

COMPRESSED AIR SYSTEMS IN FMCG FACILITIES

The one area where you need to apply pressure.

Compressed air, sometimes referred to as the fourth utility, is widely used in the food and beverage manufacturing industry and provides various functions.

It provides users an alternative to other forms of energy in applications where these sources are impractical. While many may think of compressed air as essentially free, producing and distributing this utility can represent a significant cost and as such it is essential to optimize the design of both the supply and distribution systems. A poorly designed system can have a significant negative impact on productivity and increase the costs associated with running a plant. Whether one is looking to upgrade an existing system or install a new one, a suitable and correctly sized design is crucial.

The most important factors to consider when designing a compressed air system are the required quantity and pressure of the air at each take off point. These allow the designer to accurately size both the supply equipment, including compressor, dryer and air receivers, and the distribution piping. While it may seem attractive to use smaller pipes to save on installation costs, under sizing the distribution piping results in high air velocities which leads to excessive pressure loss and increased wear in the system. Furthermore, insufficient pressure at demand points can result in loss of production time while unnecessary pressure drops put additional pressure on the compressor, both of



which increase the running costs of a compressed air system.

In the past, the design of a compressed air system may have focused primarily on initial cost, however this is not representative of the true cost of a system over its life nor does this strategy account for the growing trend to be more energy efficient. It is estimated that 88% of the overall lifetime cost for a compressed air system is spent on operation and maintenance so it is critical to ensure that the most efficient compressor and piping system is chosen for the project. Simply increasing the supply pressure is not a cost-effective solution for combatting the increased pressure losses seen in poorly designed or worn systems. Designing and installing a more efficient system may represent a larger initial investment but the operating and maintenance costs over the lifetime of the system are greatly reduced. Not only are the operating costs lower as there is no need to compensate for excessive pressure drops or leaks

in the system, but the production losses associated with excessive downtime and reduced productivity are greatly reduced when the system does not experience undue wear. The combination of adequately sized piping, optimized compressors, and air receivers to absorb surge demands, and proper maintenance of the system over its lifetime are the only way to achieve high efficiency within a system and hence reduce to cost of running such a system.

In addition to the demand pressures and volumes, it is also necessary to consider how and where the compressed air will be used. Firstly, pipe lengths should be kept as short as possible to reduce pressure drops while ensuring that the layout allows sufficient access for maintenance and where applicable, cleaning of the piping. Secondly, in Food and Beverage manufacturing facilities, where contamination is a concern, it is essential that the quality of compressed air meets all relevant requirements and that contaminants are reduced to acceptable levels,

especially in contact applications such that the quality of the product delivered to the consumer is not compromised. There are a range of air filters and treatments that can be used to provide air of a quality suitable for various uses. Astratek Manufacturing Engineers use our industry experience and design knowledge to offer our clients the best solutions for their specific needs.

A well-designed system should not only provide the plant with a safe and reliable source of compressed air but should also make provisions for future needs and ensure the system is accessible for maintenance.

While traditional piping is cheaper to install, the newer 'quick connect' piping options offer greater adaptability – installing a new drop can take as little as 15 minutes and does not require special equipment. These systems also boast reduced pressure drops and can withstand higher velocities than traditional piping without compromising their

lifespan. These piping systems, available in Aluminum and Stainless Steel for commonly used pipe sizes, are suited to many Food and Beverage manufacturing applications while maintenance or system expansion can be achieved with minimal interruption to manufacturing activities.

Astratek Manufacturing Engineers have been involved in a range of projects ranging from green fields through to upgrades and expansions of established facilities and as such have a wealth of industry specific knowledge. Two recent projects highlight the importance of detailed design of systems and the issues that can present themselves. The first project involved the design of a new installation where modelling software was used to confirm to the client that the system had been sufficiently engineered to supply the correct volume of air to a large facility without excessively high-pressure losses. The second project initially focused on supplying compressed

air to a new building on an existing site using the existing compressor however it was found that there was not sufficient capacity to supply this expansion and an additional compressor and the inclusion of an air receiver for intermittent demands were used to provide the additional supply. In both projects, the systems were designed with additional capacity in line with the clients' anticipated future needs without increasing the initial cost to be prohibitive.

To contact Astratek Manufacturing Engineers for assistance and advice regarding compressed air systems and advice for your FMCG facility you can scan the below QR code and complete the online form or e-mail us at info@astratek.co
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