TC-5.6.1 VRV IV "Additional Refrigerant Charge" Manual Calculation – Student

Refer to Installation manual as required.

HEAT PUMP

Example System: RXYQ264XAYD (1x RXYQ144XATJ+ 1x RXYQ120XATJ)

System Indoor Fan Coil Connection Ratio: 116%

Use this formula for calculating the additional refrigerant charge for heat pump systems -

R=[(X1 × ø7/8) × 0.249+(X2 × ø3/4) × 0.175+(X3 × ø5/8) × 0.121+(X4 × ø1/2) × 0.081+(X5 × ø3/8) × 0.040+(X6 × ø1/4) × 0.015]+[A]+[B]

X1 through X6 =Total length (ft.) of liquid piping size at the various diameters (Øa)

"A" = Parameter A = the amount of refrigerant based on the module capacity

"B" = Parameter B = the amount of refrigerant based on; Actual system piping length + System IDU Fan Coil Connection Ratio + ODU(s) capacity

Let's break it down….recalling

The Order of Operations for solving linear math equations

One way to remember the order → "**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally" (P.E.M.D.A.S.)

Parentheses, **E**xponents, **M**ultiplication & **D**ivision (left to right), **A**ddition & **S**ubtraction (left to right)

Thus…

R = [(X1 × ø7/8) × 0.249

+

(X2 × ø3/4) × 0.175

+

(X3 × ø5/8) × 0.121

+

(X4 × ø1/2) × 0.081

+

(X5 × ø3/8) × 0.040

+

(X6 × ø1/4) × 0.015]

+

Parameter [A]

+

Parameter [B]

Heat Pump Worksheet

Using the following measured linear piping lengths –

Total length (ft) of 7/8” liquid line = 0’
Total length (ft) of 3/4” liquid line = 60’
Total length (ft) of 5/8” liquid line = 15’
Total length (ft) of 1/2” liquid line = 45’
Total length (ft) of 3/8” liquid line = 100’
Total length (ft) of 1/4” liquid line = 45’
Total (ft) = 265’
Parameter A =?? (From table in Installation Manual)
Parameter B =?? (From table in Installation Manual)

R =

0 × 0.249 = _____lbs.
+
60 × 0.175 = _____lbs.
+
15 × 0.121 = _____lbs.
+
45 × 0.081 = _____lbs.
+
100 × 0.040 = _____lbs.
+
45 × 0.015 = _____lbs.
+
(Par-A) = _____lbs.
+
(Par-B) = _____lbs.

Pounds of Additional Refrigerant Charge required for this system = _____

Heat Recovery

The example system for this exercise is:

REYQ264XATJU Heat Recovery (**REYQ144XATJU** + **REYQ120XATJU**)

System Connection Ratio is 116%

Refer to Installation manual as required.

Heat Recovery Systems requires additional calculations =

This is the formula for calculating the required additional refrigerant charge for heat recovery systems -

R=[(X1 × ø7/8) × 0.249+(X2 × ø3/4) × 0.175+(X3 × ø5/8) × 0.121+(X4 × ø1/2) × 0.081+(X5 × ø3/8) × 0.040+(X6 × ø1/4) × 0.015] × **1.04**+[A]+[B]+[**C**]]

X1 through X6 =Total length (ft.) of liquid piping size at the various diameters (Øa)

"A" = Parameter A = the amount of refrigerant based on the branch selector units

"B" = Parameter B = the amount of refrigerant based on outdoor unit capacity type

"C" = Parameter C = Refrigerant amount based on total ODU capacity type as defined by the field piping length and indoor units capacity, or Parameter D, whichever is the lesser amount.

Parameter "D" is additional charge for the type of indoor units on the system.

Once the total liquid line calculation is done, multiply it by 1.04.

From previous Heat Pump example - Ex. 20.64lbs x 1.04 = **21.46lbs** (Liquid Line amount).

Heat Recovery Worksheet

Total length (ft) of 7/8” liquid line = 0’
Total length (ft) of 3/4” liquid line = 60’
Total length (ft) of 5/8” liquid line = 15’
Total length (ft) of 1/2” liquid line = 45’
Total length (ft) of 3/8” liquid line = 100’
Total length (ft) of 1/4” liquid line = 45’
Total (ft) = 265’
Parameter A = (4) BS4Q54T Boxes
Parameter B = REYQ144TTJU + REYQ120TTJU
Parameter C = combined ODU model numbers
Parameter D = (5) FXMQ30, and (10) FXFQ24 fan coils

R =
0 × 0.249 = _____lbs.
+
60 × 0.175 = _____lbs.
+
15 × 0.121 = _____lbs.
+
45 × 0.081 = _____lbs.
+
100 × 0.040 = _____lbs.
+
45 × 0.015 = _____lbs.
x
1.04 = _____lbs.
+
(Par-A) = _____lbs.
+
(Par-B) = _____lbs.
+
(Par-C or D) = _____lbs.

Pounds of Additional Refrigerant Charge required for this system = _____