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CREATING THE IDEAL ROOM FOR YOUR AIR COMPRESSOR

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Ever made a big purchase and then thought, now where do I put this? Careful consideration of where you place your new compressed air system is just as important as the system itself. Selecting and designing the area for your stationary rotary screw air compressor system is more than just clearing out space in a storage room – it's about setting up your facility for long-term efficiency and safety, while minimizing capital expense. From location to ventilation, thoughtful planning on the front end can go a long way toward maximizing compressor usage, performance, and longevity.

(Compressor Room) Location, Location, Location

Where you place your compressor room within your manufacturing operation can make a big difference, not only on installation costs but also on efficiency

and overall system performance. For example, placing your compressor room as close to the primary power source as possible can help save you significantly on wiring costs while minimizing potential voltage drops. A central location also helps shorten piping runs, reducing the risk of compressed air pressure losses.

Another determining factor is floor condition, which is critical to both compressor performance and longevity. For oil flooded rotary screw air compressors, the floor should not deviate more than 1/8 inch from corner to corner for every 10 feet. Centrifugal compressors and dry screws (oil free) require even tighter tolerances – between 0.010 and 0.015 inches. Don't forget to consider securing your higher horsepower compressor too; for units 250 hp and above, grouting the base frame to the floor with an epoxy compound is highly recommended. This ensures 100% frame-to-floor contact and reduces vibration. While smaller units are less sensitive, full contact is still desirable for stability and noise reduction.

Piping and Pressure

Compressed air efficiency can be significantly impacted by piping design, especially when it comes to pressure drops and energy efficiency. Factors like pipe distance, diameter, and material all play a role. Aluminum piping systems, for example, have corrosion-resistant properties, possess a smooth interior surface, and typically offer lower resistance to airflow than galvanized, black iron or black steel.

For longer pipe runs, increasing the pipe diameter is essential to offset friction losses. The farther the air travels, the more resistance it encounters, which can lead to large pressure drops if not properly accounted for. When using galvanized, black iron or black steel in particular, a good rule of thumb is to increase the pipe diameter for every 20 feet of run to help maintain optimal pressure.

Also, try to avoid sharp elbows and fittings in the piping when designing the system. A looped distribution network – which feeds air from two directions – is often the preferred layout for maintaining consistent air pressure.

Ventilation and Temperature Considerations

Keeping the compressor room within the manufacturer's specified operating temperature range is critical for reliable operations and equipment life. Ideally, ambient temperatures should remain above freezing and below 105°F.

Ventilation systems should be designed to remove hot exhaust air while supplying intake air that is as clean and dry as possible. For facilities in high-dust or high-moisture environments, make sure to anticipate increased maintenance intervals for filters and heat exchangers. Without proper ventilation, compressors and air treatment systems can overheat, accelerating component wear and reducing operational efficiency.

Safety and Compliance

Compressor room design must meet applicable OSHA and NFPA requirements. This includes proper placement of disconnects and breakers, adherence to "Walking and Working Surfaces" guidelines, adequate lighting, and noise abatement.

Be aware of floor drains that may be in the compressor room. Spills from compressor fluids or cleaning agents used in maintenance could reach these drains, potentially leading to environmental violations if they reach wastewater systems. Secondary containment should be in place to help prevent this risk.

Energy Recovery

Rotary screw air compressors generate substantial heat during operation, but that heat doesn't have to go to waste. Incorporating heat recovery systems can turn this into usable energy for your facility.

For air-cooled compressors, exhaust air can be ducted to supplement building heat during colder months. Water-cooled compressors can transfer recovered heat to preheat boiler or process water, reducing the load on existing heating systems and improving your facility's overall energy efficiency.

Room To Move and Grow

Think long-term. As your business grows, likely so will your compressed air needs, which can include additional compressors, dryers, or storage tanks down the road. Designing your compressor room with capacity at the forefront could save you a lot of time and energy in the future. And, be sure to account for adequate clearance to all compressors and air treatment equipment for both safety and serviceability. This means a minimum of three feet should be maintained around all sides of compressors and dryers, with greater clearance provided for larger machines or where overhead lifting equipment may be required for component removal. Don't forget workflow: allow pathways for forklifts, hoists, or cranes in the layout.

The compressor room is more than a storage space for equipment – it is a purpose-built environment that supports long-term efficiency, safety, and growth. With the right planning upfront, it becomes the foundation of a reliable compressed air system. Invest the time to do it right, and you'll help set your operation up for longer uptime, lower costs, and fewer surprises down the line.