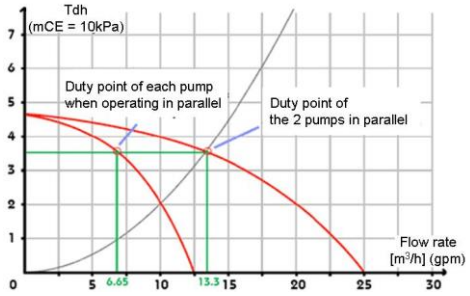
Name : **Date:**

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.



OPERATING CHARACTERISTICS OF PUMPS IN CLOSED CIRCUITS – LEVEL 2

English lesson
https://hvac-learning.com/hydraulics/hydraulic-distribution-training/operating-characteristics-of-pumps-in-closed-circuits-level-2/

French version:
https://formation.xpair.com/cours/comportement-pompes-circuit-ferme-2.htm
https://formation.xpair.com/cours/comportement-pompes-centrifuges-chauffage-eau-glacee-partie3.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:

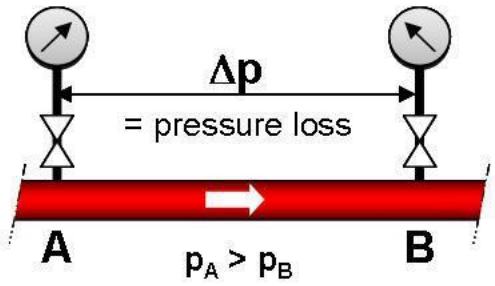
- *" **Study the course on-line before doing the next exercise**" or*
- *" **Study the course on-line before going to the next paragraph**"*

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 – Evolution of pressure losses in relation to flow rates training – A level

Study the course on-line.



Question 1

Study a network presenting 75 [kPa] of pressure loss for 48 [m^3/h] (211 gpm). What will be the pressure loss for 60 [m^3/h] (264 gpm)?

Question 2

Study a network presenting 43 [kPa] of pressure loss for 24 [m^3/h] (105.6 gpm). What will be the pressure loss for 17 [m^3/h] (74.8 gpm)?

Remember that the pump supplies a Tdh equal to the pressure loss of the circuit (see section "Pump 1st level")

Question 3

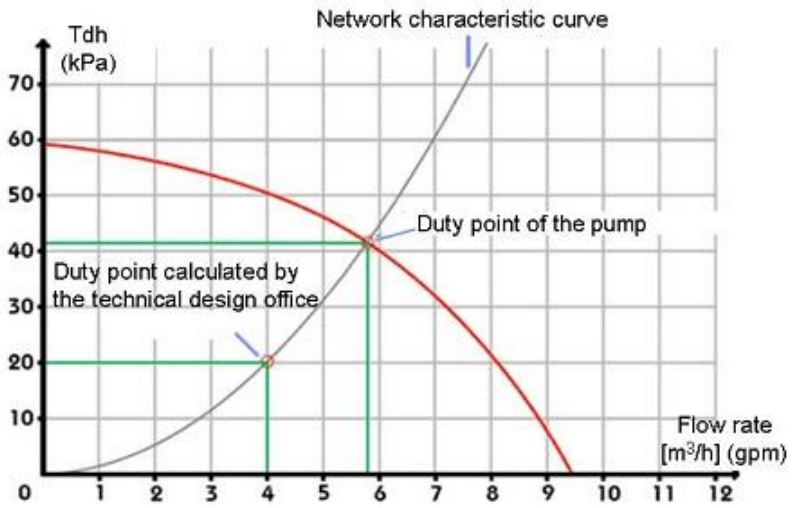
A pump supplies a flow of 25 [m^3/h] (110 gpm) due to a Tdh of 82 [kPa].
What would be the Tdh required to obtain a flow of 31 [m^3/h] (136.4 gpm)?

Question 4

A pump supplies a flow of 54 [m^3/h] (238 gpm) due to a Tdh of 52 [kPa].
What will be the required Tdh to obtain a flow of 48 [m^3/h] (211 gpm)?

