AIRDEX CORPORATION

Series DC-DCT

Airdex standard direct drive blower assemblies

SPECIFICATIONS & PERFORMANCE CURVES

AIRDEX CORPORATION

This catalogue presents a new line of Airdex standard Direct Drive Blowers in both full size and compact housing series. Included is performance data for blower selection in graph form, along with dimensional data.

Due to the wide range of motor performance available from the several motor manufacturers, it was felt that power requirements presented on a ***torque*** *basis would be most useful for motor selection. Design engineers and their suppliers will find this data useful in the selection of the best and most economical motor for a given application.*

Airdex performance data has been developed from tests with precise equipment and instrumentation under test conditions of AMCA Code, Bulletin 210 with outlet duct. Since Direct Drive Blower performance is affected by motor placement in the blower inlet, all testing was conducted with a motor in position so performance data includes its effect.

Suggestions for the Use of Performance Data

The blower performance graphs which follow show constant speed lines for the static pressure (S.P., Inches W.G.) and volume (CFM) relationship. These lines are intersected by constant torque lines (oz. in./oz. ft.) which indicate power requirements for each set of air volume, static pressure and speed relationships. To interpolate for changing conditions, system lines based on the fan laws are also shown on each graph. Each blower's principal dimensions are also shown with the appropriate graph for easy reference.

Usually, the dimensions of the available space as well as the required air volume is known. Total static pressure requirements can be approximated for preliminary selection. It should be noted that total static pressure requirements include those needed to offset entering and internal losses as well as the planned external pressure. While methods are available for measuring entering and internal losses, they usually only serve the academic interest. The Product Design Engineer knows from experience that the entering and internal losses often equal or exceed the known external requirement. Judgement will serve for preliminary blower selection but the final selection should be made on the basis of tests run with the blower in a given unit.

SUGGESTIONS FOR USE OF PERFORMANCE DATA

With known CFM requirements and approximated total static pressure requirements, a blower may be selected to fit the performance requirements of the heating or air conditioning unit. Torque required is readily determined from the graphs. Below is a chart to relate the speed and torque to horsepower terms when this is of interest.

Figure1 shows the graph performance for a Airdex blower. Figure 2 is a typical motor performance curve — this one for a ¼ HP, 6 pole, PSC motor.

Use of blower performance as here presented is shown by following examples:

EXAMPLE 1: A unit being designed will allow installation of a Airdex blower with adequate inlet clearance. The unit requires 1200 CFM, and the total static pressure is estimated at .7 in. W.G. Reading up the vertical 1200 CFM coordinate to its intersection with the .7 line, it is noted that this crosses at approximately 1000 RPM, and this point falls close to the 300 oz. inches of torque line. The table below shows that this is within the limits of a nominal ⅓ HP motor.

EXAMPLE 2: Performance of the motor shown in Figure 2 when applied to a Airdex blower is of interest. Six points indicated as "A" through "F" on the motor torque curve are selected at convenient points of 10, 15, 20, 25, 30, and 34.8 oz. ft. torque. The last point (34.8) was used only because it is at the point of maximum motor torque delivery. Corresponding speeds for these motor torque values give speeds of 1160, 1140, 1110, 1075, 1030, and 875 RPM, respectively. By plotting points that represent these speed torque values on the blower performance curve, a motor performance line may be drawn. This line would represent the anticipated performance of the motor-blower combination.

EXAMPLE 3: A unit being tested with a Airdex blower indicates air delivery of 800 CFM at 1000 RPM and .28 S.P. as required in the external test duct. The required air delivery is 1000 CFM at .28 S.P. external. By following vertically the 800 CFM line to its intersection with the 1000 RPM line, it is observed that the blower is producing a total of .72 S.P. Since .28 is external, the internal losses must be .44 (.72 minus .28). The internal system is indicated then by the intersection of the 800 CFM line and the .44 S.P. line. Conveniently in this example this is on a drawn system line. By following this system line to its intersection with the 1000 CFM line, it is learned that the new system resistance at 1000 CFM is .69. But, since .28 external is still required, a total of .97 (.69 plus .28) is required. The new conditions now become 1000 CFM at .97 static pressure. The graph indicates that the blower must now run at 1150 RPM with a torque requirement of 280 ounce inches. Since 1150 RPM is usually above the operating range of a 6-pole motor, another motor-blower combination is probably desirable.

OUNCE-INCHES OF TORQUE FOR GIVEN HP AND SPEED									
	HORSEPOWER								
	1/15	1/10	1/8	1/6	1/4	1/3	1/2	3/4	1
RPM	TORQUE, OUNCE-INCHES								
1600	42.0	63.0	78.8	105	158	210	315	473	630
1500	44.8	67.2	84.0	112	168	224	336	504	672
1400	48.0	72.0	90.0	120	180	240	360	540	720
1300	51.7	77.5	96.9	129	194	258	388	582	775
1200	56.0	84.0	105	140	210	280	420	630	840
1100	61.1	91.6	115	153	229	305	458	687	916
1000	67.2	101	126	168	252	336	504	756	1008
900	74.9	112	140	187	281	374	562	843	1124

Figure 1

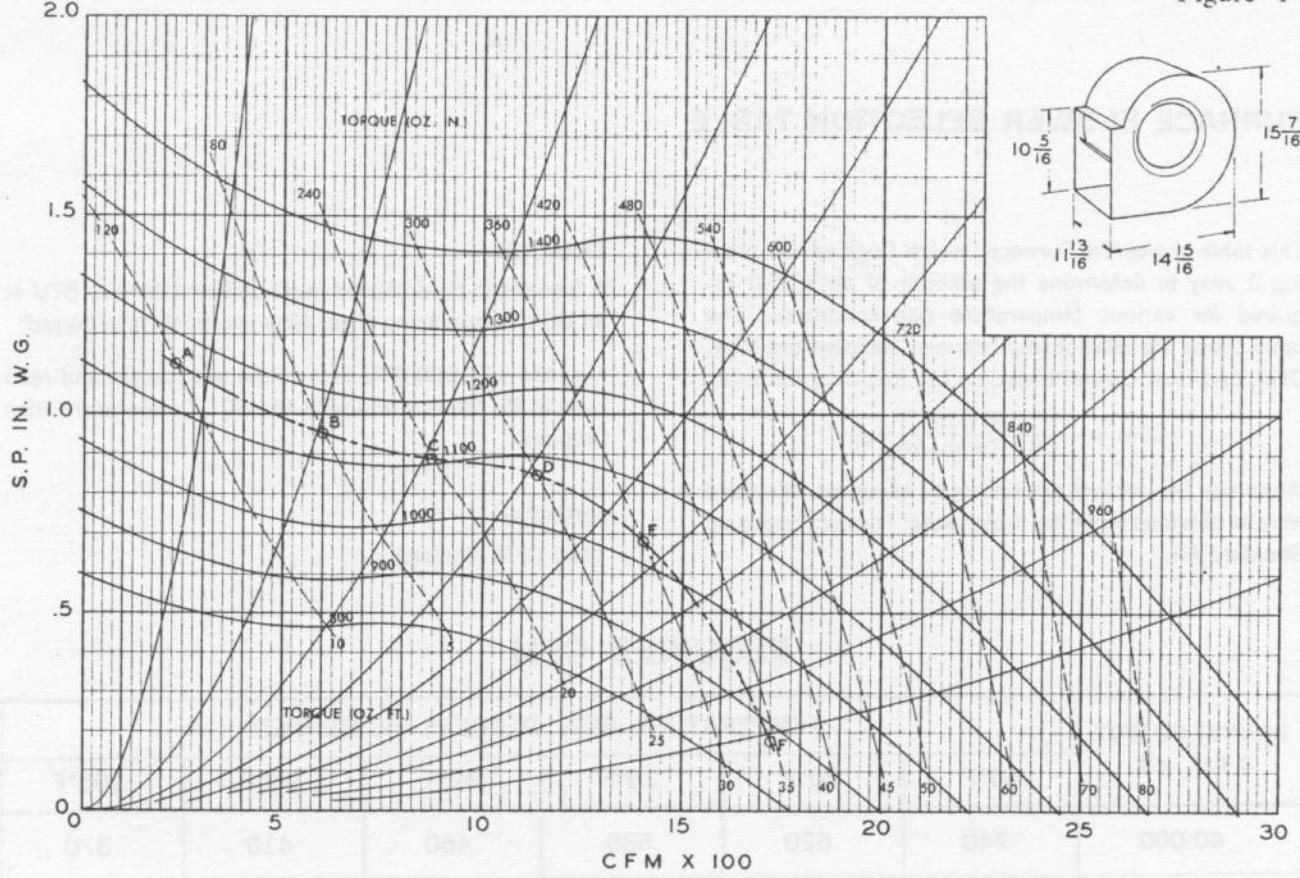
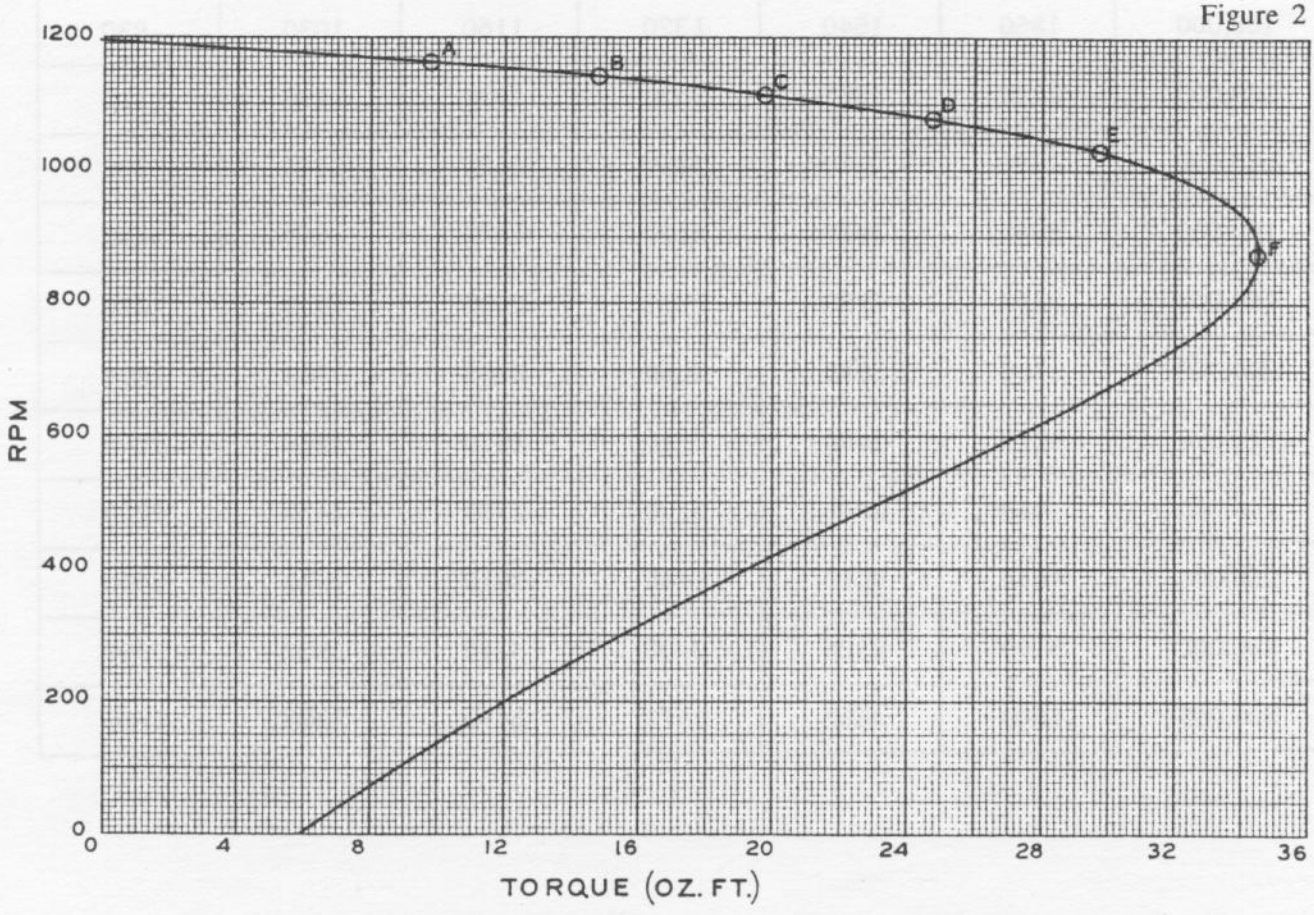


Figure 2



FURNACE BLOWER SELECTION TABLE

This table serves the Furnace Design Engineer by making it easy to determine the amount of air (CFM) required for various temperature rise conditions. The table shows the relationship between Temperature Rise, CFM, and Heat Output based on the following formula:

$$CFM = \frac{BTU/hr.}{1.08 \times Temp.\ Rise\ °F.}$$

When any two factors are known or assumed, the third may be obtained from the table. Note: Formula based on Standard Air.

