



ENGINEERING CONSULTANTS

15835-1

PROJECT BASEBOARD RADIATION SIZING	DATE 7-26-86	BY JS	PROJECT NO.
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- 1) CALCULATE HEAT LOSS IN MBH
- 2) FOR MOST APPLICATIONS ASSUME
180° F ENTERING WATER TEMPERATURE
20° F TEMPERATURE DROP
70° F ENTERING AIR TEMPERATURE
- 3) CALCULATE $GPM = \frac{MBH \times 1000}{\Delta T \times 500}$
- 4) FROM ATTACHED CHART #1 / DETERMINE MINIMUM PIPE SIZE TO MAINTAIN .25 FPS
- 5) FROM ATTACHED CHART #2 DETERMINE ACTUAL VELOCITY $FPS = \frac{GPM}{GPF \times 60}$
- 6) FROM ATTACHED CHART #3 DETERMINE TEMPERATURE CORRECTION FACTOR FOR AVERAGE WATER TEMP. AND ENTERING AIR TEMPERATURE
- 7) FROM ATTACHED CHART #4 DETERMINE CORRECTION FACTOR FOR WATER VELOCITY
- 8) DETERMINE HEIGHT MOUNTING CORRECTION FACTOR FROM MANUFACTURER'S DATA. USUALLY .9
- 9) TOTAL CORRECTION FACTOR = (CF CHART #3) X (CF CHART #4) X (HEIGHT CF)
- 10) SELECT DESIRED LENGTH OF BASEBOARD HEATER
- 11) DESIGN RATING = $\frac{MBH \text{ LOSS}}{\text{LENGTH}}$



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12) DESIRED IBR RATING = $\frac{\text{DESIGN RATING}}{\text{TOTAL CORRECTION FACTOR}}$

13) FROM MANUFACTURER'S CATALOG, SELECT SUITABLE UNIT TO MATCH DESIRED IBR RATING OR NEXT LARGEST SIZE

14) ACTUAL LENGTH OF FINS = $\frac{\text{MBH LOSS}}{\text{ACTUAL IBR RATING}}$

NOTES: FIN LENGTH IS USUALLY 2' LESS THAN CABINET LENGTH.

EXAMPLE:

GIVEN HEAT LOSS IS 10 MBH
DESIRED CABINET LENGTH = 12 FT

A) $\text{GPM} = \frac{10 \times 1000}{20 \times 500} = 1.0$

B) MINIMUM PIPE SIZE = 1 1/4"

C) $\text{VELOCITY} = \frac{1.0}{3.93} = .25$

D) CF CHART #3 = .57

E) CF CHART #4 = .905

F) CF HEIGHT = .9

G) $\text{TOTAL CF} = .57 \times .905 \times .9 = .46$

H) $\text{DESIGN RATING} = \frac{10000}{10 \text{ FT}} = 1000 \text{ B/HR-FT}$

I) $\text{DESIRED IBR RATING} = \frac{1000}{.46} = 2173.91$

J) USE STERLING 1 1/4" - E1433 w/32 FINS PER FT
IBR = 2220

K) $\text{ACTUAL DESIGN RATING} = 2220 \times .46 = 1021.20 \text{ B/HR-FT}$

L) $\text{ACTUAL LENGTH} = \frac{10000}{1021.20} = 9.79 \text{ FT}$

M) CORRECT TO NEAREST INCH 9'-10"

COMMERCIAL FINNED-TUBE DESIGN DATA

CHARTS FOR RATING CORRECTIONS

CATALOG FINNED-TUBE RATINGS ARE BASED UPON THE FOLLOWING CONDITIONS:

