

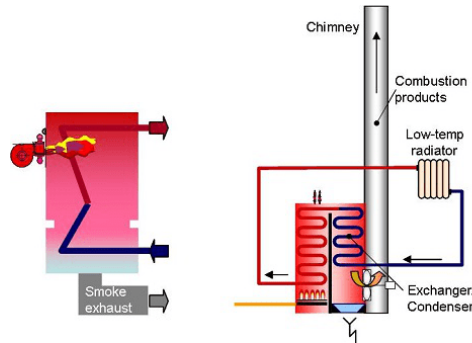
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HVAC Learning.com

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.



CONDENSING BOILER SYSTEMS WITHOUT DHW - 2 AND 3 CONNECTIONS

English lesson

<https://hvac-learning.com/heating/condensing-boiler-rooms-training/condensing-boiler-systems-without-dhw-2-and-3-connections/>

French version:

<https://formation.xpair.com/cours/chaufferies-condensation.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.

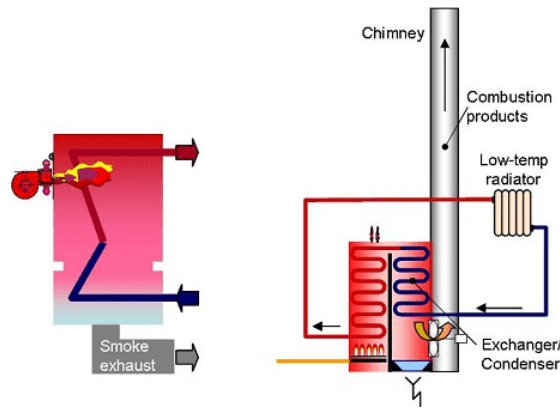
So now off you go and work well!

Good luck!

The Authors.

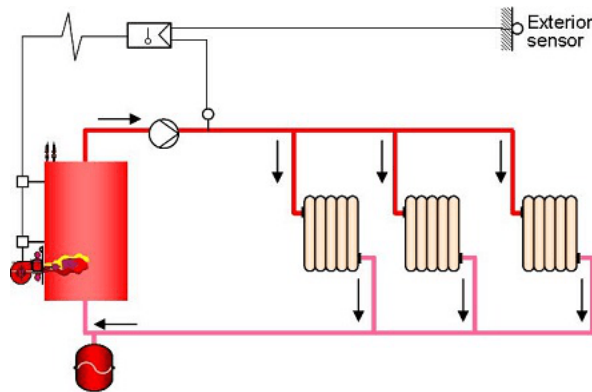
N°1 – Condensing boiler technology training (A level)

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



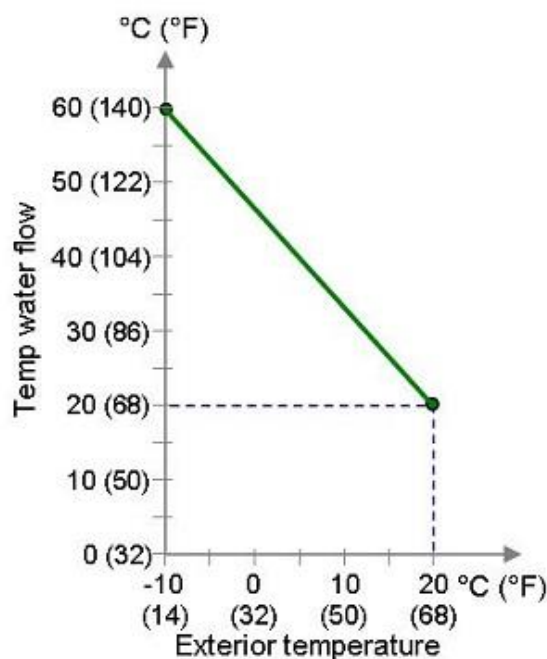
N°2 – Single return condensing boiler – Part 1 training (A to HND level)