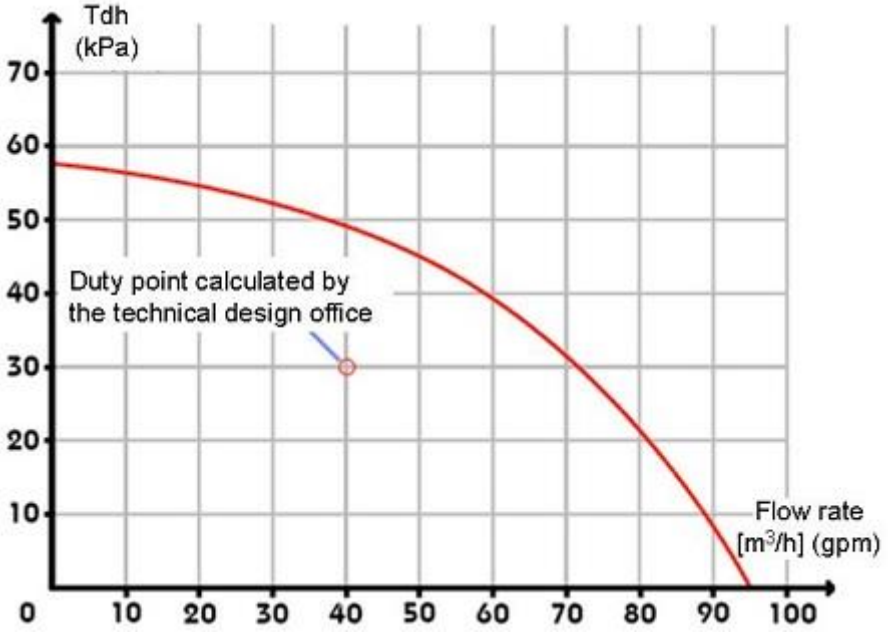
N°2 – Pump duty points and network curves training – HND level

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



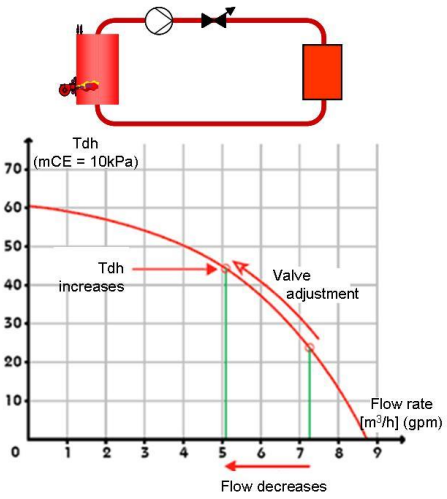
Question 1

The technical design office plans for a pressure loss of 30 [kPa] for 40 [m^3/h] (176 gpm).
Determine the flow obtained in the network if the pump below is fitted.



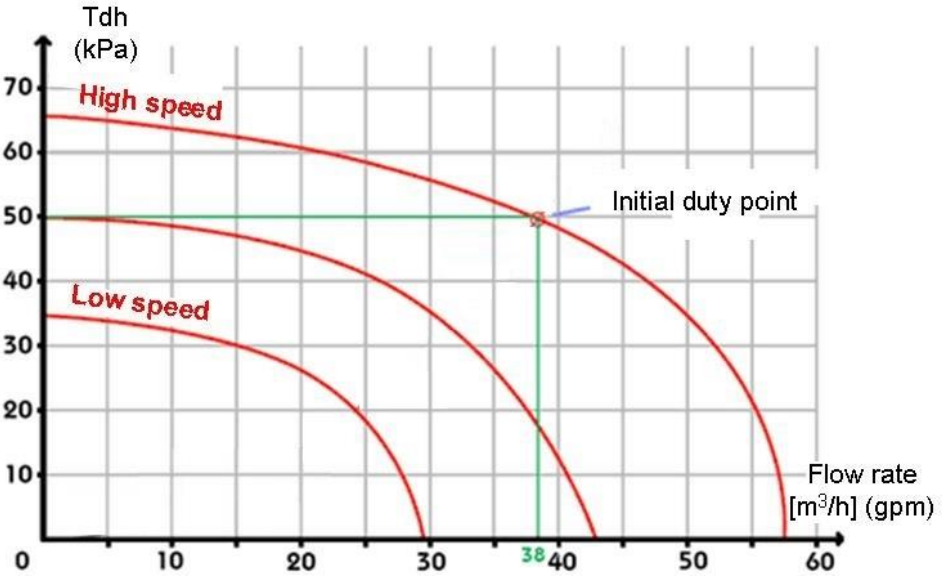
N°3 – Adjusting flow rate and speed changes – HND level

Study the course on-line.



