

INTERPRETATION: IIAR SC 2013-1

SUBJECT: ANSI / IIAR 2-2008, SECTION 6.2.2.1

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QUESTION:

Background Info: Section 6.1.2.1 of ANSI/IIAR 2-2008 is worded as follows:  
When equipped with a stop valve in the discharge connection, every positive displacement compressor shall be equipped with a pressure relief device selected to prevent the discharge pressure from increasing to more than 10% above the lowest of the maximum allowable working pressures of the compressor, any other components located in the path between the compressor, and the stop valve. Such pressure relief devices shall be sized to accommodate the output of the compressor or in accordance with 11.2.7, whichever is larger.

Appendix E (informative) describes one acceptable method of calculating the discharge capacity of positive displacement compressor pressure relief devices.

The question is as follows: Does this mean the relief valve mounted on a screw compressor package consisting of an oil separator and a screw compressor needs to be sized, based on the SCFM capacity, for the worst case of: 1) the screw compressor require capacity (per Appendix E) or 2) the capacity required for the oil separator? Clarify that the relief valve does not need to be sized for the combined sum of the compressor capacity and the capacity required for the oil separator.

Example: A compressor requiring a relief valve of 23.97 SCFM capacity is installed on an oil separator requiring a relief valve of 7.97 SCFM. The required relief valve must have a capacity of at least 23.97 SCFM not 31.94 SCFM.

ANSWER:

Although it is infrequent, occasionally there is an intervening stop valve between the discharge of the compressor and the oil separator. If this is the case, separate relief protection would be required for each component. The compressor's relief valve would be connected upstream of the stop valve (between the stop valve and the compressor outlet) and the relief protection for the oil separator directly attached. The relief valves would be sized on the minimum regulated flow for the compressor and external heat load for the separator, respectively.

If there is no intervening stop valve between the compressor and the oil separator, the relief device(s) connected to the oil separator would be sized based on the larger value of 1) compressor displacement in accordance with a method like that included in Appendix E or 2) in accordance with 11.2.7 (method of determining relief valve capacity based on vessel size).

It is noteworthy that many oil separators have small relief connections. The designer should consider the effects of inlet pressure loss from the protected component to the relief device inlet and ensure that the capacity of the selected relief device is still equal to or greater than required when it is de-rated for inlet pressure loss attributed to the piping, valves (3-way), and other fittings.