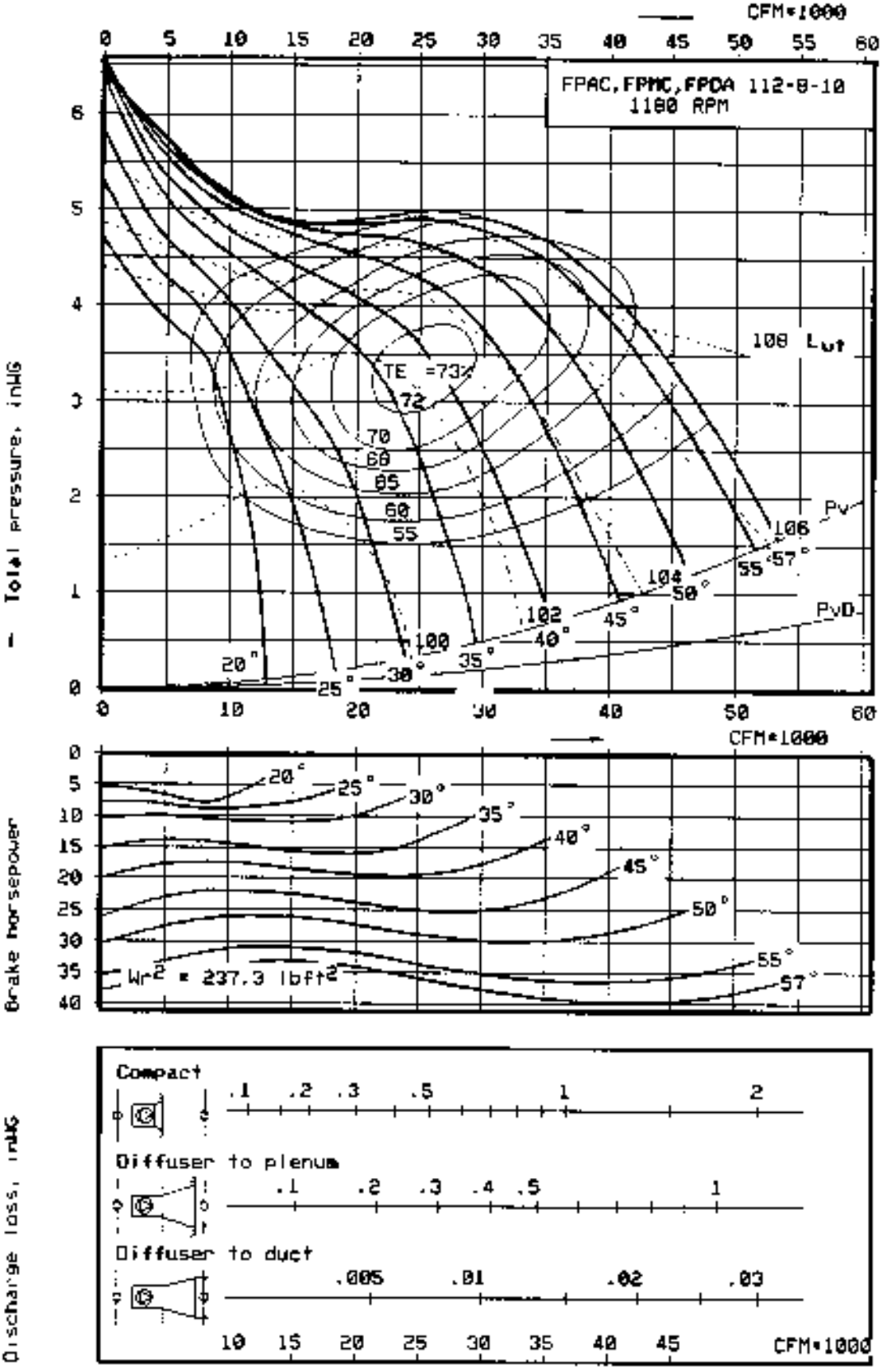

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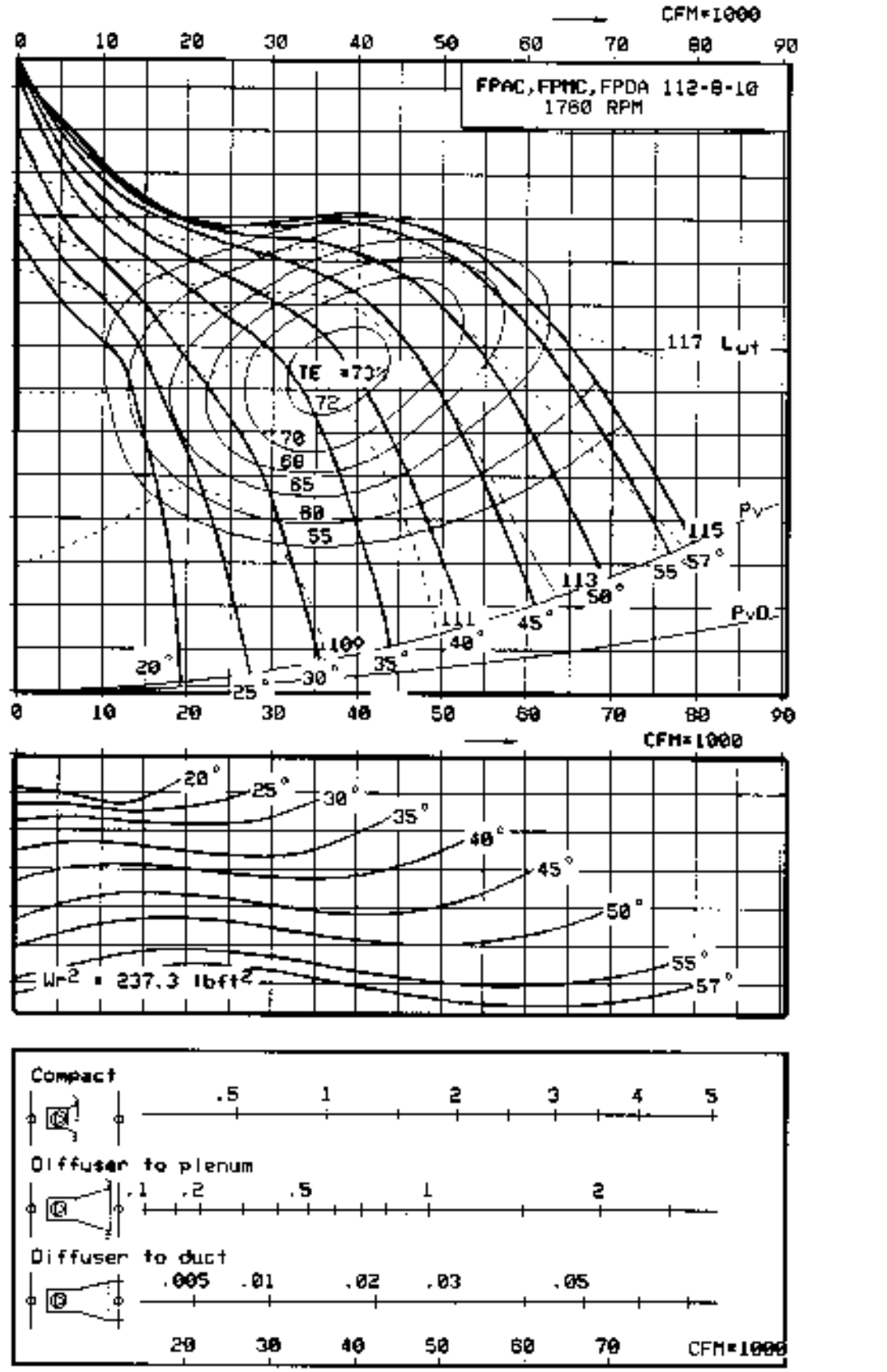

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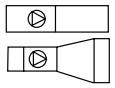

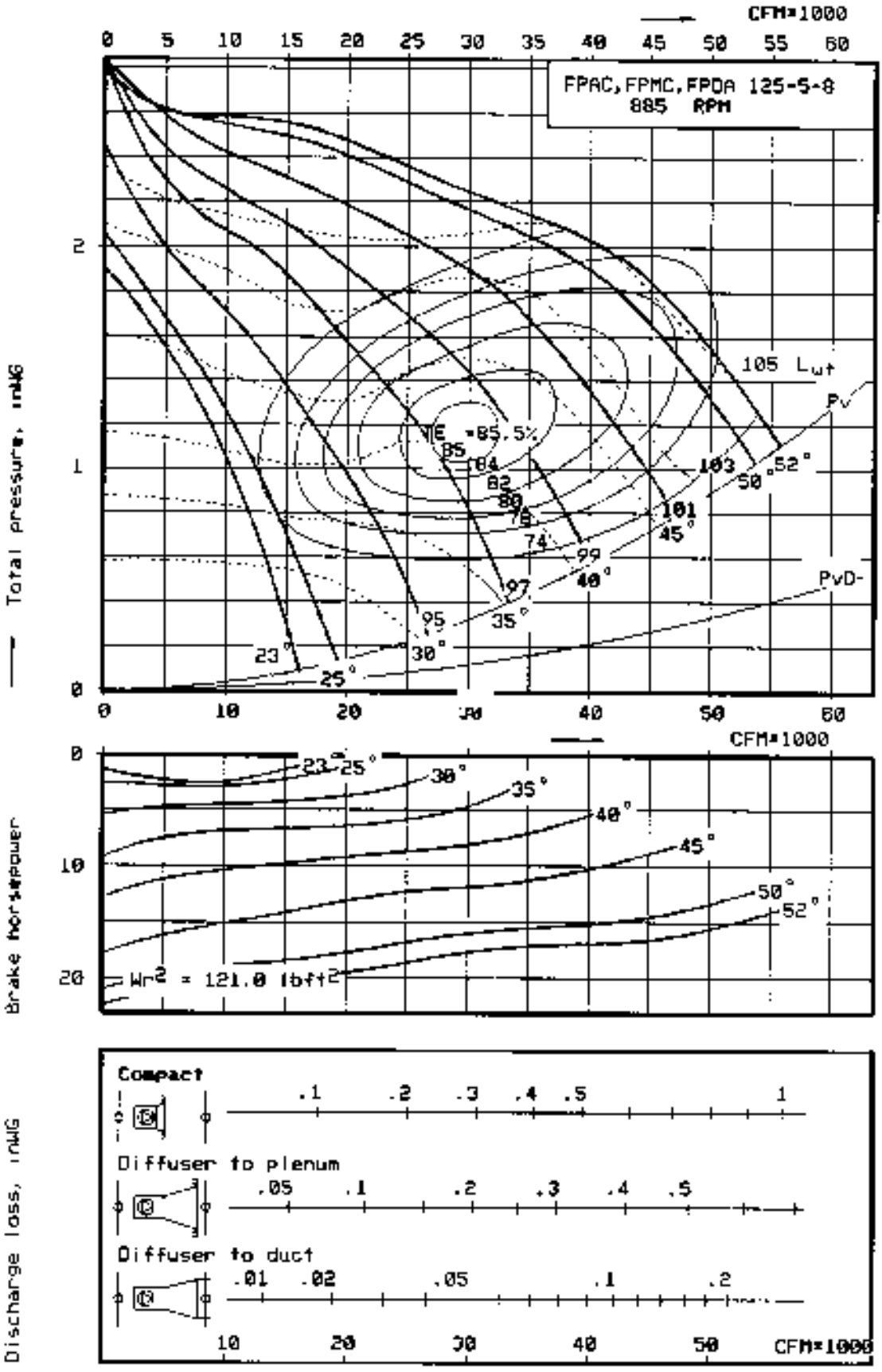

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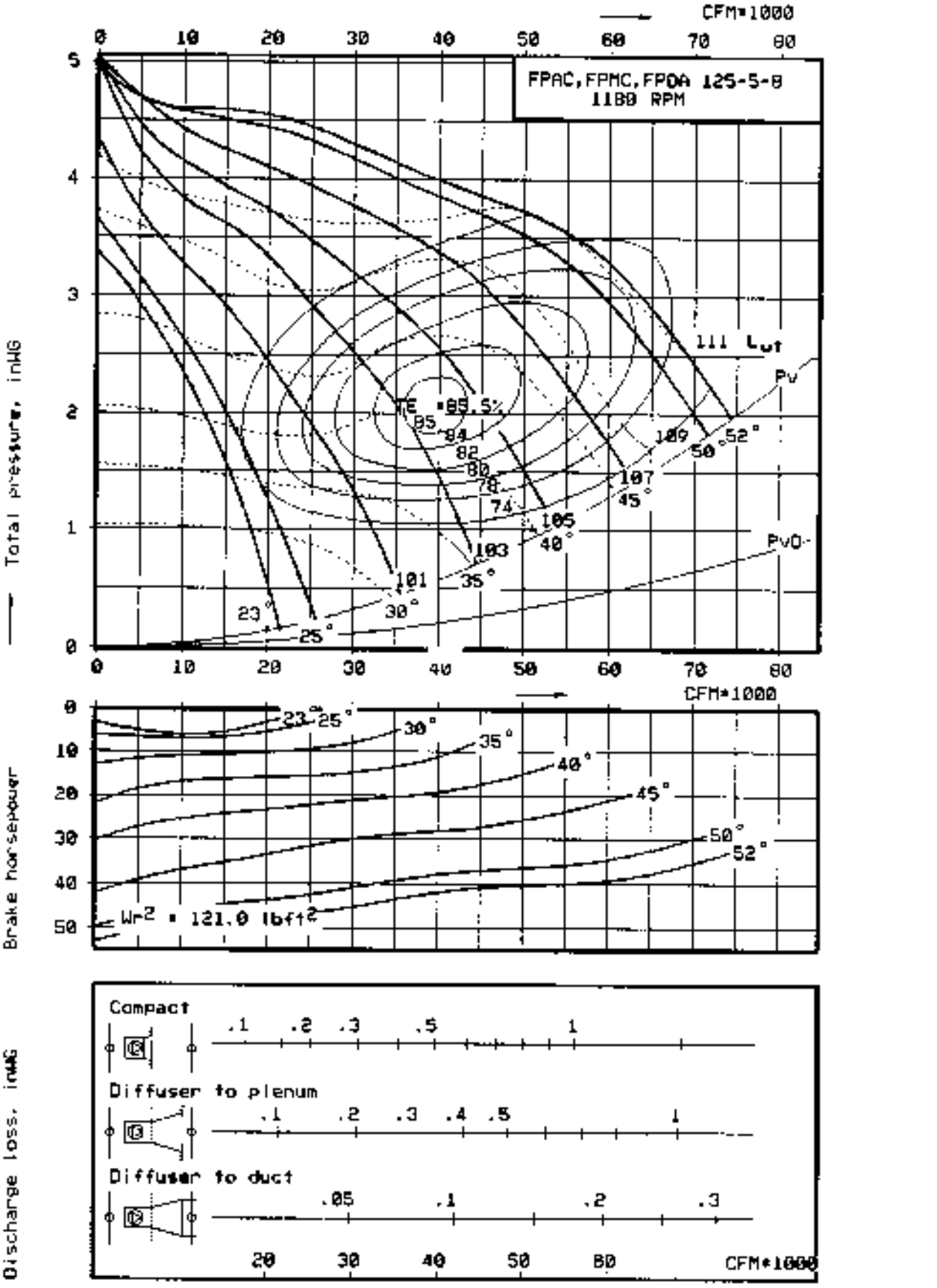

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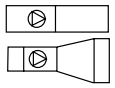

