Advanced Distributor Products®

UNIT HEATER SIZING GUIDE

INSTRUCTIONS

Design Temperature Differentials (Degrees F)

Wall & Ceiling

Inside Temp. - Record the inside temperature that will be maintained in the building.
Outside Temp. - Record the outside temperature for the area in which the building will be located; see Table 2.
Design Temp. Diff.- Calculate the difference between these two temperatures.

Floor

Inside Temp. - Record the inside temperature that will be maintained in the building.
Outside Temp. - Record the ground temperature based on the winter design temperature of the area in which building will be located; see Table 3.
Design Temp. Diff.- Calculate the difference between these two temperatures.

Building Dimensions (ft):

Record the length (ft), width (ft) and height (ft) of the building and calculate the volume (cubic ft) of the building.

Construction "U" Values (Table 1):

Based on Table 1 list the "U" values for the walls, roof, floor, windows and doors of the building.
For additional types of construction material not listed in Table 1 please refer to the ASHRAE Handbook of Fundamentals for a more extensive list.

Calculations:

Record the number of doors in the building and their respective height (ft) and width (ft).
Record the number of windows in the building, along with their respective height (ft) and width (ft).

Infiltration:

Record the number of air changes per hour from Table 4 based on the building type.
Calculate the heat loss based on infiltration by multiplying the volume of the building by the Design Temperature Difference of the walls and ceilings by the number of air changes per hour.

Subtotal

Add the heat loss (BTU/HR) from each section of the building: doors, windows, walls, floors roof, and from infiltration. Once a subtotal is calculated add 10% of this value to the subtotal for a factor of safety to determine the Total Heat Loss for the building (BTU/HR). This Total Heat Loss for the building will be the total heat output required by the ADP Unit Heater(s). Please refer to Page 5 of the Sizing Guide to determine which heater(s) is right for this application.

UNIT HEATER SIZING GUIDE

All calculations are based on information received from the customer. (bold boxes)

Job Owner or Builder: _____ **City & State:** _____
Distributor: _____ **Building Use:** _____

Design Temperature Di□erentials (Degrees F)

Wall & Ceiling:
Inside Temp: [ ]
Outside Temp (table 2): - [ ]
Design Temp Diff. = [ ]

Floor:
Inside Temp: [ ]
Ground Temp (table 3): [ ]
Design Temp Diff. [ ]

Building Dimensions (ft.):

Length [ ] **Width** [ ] **Height** [ ]

Volume (cu. ft.) _____

Construction "U" Values (table1):

Walls [ ] Roof [ ] Floor [ ] Windows [ ] Doors [ ]

Calculations:

Doors:							**Square Ft.**		**"U" Factor**		**Design T.D.**		**BTU/HR**
#		X H		X W		=		X		X		=	
#		X H		X W		=	1	X		X		=	
#		X H		X W		=		X		X		=	
Windows:													
#		X H		X W		=		X		X		=	
#		X H		X W		=	2	X		X		=	
#		X H		X W		=		X		X		=	
Walls:													
L		X H		X 2 -	1	=	3	X		X		=	
W		X H		X 2 -	2	=	4	X		X		=	
Floor:													
L		X W				=	5	X		X		=	
Roof:													
L		X W				=	6	X		X		=	

In□ltration: Volume X TD X [ ] Air Changes (table 4) = _____

Subtotal = _____

Safety Factor: Add 10% for possible high winds, morning warm ups, periods of higher than average in□ltration, etc. = _____