EXAMPLE:

A furnace to be designed must deliver 100,000 BTU at an 80° Temperature Rise. How much air is required?

Find the 100,000 BTU line on the left margin and read over to its intersection with the 80° Temperature Rise Column.

ANSWER:

1160 CFM required.

REQUIRED CFM

BONNET OUTPUT B.T.U./HR.	TEMPERATURE RISE DEGREES FAHRENHEIT					
	50°F	60°F	70°F	80°F	90°F	100°F
40,000	740	620	530	460	410	370
60,000	1110	930	790	690	620	560
80,000	1480	1230	1060	930	820	740
100,000	1850	1540	1320	1160	1030	930
120,000	2220	1850	1590	1390	1230	1110
140,000	2590	2160	1850	1620	1440	1300
160,000	2960	2470	2120	1850	1650	1480
180,000	3330	2780	2380	2080	1850	1670
200,000	3700	3090	2650	2300	2060	1850
220,000	4070	3400	2910	2550	2260	2040
240,000	4440	3700	3170	2780	2470	2220
260,000	4810	4010	3440	3010	2670	2400
280,000	5190	4320	3700	3240	2880	2590
300,000	5560	4630	3970	3470	3090	2780

AIR CONDITIONER BLOWER SELECTION GRAPH

These graphs serve the Design Engineer by making it easy to determine the amount of air (CFM) required for various air conditioner sizes. The chart shows a relationship between temperature drop and air requirements (CFM). The chart is based on the formula:

$$CFM = \frac{\text{Load (tons)} \times 12{,}000 \times .75}{1.08 \times \text{Temp. Drop °F.}}$$

Note that the formula is based on Standard Air.

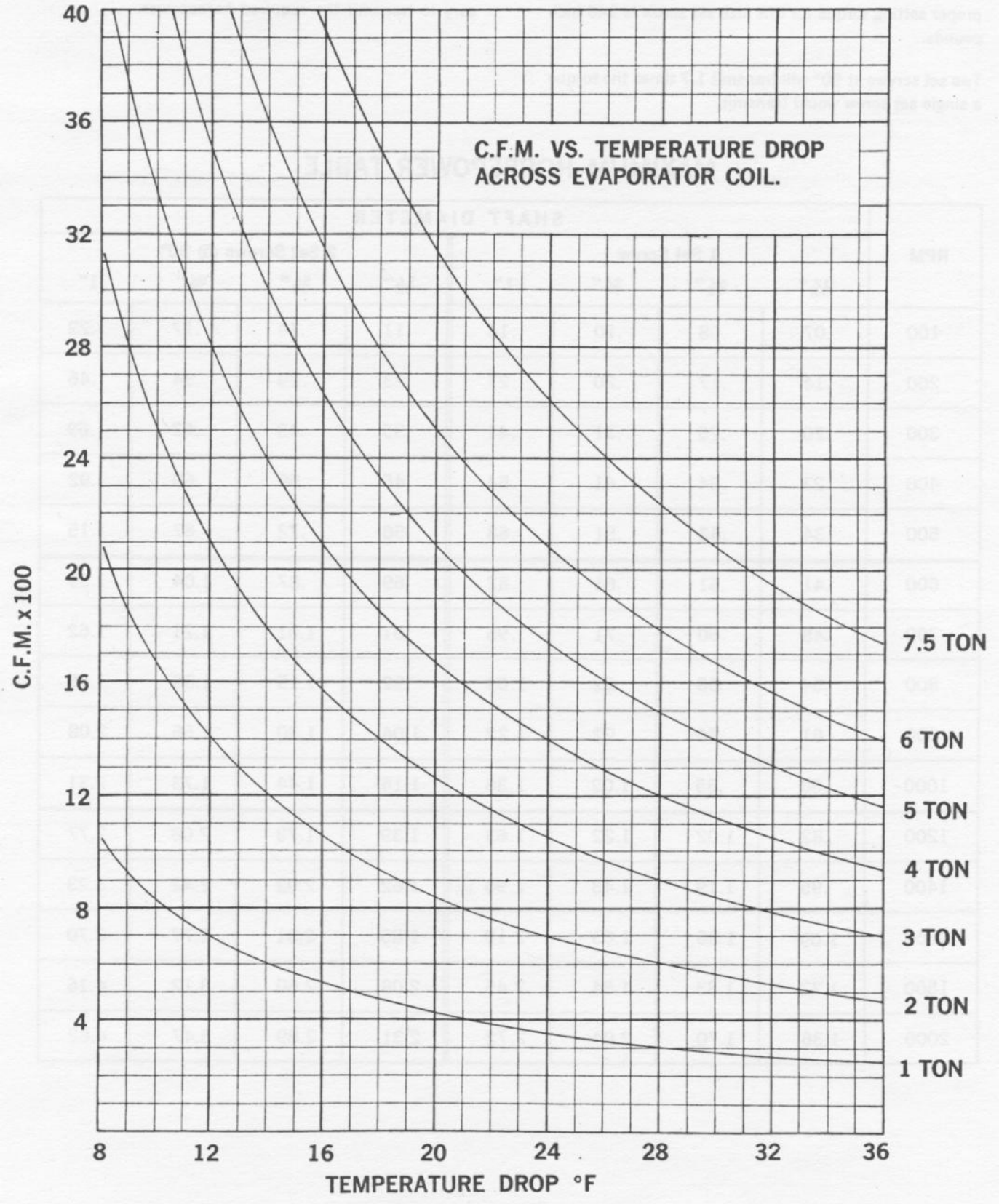
EXAMPLE:

Find CFM required for a 3 ton load with a 20° temperature drop across the evaporator coil.

On bottom scale find 20° drop and read up to where the vertical line intersects the 3 ton curve. Read left from this intersection to the CFM scale.

ANSWER:

1250 CFM required.



HORSEPOWER TRANSMISSION

Direct Drive wheels are available with one 5/16" diameter set screw or two 5/16" diameter set screws at 90°. The proper setting torque for this size set screw is 140 inch pounds.

Two set screws at 90° will transmit 1.7 times the torque a single set screw would transmit.

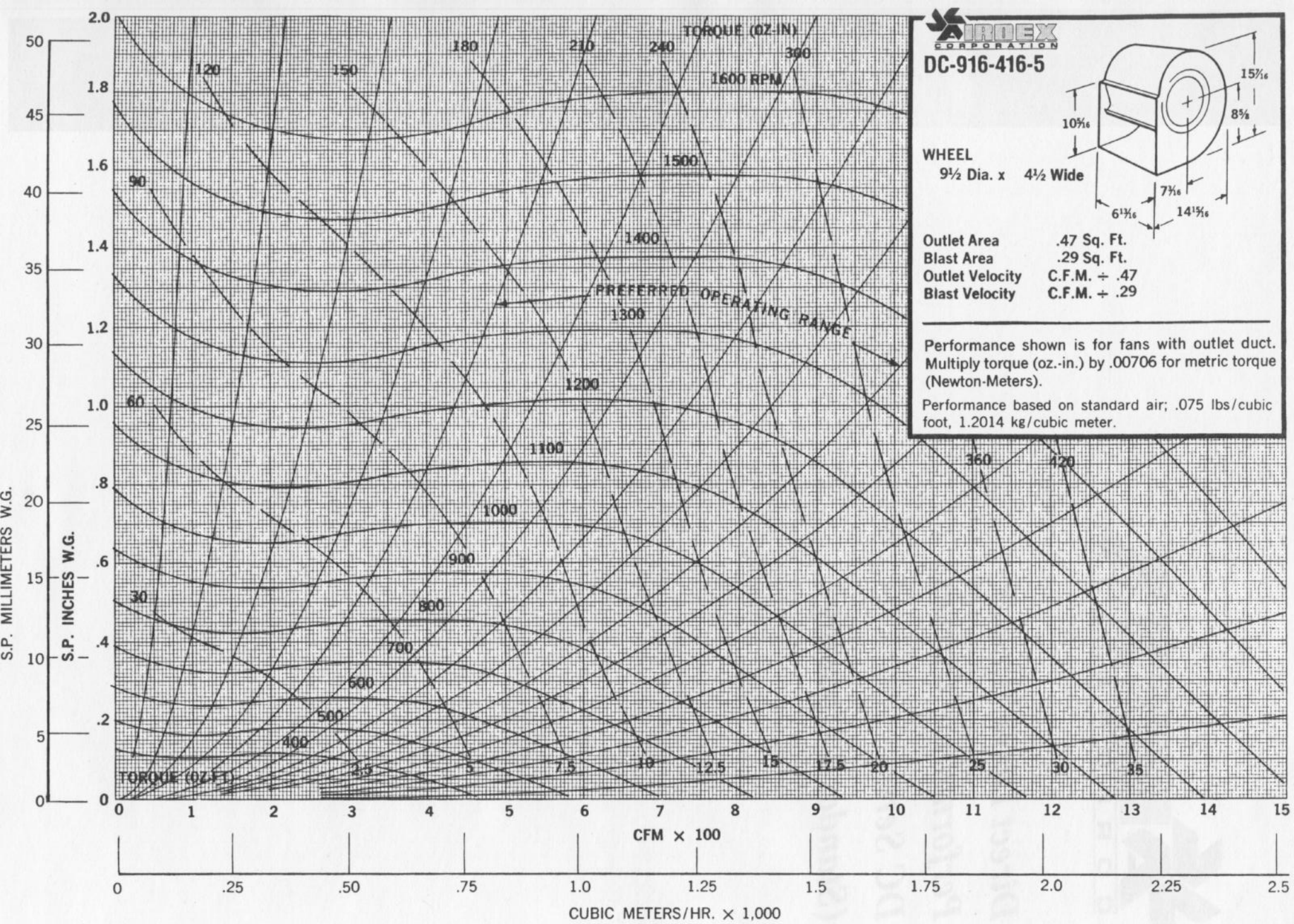
The following maximum horsepower table is recommended in specifying the number of set screws necessary to transmit the required horsepower.