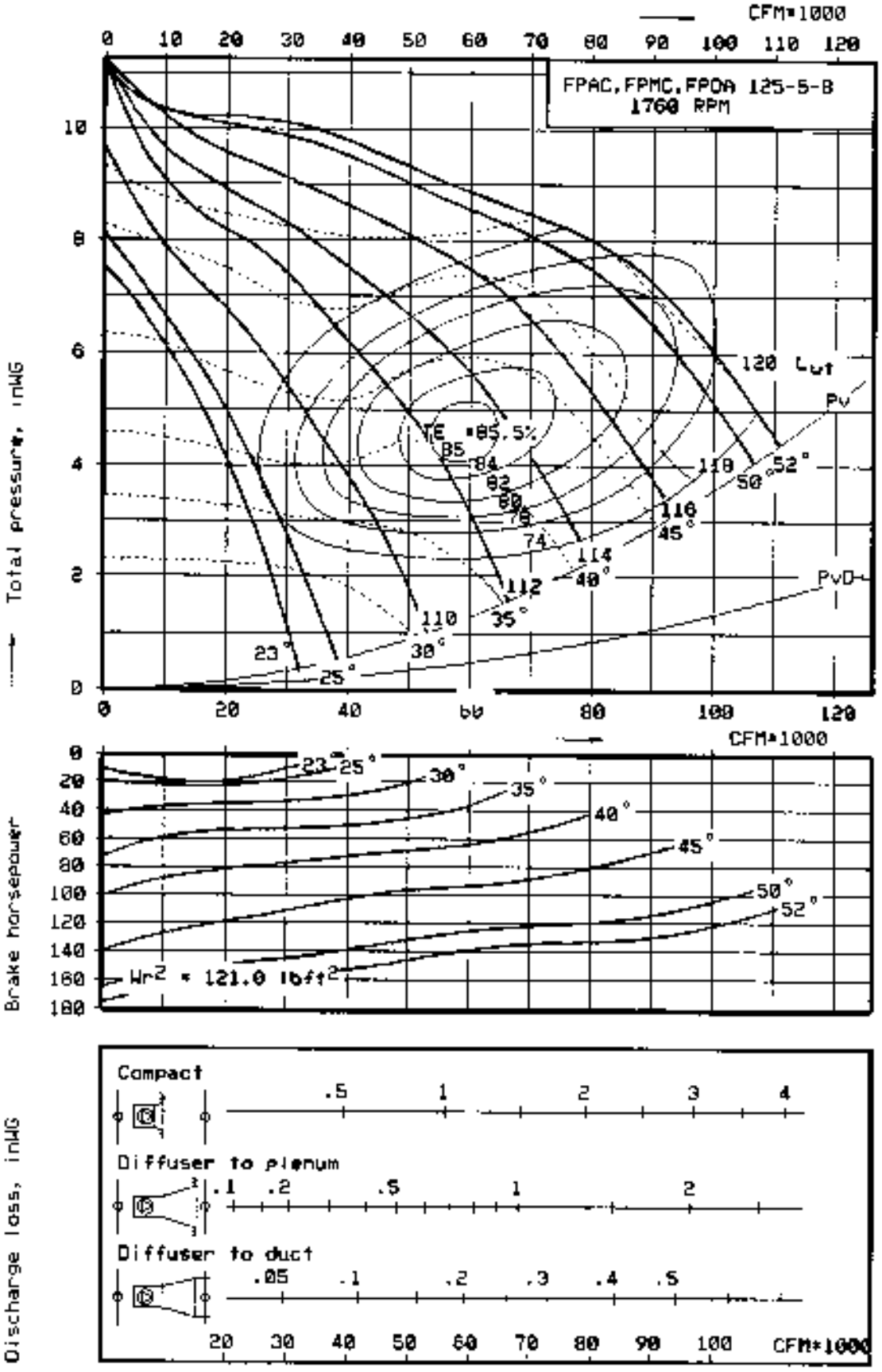

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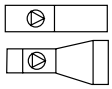

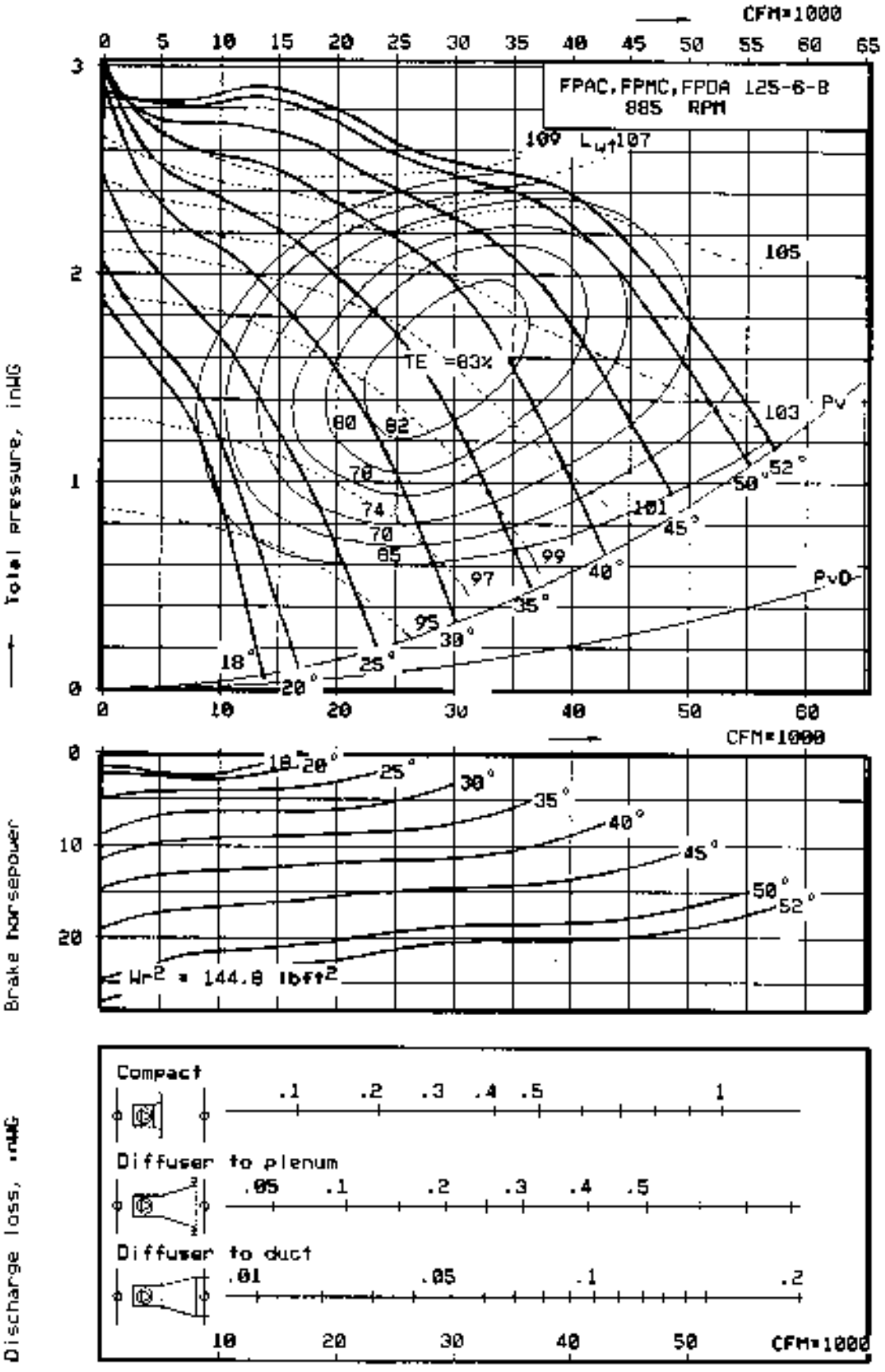

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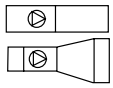

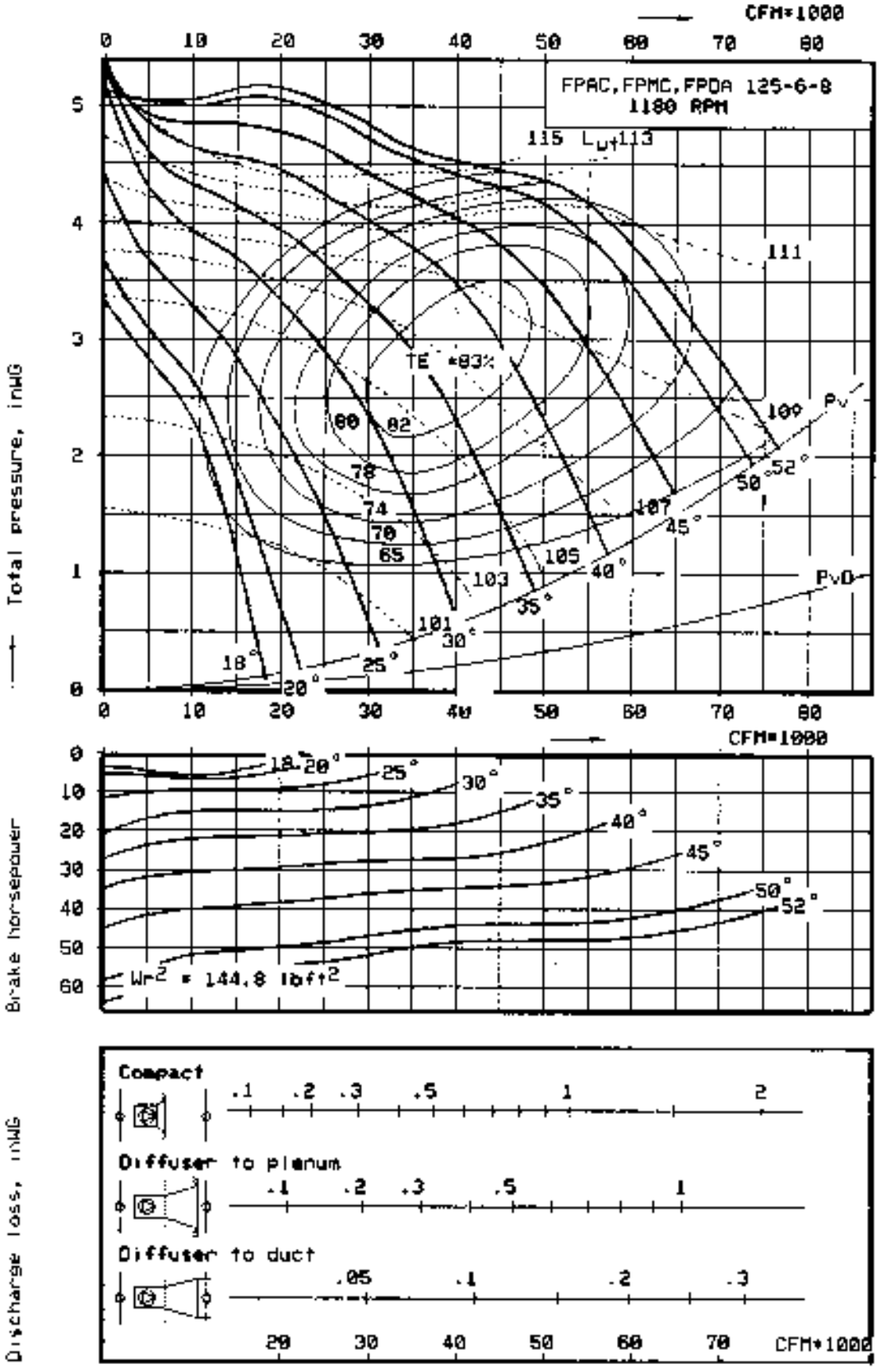

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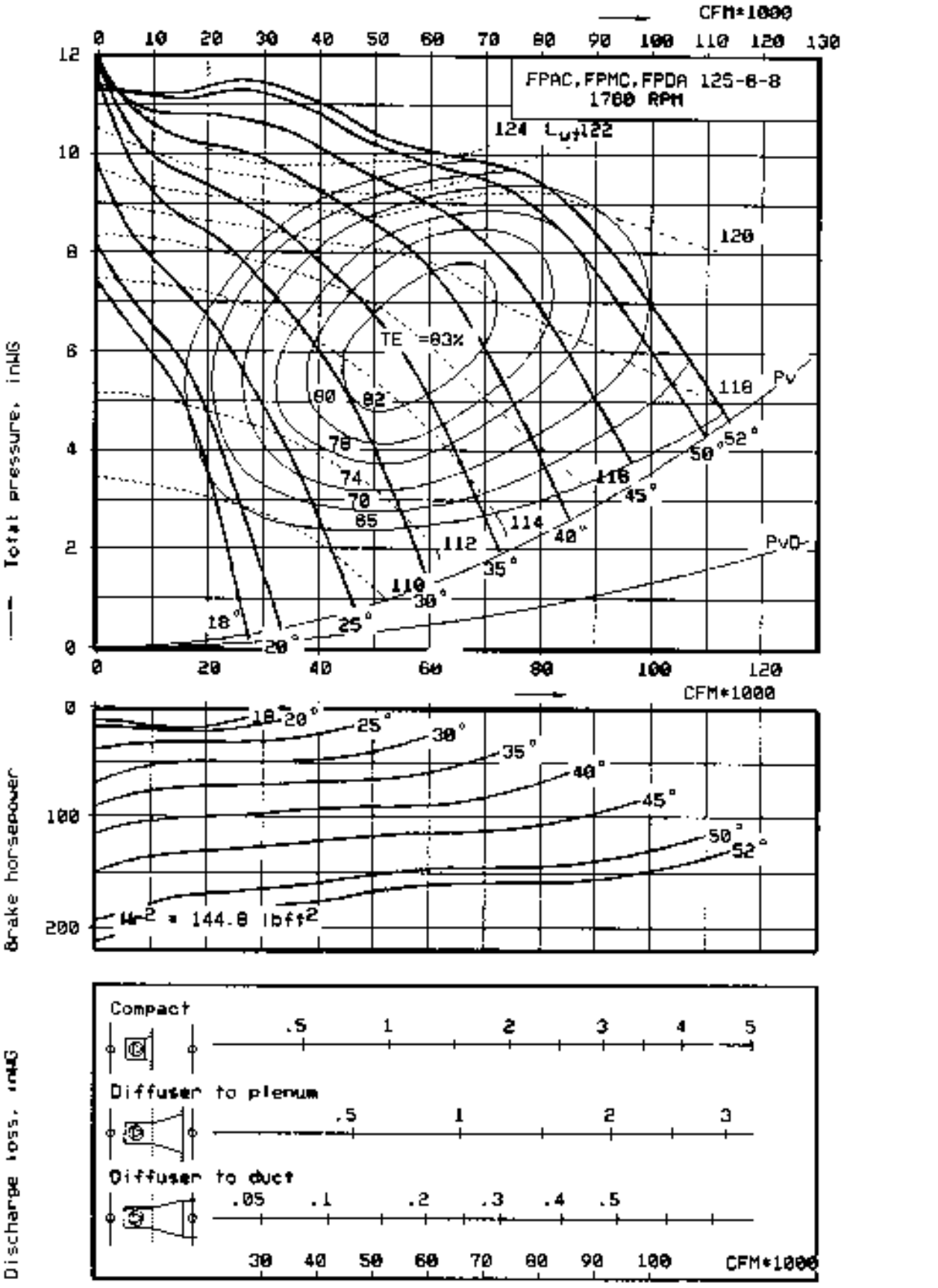

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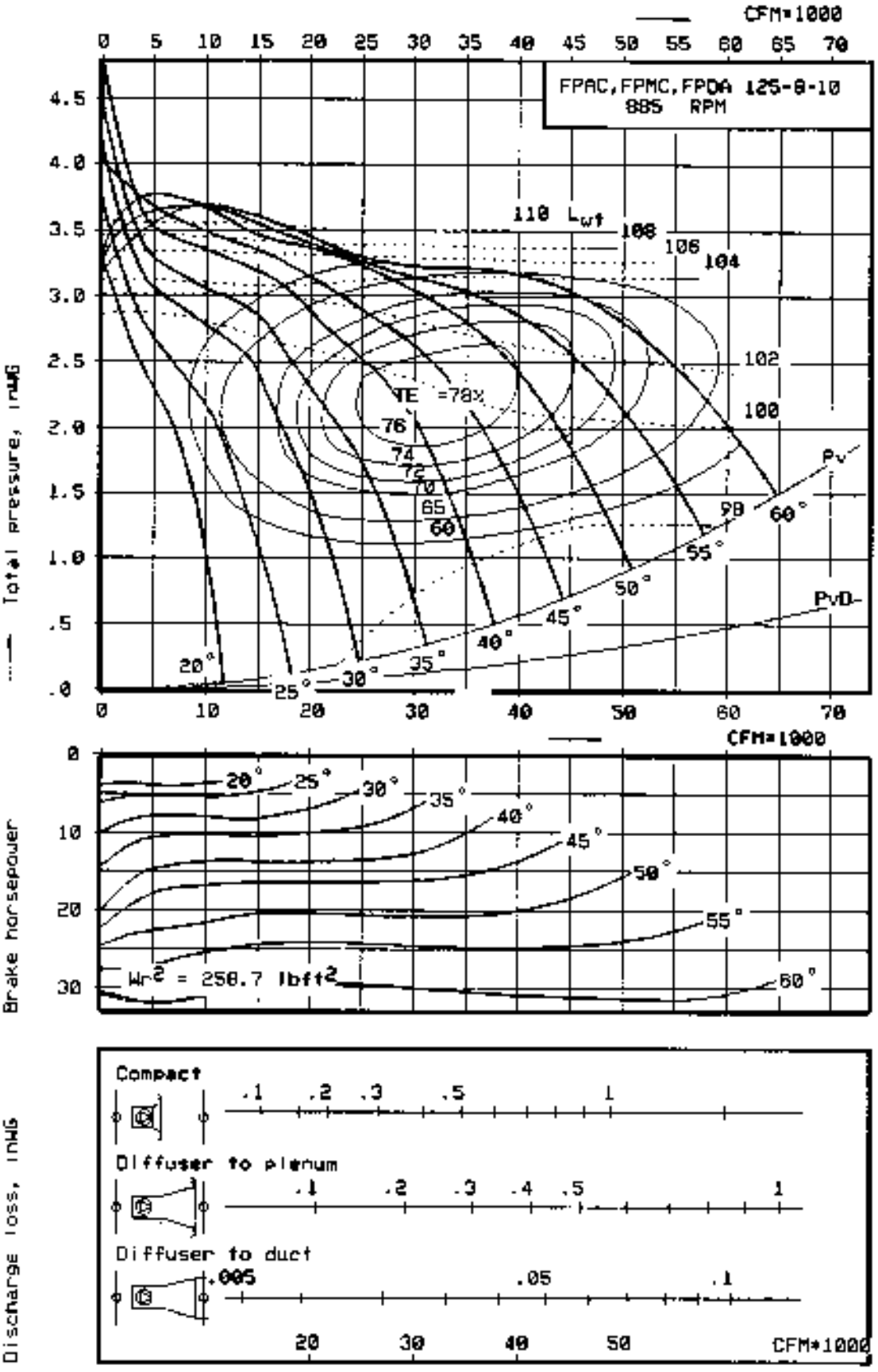