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



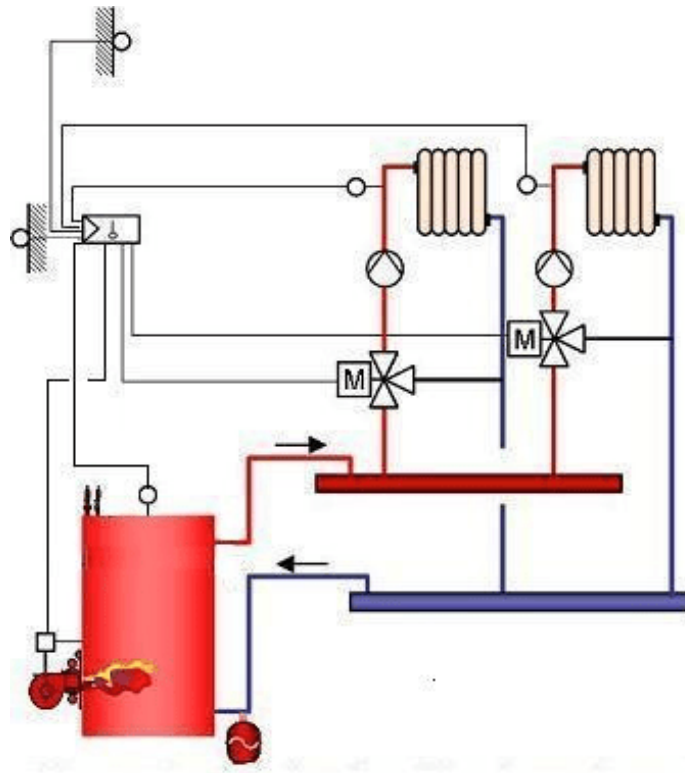
Question 1

Considering the set point line of the radiator circuit below, draw the set point line for an under-floor heating system for the above boiler:



N°3 – Heating systems with a single return condensing boiler – Part 2 training (A to HND level)

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



Question 1

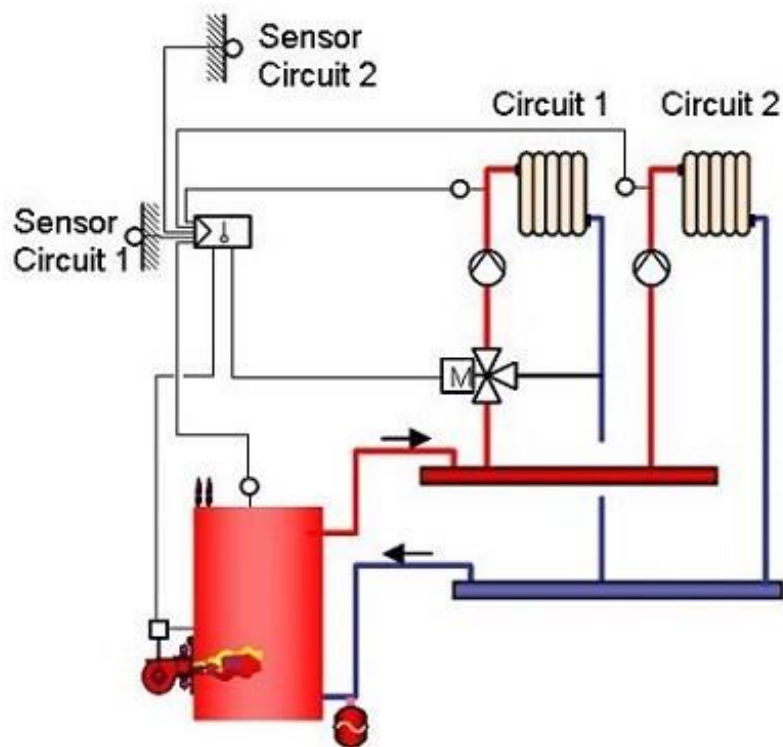
Mark on the diagram above the numbers indicated in the description below.

System description:

- 2 radiator circuits n°1 (left) & n°2 (right).
- The controller ensures the regulating of circuit n°1 subject to exterior temperature measured on sensor n°3; it controls the circuit outlet temperature on the sensor n°4 by action on the 3WV (**3 way valve**) n°5.
- The controller ensures the regulating of circuit n°2 subject to exterior temperature measured on sensor n°6 (left); it controls the circuit outlet temperature on the sensor n°7 by action on the 3WV n°8.
- By action on the burner, the controller also regulates boiler production temperature on sensor n°9 subject to the requirements generated by the control of the 2 outlet temperatures.

Question 2

How, in the below system, is temperature variation effected on the circuit n°2 outlet?



Question 3

In the above system, the temperature of circuit n°2 is that regulated by the boiler. Is this temperature:

- Always inferior or equal to that of circuit n°1 ?
- Always equal to that of circuit n°1?
- Always superior or equal to that of circuit n°1?