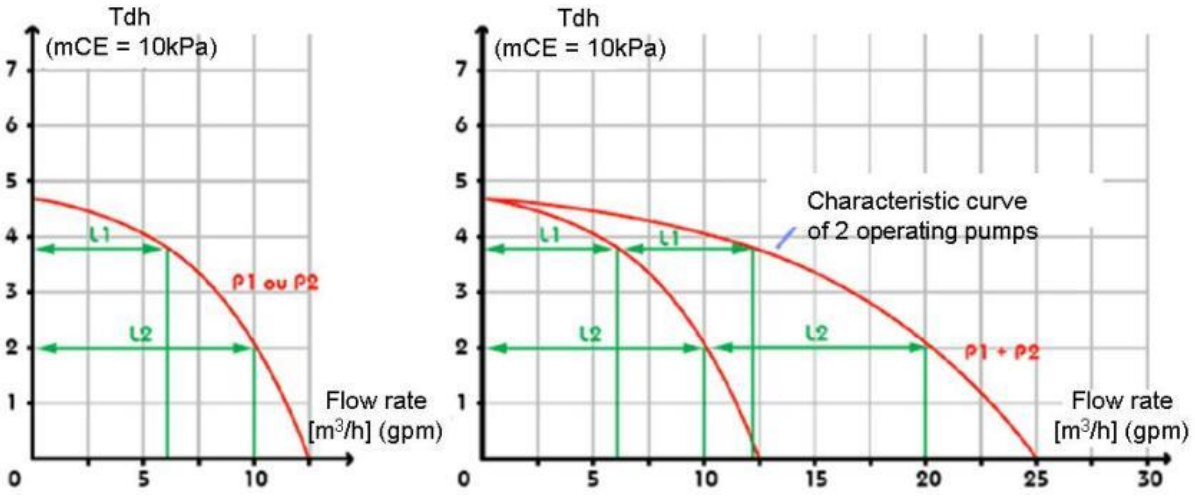
Question 1

What will be the flow rate of the pump defined below if we change from high speed to low speed?
If we retain the high speed, what pressure loss must be created in the circuit to obtain the same flow as at low speed?



N°4 - Characteristic curves of pumps operating in parallel training - HND level

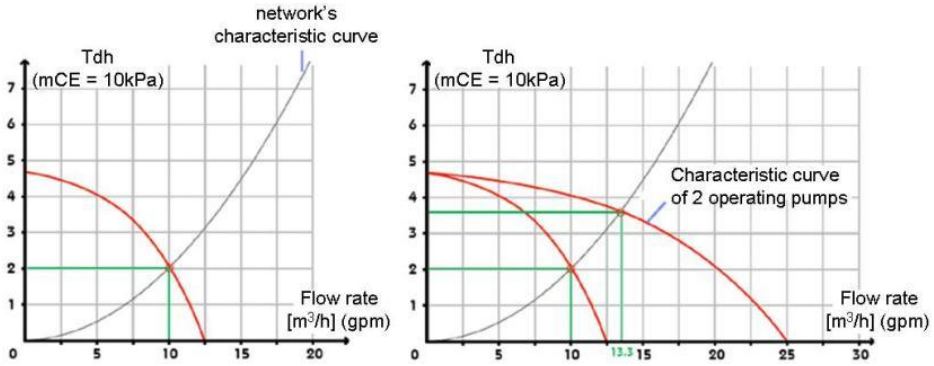
Study the course on-line.



One single operating pump *Two identical operating pumps*

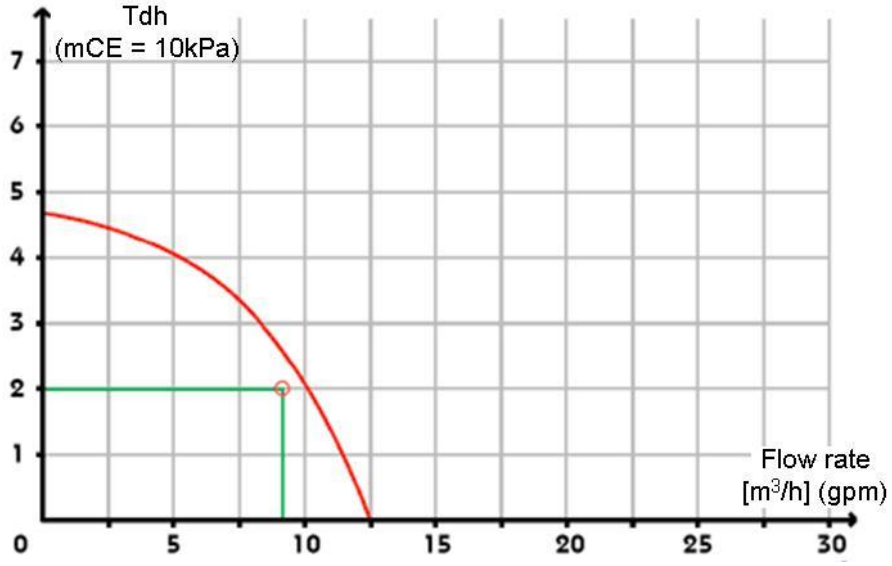
N°5 - Flow rates of pumps operating in parallel training - HND level

Study the course on-line.