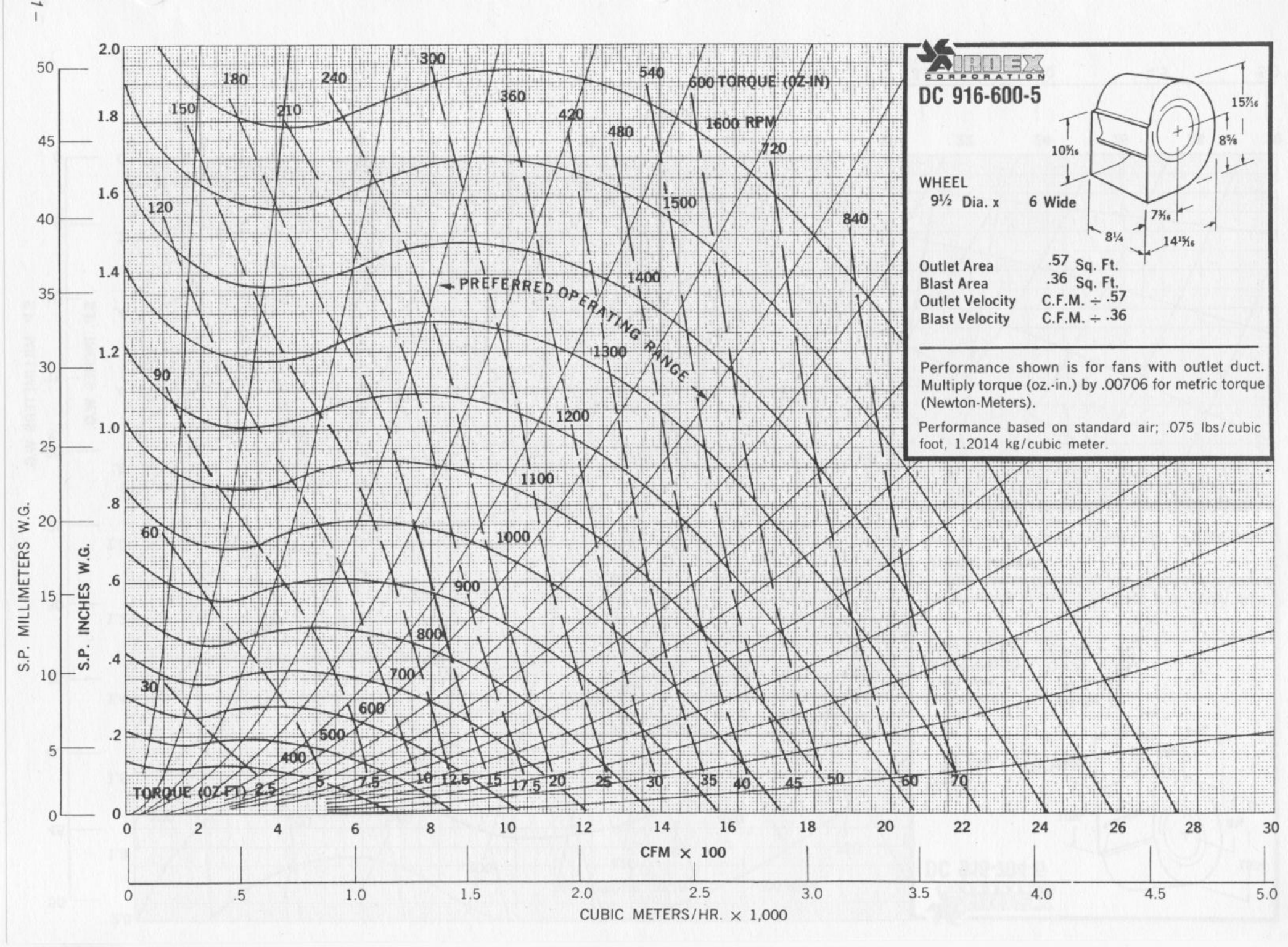
MAXIMUM HORSEPOWER TABLE

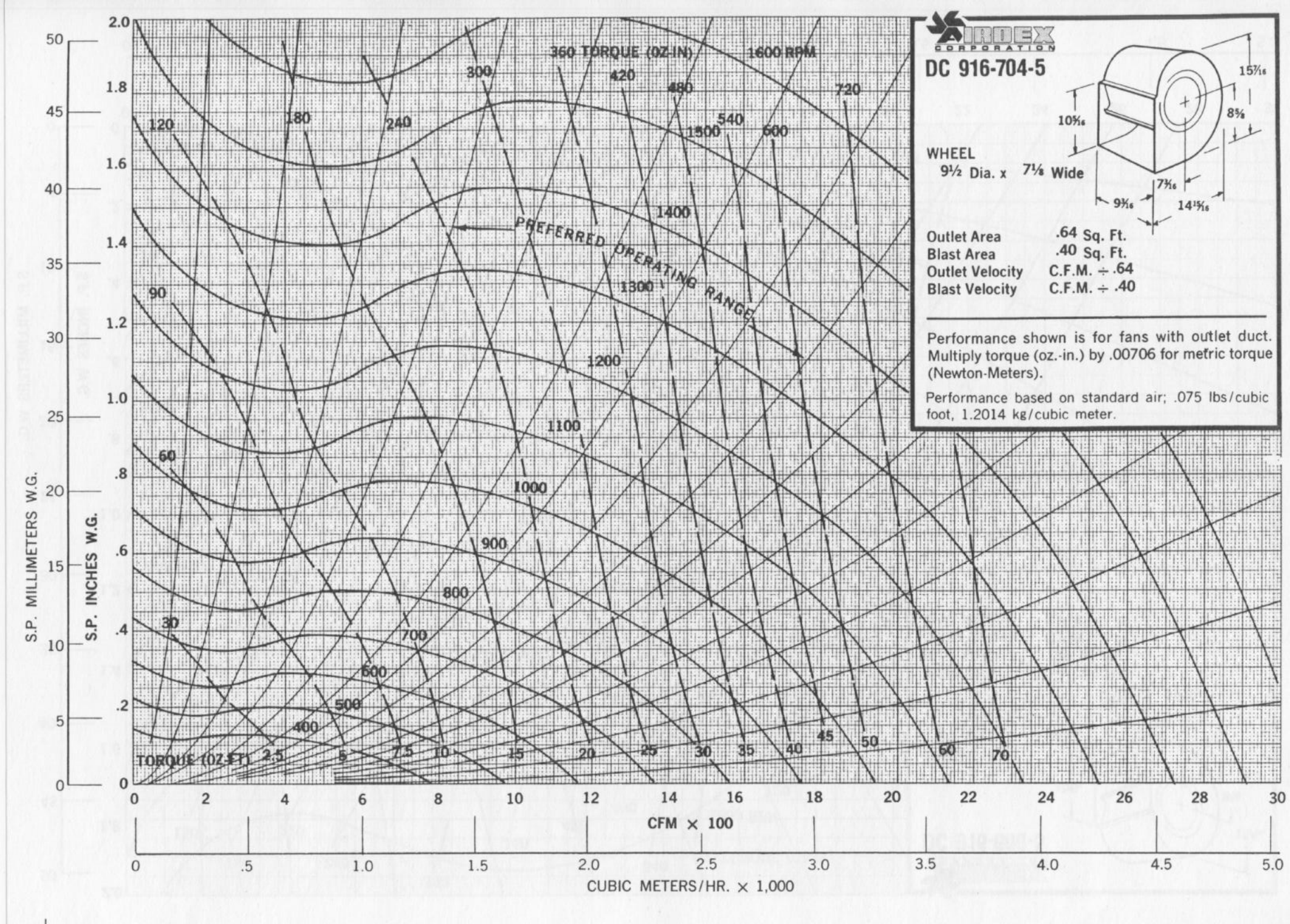
RPM	SHAFT DIAMETER							
	1 Set Screw				2 Set Screws @ 90°			
	1/2"	5/8"	3/4"	1"	1/2"	5/8"	3/4"	1"
100	.07	.08	.10	.14	.11	.14	.17	.23
200	.14	.17	.20	.27	.23	.29	.34	.46
300	.20	.25	.31	.41	.35	.43	.52	.69
400	.27	.34	.41	.54	.46	.58	.69	.92
500	.34	.42	.51	.68	.58	.72	.87	1.15
600	.41	.51	.61	.82	.69	.87	1.04	1.39
700	.48	.60	.71	.95	.81	1.01	1.21	1.62
800	.54	.68	.82	1.09	.92	1.15	1.39	1.85
900	.61	.76	.92	1.22	1.04	1.30	1.56	2.08
1000	.68	.85	1.02	1.36	1.15	1.44	1.73	2.31
1200	.82	1.02	1.22	1.63	1.39	1.73	2.08	2.77
1400	.95	1.19	1.43	1.90	1.62	2.02	2.42	3.23
1600	1.09	1.36	1.63	2.18	1.85	2.31	2.77	3.70
1800	1.22	1.83	1.84	2.45	2.08	2.60	3.12	4.16
2000	1.36	1.70	2.04	2.72	2.31	2.89	3.47	4.62

