



Title:

Understanding a boiler's true output 'From and at' rating

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By:

MEH

Approved By RSW

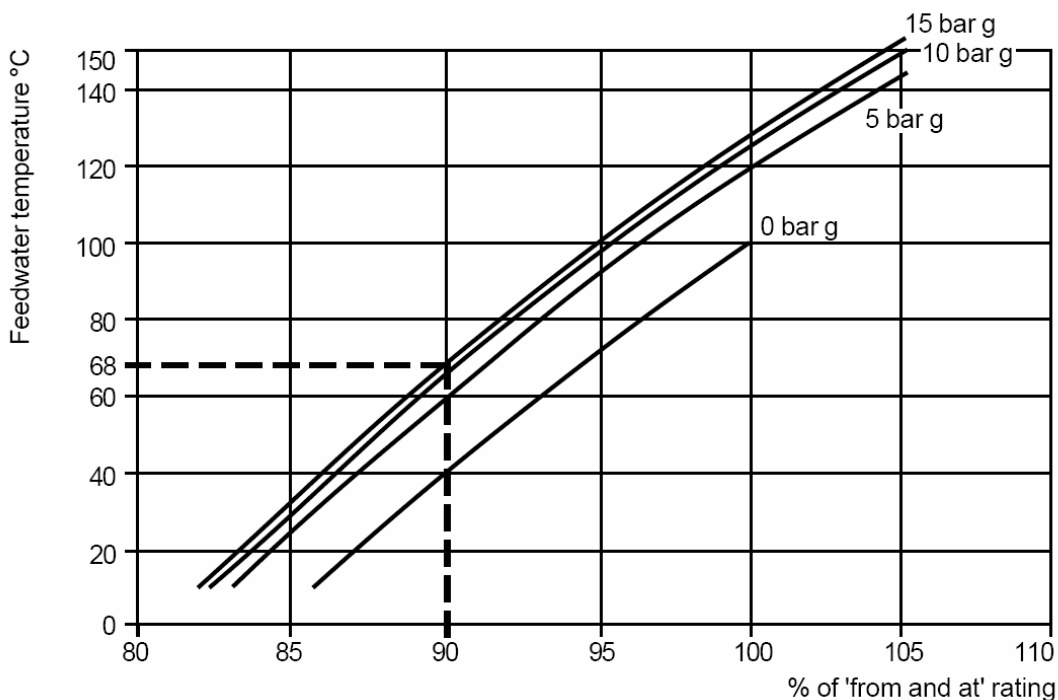
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'From and at' rating

The 'from and at' rating is widely used by shell boiler manufacturers to give a boiler a rating which shows the amount of steam in kg/h which the boiler can create 'from and at 100°C', at atmospheric pressure. Each kilogram of steam would then have received 2 258 kJ of heat in the boiler.

Boilers are often operated with feed water temperatures lower than 100°C. Consequently the boiler is required to supply enthalpy to bring the water up to boiling point. Most boilers operate at pressures higher than atmospheric, so that the boiler temperature is above 100°C. This calls for additional enthalpy of saturation of water. As the boiler pressure rises, the saturation temperature is increased, needing even more enthalpy before the feed water is brought up to boiling temperature. Both these effects reduce the actual steam output of the boiler as less fuel is available to produce steam.

The graph shows feed water temperatures plotted against the percentage of the 'from and at' figure for operation at pressures of 0, 5, 10 and 15 bar g.



The use of the 'from and at' graph can be shown in the following example which demonstrates calculating the actual output from a boiler.

A boiler has a 'from and at' rating of 2000 kg/h and operates at 15 bar g whilst the feed water temperature is 68°C. Using the graph,

The percentage 'From and at' rating = 90%
Therefore output = 2 000 kg/h x 90%
Boiler output = 1 800 kg/h