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Effect of Corrosion in Steel Pipes

Its impact on product quality and energy loss

by Imtiaz Rastgar.

Corrosion is one of the major causes for degrading performance of steel pipes in compressed air systems and there is a need for industry professionals on the cost of operation and loss of quality. Corrosion is the gradual loss of material from metal surface. This loss of material results in inefficient performance of compressed air system. It shortens the time for replacing existing compressed air piping and piping accessories with the new ones. This periodic replacement of steel pipes and piping instruments impose plenty of cost on business. Pitting corrosion is the source of pipe leaks. Leakage of compressed air through corroded pipes increases with their running time until it results in more than 50% compressed air loss.

Effects of Corrosion

It is important to note, that most of the users of steel piping, prefer to find an option for replacement of existing system and accessories after observing the following effects due to corrosion.

Pipe appearance

Corrosion starts with the damage of pipe inner or outer surface coating. When coating on outer surface fades, pipes look dull and it affects external auditing.

Leaks

As the coating of pipes worn out, corrosion starts due to moisture in compressed air. The gradual pitting corrosion continued with occurrence of leaks.

Following data about leakage of compressed air through steel pipes is worst news for compressed air users relying on galvanized steel piping.

About 42% energy saving is possible through leakage control in compressed air system which always born by corrosion in steel pipes.

Pressure drop

Due to high leak rate and corroded irregular inner surface profile, unacceptable pressure drops occur. This drop in pressure, indirectly reduces the profitability of the business.

Year	Connections Leaking with Steel Pipes
Year 1	0%
Year 2	7%
Year 3	13%
Year 4	20%
Year 5	25%

Rust particles

Corrosion generates rust which is metal in powder form after reaction with oxygen. These rust particles flow with compressed air in steel pipe and badly attack the piping accessories and instruments i.e. filters, dryers, pressure gauges etc.

Therefore, poor filtration, combined with internally rusted pipes can bring tramp rust particles into the end product, causing loss of quality!

Wasted energy

With choked filter due to rust and restricted flow through corroded pipes, the motor of the compressor will consume extra power to overcome friction in the flow of compressed air.

Air contamination

When compressed air passes through rusty pipe, it is contaminated with hydrogen ions and rust particles. This contaminated air is not suitable for use in many machines and processes.

Summary

Compressed air loss in steel piping through leaks can reach up to almost 50%, after 8-10 years of installation. There is a need to recognize this phenomenon and take corrective actions. AirAudits can help identify the health of industrial compressed air systems, on basis of which corrective actions can be initiated. ◆

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