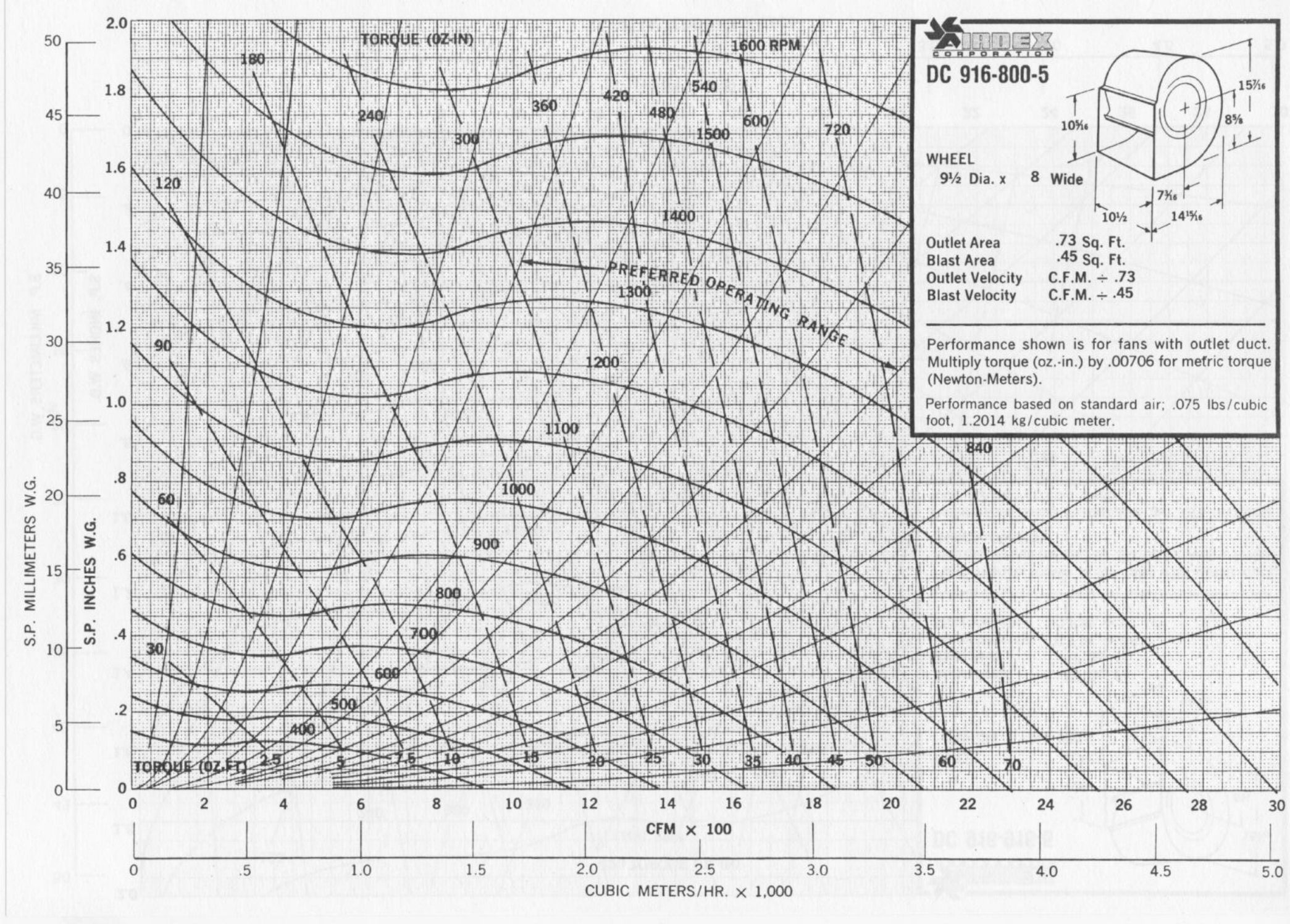
AIRDEX CORPORATION

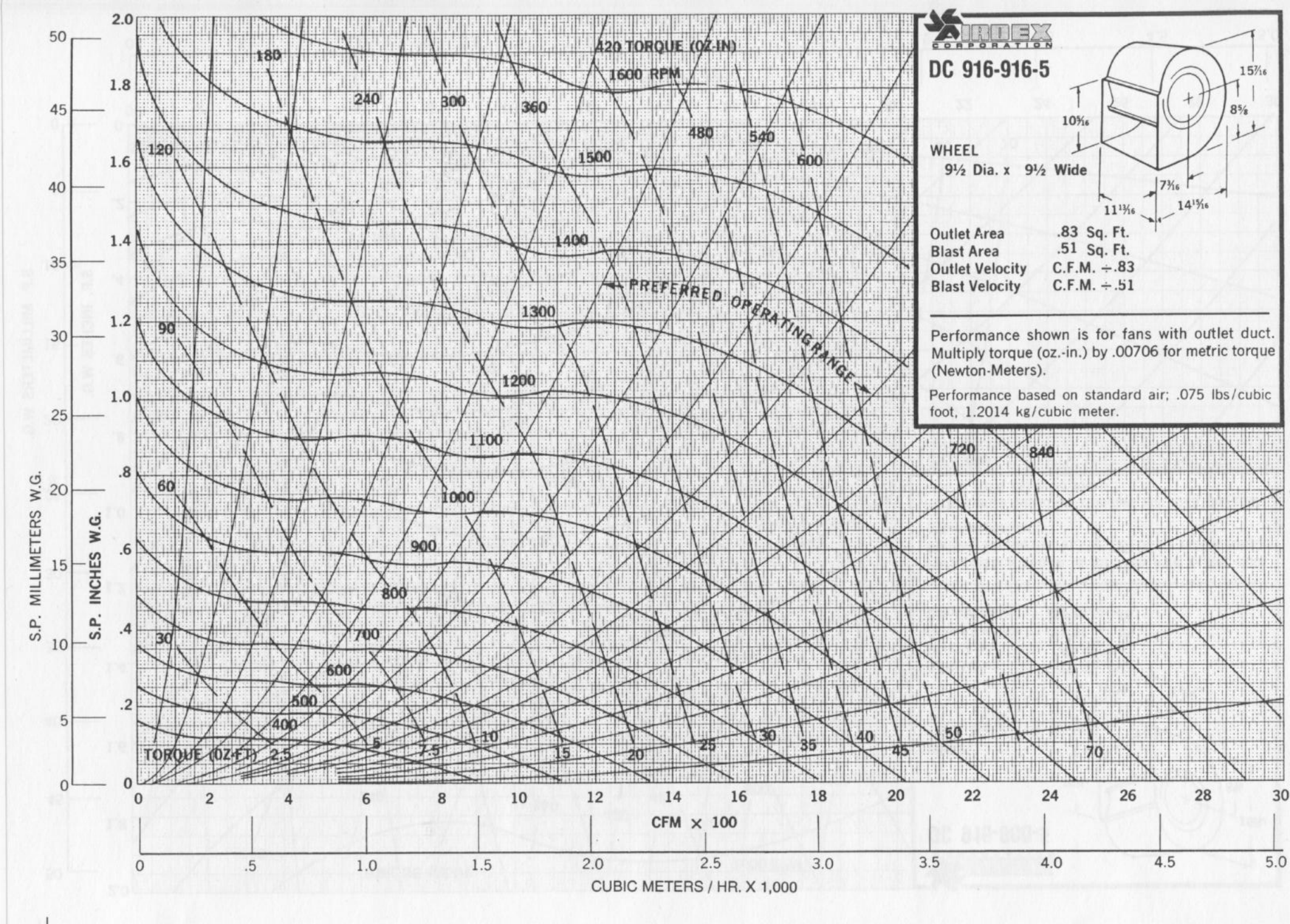
Direct Drive Blower Performance Curves DC Series (Standard Housing)

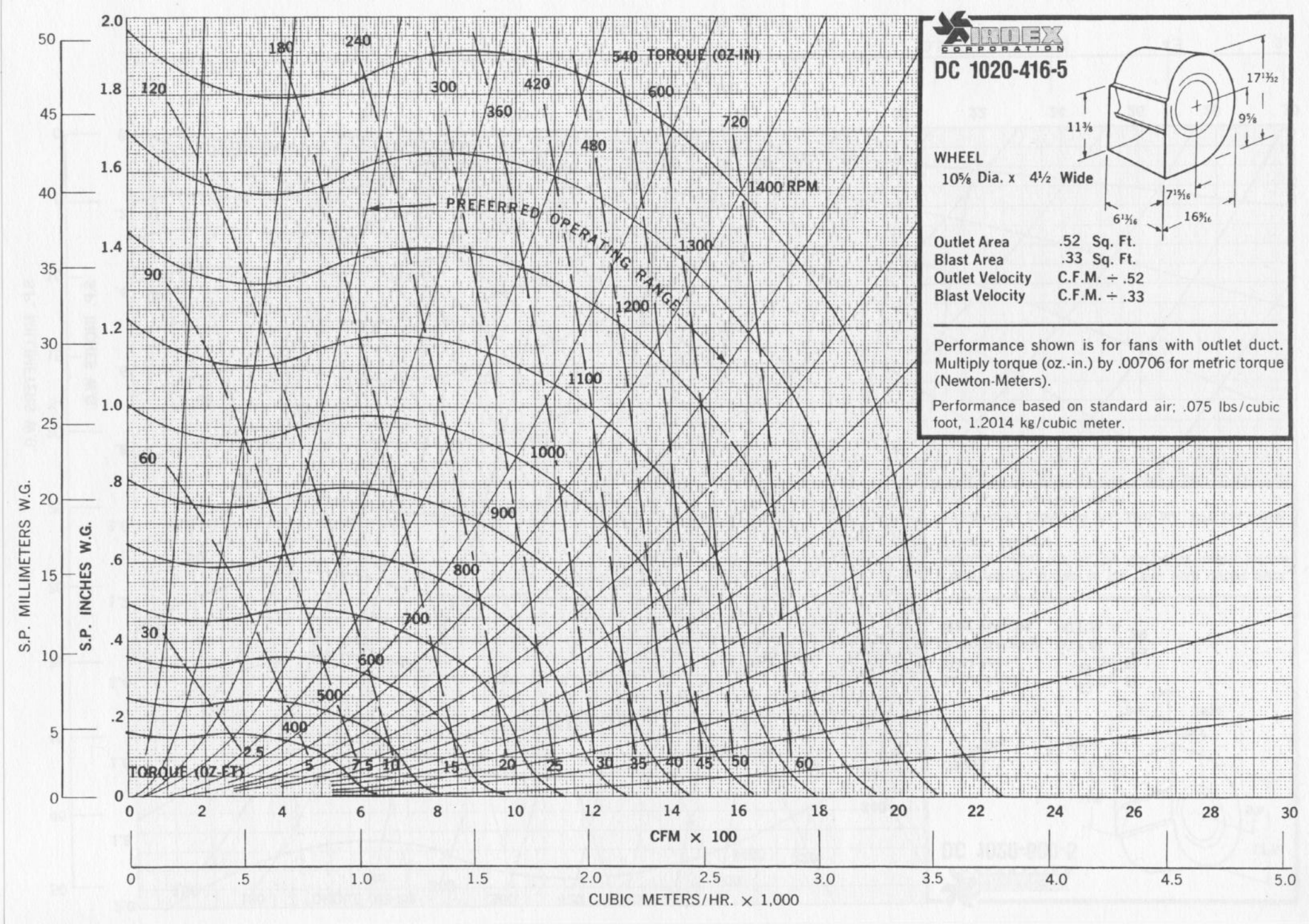

AIRDEX CORPORATION
DC-916-416-5
WHEEL
9½ Dia. x 4½ Wide
Outlet Area .47 Sq. Ft.
Blast Area .29 Sq. Ft.
Outlet Velocity C.F.M. ÷ .47
Blast Velocity C.F.M. ÷ .29
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
TORQUE (OZ-FT)
PREFERRED OPERATING RANGE
S.P. INCHES W.G.
S.P. MILLIMETERS W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

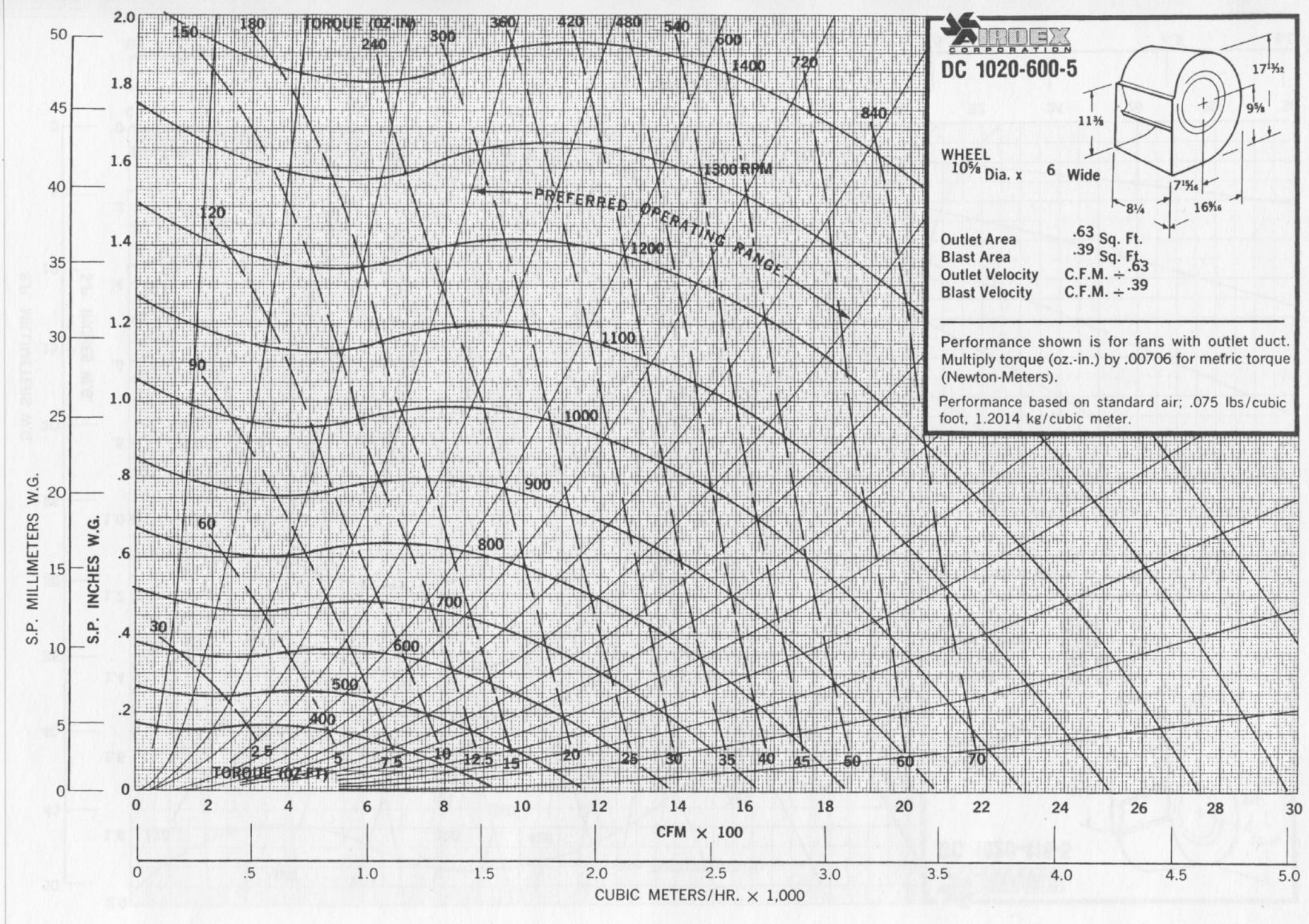

AIRDEX CORPORATION
DC 916-600-5
WHEEL
9½ Dia. x 6 Wide
Outlet Area .57 Sq. Ft.
Blast Area .36 Sq. Ft.
Outlet Velocity C.F.M. ÷ .57
Blast Velocity C.F.M. ÷ .36
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
PREFERRED OPERATING RANGE
TORQUE (OZ-FT)
S.P. INCHES W.G.
S.P. MILLIMETERS W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

