

Nom:

Date:

HVAC Learning.com

# Exercise Booklet

*Print this exercise booklet before studying the lesson on-line. It will enable you to write your answers to the HVAC learning exercises. You will thus be able to switch between reading or listening to the file on-line and writing in the booklet.*



## HEAT EMITTERS

*English lesson*

<https://hvac-learning.com/heating/heat-emitters-and-boilers-training/heat-emitters/>

*French version:*

<https://formation.xpair.com/cours/emetteurs-chaaleur.htm>

*For each exercise, you will write your answer, then you will study its correction on-line before going to the next exercise.*

*If you cannot do an exercise, you will be able to study its correction directly, but **force yourself to write your answer** as often as possible.*

*Note that between 2 exercises, you will find it necessary to study the course. As a warning, in the booklet, you will sometimes find the following indication:*

- *“ **Study the course on-line before doing the next exercise**” or*
- *“ **Study the course on-line before going to the next paragraph**”*

*Only study the paragraphs or the exercises which have an equal or a lower level than the one your training requires.*

*NVQ Level = Vocational Certificate*

*A Level = High school Diploma*

*HND Level = Associate's Degree*

*MSC Level = Engineering Schools*

*Then, when you have completed a file, you will be able to assess your level on-line through a Multiple Choice Questionnaire in which you will only answer the questions related to the themes you have studied.*

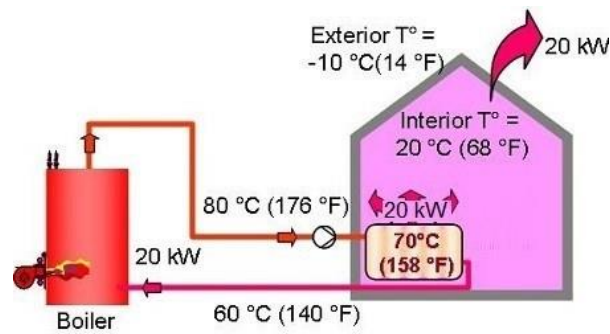
*So now off you go and work well!*

*Good luck!*

*The Authors.*

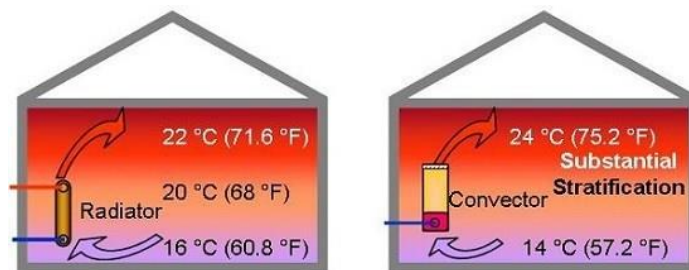
## N°1 – Role of emitters training – NVQ level

**Study the course on-line.**



## N°2 – Heat transmission training – NVQ level

**Study the course on-line before treating the next exercise.**



### Question 1

Which of the below is the most radiant or convective emitter?



