

章节 2.8

额定热功率

额定热功率

有些制造设备上标有热量输出的信息。这些设计的额定数据有时非常有用，但有时也会产生误导。额定热功率总是涉及到在特定的蒸汽压力下将一定质量的水或者其它流体加热提高一定的温度。这些公布的数据考虑了换热器表面结垢因素的影响，具有良好的可信度。

必须清楚任何因素的改变都会改变预定的热量输出，因而改变蒸汽耗量。例如二次侧流体的温度比指定的要低会增加热负荷，同时蒸汽压力比指定压力低也会降低传热能力。

压力和温度通常能容易地测量，从而能采用相应修正措施。但是，空气、水或其它流体的流率测量要困难的多。另外无法预计的风机皮带脱落或者泵的叶轮磨损也能导致偏差，同时诸如附加于泵和风机阻力的减少也会使流率高于设计值。

最常见的错误是假定制造商的额定热功率等于实际负荷。换热器可能具有满足或超过给定负荷的能力，但与之相连接的负载可能只有该能力的一部分。很显然，了解设备的额定热功率是很有帮助的，但如果将它和实际的热负荷相联系时必须要小心。

如果负荷用kW表示，蒸汽压力给定，蒸汽的流率可以用公式2.8.1确定：

$$\text{蒸汽流率 (kg/h)} = \frac{\text{负荷kW} \times 3600}{\text{工作压力下的} h_{fg}} \quad \text{公式2.8.1}$$

换热器制造公司		
系列号	HX12345	
型号和口径	AB12345	
压力	设计压力	测试压力
	壳侧 10.0 barg	15.0 barg
	管侧 17.0 barg	25.5 barg
正常工作压力	14.1 barg	
壳体厚度	5mm	
测试日期	1985	
设计标准—壳侧	BS 853	
设计标准—管侧	BS 853	
设计功率	250kW	

图2.8.1 典型的换热器制造商提供的铭牌

Questions

1. What is the result of using a heat exchanger rating to calculate its steam consumption ?
 - a| The true connected heat load may be different from the rated figure
 - b| The rating does not take account of the temperature of the secondary medium
 - c| The rating is based on a steam pressure of 1.0 bar
 - d| The rating does not allow for condensate forming in the heat exchanger

2. A heat exchanger has a design rating based on a working pressure of 7 bar g. What would be the effect of supplying the exchanger with steam at 3 bar g ?
 - a| The heat output would be greater because the enthalpy of evaporation at 3 bar g is higher than at 7 bar g
 - b| The heat output would be greater because steam at 3 bar g has a greater volume than steam at 7 bar g
 - c| Less weight of steam would be required because steam at 3 bar g has a higher enthalpy of evaporation than at 7 bar g
 - d| The output would be reduced because the difference in temperature between the steam and product is reduced

Answers

1: a, 2: d