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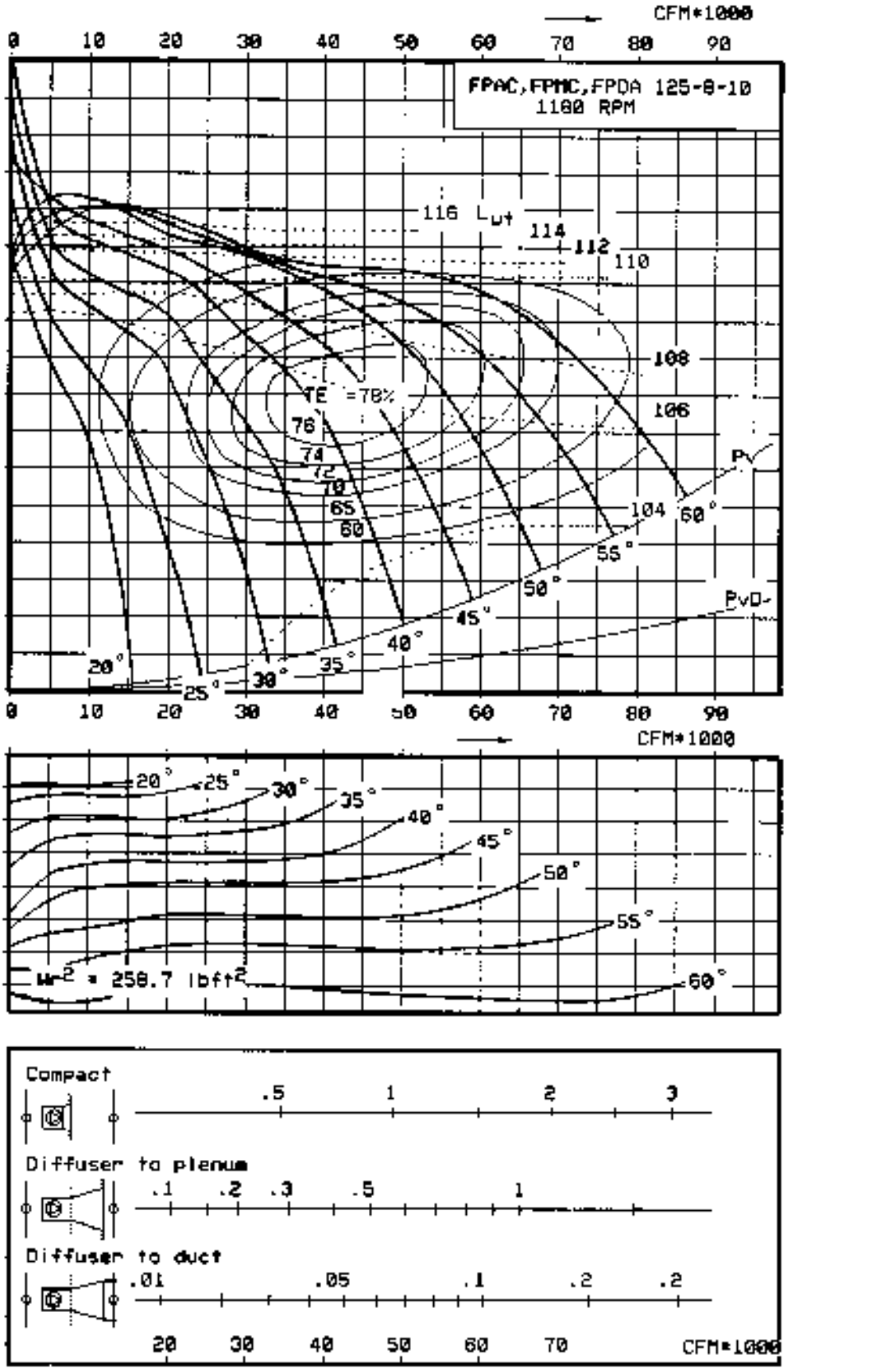

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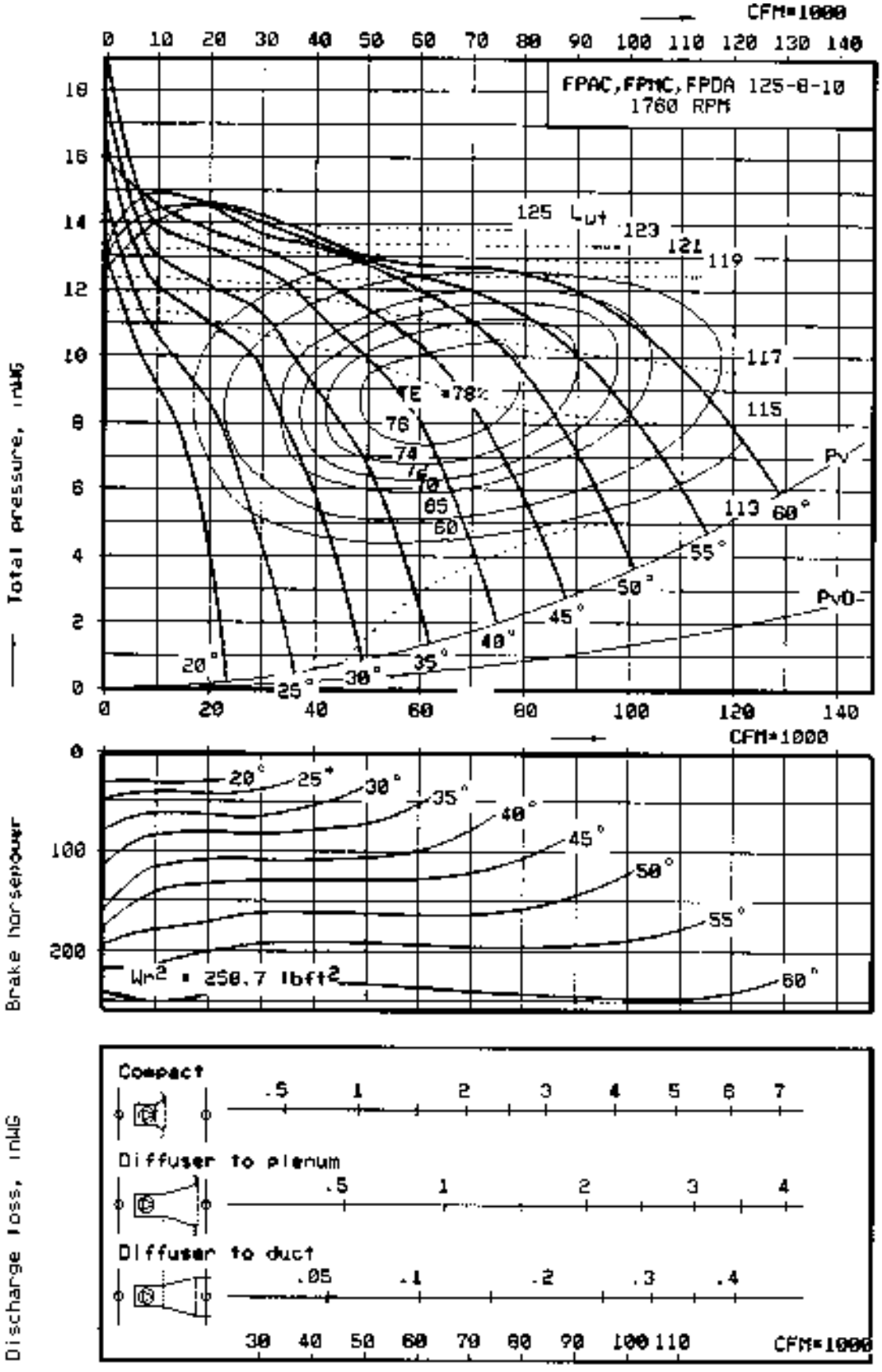

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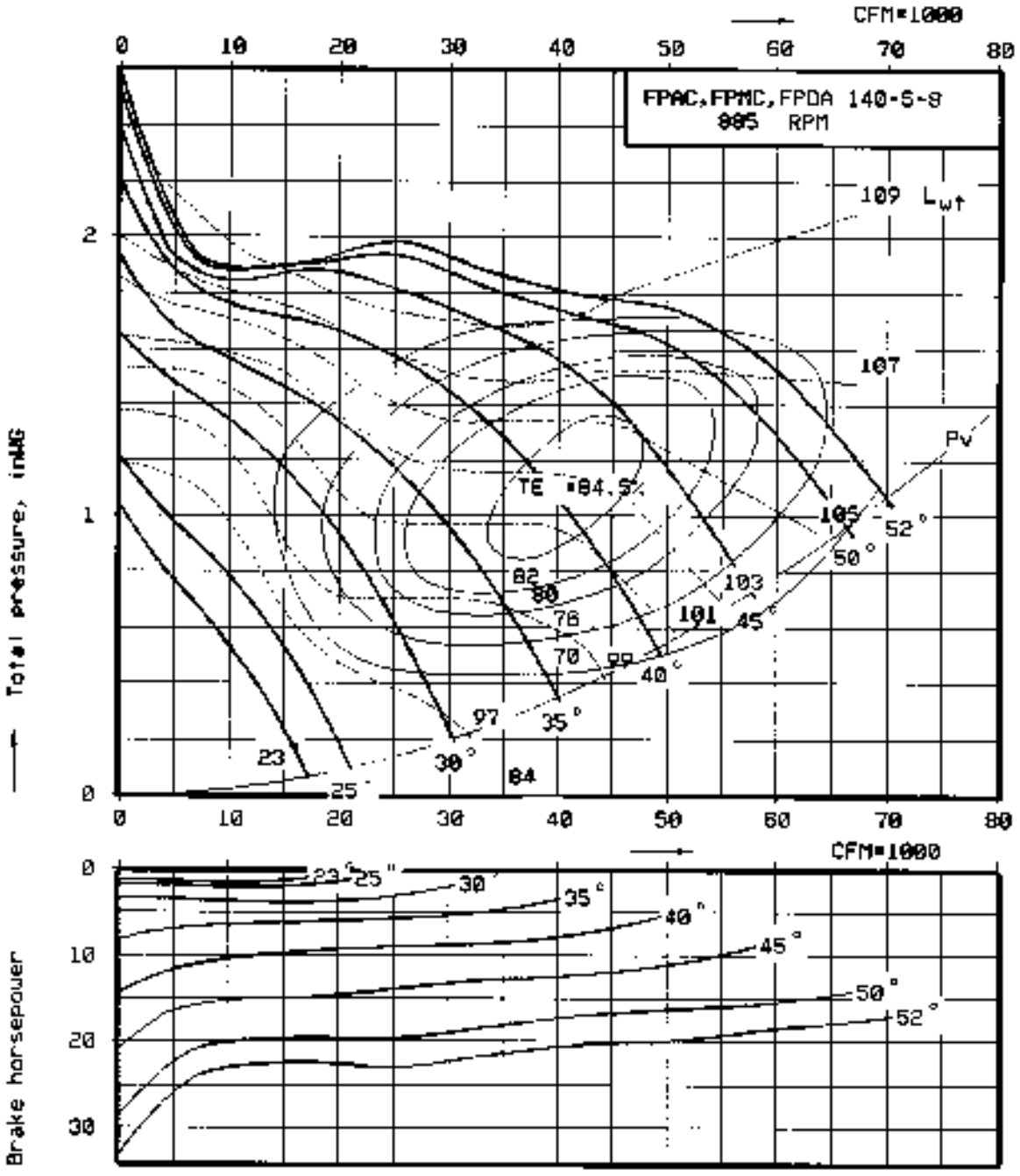

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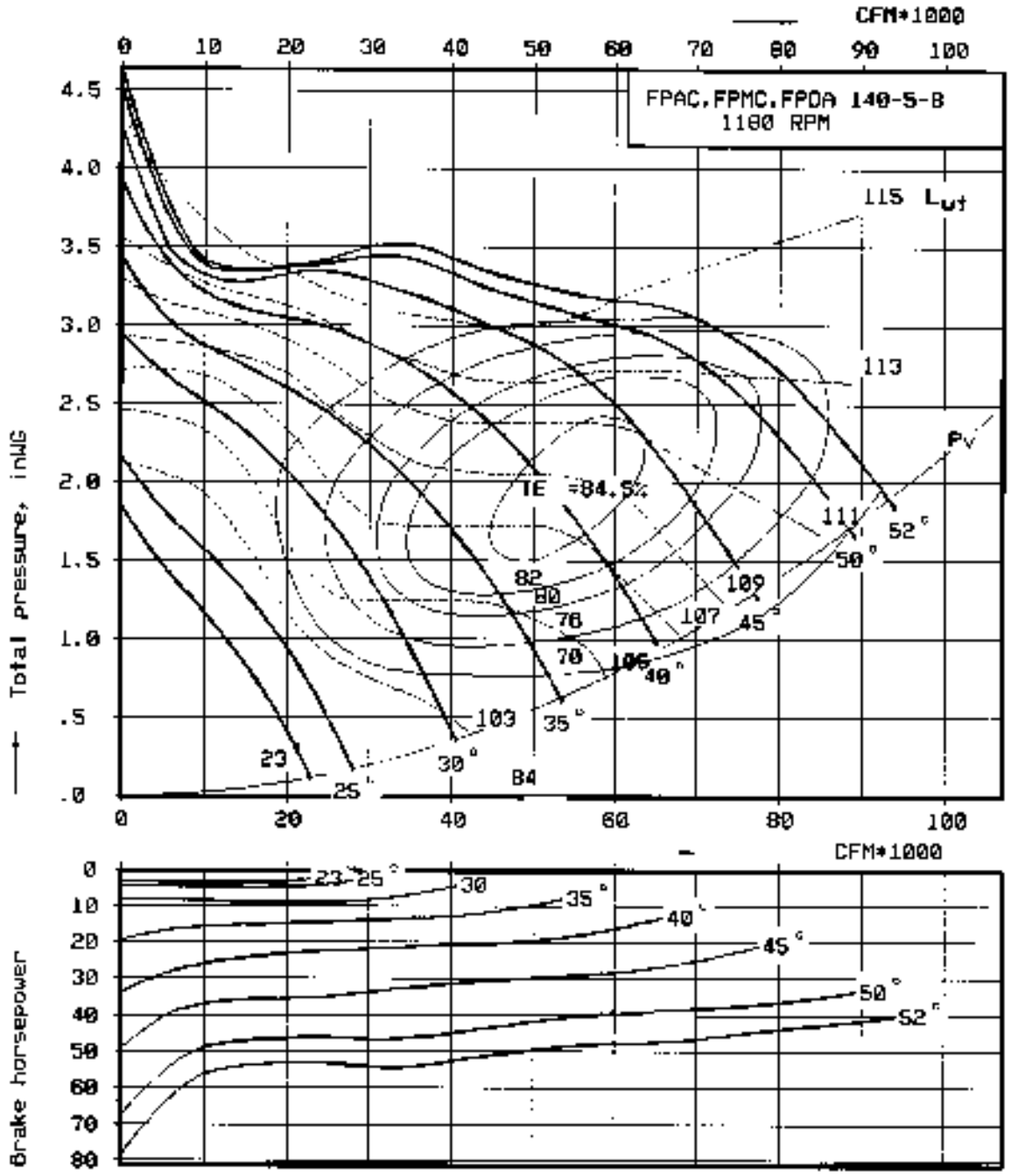

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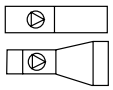