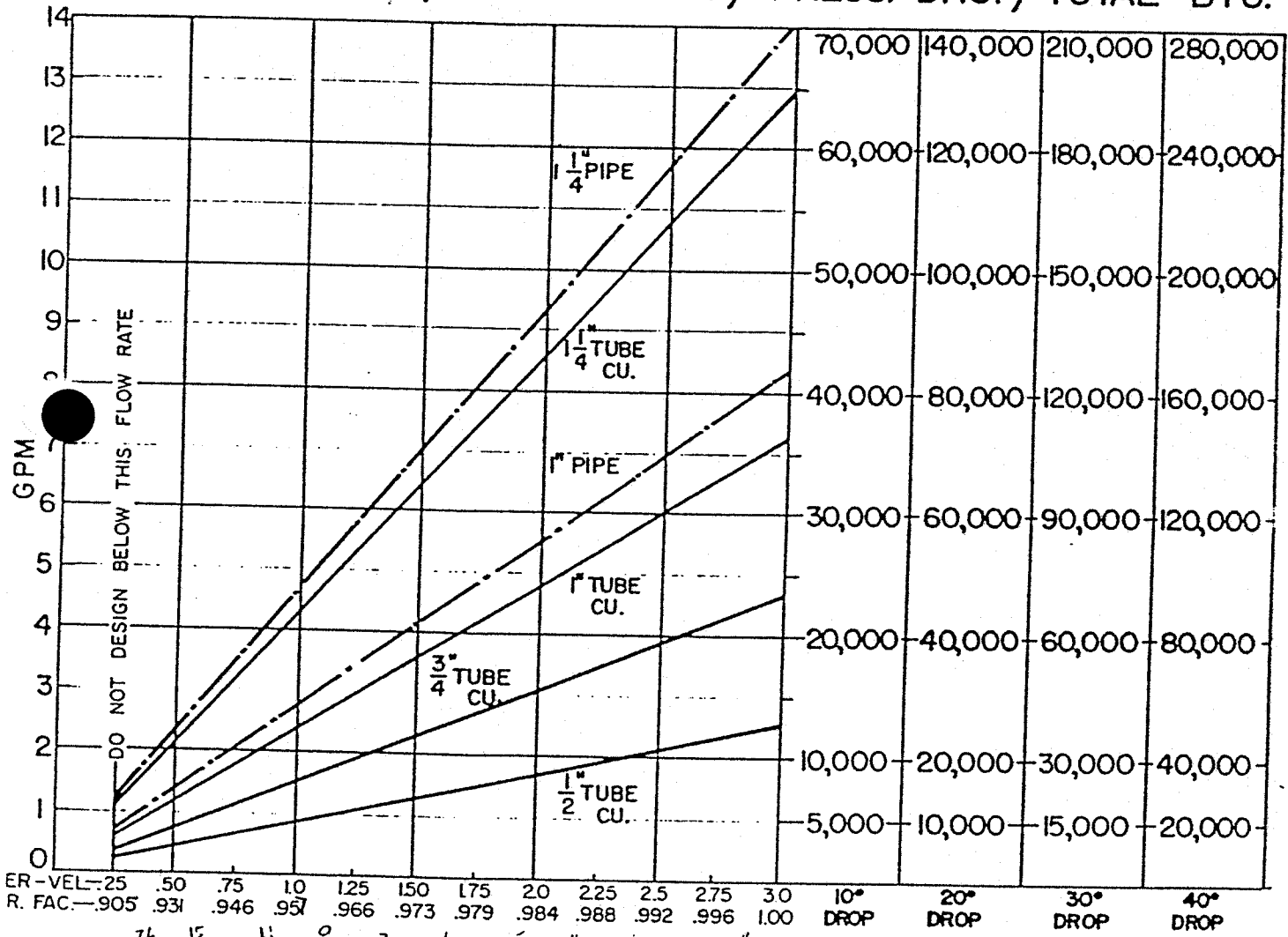
- 215° F AVERAGE WATER OR STEAM TEMPERATURE
- 65° F ENTERING AIR TEMPERATURE
- 3 FEET PER SECOND WATER FLOW RATE
- CATALOG MOUNTING HEIGHT