Question 4

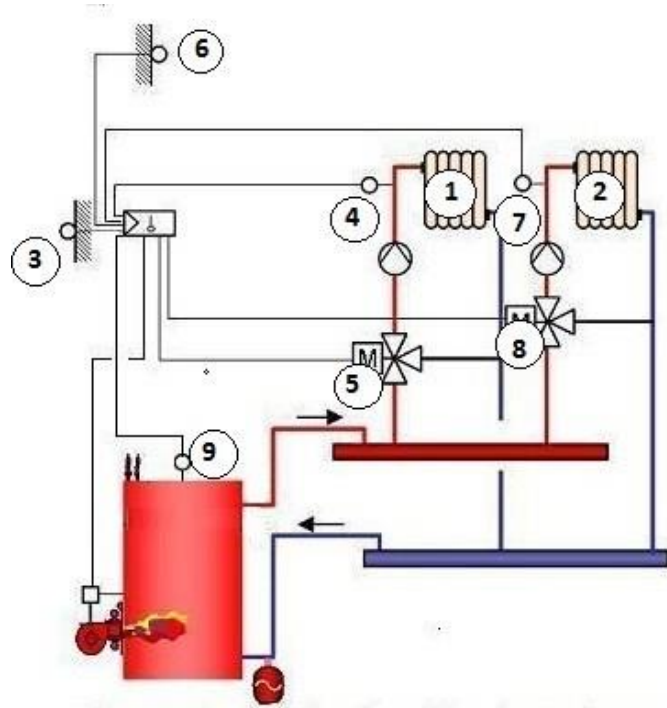
In the hypothesis whereby the 2 circuits of the above system are fitted with radiators of the same nominal operating regime, what difference(s) could explain that a 3WV has been fitted to circuit n°1 and not to circuit n°2 (which allows circuit n°1 to be fed at a lower temperature than n°2, from time to time).

N°4 – Minimal water in-flow training (A to HND level)

Certain boilers require a minimum feed through flow. The burner is therefore linked to a flow-switch.

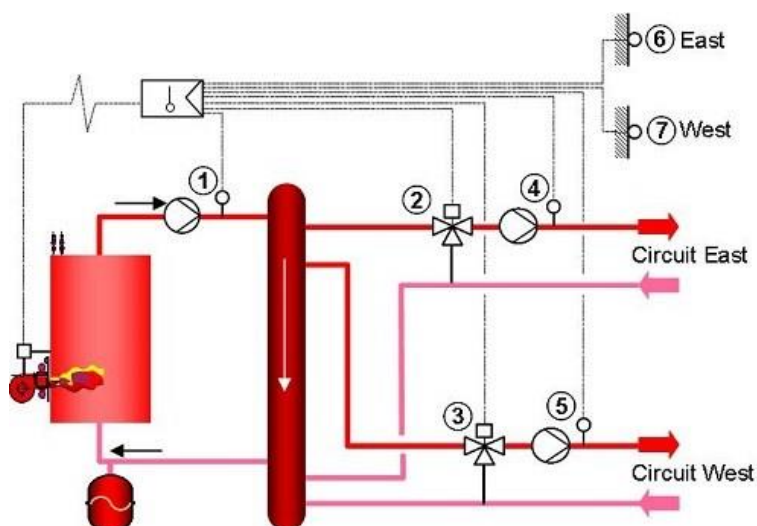
Question 1

If, in the system below, the 3WV's n°5 & n°8 close, what is the flow in the boiler?



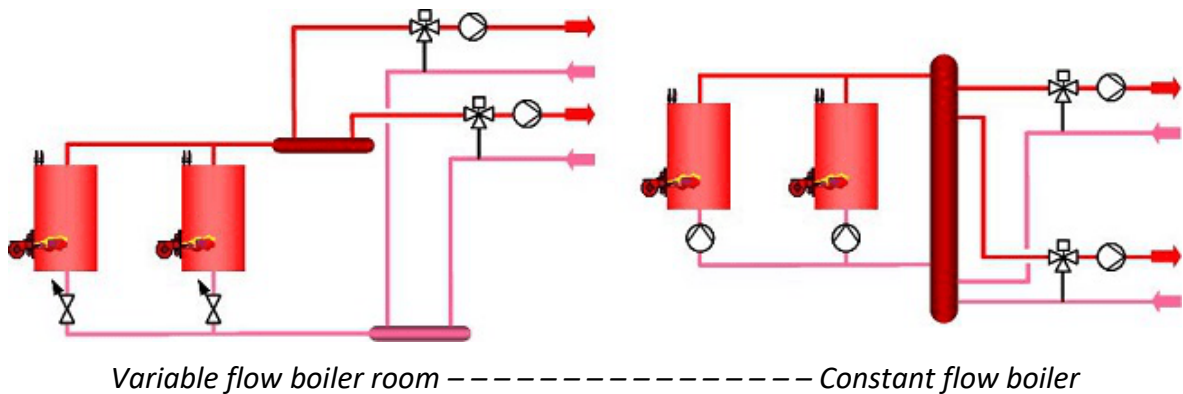
Question 2

Respecting the numbering in the diagram below, explain the regulating operating principle corresponding to the heating system below:



N°5 – Constant or variable flow boiler room systems training (A to HND level)

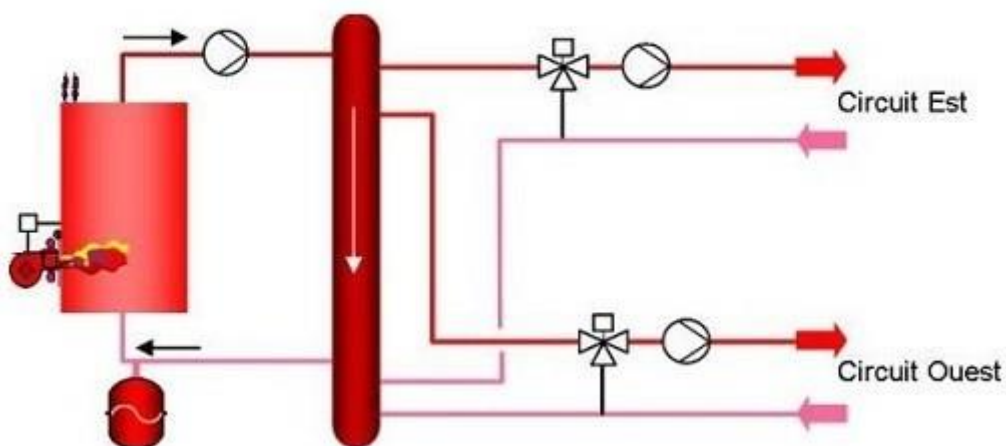
Study the course on-line before treating the next exercise.



Question 1

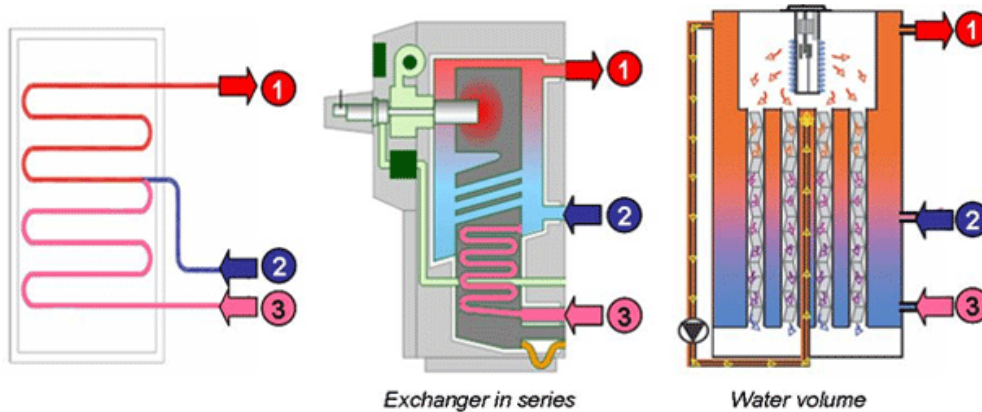
Symbolize on the system below, a regulating scheme:

- To regulate the temperature of each circuit from an exterior temperature measurement for each circuit.
- To regulate the temperature of boiler production subject to the requirements of the 2 circuits by modulating the burner power.



N°6 – Double return condensing boiler training (A to HND level)

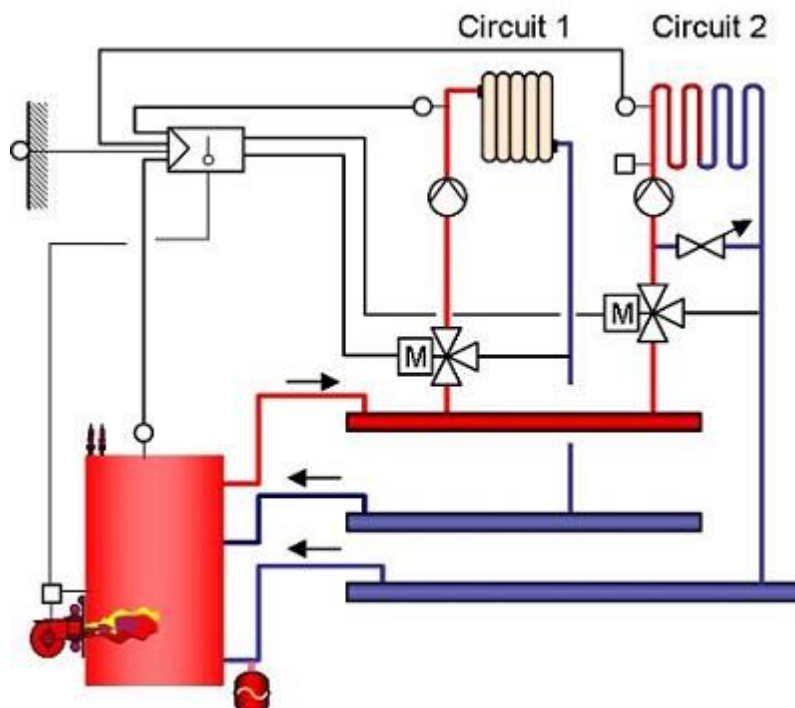
Study the course on-line before treating the next exercise.