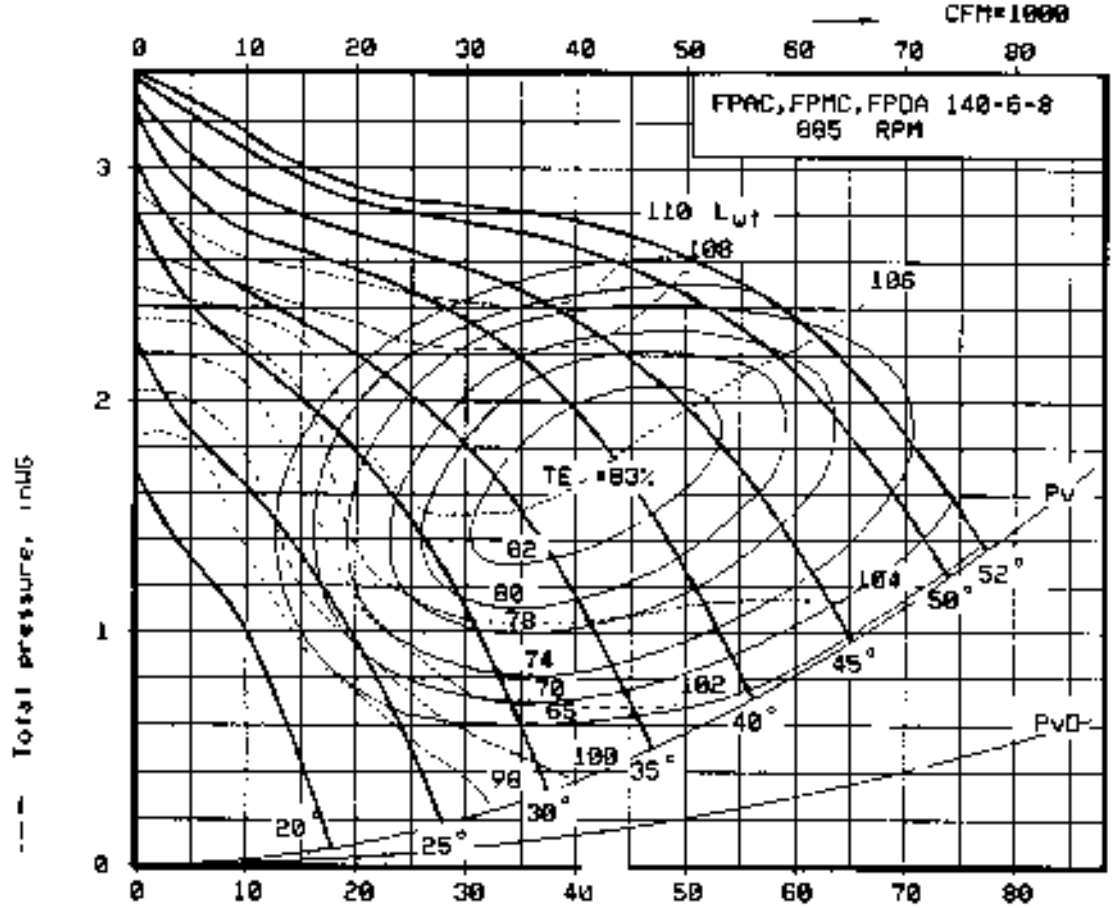

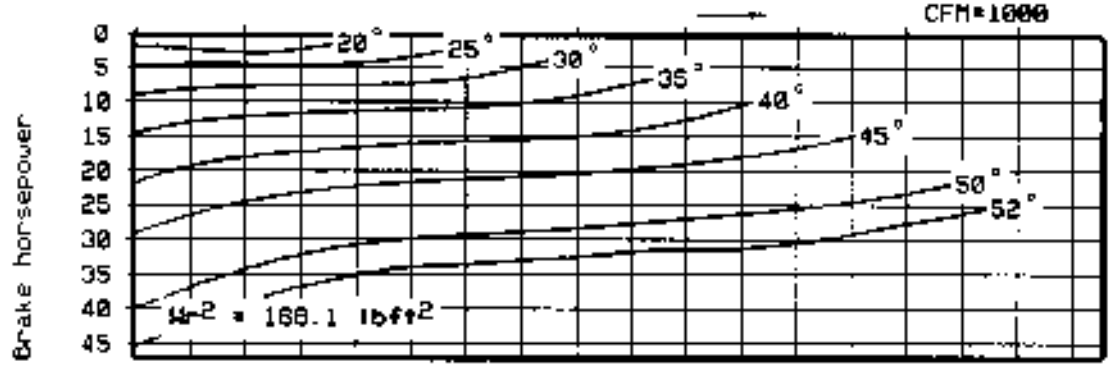

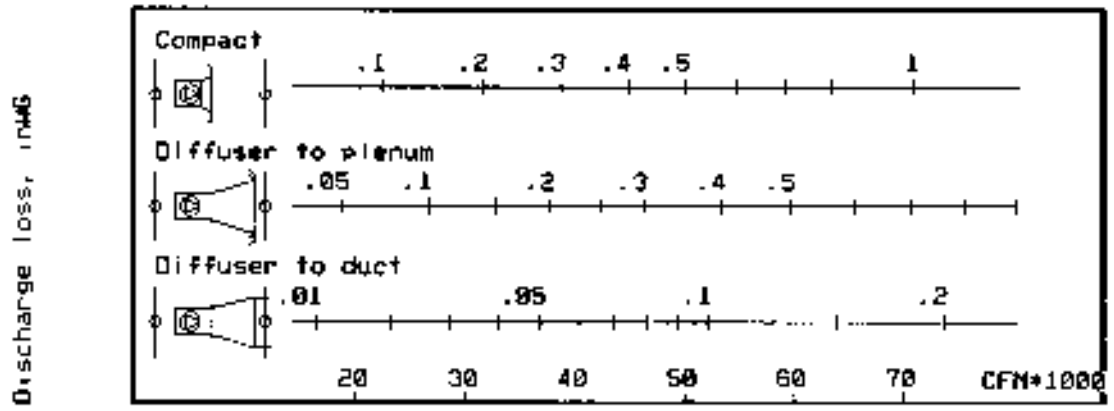

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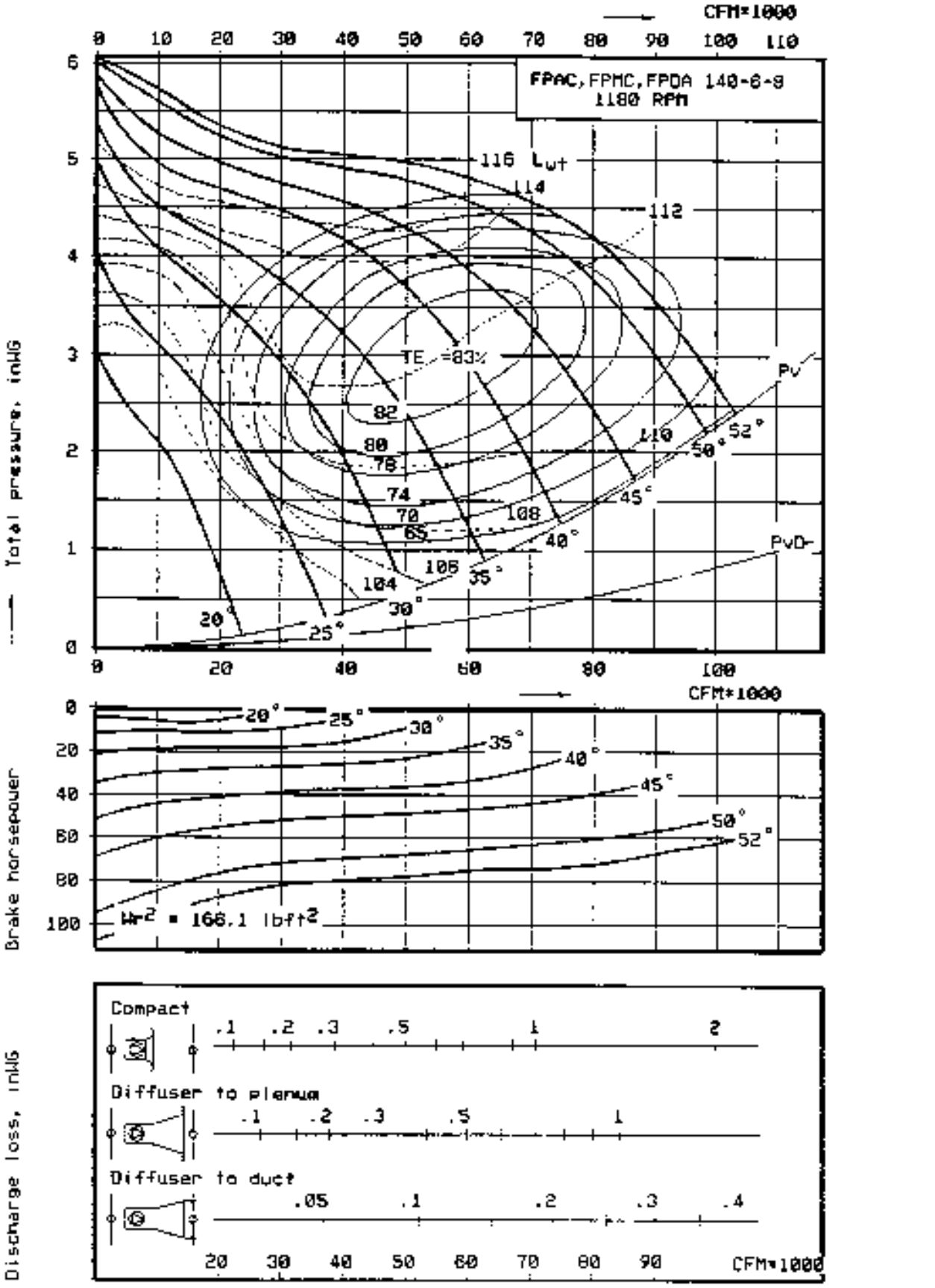

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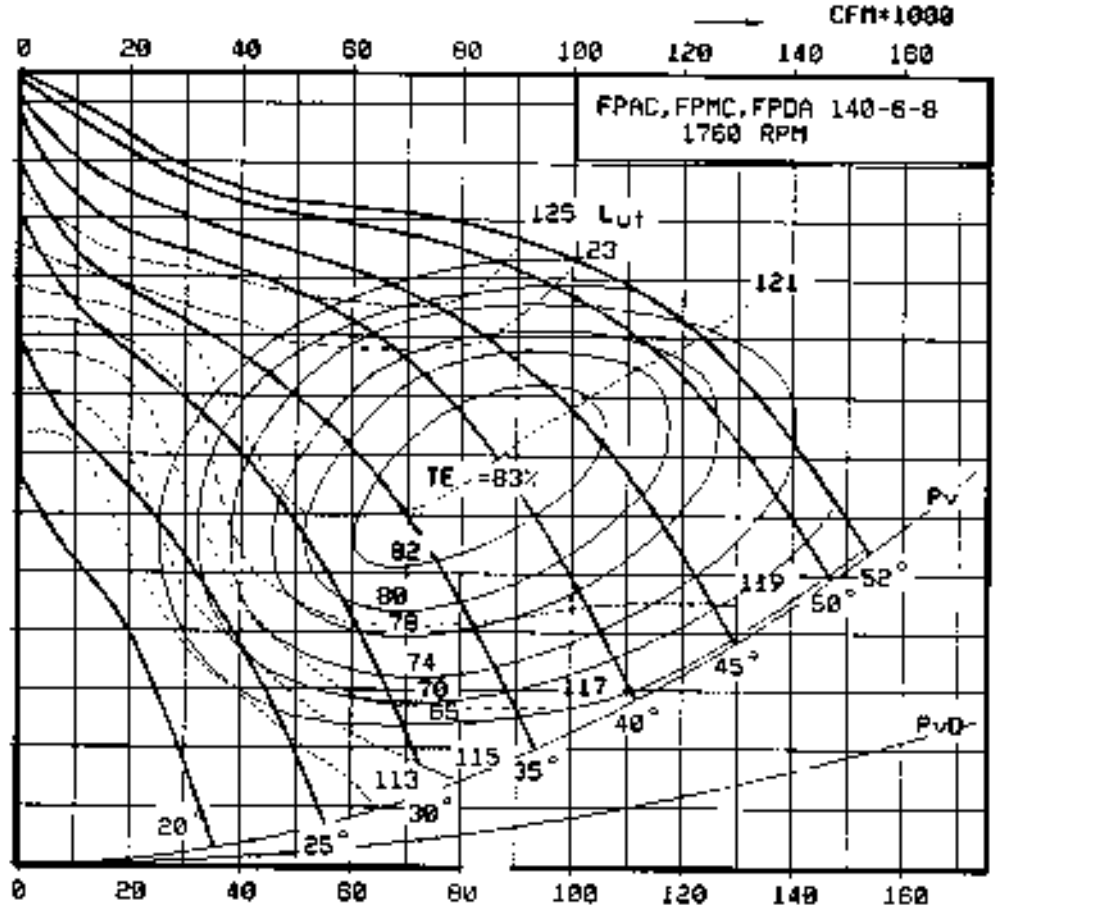

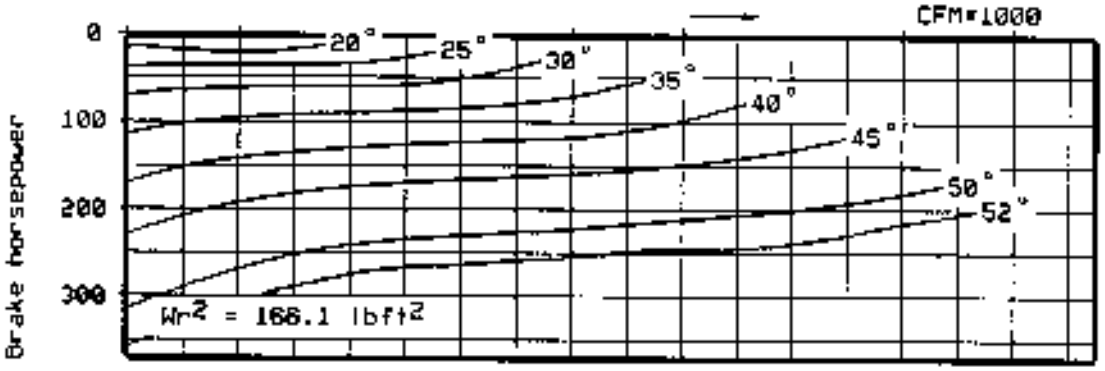

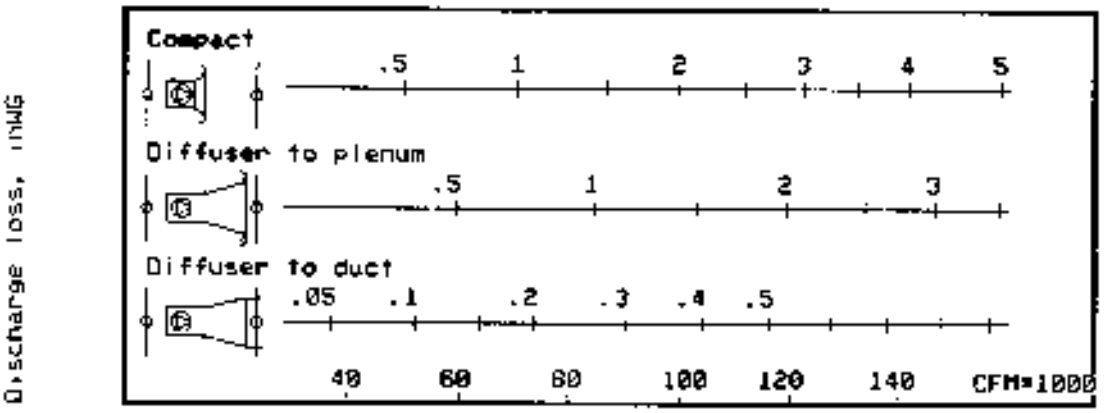

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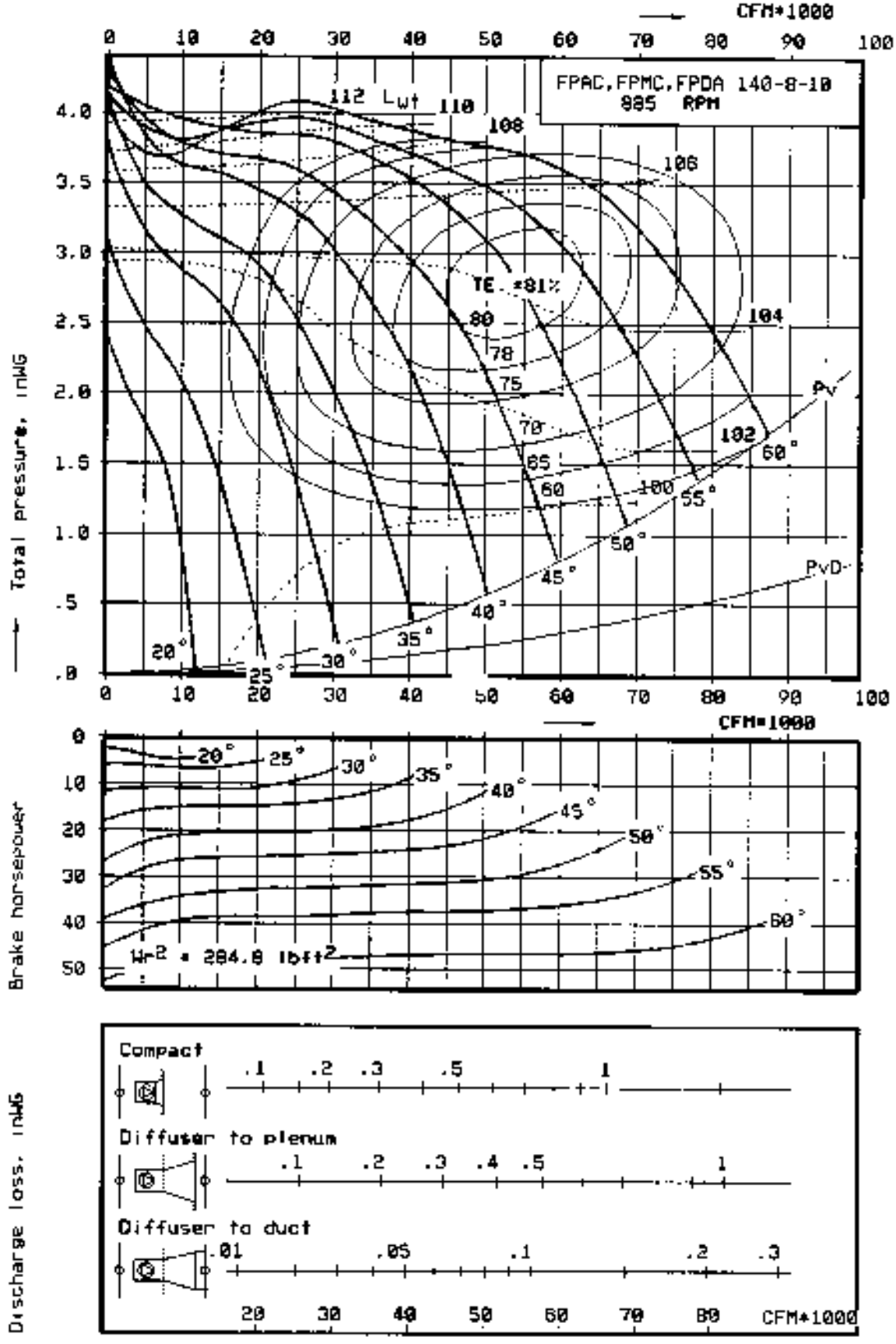

