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Review Article

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION STANDARDS FOR AIR SYSTEMS

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ABSTRACT

Air system is a system of mechanical refrigeration, in which cold air is compressed, cooled, and permitted to expand and thus acts as the refrigerating agent. International standards bring technological, economic, and social benefits. This article provides an introduction to the International Organization for Standardization (ISO) 8573 and ISO 12500 series of international standards which cover compressed air purity and test methods, as well as the purification equipment essential to achieve the standards. The amount of water present in a compressed air system is staggering. Combination of a small 2.8 m^3/min (100 cfm) compressor and refrigeration dryer operating for 4000 h in typical Northern European climatic conditions can produce approximately 10,000 L or 2200 gallons of liquid condensate per year. If the compressor is oil lubricated with a typical 2 mg/m^3 (2 ppm) oil carryover, then though the resulting condensate would visually resemble oil, oil would, in fact, account for <0.1% of the overall volume and it is resemblance to oil to which a false association is made. Testing standards are being revised to give the users an unblemished picture of how components will perform. These standards are being written to help users manage their total energy consumption. To help users evaluate their compressed air systems, additional standards are about to release and these newer standards can have a significant impact on plant energy consumption if properly applied.

Keywords: Air system, International Organization for Standardization 8573, International Organization for Standardization 12500.

INTRODUCTION

International Organization for Standardization (ISO) is the world's largest developer of voluntary international standards. International standards give state of the art specifications for products, services, and good practice, helping to make industry more efficient and effective. Developed through global consensus, they help to break down barriers to international trade [1].

Air system is a system of mechanical refrigeration, in which cold air is compressed, cooled, and permitted to expand and thus acts as the refrigerating agent.

Compressors in today's market shall essential meet a variety of standards written by a wide range of organizations throughout the world. Until recently, most standards were written to deal with safety, mechanical, electrical, and performance of the individual components of a compressed air system. Recognition of the significant amount of power used by compressed air systems has led to a shift in standards writing over the past couple of decades. Testing standards are being revised to give the users an unblemished picture of how components will perform. These standards are being written to help users manage their total energy consumption. To help users evaluate their compressed air systems, additional standards are about to release. Among these new standards, the most significant is the American Society of Mechanical Engineers EA-4-2 008 and ISO 11011. EA-4-2 008 will be known an American National Standards Institute standard when its development is complete [2].

One of the key features of ISO 11011 is the establishment of facts such as the capacity of compressed air to be used, its generation cost by a process indicating "baseline" performance. The purpose of baselining is to establish the current performance levels and costs of a compressed air system and to correlate the results with the plant's current production levels. As improvements are made to the system, it will be possible to estimate the success by comparing the new measurements with the original baseline.

Both of the standards deal with requirements for air system. The American Society of Mechanical Engineers (ASME) standard, EA-4-2 008, is a part of a suite of assessment standards that include compressed air system pumping stems, steam, and process heat. ASME describes EA-4-2 008 as follows:

- To understand the international standards for compressed air quality, it is essential to understand the sources of contamination, the individual contaminants found within a compressed air system and the problems that contaminants can cause the following:

Sources of contamination in a compressed air system [3]

Contaminants in a compressed air system can generally be recognized to the following:

The quality of air being drawn into the compressor

Air compressors draw in large volumes of air from the surrounding atmosphere containing large numbers of airborne contaminants.

The type and operation of the air compressor

The air compressor itself can also add contamination, for example, particles in coolants and lubricants.

Compressed air storage devices and distribution systems

The air receiver system and channeling are designed to store and distribute the compressed air. As a consequence, they will also store large amounts of contamination drawn into the system. In addition, channeling and air receivers will also cool the moist compressed air forming condensate which causes damage and corrosion.

Types of contamination found in a compressed air system [4]

Atmospheric dirt

Atmospheric air in an industrial environment typically contains 140 million dirt particles for every cubic meter of air. About 80% of these particles are <2 microns in size and are too small to be captured by the compressor intake filter, therefore, passing directly into the compressed air system.

Water vapor, condensed water, and water aerosols

Atmospheric air contains water vapor (water in a gaseous form). The ability of compressed air to hold water vapor is dependent on its