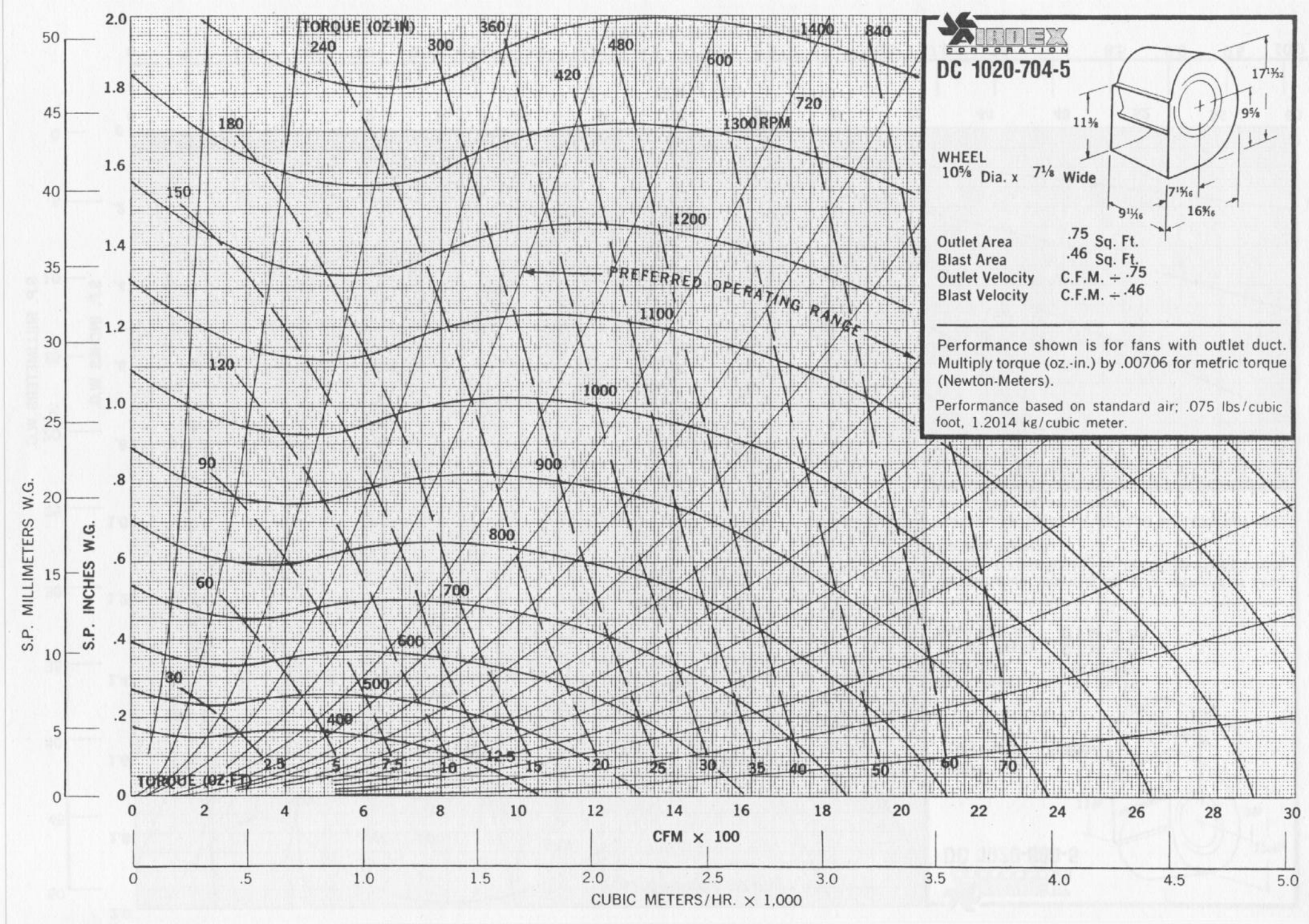

DC 916-704-5
WHEEL
9½ Dia. x 7⅛ Wide
Outlet Area .64 Sq. Ft.
Blast Area .40 Sq. Ft.
Outlet Velocity C.F.M. ÷ .64
Blast Velocity C.F.M. ÷ .40
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
360 TORQUE (OZ-IN)
1600 RPM
PREFERRED OPERATING RANGE
TORQUE (OZ-FT)
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

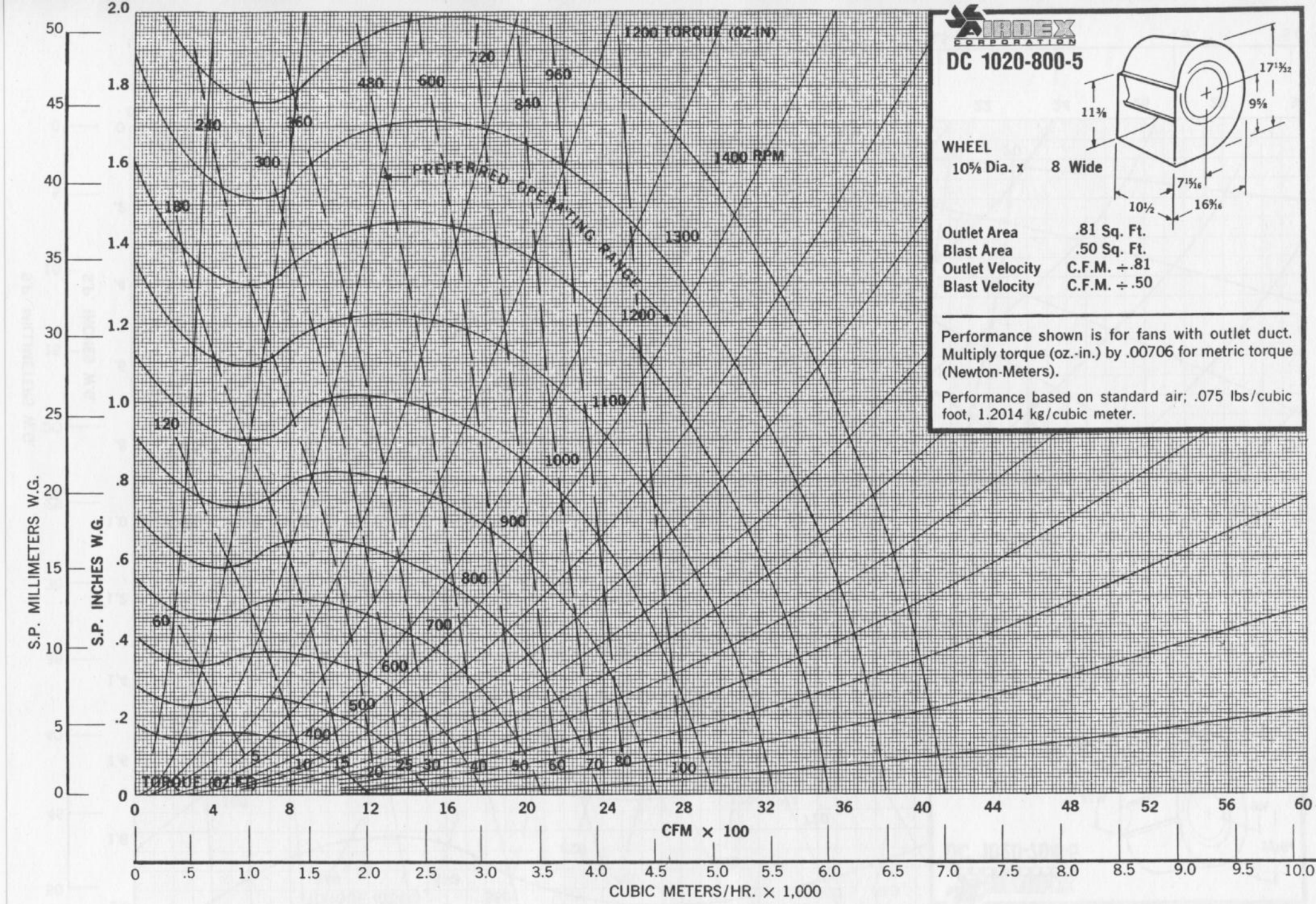

AIRDEX CORPORATION
DC 916-800-5
WHEEL
9½ Dia. x 8 Wide
Outlet Area .73 Sq. Ft.
Blast Area .45 Sq. Ft.
Outlet Velocity C.F.M. ÷ .73
Blast Velocity C.F.M. ÷ .45
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
TORQUE (OZ-FT)
PREFERRED OPERATING RANGE
1600 RPM
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
360
300
240
180
120
90
60
30
540
480
420
840
720
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

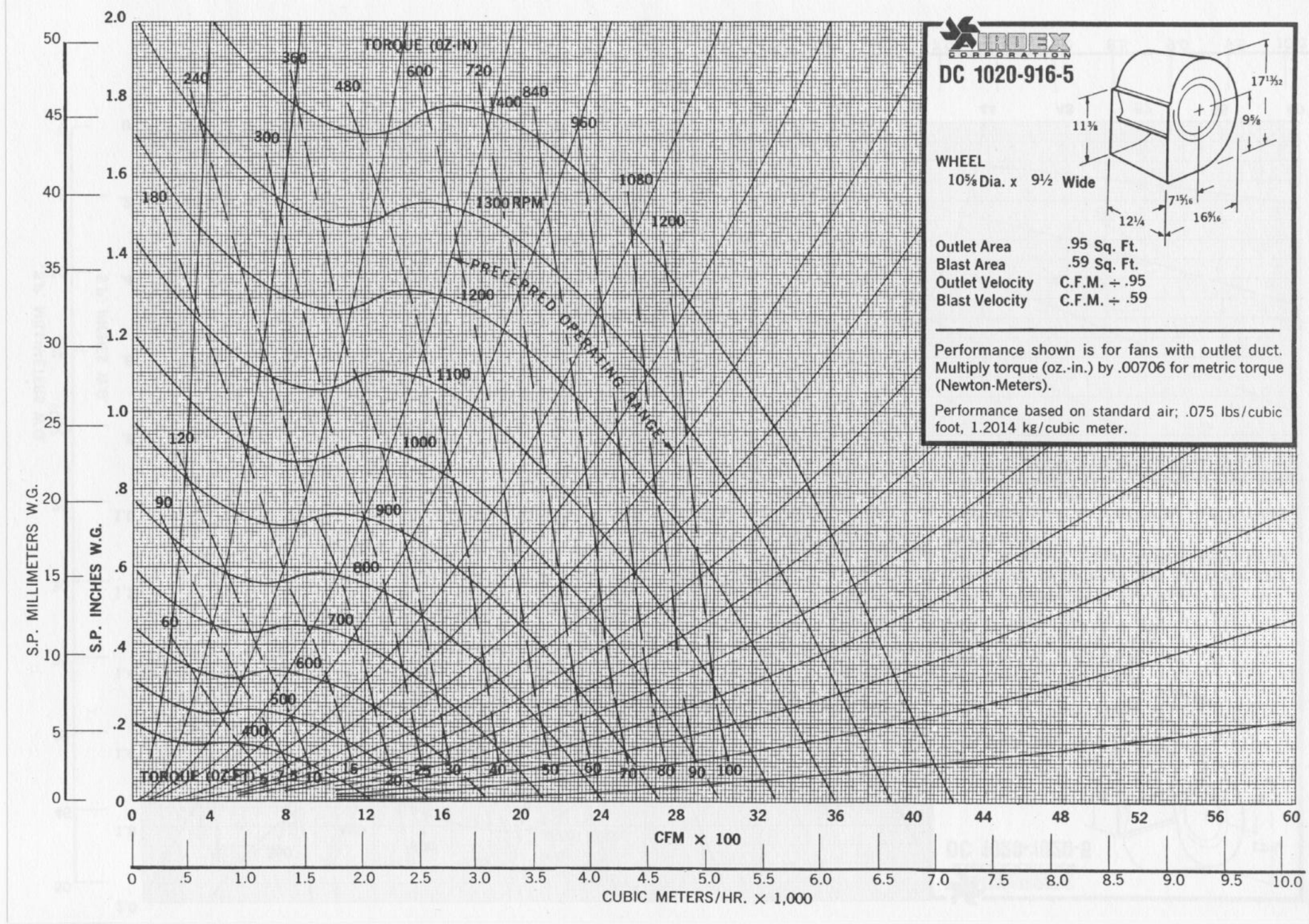

AIRDEX CORPORATION
DC 916-916-5
WHEEL
9½ Dia. x 9½ Wide
Outlet Area .83 Sq. Ft.
Blast Area .51 Sq. Ft.
Outlet Velocity C.F.M. ÷.83
Blast Velocity C.F.M. ÷.51
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
420 TORQUE (OZ-IN)
1600 RPM
PREFERRED OPERATING RANGE
TORQUE (OZ-FT)
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM x 100
CUBIC METERS / HR. X 1,000