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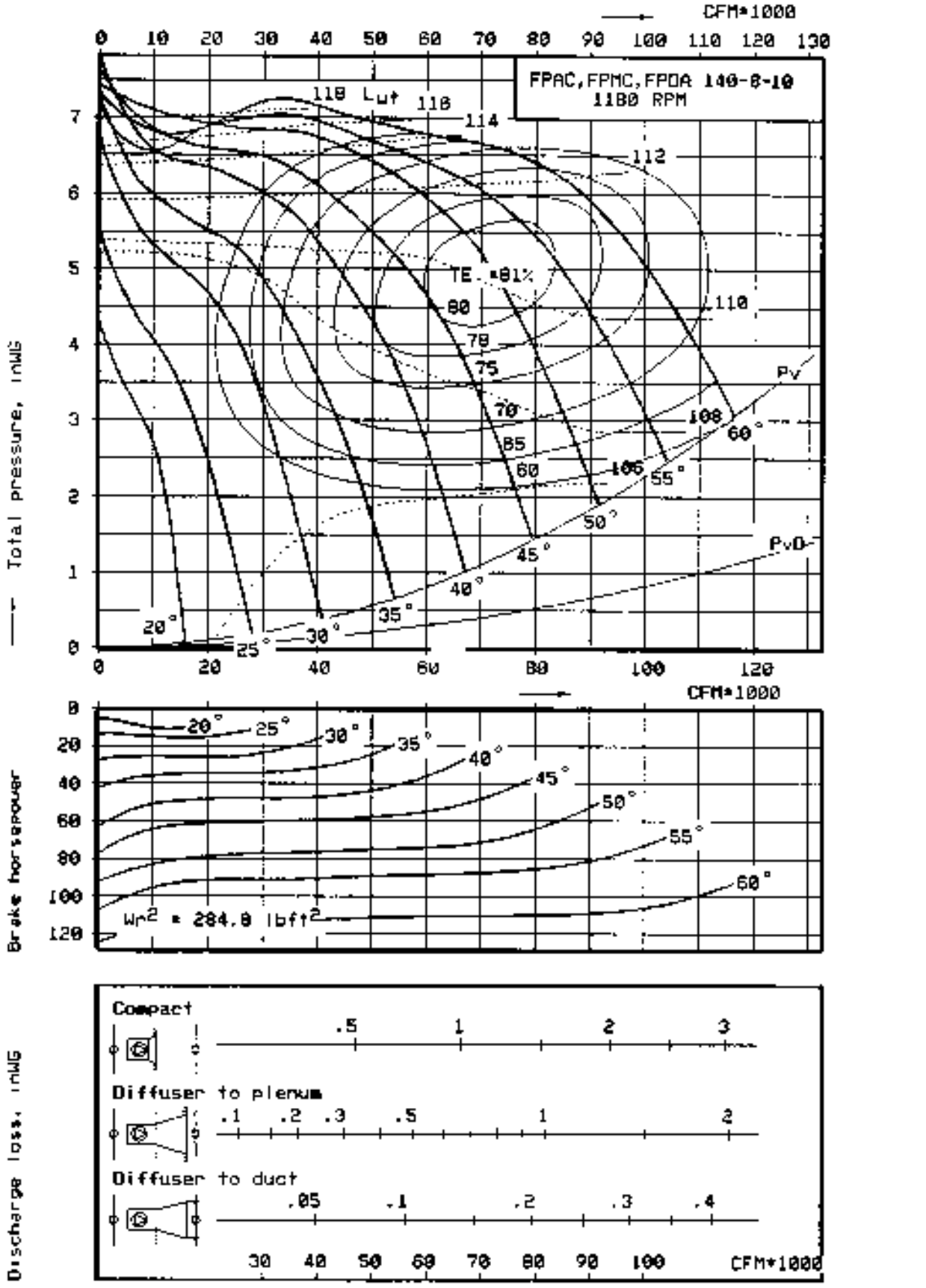

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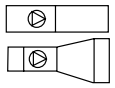

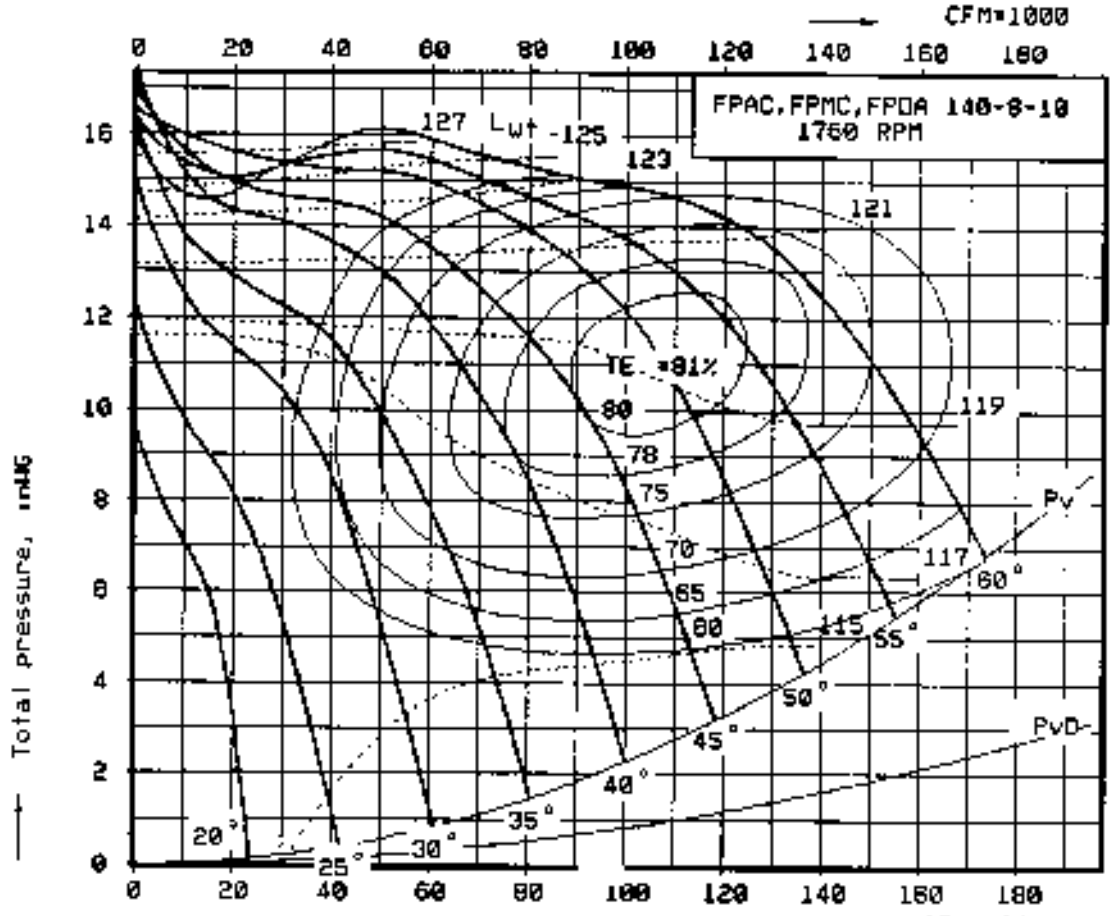

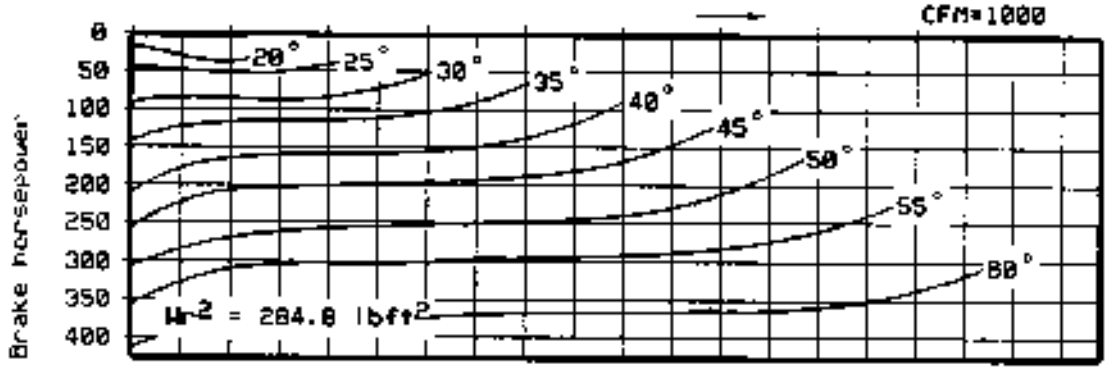

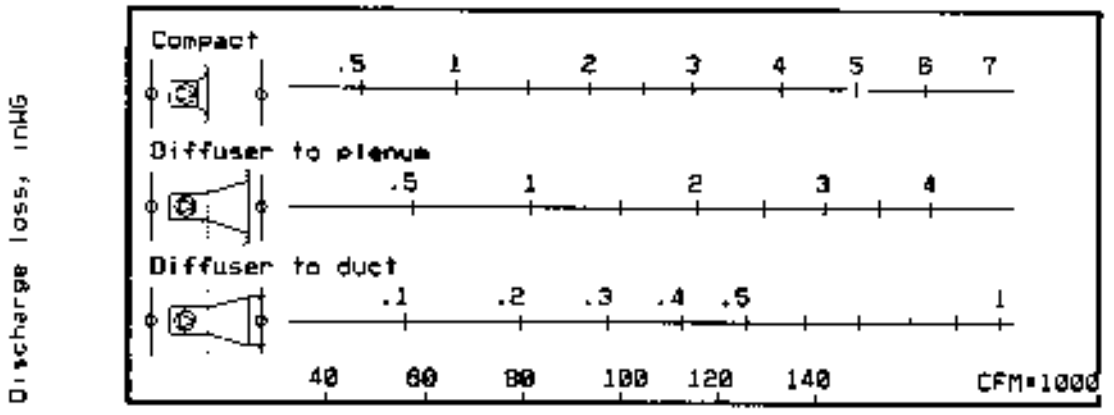

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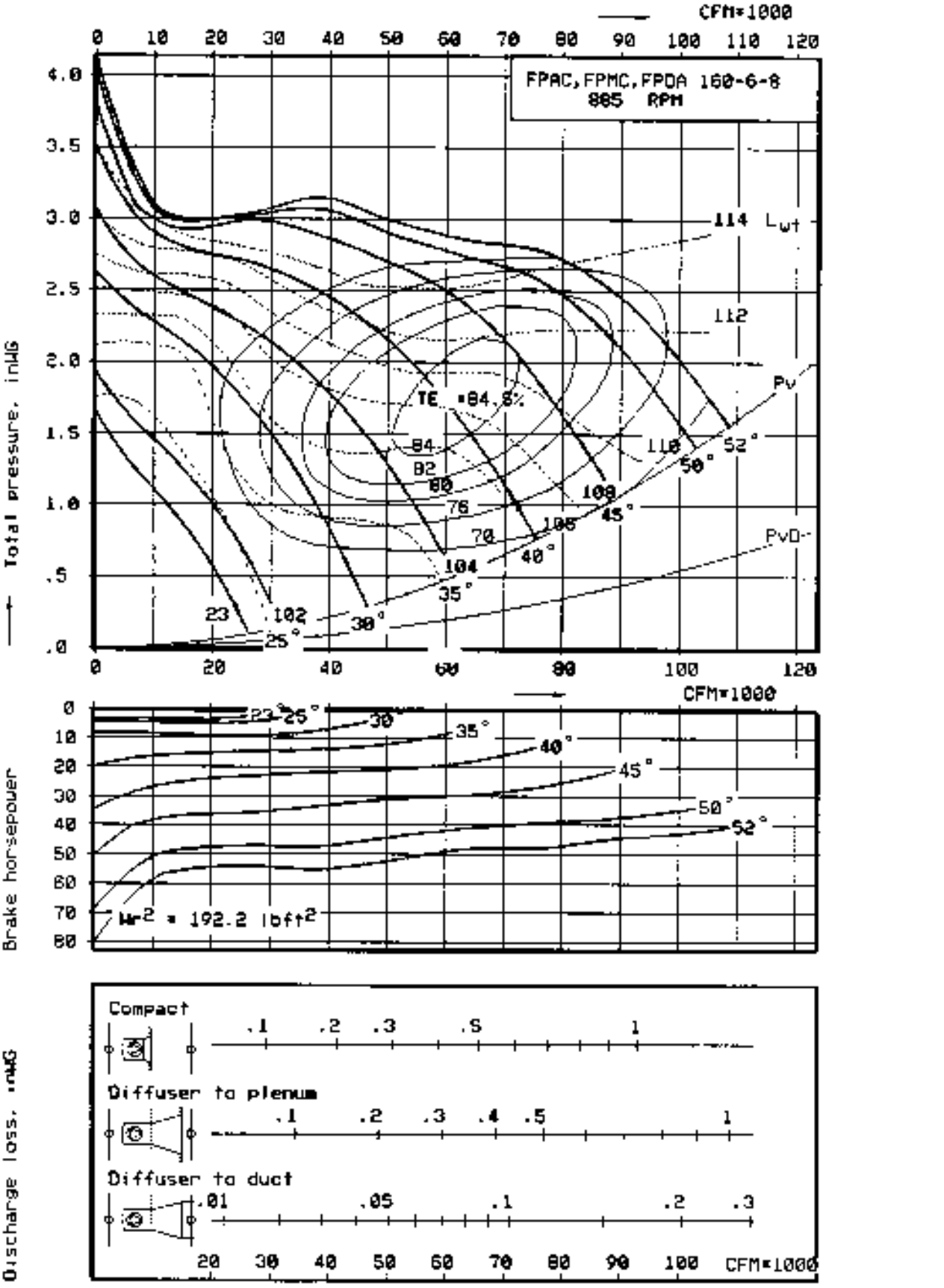

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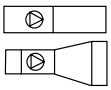