USE THE FOLLOWING CALCULATION WITH CORRECTION FACTORS FOR JOB CONDITIONS TO DETERMINE CORRECTED RATING:

$$\text{CORRECTED RATING} = (215^\circ \text{ F CATALOG RATING}) \times \left(\frac{\text{CORRECTION FACTOR FOR STEAM OR WATER AND AVERAGE AIR TEMP.}}{\text{CORRECTION FACTOR FOR MOUNTING HGT-SEE CATALOG RATING}} \right) \times \left(\frac{\text{CORRECTION FACTOR FOR FLOW RATE}}{\text{CORRECTION FACTOR FOR MOUNTING HGT-SEE CATALOG RATING}} \right)$$

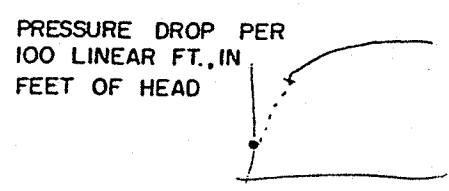
USE THE FOLLOWING CHARTS TO SELECT CORRECTION FACTORS

4 CHART/WATER VEL./CORR. FACTOR / PRESS. DROP/TOTAL BTU.



1/2\"/>
3/4\"/>
1\"/>
1\"/>
1\"/>
1/4\"/>

BELOW 0.75 FPM FACTOR ≈ 0.6 + 1.22 FPM



STERLING RADIATOR • 260 NORTH ELM ST. • WESTFIELD, MASS. 01085

3/96



PROJECT FIN TUBE SIZING	DATE 9/1/82	BY JGB	PROJECT NO.
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VELOCITY FACTOR

$$FPS = \frac{GPM}{(GPF \times 60)} \quad \frac{2}{726}$$

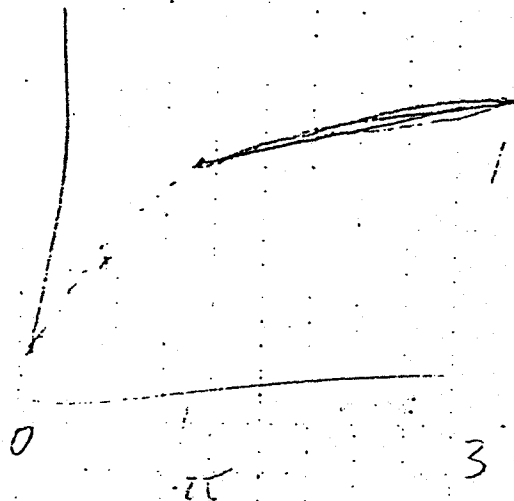
#2 PIPE VOLUME (GPF x 60)

SIZE	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
TYPE L	0.726	1.500	2.652	3.930	5.550	9.666
SCH 40	0.948	1.662	2.694	4.662	6.348	10.44

#1 MINIMUM GPM FOR 0.25 FPS

SIZE	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
TYPE L	0.182	0.375	0.656	0.983	1.39	2.42
SCH 40	0.237	0.416	0.674	1.17	1.59	2.6

2 MBH 4 MBH 6 MBH 10 MBH 14 MBH



RADIATION SIZING

JOB NAME: _____
 JOB NO. : _____
 DATE : _____
 BY : _____

No.	M16H	PIPE SIZE	CU OR FE	AWT (°F)	WTD (°F)	EAT (°F)	GPM	VEL. (FPS)	CORRECTION FACTORS				IRR (BTUH/EA)	DESIGN VALUES					
									TEMP	VEL.	HEIGHT	TOTAL		BTUH/EA	LENGTH	AIRH	GPM		
(1)																			
(2)																			
(3)																			
(4)																			
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(29)																			
(30)																			

TOTAL

PERFORMANCE BASED ON FWT OF _____ °F
 BOILER SIZED FOR S.F. OF _____

3/90