Radiator



Heating floor

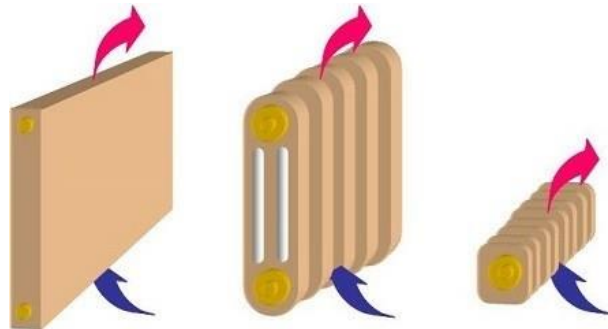


Convector

**Study the course on-line before treating the next paragraph.**

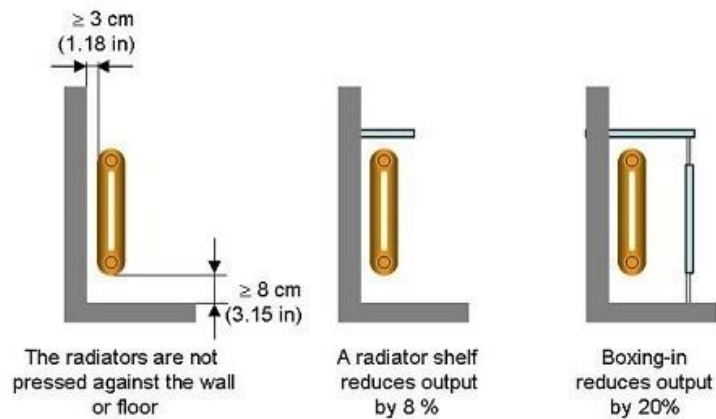
### N°3 – Radiator technology training – NVQ level

*Study the course on-line.*



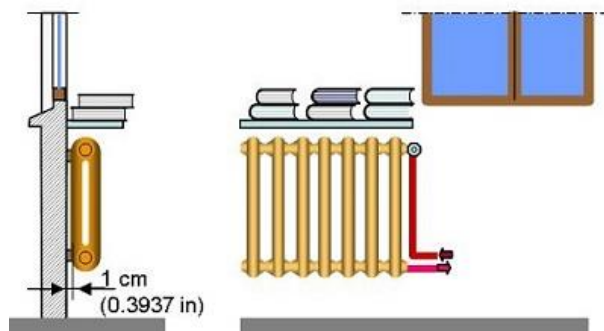
### N°4 – Rules for fitting emitters training – NVQ level

*Study the course on-line before treating the next exercise.*



#### Question 1

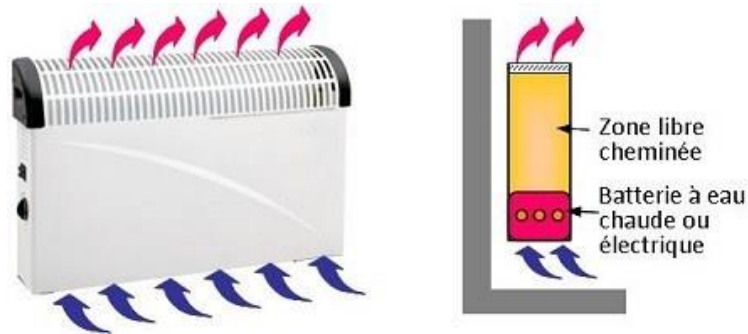
Looking at the view below, state the anomalies of the installation and propose solutions that would provide maximum heat emission.





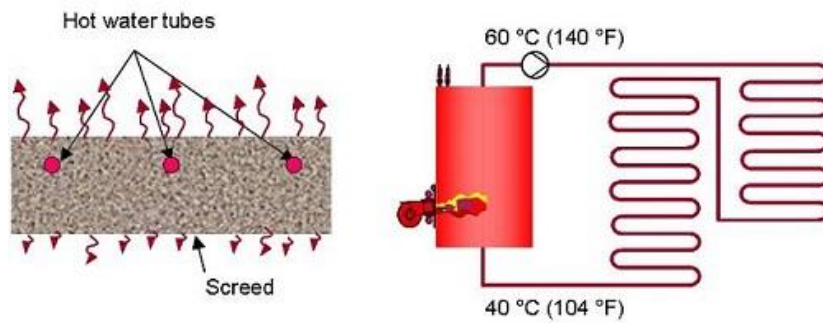
## N°5 – Convectors training – NVQ level