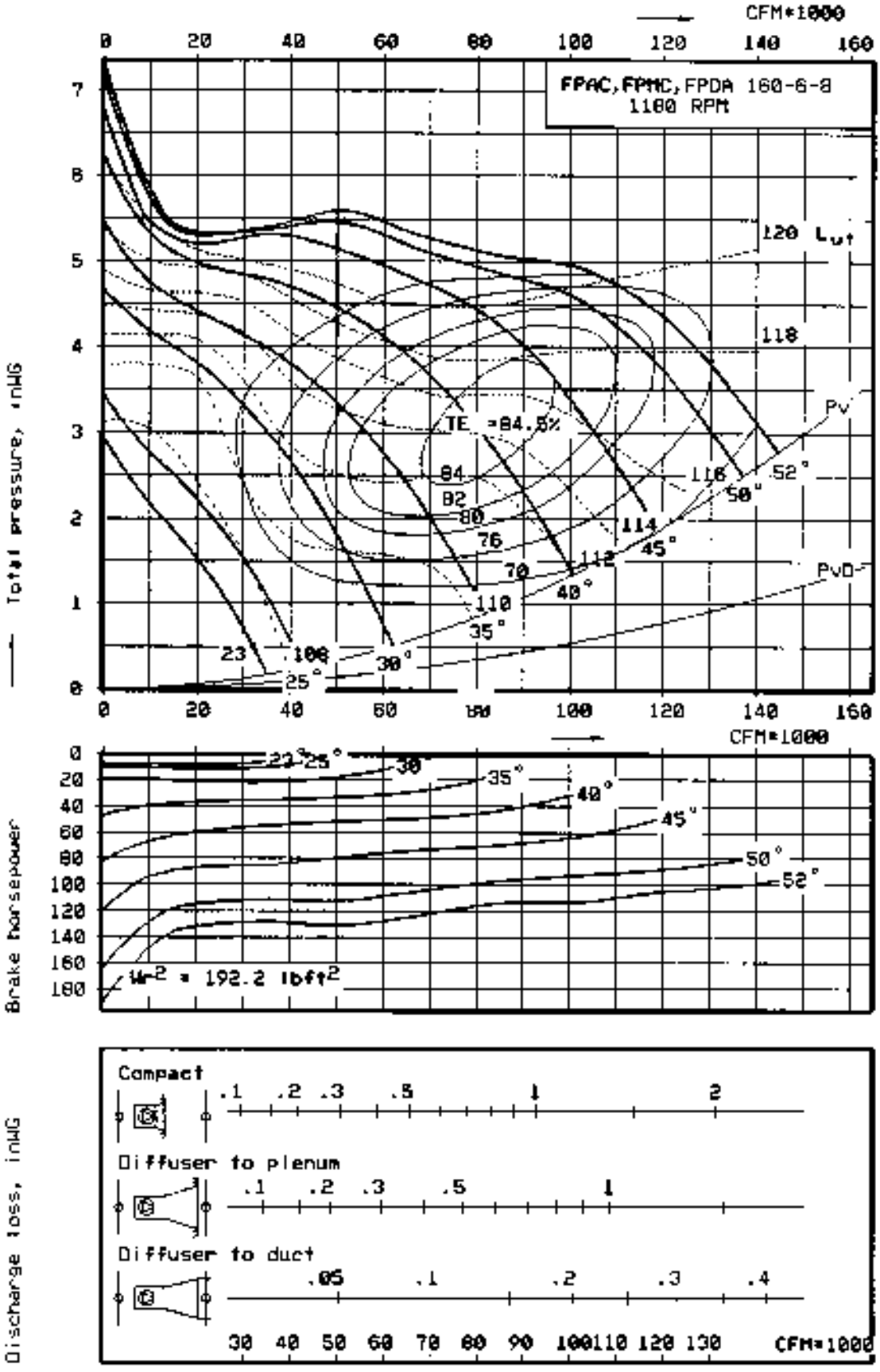

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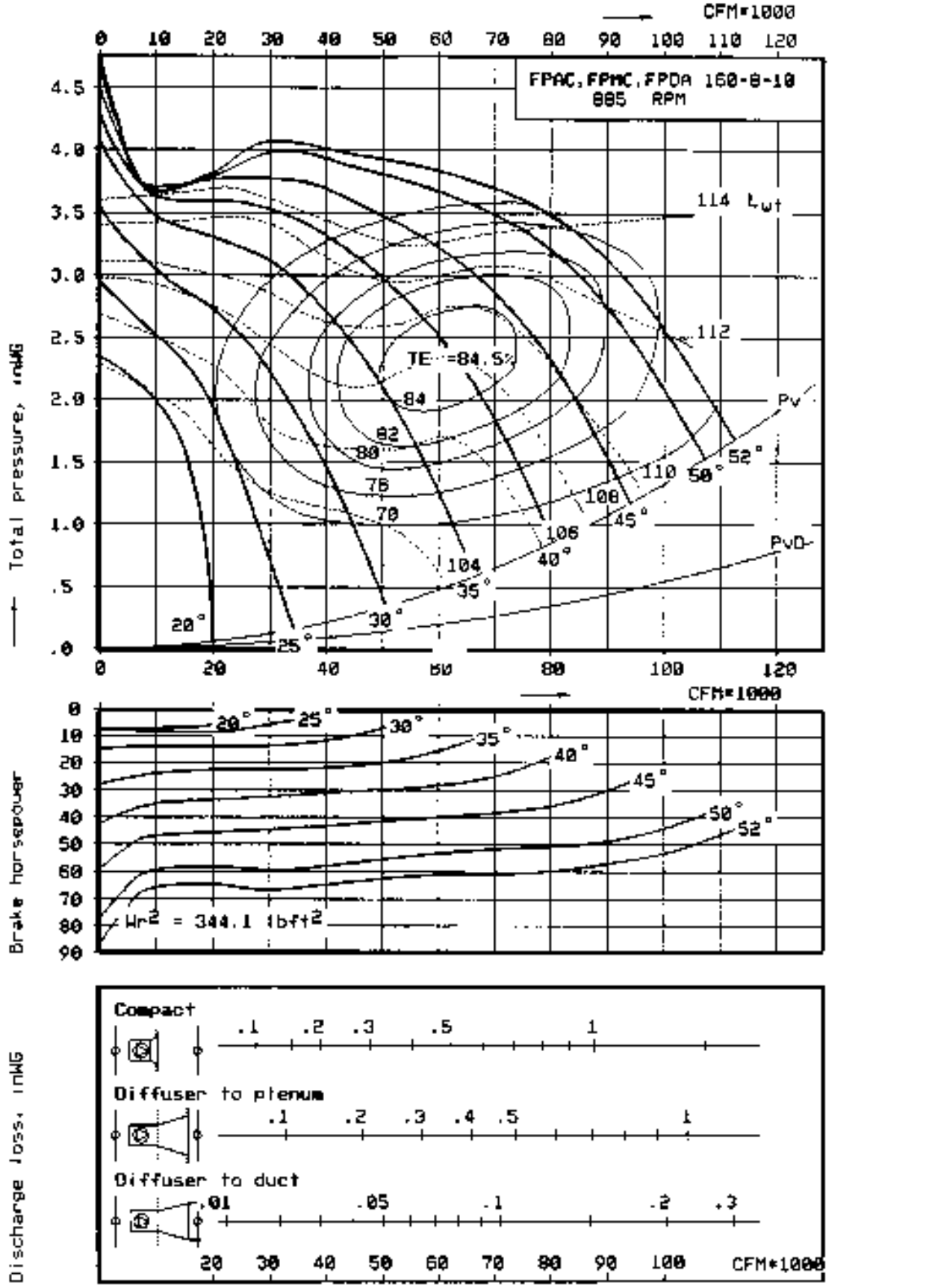

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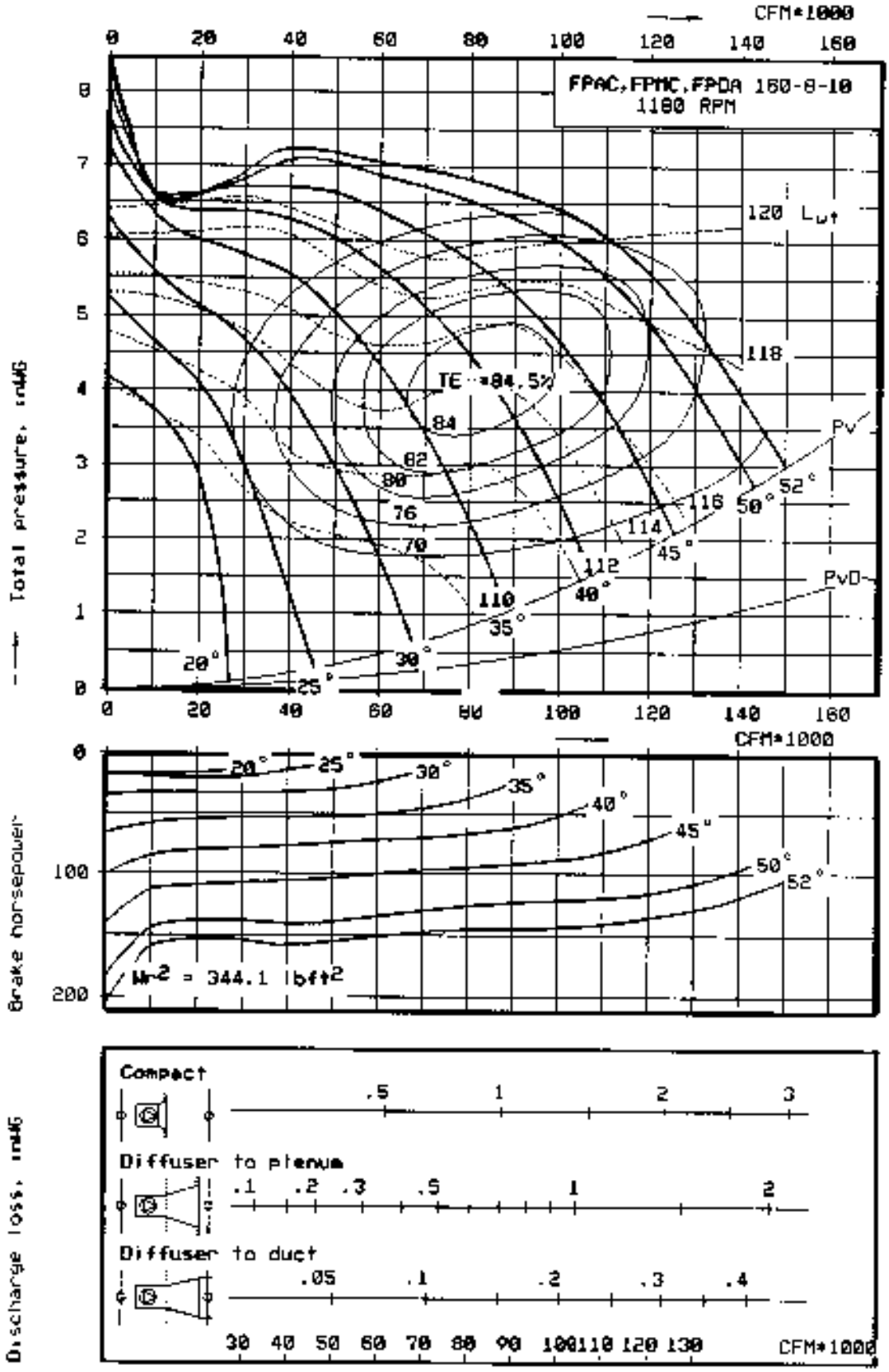

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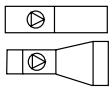

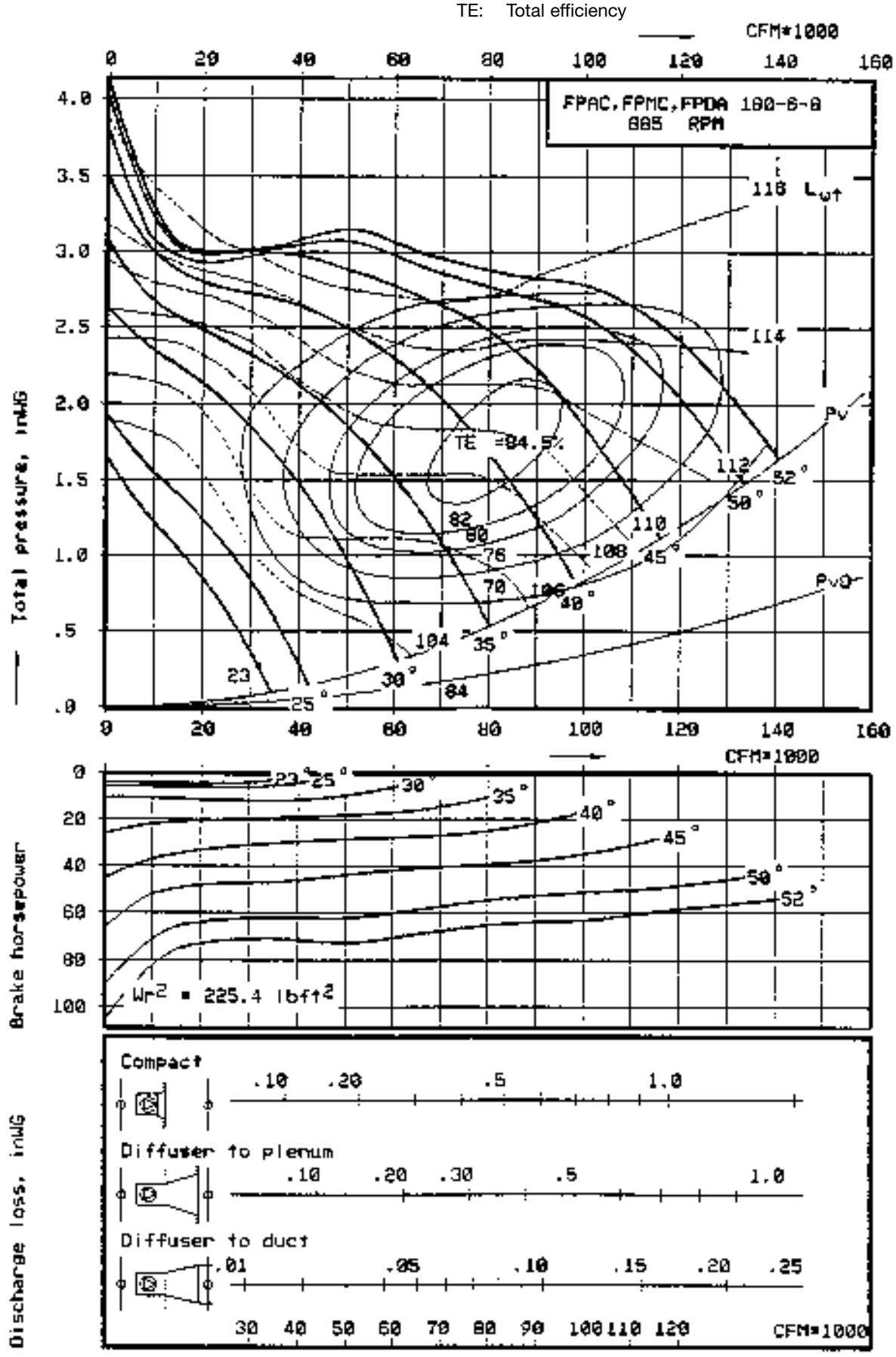

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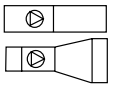