Question 1

Indicate on the diagram below the numbers shown in the description:

- The system has a radiator circuit n°1 and under-floor heating n°2.
- The condensing boiler has 2 returns n°7 (high temperature) & n°8 (low temperature).
- To favour maximum condensation, the under-floor heating return is connected on the low temperature return of the boiler.
- The regulator n°11 controls the temperature at the radiator circuit outlet on sensor n°5 as well as the temperature at the under-floor heating outlet on sensor n°9.
- These controls operate subject to the exterior temperature (sensor n°10) by acting respectively on the 3WV's n°6 and n°12.
- By action on the modulating burner n°4 the regulator n°7 controls the boiler production temperature on the sensor n°3, subject to the greatest demand generated by sensors n° 5 and n°9.



N°7 – Number of condensing boilers training (HND level)

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

Boiler power used in priority in proportion to the total power (kW) requirements	Theoretical maximum cover of heating requirements (kWh) by the boiler used in priority
100 %	100 %
66 %	95 %
50 %	85 %
33 %	65 %
25 %	55 %

Question 1

A heating system has 3 boilers of 250 [kW] for production requirements of 750 [kW].

In theory, how much of the total consumption can be covered by 1 of the 3 boilers if used in priority?

Question 2

A heating system has 3 boilers of 250 [kW] for production requirements of 750 [kW].

In theory, how much of the total consumption can be covered by 2 of the 3 boilers if used in priority?

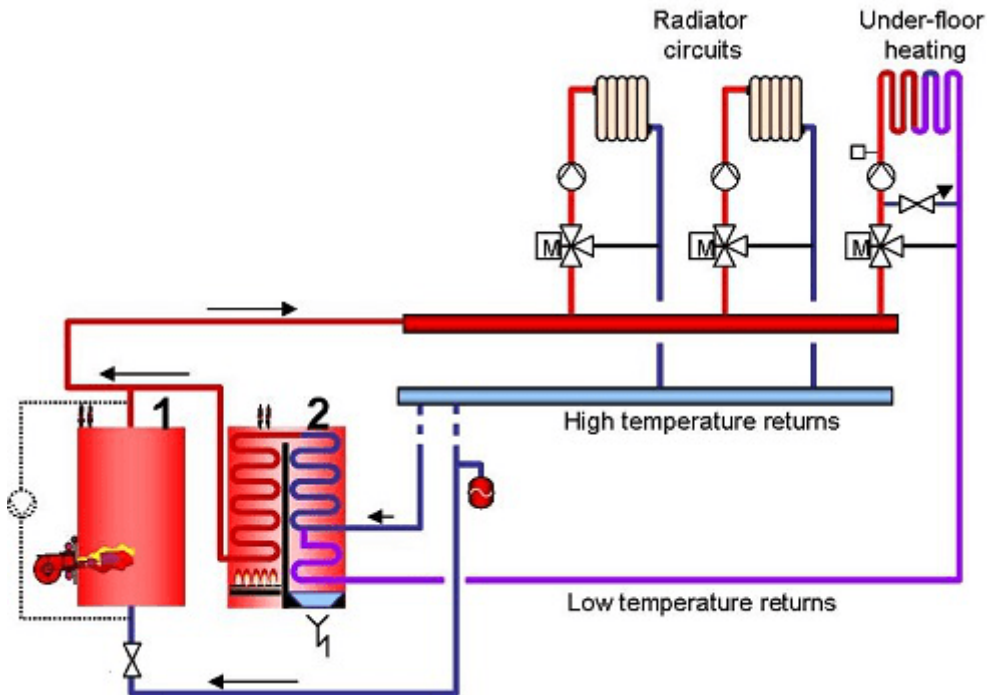
N°8 – One condensing boiler and one standard boiler systems (HND level)

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



Question 1

On the boiler below mark the position of the balancing valves required to split the flow between the different boilers and the 2WV (all or nothing) necessary for a cascade control.



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