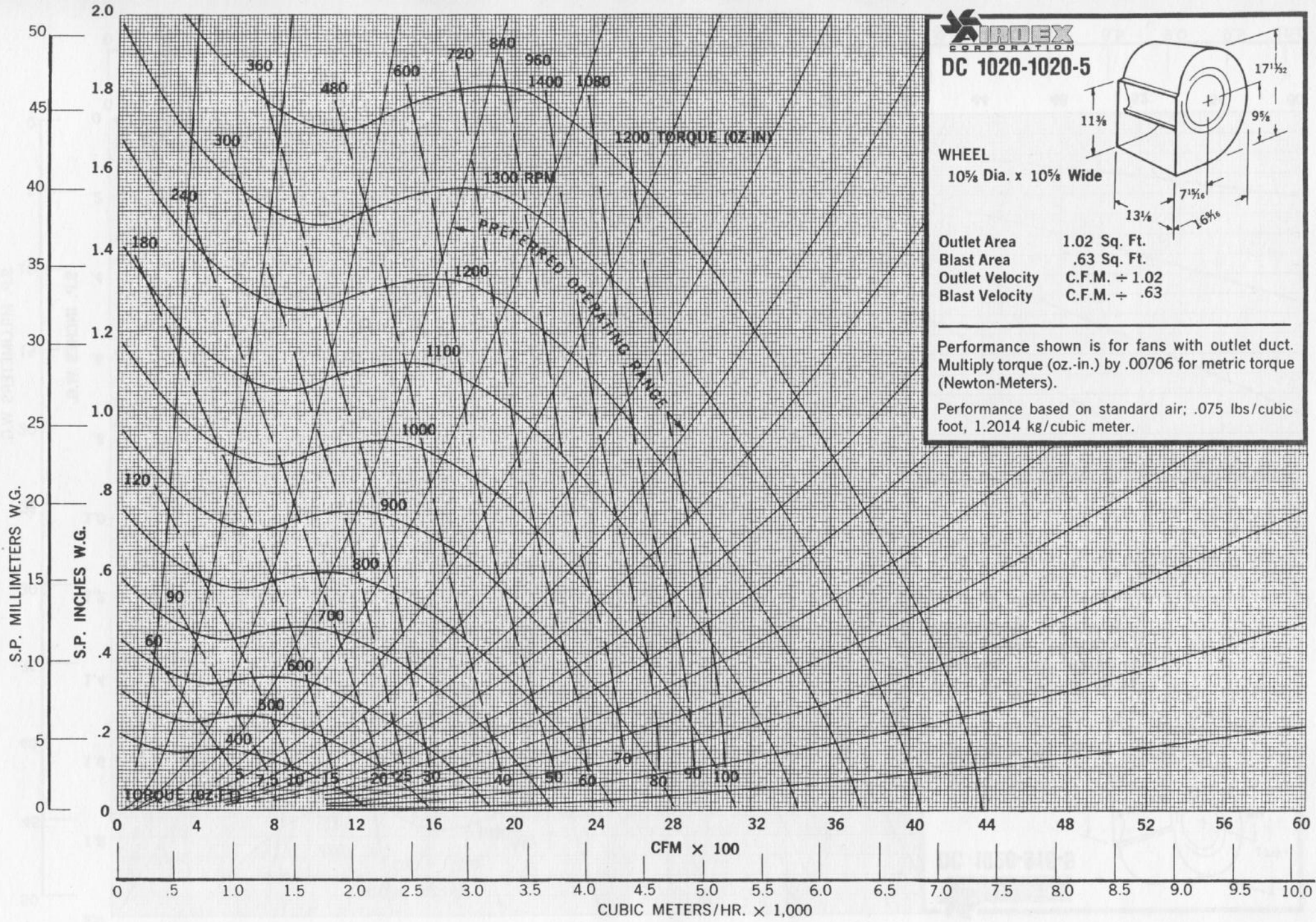

AIRDEX CORPORATION
DC 1020-416-5
WHEEL
10⅝ Dia. x 4½ Wide
Outlet Area .52 Sq. Ft.
Blast Area .33 Sq. Ft.
Outlet Velocity C.F.M. ÷ .52
Blast Velocity C.F.M. ÷ .33
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
PREFERRED OPERATING RANGE
1400 RPM
TORQUE (OZ-FT)
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

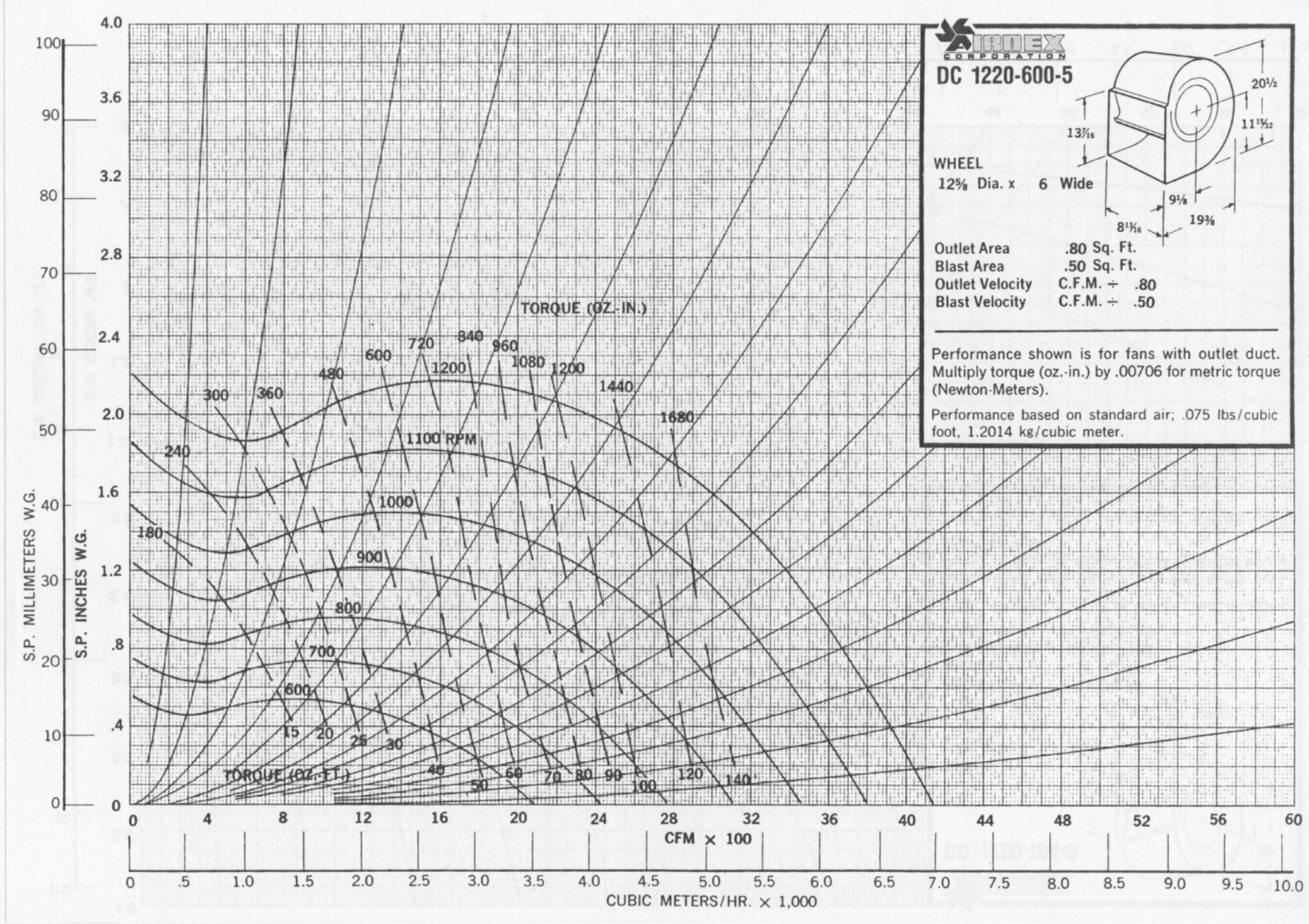

DC 1020-600-5
WHEEL
10⅝ Dia. x 6 Wide
Outlet Area .63 Sq. Ft.
Blast Area .39 Sq. Ft.
Outlet Velocity C.F.M. ÷ .63
Blast Velocity C.F.M. ÷ .39
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
TORQUE (OZ-FT)
PREFERRED OPERATING RANGE
1300 RPM
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