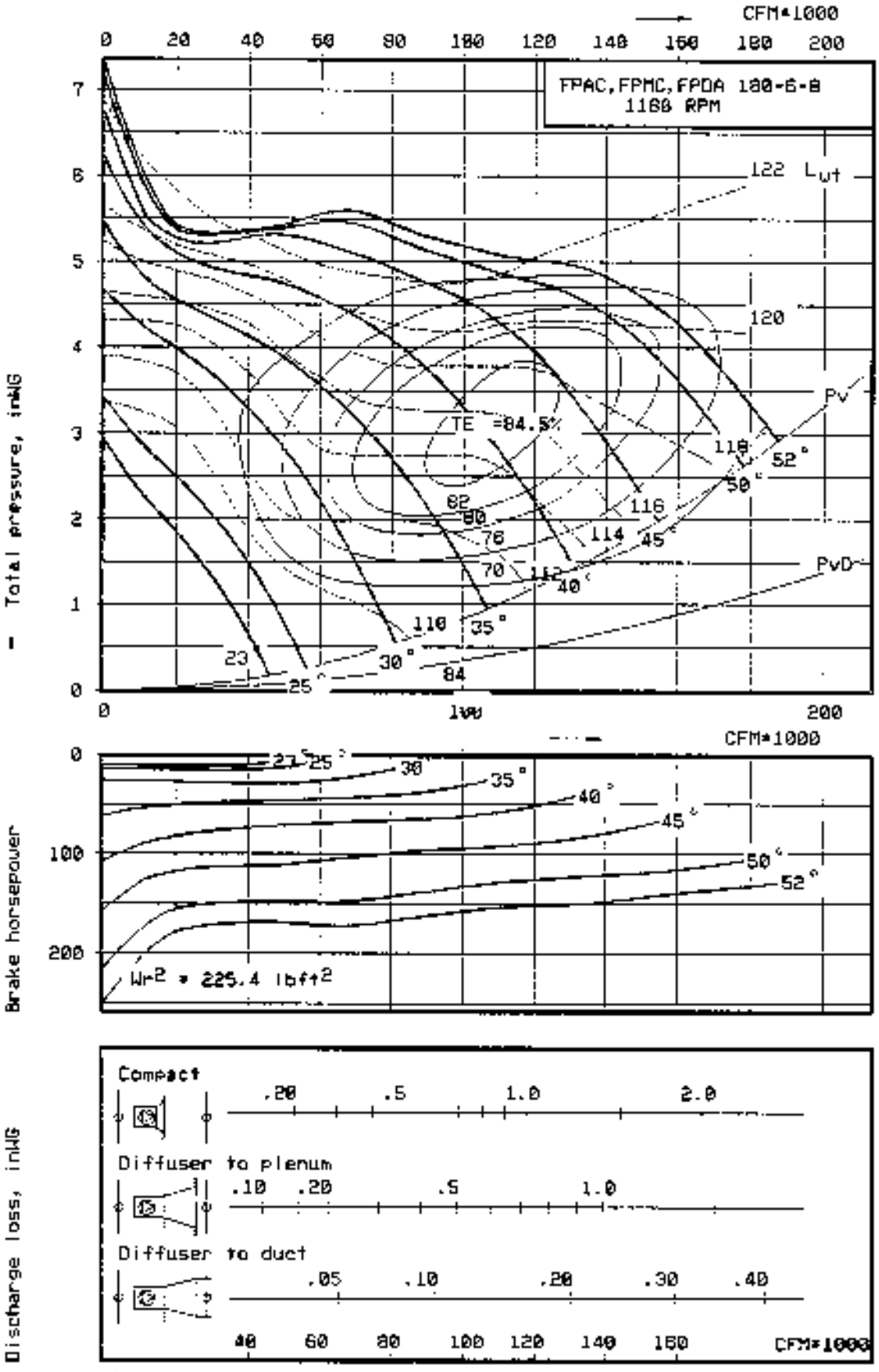

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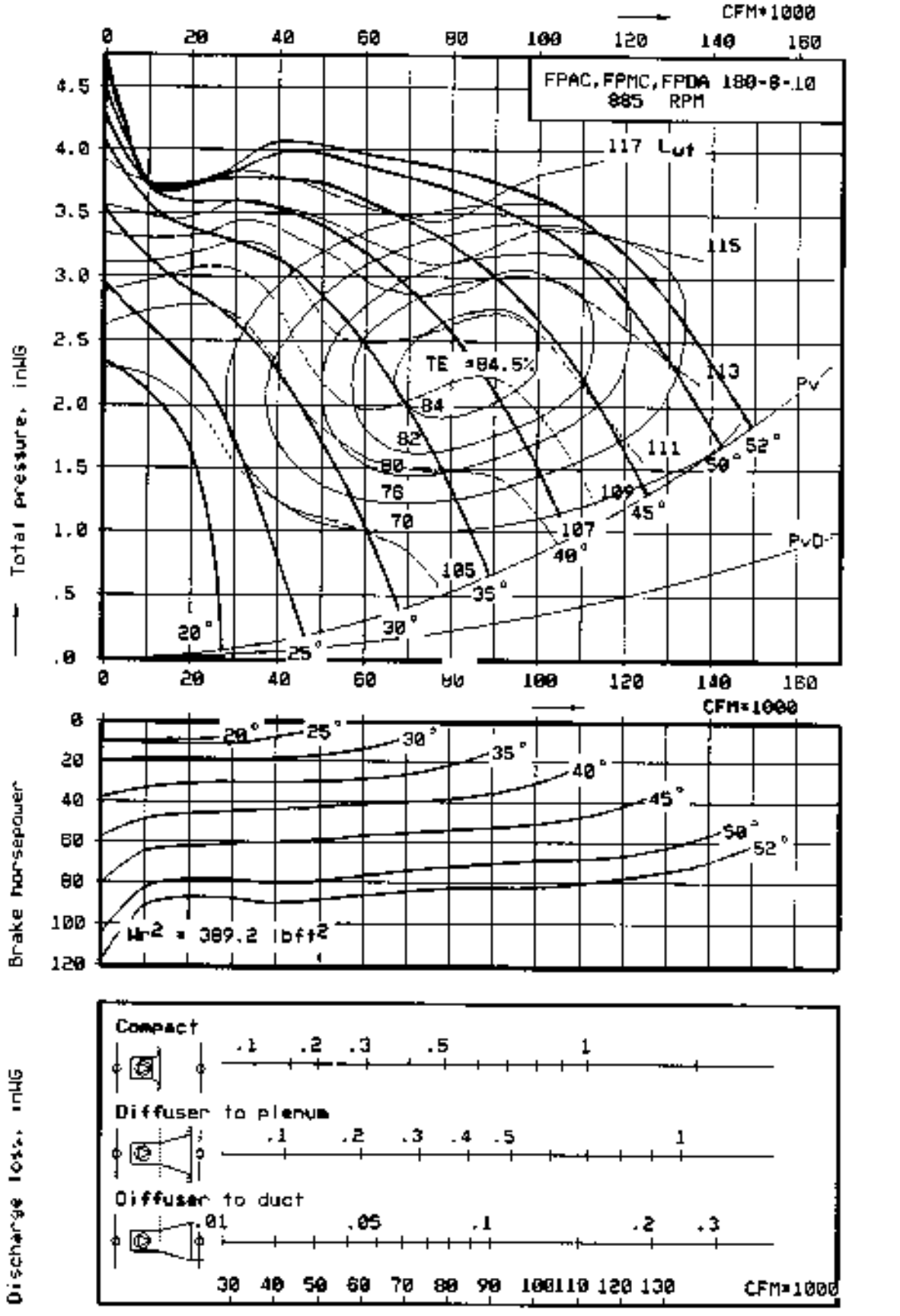


AXICO ANTI-STALL®

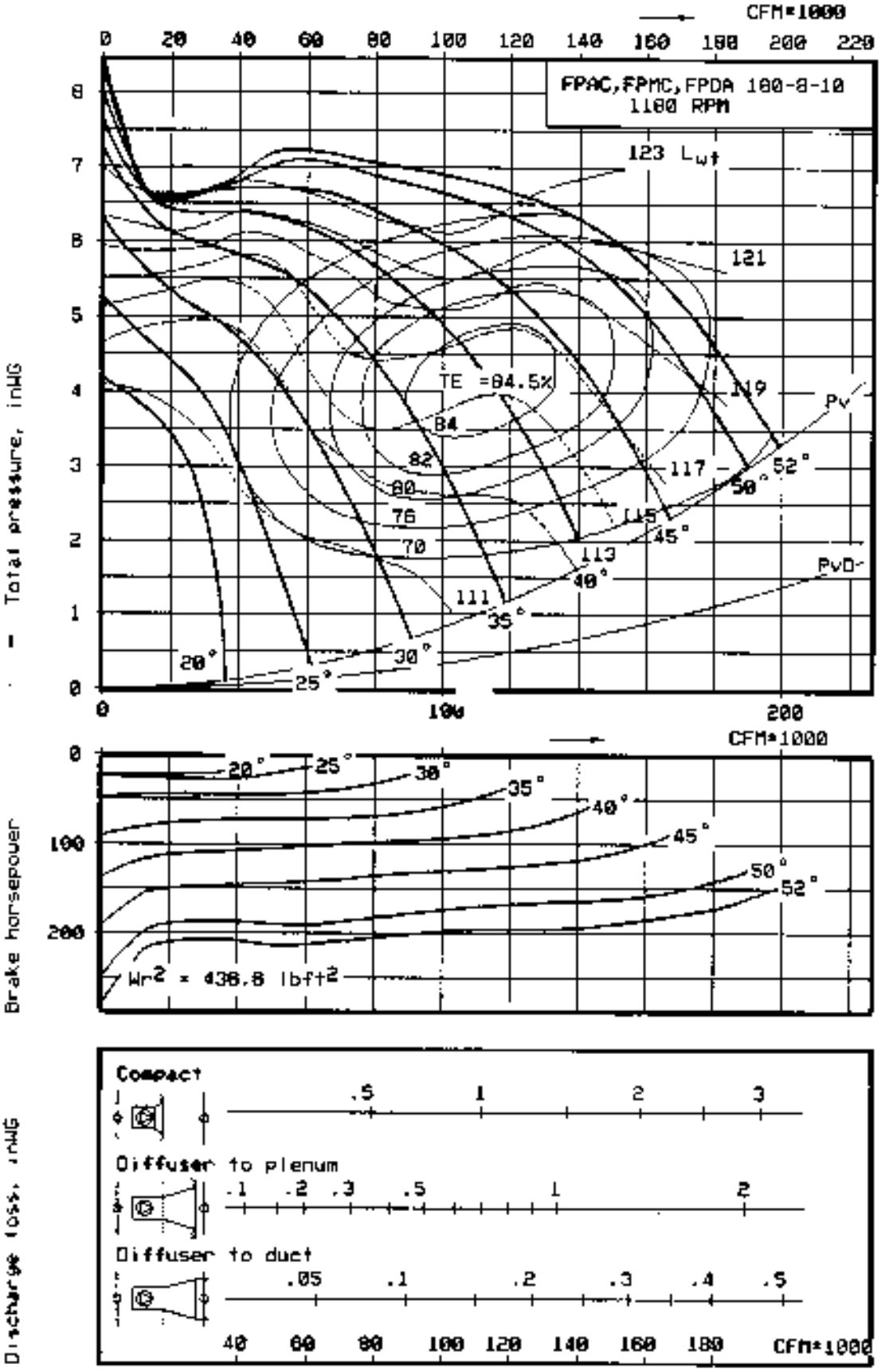
Fan chart is valid for a gas density of .075 lb/ft^3.

L_{wt}: Total sound power level dB(A)

P_V: Velocity pressure in fan diameter duct

P_{VD}: Velocity pressure in diffuser diameter duct

TE: Total efficiency



AXICO ANTI-STALL®

Fan chart is valid for a gas density of .075 lb/ft^3.

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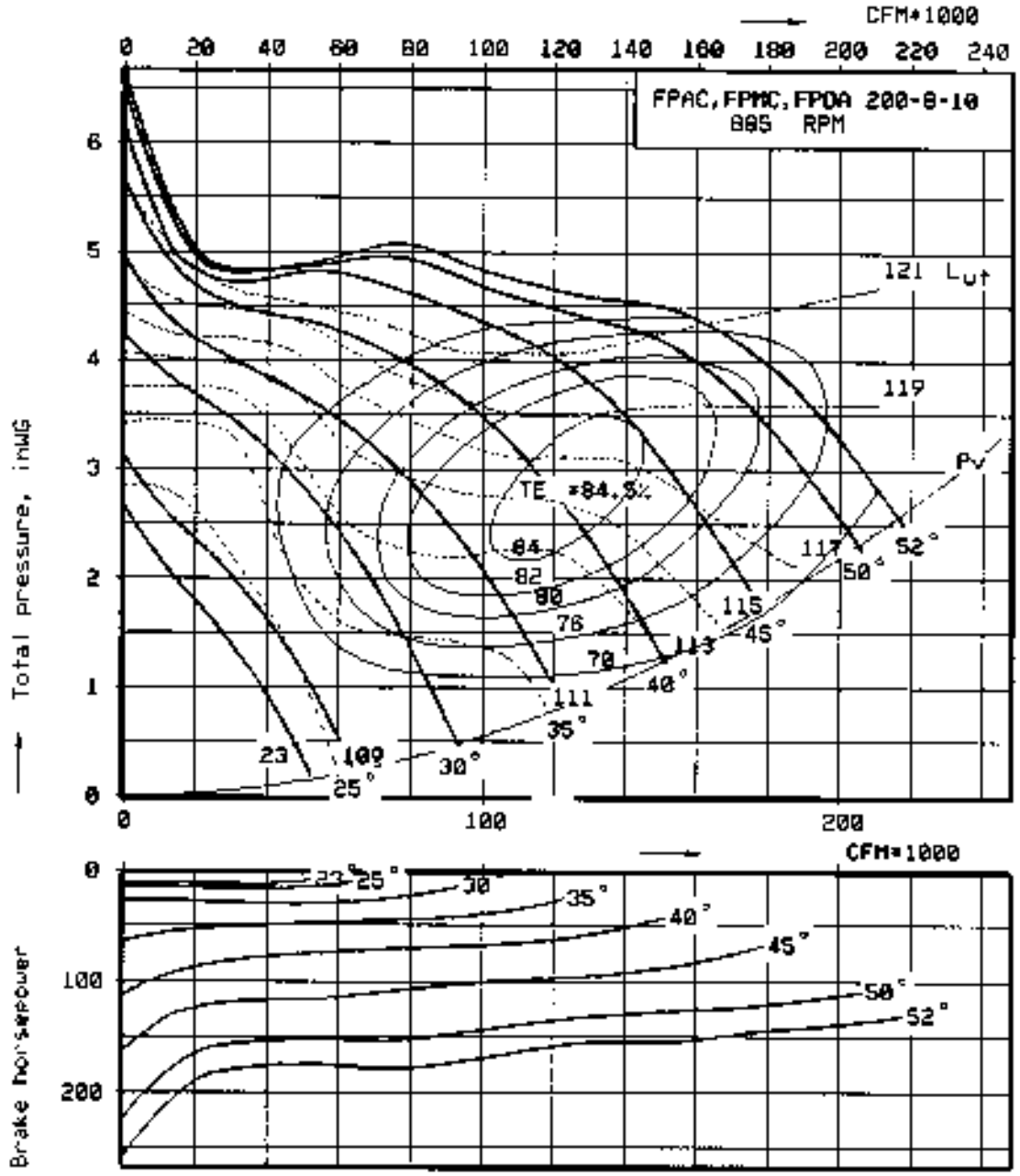

AXICO ANTI-STALL®

Fan chart is valid for a gas density of .075 lb/ft^3.

L_{wt}: Total sound power level dB(A)

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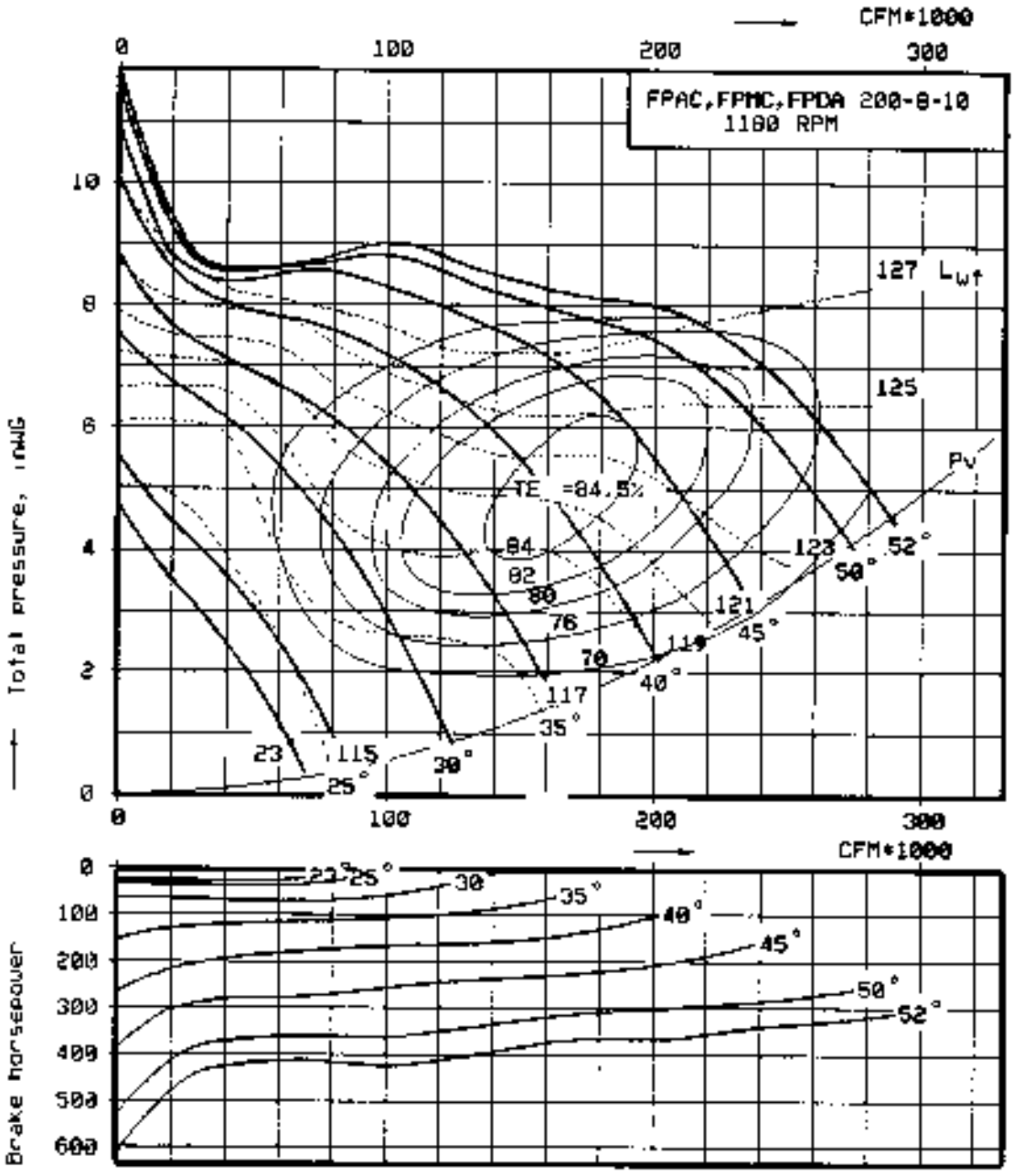

Sound Power Correction Factors

The correction factors shown below are to be added to the total sound power (L_{wt}) as shown at the point of operation on the appropriate fan curve to obtain sound power levels for eight octave bands.