Question 1

The technical design office has planned a pressure loss of 2 [mH2O] (6.6 ft/H2O) for 9 [m3/h] (39.6 gpm) for a network.
What will be the flow rate if 2 pumps are fitted in parallel in the network, as defined below:
– when only one pump is operating?
– when the two pumps are operating in parallel (specify in this case the flow of each pump)?



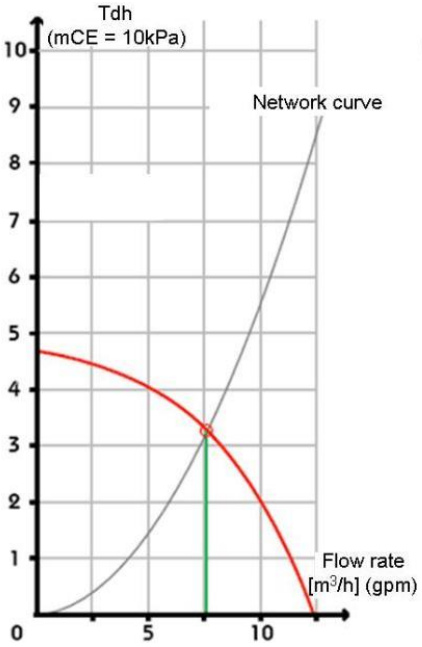
Study the course on-line before treating the next paragraphe.

N°6 - Characteristic curves of pumps operating in series training - HND level

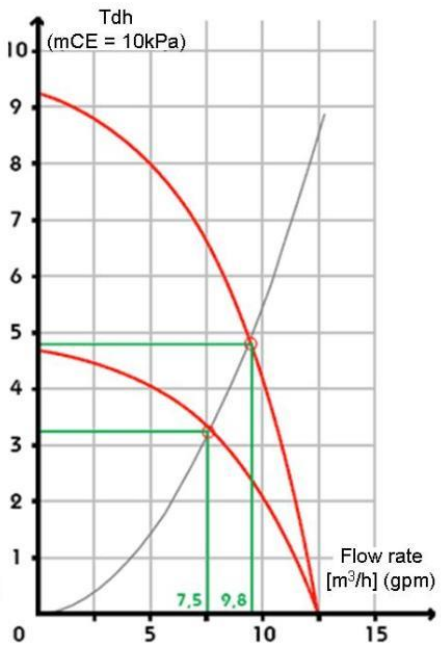
Study the course on-line

N°7 - Flow rates of pumps operating in series training - HND level

Study the course on-line.



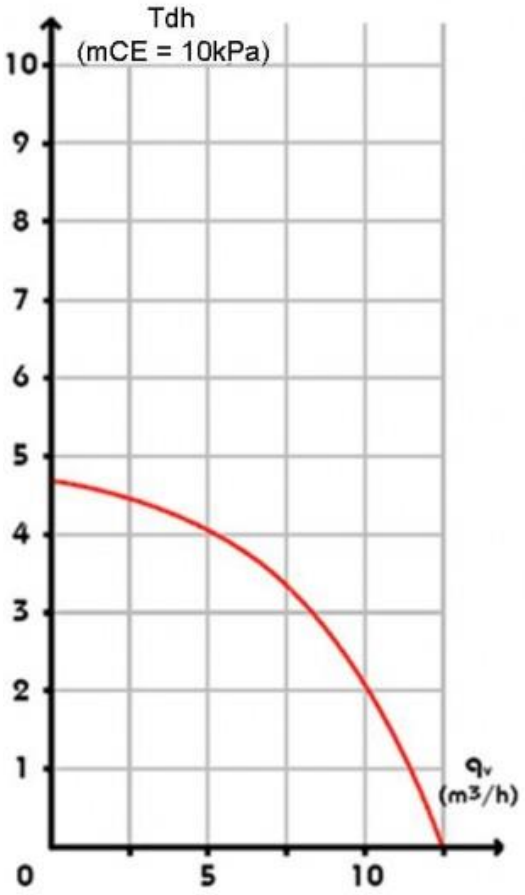
One single operating pump



Two identical operating pumps operating in series

Question 1

The technical design office has planned for a network, a heat loss of 3 [mH2O] (9.8 ftH2O) for 5 [m3/h] (22 gpm).
What flow will be obtained if 2 pumps are installed in series as defined below when just one is operating, and then for the 2 in series?



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