Total BTU/H = _____

Number of Heaters [ ] **Total BTU/H per heater** = _____

Table 1

COMMON BUILDING MATERIALS	U"	COMMON BUILDING MATERIALS	"U"
Walls:		**Flat Roofs:**	
Poured concrete, 80#/cu.ft.		Corrugated Metal (un-insulated)	1.50
8-inch	0.25	w/1-inch bolt or blanket	0.23
12-inch	0.18	w/1 1/2-inch bolt or blanket	0.16
Concrete Block, hollow cinder aggregate		w/3-inch bolt or blanket	0.08
8-inch	0.39	Flat Metal	
12-inch	0.36	w/3/8-inch built-up roofing	0.90
Concrete Block, hollow gravel aggregate		w/1-inch blanket insulation under deck	0.21
8-inch	0.52	w/2-inch blanket insulation under deck	0.12
12-inch	0.47	Wood-1"	
Concrete Block, w/4-inch facebrick		(un-insulated) w/3/8-inch built-up roofing	0.48
8-inch Cinder	0.33	w/1-inch blanket insulation	0.17
8-inch Gravel	0.41	Wood-2"	
Metal		(un-insulated) w/3/8-inch built-up roofing	0.32
(un-insulated)	1.17	w/1-inch blanket insulation	0.15
w/1-inch blanket insulation	0.22	**Pitched Roofs:**	
w/3-inch blanket insulation	0.08	Corrugated Metal (un-insulated)	1.50
Frame		w/1-inch bolt or blanket	0.23
2x4 w/ 1/2" asphalt sheathing and wood		w/1 1/2-inch bolt or blanket	0.16
siding, 1/2" sheetrock		w/3-inch bolt or blanket	0.08
(un-insulated)	0.23	Framed Roof (un-insulated)	0.48
w/3-inch insulation	0.08	w/R-11 (3 1/2") Fiberglas	0.09
Windows:		w/R-19 (6") Fiberglas	0.05
Vertical, single-glass	1.13	w/1" Polystyrene	0.14
Vertical, double-glass	0.69	**Floors:**	
Horizontal, single-glass (sky light)	1.40	4-inch concrete	0.65
Doors:		6-inch concrete	0.43
Metal-single sheet	1.20	8-inch concrete	0.33
Wood, 1-inch	0.64	10-inch concrete	0.26
Wood, 2-inch	0.43		

Note: For additional types of construction, refer to the ASHRAE Handbook of Fundamentals.

Table 2

Winter Design Temperatures

STATE	CITY	TEMP F
Alabama	Birmingham	21
	Huntsville	16
	Mobile	29
	Montgomery	25
Alaska	Anchorage	-18
	Fairbanks	-47
	Juneau	1
	Nome	-27
Arizona	Flagstaff	4
	Pheonix	34
	Tucson	32
	Winslow	10
	Yuma	39
Arkansas	Fort Smith	17
	Little Rock	20
	Texarkana	23
California	Bakersfield	32
	Burbank	39
	Fresno	30
	Long Beach	43
	Los Angeles	40
	Oakland	36
	Sacramento	32
	San Diego	44
	San Francisco	38
	Santa Maria	33
Colorado	Alamosa	-16
	Colo. Springs	2
	Denver	1
	Grand Junction	7
	Pueblo	0
Conn.	Bridgeport	9
	Hartford	7
	New Haven	7
Delaware	Wilmington	14
D.C.	Washington	17
Florida	Daytona Beach	35
	Fort Myers	44
	Jacksonville	32
	Key West	57
	Lakeland	41
	Miami	47
	Orlando	38
	Pensacola	29
	Tallahassee	30
	Tampa	40
	W. Palm Beach	45
Georgia	Athens	22
	Atlanta	22
	Augusta	23
	Columbus	24
	Macon	25
	Rome	22
	Savannah	27
Hawaii	Honolulu	63
	Hilo	62
Idaho	Boise	10
	Lewiston	6
	Pocatello	-1
Illinois	Aurora	-1
	Champaign	2
	Chicago	-4
Illinois (cont)	Moline	-4
	Peoria	-4
	Rockford	-4
	Springfield	2
Indiana	Evansville	9
	Fort Wayne	1
	Indianapolis	2
	South Bend	1
Iowa	Burlington	-3
	Des Moines	-5
	Dubuque	-7
	Sioux City	-7
	Waterloo	-10
Kansas	Dodge City	5
	Goodland	0
	Topeka	4
	Wichita	7
Kentucky	Covington	6
	Lexington	8
	Louisville	10
Louisiana	Alexandria	27
	Baton Rouge	29
	Lake Charles	31
	New Orleans	33
	Shreveport	25
Maine	Bangor	-6
	Caribou	-13
	Portland	-1
Maryland	Baltimore	13
	Frederich	12
Mass.	Boston	9
	Pittsfield	-3
	Worcester	4
Michigan	Alpena	-6
	Detroit	6
	Escanaba	-7
	Flint	1
	Grand Rapids	5
	Lansing	1
	Marquette	-8
	Muskegon	6
	Saginaw	4
	Sault Ste. Marie	-8
Minn.	Duluth	-16
	Minneapolis	-12
	Rochester	-12
Miss.	Jackson	25
	Meridan	23
	Vicksburg	26
Missouri	Columbia	4
	Kansas City	6
	St. Joseph	2
	St. Louis	6
	Springfield	9
Montana	Billings	-10
	Glasgow	-18
	Great Falls	-15
	Havre	-11
	Helena	-16
	Kalispell	-7
	Miles City	-15
	Missoula	-6
Nebraska	Grand Island	-3
	Lincoln	-2
	Norfolk	-4
	North Platte	-4
	Omaha	-3
	Scottsbluff	-3
Nevada	Elko	-2
	Ely	-4
	Las Vegas	28
	Reno	10
	Winnemucca	3
N. Hamp.	Concord	-3
	Portsmouth	2
N. Jersey	Atlantic City	13
	Newark	14
	Trenton	14
N. Mexico	Albuquerque	16
	Raton	1
	Roswell	18
	Silver City	10
New York	Albany	-1
	Binghamton	1
	Buffalo	6
	New York	15
	Rochester	5
	Schenectady	1
	Syracuse	2
N. Carolina	Asheville	14
	Charlotte	22
	Greensboro	18
	Raleigh	20
	Wilmington	26
	Winston-Salem	20
N. Dakota	Bismarck	-19
	Devils Lake	-21
	Fargo	-18
	Williston	-21
Ohio	Akron	6
	Cincinnati	6
	Cleveland	5
	Columbus	5
	Dayton	4
	Mansfield	5
	Sandusky	6
	Toledo	1
	Youngstown	4
Oklahoma	Norman	13
	Oklahoma City	13
	Tulsa	13
Oregon	Astoria	29
	Eugene	22
	Medford	23
	Pendleton	5
	Portland	23
	Roseburg	23
	Salem	23
Penn.	Allentown	9
	Erie	9
	Harrisburg	11
	Philadelphia	14
	Pittsburgh	5
	Reading	13
Penn. (cont)	Scranton	5
	Williamsport	7
Rhode Island	Newport	9
	Providence	9
S. Carolina	Charleston	27
	Columbia	24
	Florence	25
	Greenville	22
S. Dakota	Huron	-14
	Rapid City	-7
	Sioux Falls	-11
Tennessee	Bristol	14
	Chattanooga	18
	Knoxville	19
	Memphis	18
	Nashville	14
Texas	Abilene	20
	Amarillo	11
	Austin	28
	Brownsville	39
	Corpus Christi	35
	Dallas	22
	El Paso	24
	Fort Worth	22
	Galveston	36
	Houston	32
	Laredo	36
	Lubbock	15
	Midland	21
	Port Authur	31
	San Angelo	22
	San Antonio	30
	Victoria	32
	Waco	26
	Witchita Falls	18
Utah	Ogden	5
	Provo	6
	Salt Lake City	8
Vermont	Burlington	-7
	Rutland	-8
Virginia	Lynchburg	16
	Norfolk	22
	Richmond	17
	Roanoke	16
Washington	Olympia	22
	Seattle	26
	Spokane	2
	Tacoma	24
	Walla Walla	7
	Yakima	5
W. Virginia	Charleston	11
	Elkins	6
	Huntington	10
	Parkersburg	11
Wisconsin	Green Bay	-9
	La Crosse	-9
	Madison	-7
	Milwaukee	-4
Wyoming	Casper	-5
	Cheyenne	-1
	Lander	-11
	Sheridan	-8