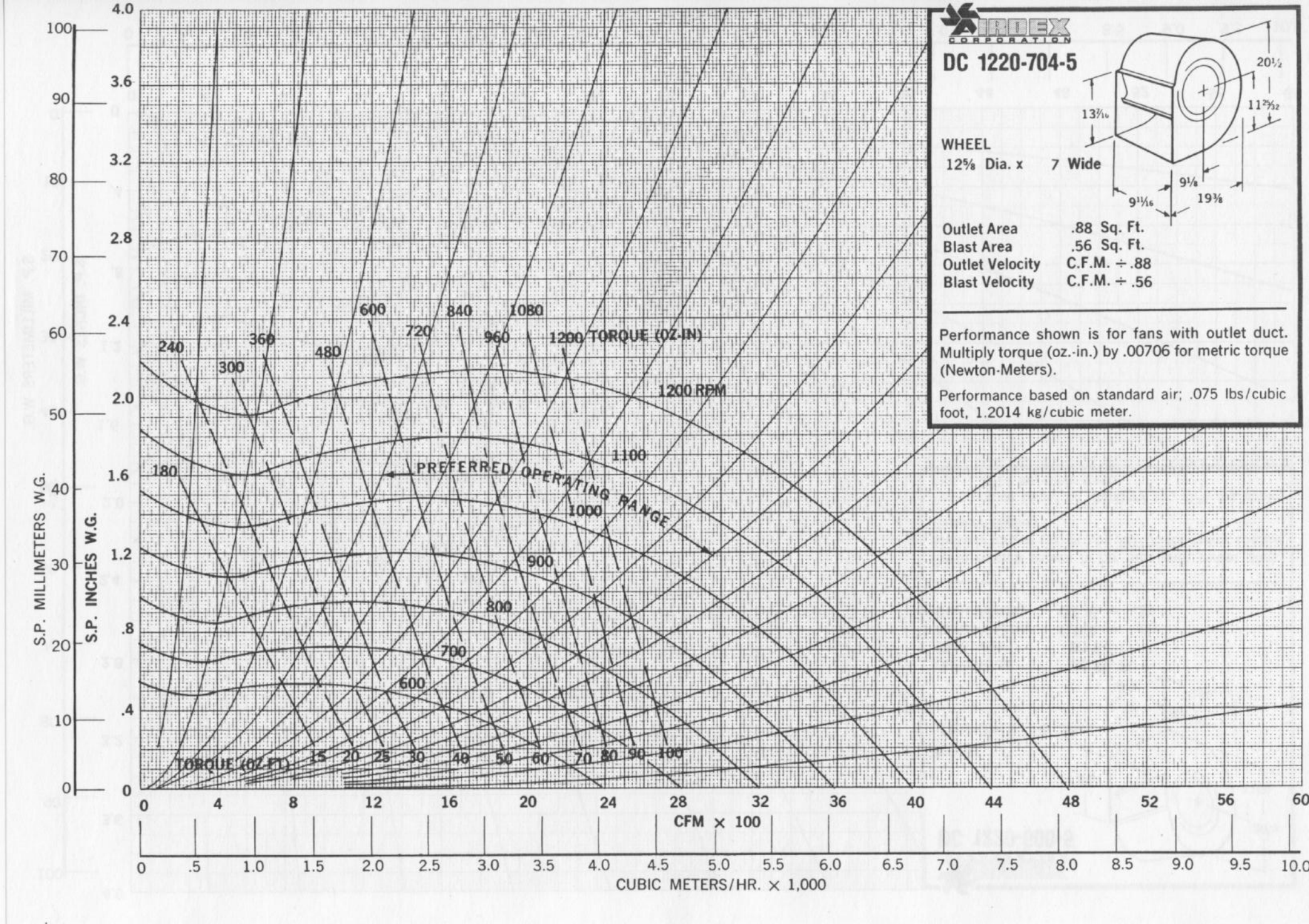

AIRDEX CORPORATION
DC 1020-704-5
WHEEL
10⅝ Dia. x 7⅛ Wide
Outlet Area .75 Sq. Ft.
Blast Area .46 Sq. Ft.
Outlet Velocity C.F.M. ÷ .75
Blast Velocity C.F.M. ÷ .46
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
PREFERRED OPERATING RANGE
1300 RPM
TORQUE (OZ-FT)
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

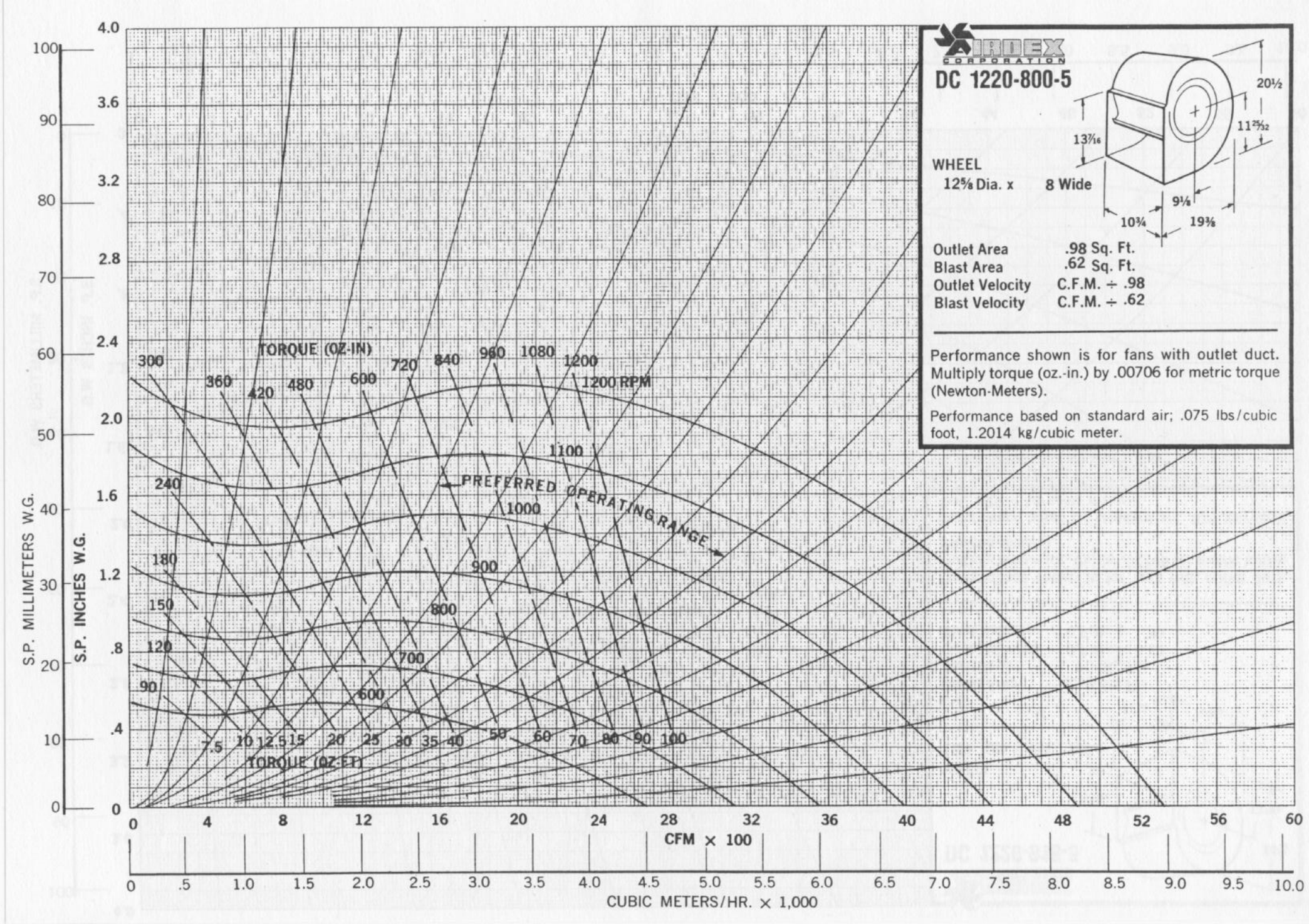

AIREX CORPORATION
DC 1020-800-5
WHEEL
10⅝ Dia. x 8 Wide
Outlet Area .81 Sq. Ft.
Blast Area .50 Sq. Ft.
Outlet Velocity C.F.M. ÷.81
Blast Velocity C.F.M. ÷.50
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
1200 TORQUE (OZ-IN)
1400 RPM
PREFERRED OPERATING RANGE
TORQUE OZ-FT
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

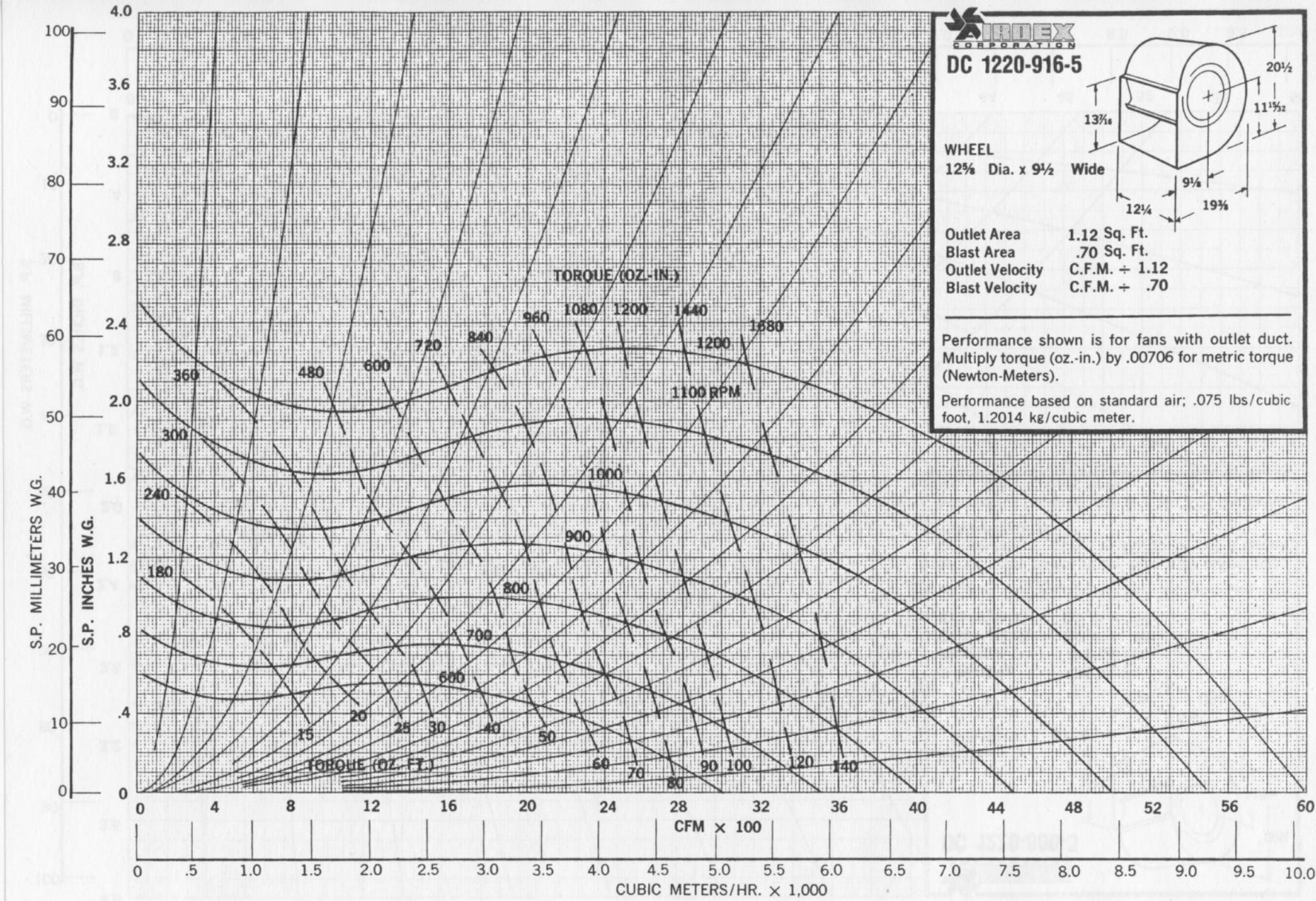

AIRDEX CORPORATION
DC 1020-916-5
WHEEL
10⅝ Dia. x 9½ Wide
Outlet Area .95 Sq. Ft.
Blast Area .59 Sq. Ft.
Outlet Velocity C.F.M. ÷ .95
Blast Velocity C.F.M. ÷ .59
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
TORQUE (OZ-FT)
PREFERRED OPERATING RANGE
1300 RPM
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000