Arrangement 4, Type 2

FAN	RPM	OCTAVE BAND / HERTZ CENTER FREQUENCY							
		1/63	2/125	3/250	4/500	5/1000	6/2000	7/4000	8/1000
080-5 Inlet	885	–3	0	0	–1	–4	–10	–14	–17
080–5 Discharge	885	2	0	0	–1	–4	–10	–15	–20
090–5 Inlet	885	–6	–2	–2	–1	–4	–10	–15	–19
090–5 Discharge	885	–2	–2	–2	–1	–4	–10	–16	–22
090–6 Inlet	885	–7	–1	–1	–5	–5	–7	–8	–10
090–6 Discharge	885	–3	1	–1	–5	–5	–7	–9	–13
100–5 Inlet	885	–10	–5	–4	0	–4	–10	–16	–21
100–5 Discharge	885	–6	–5	–4	0	–4	–10	–17	–24
100–6 Inlet	885	–9	–1	–3	–4	–5	–8	–10	–12
100–6 Discharge	885	–5	–1	–3	–4	–5	–8	–11	–15
112–5 Inlet	885	–11	–5	–5	0	–4	–10	–15	–20
112–5 Discharge	885	–8	–5	–5	0	–4	–10	–16	–23
112–6 Inlet	885	–9	–2	–4	–3	–4	–8	–12	–13
112–6 Discharge	885	–6	–2	–4	–3	–4	–8	–13	–16
112–8 Inlet	885	–2	1	–4	–1	–4	–9	–13	–15
112–8 Discharge	885	1	1	–4	–1	–4	–9	–14	–18
125–5 Inlet	885	–15	–6	–7	0	–4	–9	–15	–18
125–5 Discharge	885	–12	–6	–7	0	–4	–9	–16	–21
125–6 Inlet	885	–11	–3	–5	–3	–4	–9	–14	–15
125–6 Discharge	885	–8	–3	–5	–3	–4	–9	–15	–18
125–8 Inlet	885	–10	2	–5	–1	–5	–9	–13	–16
125–8 Discharge	885	–7	2	–5	–1	–5	–9	–14	–19
140–6 Inlet	885	–13	–5	–6	–2	–4	–9	–14	–16
140–6 Discharge	885	–11	–5	–5	–2	–4	–9	–15	–19
140–8 Inlet	885	–9	0	–6	–2	–4	–9	–12	–16
140–8 Discharge	885	–7	0	–6	–2	–4	–9	–13	–19
160–6 Inlet	885	–13	–7	–9	–2	–3	–9	–14	–16
160–6 Discharge	885	–12	–7	–9	–2	–3	–9	–15	–19
160–8 Inlet	885	–15	–3	–9	–3	–3	–9	–14	–17
160–8 Discharge	885	–14	–3	–9	–3	–3	–9	–15	–20
180–6 Inlet	885	–14	–4	–6	–2	–3	–9	–15	–18
180–6 Discharge	885	–14	–4	–6	–2	–3	–9	–16	–21
180–8 Inlet	885	–16	–2	–7	–4	–3	–8	–14	–17
180–8 Discharge	885	–16	–2	–7	–4	–3	–8	–15	–20
200–8 Inlet	885	–21	–13	–8	–5	–3	–8	–12	–16
200–8 Discharge	885	–21	–13	–8	–5	–3	–8	–13	–19
080–5 Inlet	1180	–5	–1	–3	–3	–4	–8	–13	–16
080–5 Discharge	1180	0	–1	–3	–3	–4	–8	–14	–19
090–5 Inlet	1180	–6	–2	–4	–3	–4	–8	–13	–17
090–5 Discharge	1180	–2	–2	–4	–3	–4	–8	–14	–20
090–6 Inlet	1180	–8	0	–1	–4	–4	–7	–10	–11
090–6 Discharge	1180	–4	0	–1	–4	–4	–7	–11	–14
100–5 Inlet	1180	–11	–5	–8	–2	–4	–9	–13	–19
100–5 Discharge	1180	–7	–5	–8	–2	–4	–9	–14	–22
100–6 Inlet	1180	–10	–2	–4	–4	–4	–7	–9	–11
100–6 Discharge	1180	–6	–2	–4	–4	–4	–7	–10	–14
112–5 Inlet	1180	–12	–5	–8	–3	–3	–8	–13	–18
112–5 Discharge	1180	–9	–5	–8	–3	–3	–8	–14	–21
112–6 Inlet	1180	–11	–3	–6	–4	–4	–7	–11	–13
112–6 Discharge	1180	–8	–3	–6	–4	–4	–7	–12	–16

Arrangement 4, Type 2 (cont'd)

FAN	RPM	OCTAVE BAND / HERTZ CENTER FREQUENCY							
		1/63	2/125	3/250	4/500	5/1000	6/2000	7/4000	8/1000
112–8 Inlet	1180	–3	–1	–1	1	–4	–9	–12	–14
112–8 Discharge	1180	0	–1	–1	1	–4	–9	–13	–17
125–5 Inlet	1180	–14	–4	–10	–3	–3	–9	–14	–18
125–5 Discharge	1180	–11	–4	–10	–3	–3	–9	–15	–21
125–6 Inlet	1180	–13	–3	–8	–3	–3	–8	–13	–16
125–6 Discharge	1180	–10	–3	–8	–3	–3	–8	–14	–19
125–8 Inlet	1180	–8	0	–3	0	–4	–8	–12	–15
125–8 Discharge	1180	–5	0	–3	0	–4	–8	–13	–18
140–6 Inlet	1180	–16	–7	–8	–4	–3	–7	–12	–15
140–6 Discharge	1180	–14	–7	–8	–4	–3	–7	–13	–18
140–8 Inlet	1180	–8	–2	–4	–1	–4	–7	–10	–15
140–8 Discharge	1180	–6	–2	–4	–1	–4	–7	–11	–18
160–6 Inlet	1180	–20	–11	–9	–4	–3	–7	–12	–16
160–6 Discharge	1180	–19	–11	–9	–4	–3	–7	–13	–19
160–8 Inlet	1180	–17	–8	–8	–3	–3	–7	–11	–14
160–8 Discharge	1180	–16	–8	–8	–3	–3	–7	–12	–17
180–6 Inlet	1180	–20	–9	–7	–4	–3	–6	–12	–17
180–6 Discharge	1180	–20	–9	–7	–4	–3	–6	–12	–17
180–8 Inlet	1180	–18	–9	–7	–4	–3	–6	–11	–14
180–8 Discharge	1180	–18	–9	–7	–4	–3	–6	–12	–17
200–8 Inlet	1180	–23	–14	–9	–6	–4	–7	–10	–15
200–8 Discharge	1180	–23	–14	–9	–6	–4	–7	–11	–18
080–5 Inlet	1760	–8	–4	–4	–1	–4	–7	–11	–12
080–5 Discharge	1760	–3	–4	–4	–1	–4	–7	–12	–15
090–5 Inlet	1760	–10	–6	–5	–2	–3	–7	–11	–13
090–5 Discharge	1760	–6	–6	–5	–2	–3	–7	–12	–16
090–6 Inlet	1760	–11	–5	–1	–1	–4	–8	–10	–11
090–6 Discharge	1760	–11	–5	–1	–1	–4	–8	–11	–14
100–5 Inlet	1760	–12	–8	–8	–2	–3	–7	–11	–12
100–5 Discharge	1760	–8	–8	–8	–2	–3	–7	–12	–15
100–6 Inlet	1760	–13	–7	–3	–2	–4	–7	–10	–12
100–6 Discharge	1760	–9	–7	–3	–2	–4	–7	–11	–15
112–5 Inlet	1760	–13	–9	–8	–3	–3	–6	–11	–14
112–5 Discharge	1760	–10	–9	–8	–3	–3	–6	–12	–17
112–6 Inlet	1760	–14	–8	–4	–3	–4	–6	–10	–12
112–6 Discharge	1760	–11	–8	–4	–3	–4	–6	–11	–15
112–8 Inlet	1760	–6	–3	–3	–3	–4	–7	–10	–12
112–8 Discharge	1760	–3	–3	–3	–3	–4	–7	–11	–15
125–5 Inlet	1760	–15	–11	–9	–3	–3	–7	–11	–15
125–5 Discharge	1760	–12	–11	–9	–3	–3	–7	–12	–18
125–6 Inlet	1760	–18	–10	–5	–3	–4	–6	–10	–12
125–6 Discharge	1760	–15	–10	–5	–3	–4	–6	–11	–15
125–8 Inlet	1760	–11	–3	–3	–5	–4	–6	–10	–13
125–8 Discharge	1760	–8	–3	–3	–5	–4	–6	–11	–16
140–6 Inlet	1760	–19	–12	–7	–4	–4	–6	–9	–13
140–6 Discharge	1760	–17	–12	17	–4	–4	–6	–10	–16
140–8 Inlet	1760	–11	–5	–4	–6	–4	–6	–8	–13
140–8 Discharge	1760	–9	–5	–4	–6	–4	–6	–9	–16

Sound Power Correction Factors

The correction factors shown below are to be added to the total sound power (L_{wt}) as shown at the point of operation on the appropriate fan curve to obtain sound power levels for eight octave bands.

Arrangement 4, Type 3

FAN	RPM	OCTAVE BAND / HERTZ CENTER FREQUENCY							
		1/63	2/125	3/250	4/500	5/1000	6/2000	7/4000	8/1000
080-5 Inlet	885	–3	–4	–2	–1	–4	–10	–14	–17
080–5 Discharge	885	2	–4	–2	–1	–4	–10	–15	–20
090–5 Inlet	885	–6	–6	–4	–1	–4	–10	–15	–19
090–5 Discharge	885	–2	–6	–4	–1	–4	–10	–16	–22
090–6 Inlet	885	–7	–3	–3	–5	–5	–7	–8	–10
090–6 Discharge	885	–3	–3	–3	–5	–5	–7	–9	–13
100–5 Inlet	885	–10	–9	–6	0	–4	–10	–16	–21
100–5 Discharge	885	–6	–9	–6	0	–4	–10	–17	–24
100–6 Inlet	885	–9	–5	–5	–4	–5	–8	–10	–12
100–6 Discharge	885	–5	–5	–5	–4	–5	–8	–11	–15
112–5 Inlet	885	–11	–9	–7	0	–4	–10	–15	–20
112–5 Discharge	885	–8	–9	–7	0	–4	–10	–16	–23
112–6 Inlet	885	–9	–6	–6	–3	–4	–8	–12	–13
112–6 Discharge	885	–6	–6	–6	–3	–4	–8	–13	–16
112–8 Inlet	885	–2	–3	–6	–1	–4	–9	–13	–15
112–8 Discharge	885	1	–3	–6	–1	–4	–9	–14	–18
125–5 Inlet	885	–15	–10	–9	0	–4	–9	–15	–18
125–5 Discharge	885	–12	–10	–9	0	–4	–9	–16	–21
125–6 Inlet	885	–11	–7	–7	–3	–4	–9	–14	–15
125–6 Discharge	885	–8	–7	–7	–3	–4	–9	–15	–18
125–8 Inlet	885	–10	2	–7	–1	–5	–9	–13	–16
125–8 Discharge	885	–7	2	–7	–1	–5	–9	–14	–19
140–6 Inlet	885	–13	–9	–8	–2	–4	–9	–14	–16
140–6 Discharge	885	–11	–9	–8	–2	–4	–9	–15	–19
140–8 Inlet	885	–9	–4	–8	–2	–4	–9	–12	–16
140–8 Discharge	885	–7	–4	–8	–2	–4	–9	–13	–19
160–6 Inlet	885	–13	–9	–10	–2	–3	–9	–14	–16
160–6 Discharge	885	–12	–9	–10	–2	–3	–9	–15	–19
160–8 Inlet	885	–15	–5	–10	–3	–3	–9	–14	–17
160–8 Discharge	885	–14	–5	–10	–3	–3	–9	–15	–20
180–6 Inlet	885	–14	–6	–7	–2	–3	–9	–15	–18
180–6 Discharge	885	–14	–6	–7	–2	–3	–9	–16	–21
180–8 Inlet	885	–16	–4	–8	–4	–3	–8	–14	–17
180–8 Discharge	885	–16	–4	–8	–4	–3	–8	–15	–20
200–8 Inlet	885	–21	–13	–8	–5	–3	–8	–12	–16
200–8 Discharge	885	–21	–13	–8	–5	–3	–8	–13	–19
080–5 Inlet	1180	–5	–5	–5	–3	–4	–8	–13	–16
080–5 Discharge	1180	0	–5	–5	–3	–4	–8	–14	–19
090–5 Inlet	1180	–6	–6	–6	–3	–4	–8	–13	–17
090–5 Discharge	1180	–2	–6	–6	–3	–4	–8	–14	–20
090–6 Inlet	1180	–8	–4	–3	–4	–4	–7	–10	–11
090–6 Discharge	1180	–4	–4	–3	–4	–4	–7	–11	–14
100–5 Inlet	1180	–11	–9	–10	–2	–4	–9	–13	–19
100–5 Discharge	1180	–7	–9	–10	–2	–4	–9	–14	–22
100–6 Inlet	1180	–10	–6	6	–4	–4	–7	–9	–11
100–6 Discharge	1180	–6	–6	–6	–4	–4	–7	–10	–14
112–5 Inlet	1180	–12	–9	–10	–3	–3	–8	–13	–18
112–5 Discharge	1180	–9	–9	–10	–3	–3	–8	–14	–21
112–6 Inlet	1180	–11	–7	–8	–4	–4	–7	–11	–13
112–6 Discharge	1180	–8	–7	–8	–4	–4	–7	–12	–16

Arrangement 4, Type 3 (cont'd)

FAN	RPM	OCTAVE BAND / HERTZ CENTER FREQUENCY							
		1/63	2/125	3/250	4/500	5/1000	6/2000	7/4000	8/1000
112–8 Inlet	1180	–3	–5	–5	–2	–4	–9	–12	–14
112–8 Discharge	1180	0	–5	–5	–2	–4	–9	–13	–17
125–5 Inlet	1180	–14	–8	–12	–3	–3	–9	–14	–18
125–5 Discharge	1180	–11	–8	–12	–3	–3	–9	–15	–21
125–6 Inlet	1180	–13	–7	–10	–3	–3	–8	–13	–16
125–6 Discharge	1180	–10	–7	–10	–3	–3	–8	–14	–19
125–8 Inlet	1180	–8	–4	–7	–3	–4	–8	–12	–15
125–8 Discharge	1180	–5	–4	–7	–2	–4	–8	–13	–18
140–6 Inlet	1180	–16	–11	–10	–4	–3	–7	–12	–15
140–6 Discharge	1180	–14	–11	–10	–4	–3	–7	–13	–18
140–8 Inlet	1180	–8	–6	–8	–4	–4	–7	–10	–15
140–8 Discharge	1180	–6	–6	–8	–4	–4	–7	–11	–18
160–6 Inlet	1180	–20	–13	–10	–4	–3	–7	–12	–16
160–6 Discharge	1180	–19	–13	–10	–4	–3	–7	–13	–19
160–8 Inlet	1180	–17	–10	–10	–5	–3	–7	–11	–14
160–8 Discharge	1180	–16	–10	–10	–5	–3	–7	–12	–17
180–6 Inlet	1180	–20	–11	–8	–4	–3	–6	–12	–17
180–6 Discharge	1180	–20	–11	–8	–4	–3	–6	–13	–20
180–8 Inlet	1180	–18	–11	–9	–5	–3	–6	–11	–14
180–8 Discharge	1180	–18	–11	–9	–5	–3	–6	–12	–17
200–8 Inlet	1180	–23	–14	–9	–6	–4	–7	–10	–15
200–8 Discharge	1180	–23	–14	–9	–6	–4	–7	–11	–18
080–5 Inlet	1760	–8	–8	–8	–4	–4	–7	–11	–12
080–5 Discharge	1760	–3	–8	–8	–4	–4	–7	–12	–15
090–5 Inlet	1760	–10	–10	–9	–5	–3	–7	–11	–13
090–5 Discharge	1760	–6	–10	–9	–5	–3	–7	–12	–16
090–6 Inlet	1760	–11	–9	–5	–4	–4	–8	–10	–11
090–6 Discharge	1760	–7	–9	–5	–4	–4	–8	–11	–14
100–5 Inlet	1760	–12	–12	–12	–5	–3	–7	–11	–12
100–5 Discharge	1760	–8	–12	–12	–5	–3	–7	–12	–15
100–6 Inlet	1760	–13	–11	–7	–5	–4	–7	–10	–12
100–6 Discharge	1760	–9	–11	–7	–5	–4	–7	–11	–15
112–5 Inlet	1760	–13	–13	–12	–6	–3	–6	–11	–14
112–5 Discharge	1760	–10	–13	–12	–6	–3	–6	–12	–17
112–6 Inlet	1760	–14	–12	–8	–6	–4	–6	–10	–12
112–6 Discharge	1760	–11	–12	–8	–6	–4	–6	–11	–15
112–8 Inlet	1760	–6	–7	–7	–6	–4	–7	–10	–12
112–8 Discharge	1760	–3	–7	–7	–6	–4	–7	–11	–15
125–5 Inlet	1760	–15	–15	–13	–6	–3	–7	–11	–15
125–5 Discharge	1760	–12	–15	–13	–6	–3	–7	–12	–18
125–6 Inlet	1760	–18	–14	–9	–6	–4	–6	–10	–12
125–6 Discharge	1760	–15	–14	–9	–6	–4	–6	–11	–15
125–8 Inlet	1760	–11	–7	–7	–8	–4	–6	–10	–13
125–8 Discharge	1760	–8	–7	–7	–8	–4	–6	–11	–16
140–6 Inlet	1760	–19	–16	–11	–7	–4	–6	–9	–13
140–6 Discharge	1760	–17	–16	–11	–7	–4	–6	–10	–16
140–8 Inlet	1760	–11	–9	–8	–9	–4	–6	–8	–13
140–8 Discharge	1760	–9	–9	–8	–9	–4	–6	–9	–16