Table 3

Winter Design Temp.	Use Ground Temp.
Above +15F	Disregard Floor Load
0 to +15F	+60F
-20 to 0F	+50F
-40 to -20F	+40F

Table 4

Building Types	Air Changes
Residential type building, good insulation,vapor barrier,little or no door openings.	.75 - 1
Warehouse, average insulation, little or no door openings	1 - 1.5
Commercial garage (auto care center) average insulation, many door openings.	1.5 - 2.5
Warehouse, poor insulation, many door openings	2 - 2.5
Warehouse, poor insulation, doors left open sometimes.	2.5 - 4

NOTE: These figures are to be used as guidelines only. It is up to the job estimator to accurately determine the number of air changes per hour the structure will experience.

If the space contains ventilating equipment, determine the total CFM exhausted. Use this figure in the following formula.

BTUH = (CFM exhausted X T.D.)/ 55

If this Btuh is greater than the amount under infiltration, use this amount.

FSA SERIES HEATERS

TECHNICAL DATA

MODEL NUMBER: FSA (N,P)-		30	45	60	75
TOTAL INPUT, BTUH		30,000	45,000	60,000	75,000
TOTAL OUTPUT, BTUH*		24,300	36,500	48,000	60,000
AIR VOLUME, CFM		536	750	830	950
TEMPERATURE RISE, DEGREES F		42	45	55	60
AIR THROW AT 8 FT MOUNTING HEIGHT, FEET		25	25	40	40
RECOMMENDED MOUNTING HEIGHT, FEET		10	10	12	12
FAN DATA	NUMBER OF FANS	1	1	1	1
	DIAMETER	10	10	14	14
	NUMBER OF BLADES	4	4	3	3
SHIP WEIGHT, POUNDS		60	63	87	91
FAN MOTOR DATA	HORSEPOWER	1/20	1/20	1/10	1/10
	AMPS @ 115 V / 1 PH. / 80 Hz	1.7	1.7	4.1	4.1
	RPM	1,650	1,650	1,050	1,050
FLUE SIZE, INCHES**		3	3	4	4
GAS CONNECTION, INCHES		1/2	1/2	1/2	1/2

