

Compressor Failures

by Charles Reid

Just what do we mean by the term failure? The dictionary definition is: “be unsuccessful, stop operating or working, be below the required standard”.



Why do compressors fail? This question is frequently asked by commissioning, installation and service engineers who are responsible for operating and maintaining refrigeration and air conditioning systems within the industry.

Copeland compressors undergo a comprehensive testing schedule before they are released onto the market. In spite of this it is inevitable that the odd compressor may succumb to a poorly designed system.

The following prognosis illustrates the requirement for careful analysis of the failed compressor and the system to determine the true cause of the failure.

Is the cause of the breakdown a manufacturing fault or is it a system fault? Each Copeland compressor Manufacturing Centre whether it is Berlin, Welkenraedt Belgium or Cookstown Northern Ireland has a laboratory and a team of experts who strip down and examine every compressor that is returned under warranty or for examination at the request of a customer. A report is then written, logged within the system and dispatched to the relevant personnel.

This is very important because when a compressor fails the risk of another failure is high unless the cause is found and corrected. Industry records show replacement compressors fail at a rate four times that of the original compressor. The dramatic difference indicates that most replacement failures are caused by a system problem or system change.

It has been noted that when “In-Warranty” failed compressors have been inspected a surprising fact has come to light, over half the electric motor failures are definitely the result of a mechanical problem within the compressor. We feel the actual number of those occurrences are much higher. Over 60% of compressor mechanical failures are the clear result of a system related failure, the majority of the remaining 40% are also system related, but proof is harder to document.

It is fortunate that the mechanical failures present the largest portion of compressors failed. The causes of mechanical problems are much easier to determine than are those of electrical failures.

What is most alarming is that over 30% of those in-warranty compressors returned have no defect that we can find, they should still be in service.

Whether “In-Warranty” or “Out of Warranty” the field analysis of failures is cost effective, it provides evidence that will lead to the source of the problem. The cause of failure can then be rectified before the replacement compressor is damaged and the system goes down again. This action will help eliminate future problems.