Not just a lot of hot air!

In this article, Simon Wood, National Sales Manager, Boge Compressors, discusses how compressed air users can optimise their compressed air-related energy usage through heat recovery.

Heat recovery offers a number of compressed air users the opportunity to redirect waste heat generated by the compressor into heating spaces, such as workshops, or to heating domestic water. In doing so, the user can reduce their associated energy costs.

Almost the entire energy consumption from the supply net of a standard compressor is converted into heat. Using the example of an oil-lubricated screw compressor, Diagram 1 demonstrates that approximately 4% of the heat remains in the compressed air as residual heat, while 2% is lost to the atmosphere through radiation. Importantly, 94% is available for heat recovery. This percentage may vary slightly depending on the efficiency of the motor, which will affect the amount of heat emitted. This waste heat can be directed to heat rooms such as workshops or warehouse space, or even to heat domestic water.

The implementation of heat recovery

Heat recovery is suitable where the compressor in question is within the immediate vicinity of an area being heated, for example, where the compressor is actually in the workspace being heated. Clearly, this is not always practical, in which case a room could be heated via ducting. As a result, the investment cost for a waste heat recovery system will vary depending on the location of the compressor(s) and the location of the area(s) to be heated.

In order to determine the potential energy and cost savings of implementing a heat recovery system you must first assess the heat demand in the area surrounding the compressor installation. This assessment should then be compared to the average operating hours of the existing compressed air system. This will demonstrate the possible payback from implementing heat recovery in terms of the immediate reductions in fuel, oil and gas costs.

"Compressors offer a great opportunity for saving energy and costs through redirecting waste heat."

Applications

When it comes to air-cooled compressors, waste heat in cooling air can be used in many sectors of industry for drying processes, while using a heat exchanger in the compressor system to supplement water heating can be used for space heating or, under certain circumstances, in processing procedures.

Boge has developed a standard heat-recovery system for oil-injected screw compressors. The Duotherm heat exchangers operate independently from the cooling system. Installed directly into the compressors oil circuit, the heat exchanger is able to use the waste heat in an efficient way.

The system can recover up to 75% of the electrical power taken into the compressor. This is taken in the form of heat recovered from the compressor oil.

HEAT RECOVERY

Optimising energy usage has increased the demand for heat recovery. Ideally, it is best to discuss heat recovery when planning a new installation as the positioning of the compressor can be more carefully considered for the waste heat requirements. However, it is commonplace to retrofit a heat-recovery system onto an existing compressor.

Compressors offer a great opportunity for saving energy and costs through redirecting waste heat. However, it is normally only practical with large compressors or combined systems, as the amount of energy which can be used clearly increases with the capacity of the compressor.

In order to determine viability, a needs analysis should always be undertaken to assess the heat rejected. This analysis can then be derived from the average running time of the compressor. This comparison will demonstrate the actual value of implementing a heat-recovery system. It will also show whether reclamation can cover the demand for heating or whether it just supplements an existing system.

In the right application, redirecting the heat generated by the compressor for heating space to heating domestic water will reduce associated energy bills and optimise the compressor.

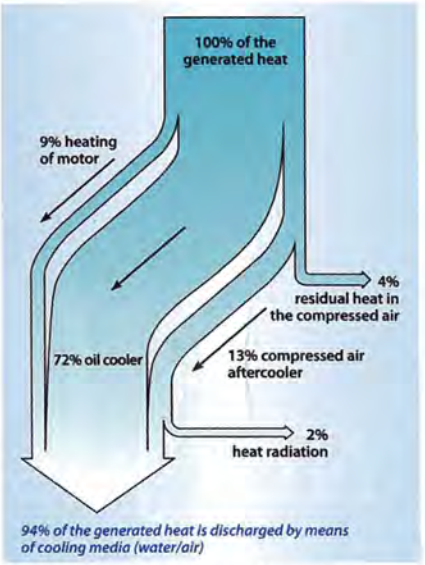

Diagram 1: *Distribution of heat in a screw compressor with oil injection cooling.*

Boge Compressors Ltd

Contact info and more items like this at ***wf.net.au/C205***