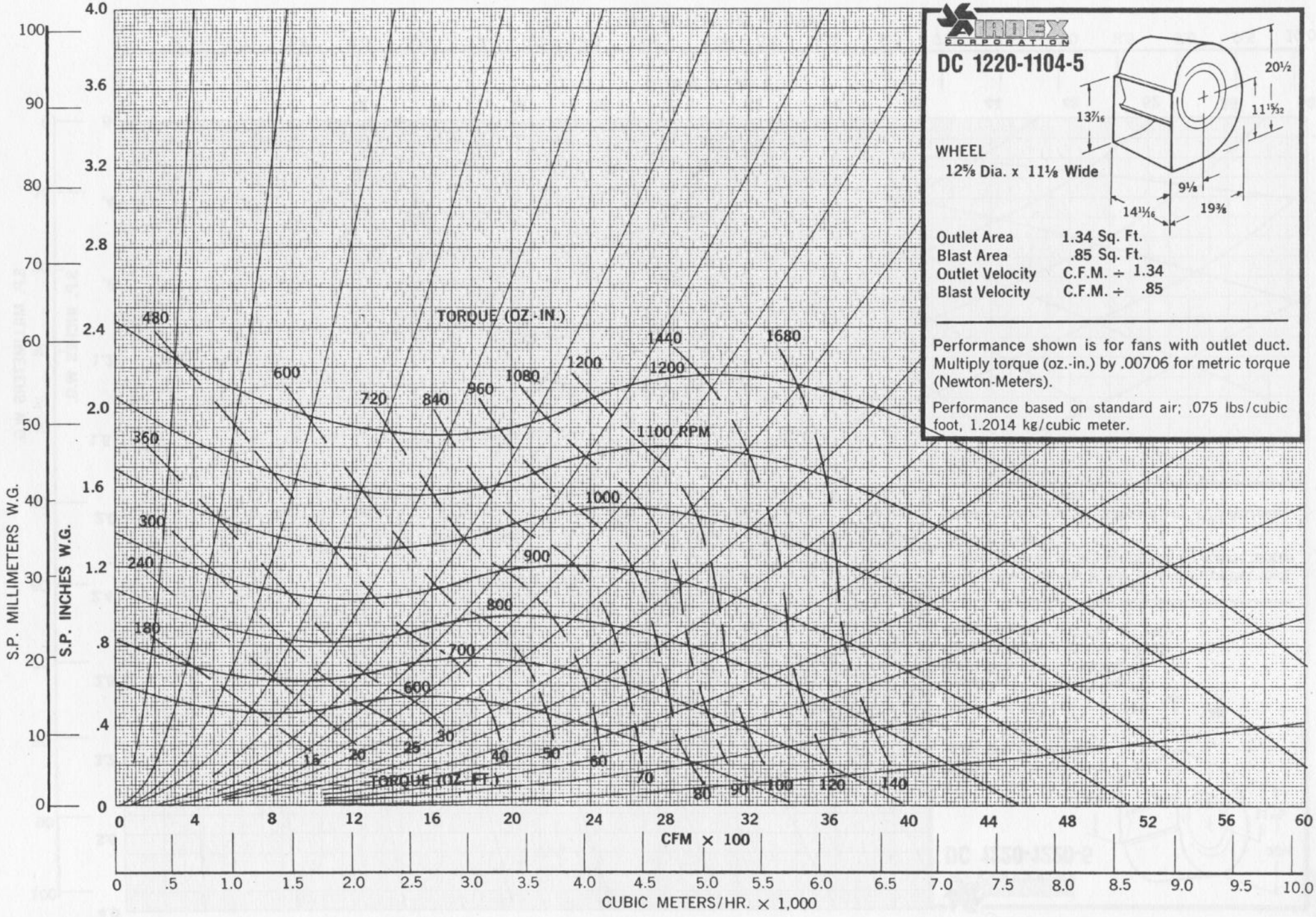

AIROEX CORPORATION
DC 1020-1020-5
WHEEL
10⅝ Dia. x 10⅝ Wide
Outlet Area 1.02 Sq. Ft.
Blast Area .63 Sq. Ft.
Outlet Velocity C.F.M. ÷ 1.02
Blast Velocity C.F.M. ÷ .63
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
1200 TORQUE (OZ-IN)
1300 RPM
PREFERRED OPERATING RANGE
TORQUE (OZ-IN)
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM x 100
CUBIC METERS/HR. x 1,000

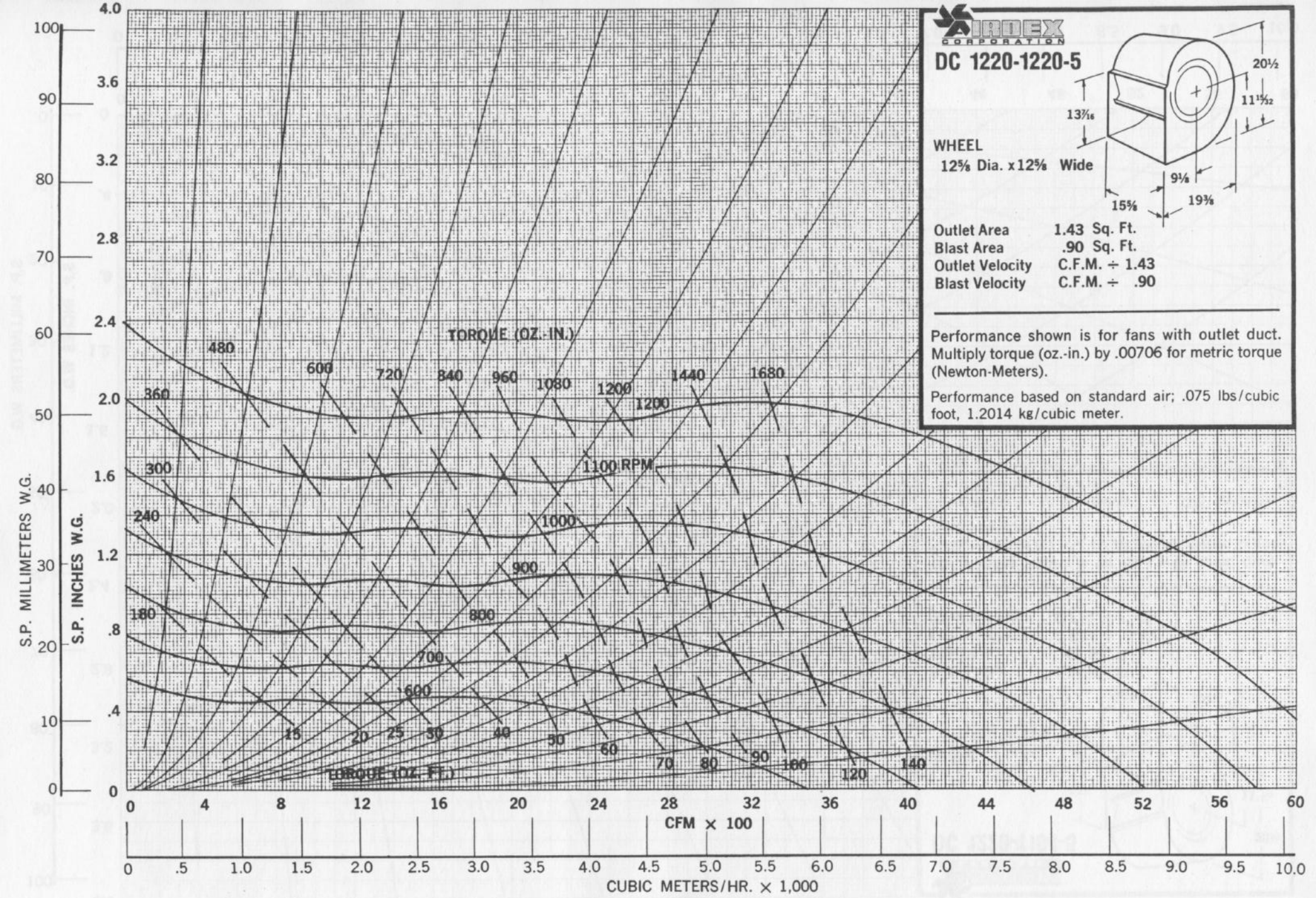

AIRDEX CORPORATION
DC 1220-600-5
20½
11 15/32
13 7/16
WHEEL
12⅝ Dia. x 6 Wide
9⅛
19⅜
8 13/16
Outlet Area .80 Sq. Ft.
Blast Area .50 Sq. Ft.
Outlet Velocity C.F.M. ÷ .80
Blast Velocity C.F.M. ÷ .50
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
TORQUE (OZ.-IN.)
TORQUE (OZ.-FT.)
1100 RPM
300
360
480
600
720
840
960
1080
1200
1440
1680
240
180
1000
900
800
700
600
15
20
25
30
40
50
60
70
80
90
100
120
140
CFM × 100
CUBIC METERS/HR. × 1,000


AIRDEX CORPORATION
DC 1220-704-5
20½
11²⁵⁄₃₂
13⁷⁄₁₆
WHEEL
12⅝ Dia. x 7 Wide
9⅛
9¹¹⁄₁₆
19⅜
Outlet Area .88 Sq. Ft.
Blast Area .56 Sq. Ft.
Outlet Velocity C.F.M. ÷ .88
Blast Velocity C.F.M. ÷ .56
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
TORQUE (OZ-IN)
240 300 360 480 600 720 840 960 1080 1200
1200 RPM
1100
1000
900
800
700
600
180
PREFERRED OPERATING RANGE
TORQUE (OZ-FT)
15 20 25 30 40 50 60 70 80 90 100
CFM × 100
CUBIC METERS/HR. × 1,000


AMDEX CORPORATION
DC 1220-800-5
20½
11²⁵⁄₃₂
13⁷⁄₁₆
WHEEL
12⅝ Dia. x 8 Wide
9⅛
10¾
19⅜
Outlet Area .98 Sq. Ft.
Blast Area .62 Sq. Ft.
Outlet Velocity C.F.M. ÷ .98
Blast Velocity C.F.M. ÷ .62
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ-IN)
300
360
420
480
600
720
840
960
1080
1200
1200 RPM
1100
1000
900
800
700
600
240
180
150
120
90
PREFERRED OPERATING RANGE
TORQUE (OZ-FT)
7.5
10
12.5
15
20
25
30
35
40
50
60
70
80
90
100
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM × 100
CUBIC METERS/HR. × 1,000


AIRDEX CORPORATION
DC 1220-916-5
WHEEL
12⅝ Dia. x 9½ Wide
20½
11 15/32
13⅞
9⅛
12¼
19⅜
Outlet Area 1.12 Sq. Ft.
Blast Area .70 Sq. Ft.
Outlet Velocity C.F.M. ÷ 1.12
Blast Velocity C.F.M. ÷ .70
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ.-IN.)
TORQUE (OZ.-FT.)
1100 RPM
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM x 100
CUBIC METERS/HR. x 1,000


AIRDEX CORPORATION
DC 1220-1104-5
20½
11 15/32
13 7/16
WHEEL
12⅝ Dia. x 11⅛ Wide
9⅛
14 11/16
19⅜
Outlet Area 1.34 Sq. Ft.
Blast Area .85 Sq. Ft.
Outlet Velocity C.F.M. ÷ 1.34
Blast Velocity C.F.M. ÷ .85
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
TORQUE (OZ.-IN.)
480
600
720
840
960
1080
1200
1440
1680
360
1100 RPM
300
1000
240
900
180
800
700
600
TORQUE (OZ.-FT.)
15
20
25
30
40
50
60
70
80
90
100
120
140
CFM x 100
CUBIC METERS/HR. x 1,000


AIRDEX CORPORATION
DC 1220-1220-5
20½
11¹⁵⁄₃₂
13⁷⁄₁₆
WHEEL
12⅝ Dia. x 12⅝ Wide
9⅛
15⅝
19⅜
Outlet Area 1.43 Sq. Ft.
Blast Area .90 Sq. Ft.
Outlet Velocity C.F.M. ÷ 1.43
Blast Velocity C.F.M. ÷ .90
Performance shown is for fans with outlet duct. Multiply torque (oz.-in.) by .00706 for metric torque (Newton-Meters).
Performance based on standard air; .075 lbs/cubic foot, 1.2014 kg/cubic meter.
TORQUE (OZ.-IN.)
480
600
720
840
960
1080
1200
1440
1680
360
1200
300
1100 RPM
240
1000
900
180
800
700
600
TORQUE (OZ.-FT.)
15
20
25
30
40
50
60
70
80
90
100
120
140
S.P. MILLIMETERS W.G.
S.P. INCHES W.G.
CFM x 100
CUBIC METERS/HR. x 1,000