FOA SEPARATED COMBUSTION HEATERS

TECHNICAL DATA

MODEL NUMBER: FSA (N,P)-		45	60	75	100	125	150	200	250	300
TOTAL INPUT, BTUH		45,000	60,000	75,000	100,000	125,000	150,000	200,000	250,000	300,000
TOTAL OUTPUT, BTUH (NAT. GAS)*		36,200	48,300	59,200	81,000	101,500	120,000	164,000	194,400	240,000
AIR VOLUME, CFM		750	830	950	2,435	2,435	2,955	2,955	5,215	5,215
TEMPERATURE RISE, DEGREES F		45	54	60	31	39	38	51	35	43
RECOMMENDED MOUNTING HEIGHT, FEET		16	20	20	20	20	20	20	30	30
FAN DATA	NUMBER OF FANS	1	1	1	1	1	1	1	2	2
	DIAMETER, INCHES	10	14	14	16	16	18	18	16	16
	NUMBER OF BLADES	5	3	3	4	4	4	4	4	4
SHIP WEIGHT, POUNDS		84	100	104	188	204	261	266	307	323
FAN MOTOR DATA	HORSEPOWER	1/20	1/10	1/10	1/8	1/8	1/8	1/8	1/8	1/8
	AMPS @ 115 V / 1 PH. / 80 Hz	1.7	4.1	4.1	2.7	2.7	2.7	2.7	2.7	2.7
	RPM	1,650	1,050	1,050	1,075	1,075	1,075	1,075	1,075	1,075
FLUE SIZE, INCHES**		3	4	4	5	5	5	5	5	6
GAS CONNECTION NPT, INCHES		1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4

SEP SERIES HEATERS

TECHNICAL DATA

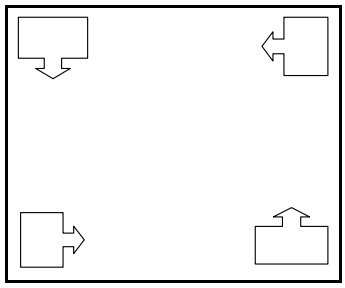
MODEL NUMBER: SEP- (N, P)		100 (A,S)	115 (A,S)	145 (A,S)	175 (A,S)	200 (A, S)	230 (A, S)	250 (A, S)	300 (A,S)	345 (A,S)	400 (A,S)
TOTAL INPUT, BTUH		100,000	115,000	145,000	172,500	195,000	230,000	250,000	300,000	345,000	390,000
TOTAL OUTPUT, BTUH*		80,500	92,000	116,000	138,000	156,000	184,000	201,250	241,500	276,000	312,000
AIR VOLUME, CFM		1,900	1,900	1,900	2,200	2,200	4,400	4,400	4,400	4,400	4,400
AIR THROW AT 8 FT. MTNG. HEIGHT, FEET		60	60	60	65	65	80	80	80	80	80
RECOMMENDED MOUNTING HEIGHT, FEET		16	16	20	20	20	30	30	30	30	30
FAN DIAMETER, INCHES		16	16	16	16	16	16	16	16	16	16
NUMBER OF FANS		1	1	1	1	1	2	2	2	2	2
SHIP WEIGHT, POUNDS		140	140	150	165	175	270	305	305	310	315
FAN MOTOR DATA	HORSEPOWER	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
	AMPS @115 V / 1 PH. / 60 Hz	2.1	2.1	2.1	2.1	2.1	4.2	4.2	4.2	4.2	4.2
FLUE CONNECTION SIZE, INCHES**		4	4	4	5	5	5	5	5	6	6
GAS CONNECTION, INCHES		1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4

*Ratings shown are for elevations up to 2,000 feet. For elevations above 2,000 feet, ratings should be reduced at the rate of 4% for each 1,000 feet above sea level.

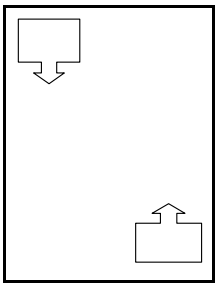
** Diameter of round pipe-adaptor furnished with heater. ( ) residential horizontal vent. Install 5' MAX length

A,S-Aluminized or Stainless Steel Heat Exchangers

RECOMMENDED MOUNTING LOCATIONS FOR UNIT HEATERS IN TWO GENERAL BUILDING SHAPES



Large square shaped building with heaters located to create circulating heated airstream sweeping heat loss surfaces.



Narrow rectangular building with heaters located to create circulating heated airstream sweeping primary heat loss surfaces.

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