**Study the course on-line.**



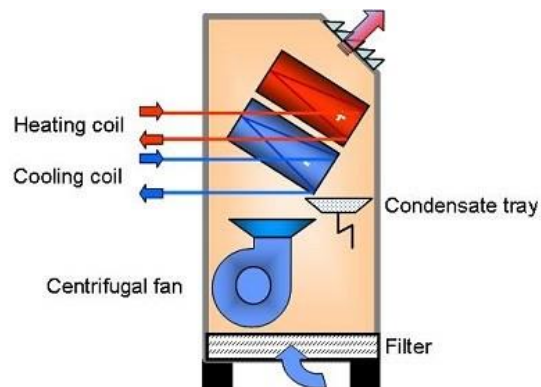
## N°6 – Under-floor heating – UFH training – NVQ level

**Study the course on-line.**



## N°7 – Fan coil units (FCU) and air heaters training – NVQ level

**Study the course on-line.**



## N°8 – Notion of resulting temperature and comfort training – A level

**Study the course on-line before treating the next exercise.**

In training at School certificate and at A level, it is not necessary to study this §. We can move on to the next section.

Heating temperature necessary to obtain a temperature felt of 20 [°C] (68 °F) at -7 [°C] (19.4 °F) exterior (With glazing 8% of wall total, exterior walls: 17 %, Interior walls: 50 %, floor: 25 %, heating by radiator)			
	Average wall interior temperature	Felt temperature (apparent)	Necessary heating temperature
Un-insulated outside walls, single glazing	18 [°C] (64.4 °F)	20 [°C] (68 °F)	22 [°C] (71.6 °F)
Un-insulated outside walls, double glazing	18,4 [°C] (65.1 °F)	20 [°C] (68 °F)	21,6 [°C] (70.9 °F)
Outside walls with 5 [cm] of insulation, double glazing	19,2 [°C] (66.6 °F)	20 [°C] (68 °F)	20,8 [°C] (69.4 °F)
Outside walls with 15 [cm] of insulation, double glazing	19,4 [°C] (66.9 °F)	20 [°C] (68 °F)	20,6 [°C] (69.1 °F)

### Question 1

Calculate the heating temperatures at -7 [°C] (19.4 °F) exterior, for a temperature felt (apparent) of 20 [°C] (68 °F) in the case of under-floor heating (UFH).

Heating temperature necessary to obtain a temperature felt of 20 [°C] (68 °F) at -7 [°C] (19.4 °F) exterior (With glazing 8% of wall total, exterior walls: 17 %, Interior walls: 50 %, floor: 25 %, under-floor heating)			
	Average wall interior temperature	Felt temperature (apparent)	Necessary heating temperature
Un-insulated outside walls, single glazing <b>+UFH</b>	20 [°C] (68 °F)	20 [°C] (68 °F)	?
Un-insulated outside walls, double glazing <b>+UFH</b>	20,4 [°C] (68.7 °F)	20 [°C] (68 °F)	?
Outside walls with 5 [cm] of insulation, double glazing <b>+UFH</b>	21,3 [°C] (70.3 °F)	20 [°C] (68 °F)	?
Outside walls with 15 [cm] of insulation, double glazing <b>+UFH</b>	21,4 [°C] (70.5 °F)	20 [°C] (68 °F)	?

Question 2

From the previous tables, complete the table below and compare the necessary heating temperatures for a comparable comfort level, depending on the level of insulation and the type of heating.

<b>Heating temperature necessary to obtain                      a temperature felt of 20 [°C] (68 °F) at -7 [°C] (19.4 °F) exterior</b> <i>(With glazing 8% of wall total, exterior walls: 17 %, Interior walls: 50 %, floor: 25 %)</i>			
	Average wall interior temperature	Felt temperature (apparent)	Necessary heating temperature
Un-insulated outside walls, single glazing + heating by radiator	?	20 [°C] (68 °F)	?
Un-insulated outside walls, double glazing +UFH	?	20 [°C] (68 °F)	?
Outside walls with 5 [cm] of insulation, double glazing + heating by radiator	?	20 [°C] (68 °F)	?
Outside walls with 15 [cm] of insulation, double glazing +UFH	?	20 [°C] (68 °F)	?

English lesson

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