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WHITEPAPER

Tips & tricks for the Metal Industry

Upgrade your metal factory with Oxycom's two-stage sustainable climate control

World leader in adiabatic cooling

Create a fresh, clean, and comfortable working climate with a reduced chance of flash rust

Metal manufacturing generates substantial heat, along with emissions like oil vapors and welding fumes comprising dust and toxic gases. Such environments adversely impact employee comfort and overall well-being. The machine factory is at the core of your business. Productivity and output are essential. Thus, efficient cooling and optimal ventilation stand as imperative factors. This whitepaper presents valuable insights and tips for solving the heat challenges in a metal factory.

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Different processes in a metal factory

The metal industry encompasses a range of processes to transform raw metals into finished products, such as casting, forming, coating, machining, welding, laser cutting, bending, etc. Every process requires a certain temperature for metal treatment.

For instance, the coating process produces significant heat due to hot-coated metal. Inadequate ventilation and intense heat create discomfort for workers and hamper productivity. Precision metalworking requires consistent temperatures, but achieving an optimal climate in the factory can be challenging. Read further for tips on creating an energy-efficient climate control for your metal factory.

Challenges:

- Excessive heat can result in inaccuracies in the size & dimensions of the products.
- The release of aerosols from cooling liquids contributes to the formation of smog.
- High internal heat load due to excessive heat generation by machines.
- The production of oil mist during machining operations.
- Production equipment tripping due to high temperatures.
- Negative pressure causing cold drafts in winter.
- Lack of fresh air (indoor air quality).
- Uncomfortable working conditions.
- Achieving energy efficiency.
- Flash rust/corrosion.

#1

Tip #1: A balanced ventilation system against negative pressure.

The negative pressure is caused by the fact that many metal processing machines have an exhaust system but no air supply. The patented IntrCooll climate control system can be combined with a natural ventilator box (no extraction fans needed) and a Heat Reclaim Module* to create a healthy, fresh, and comfortable indoor climate all year round. Additional heating can be provided by connecting the Heat Reclaim Module with a heat pump.

*A heat reclaim module is a device that captures and reuses excess heat to save energy and reduce waste.

#2

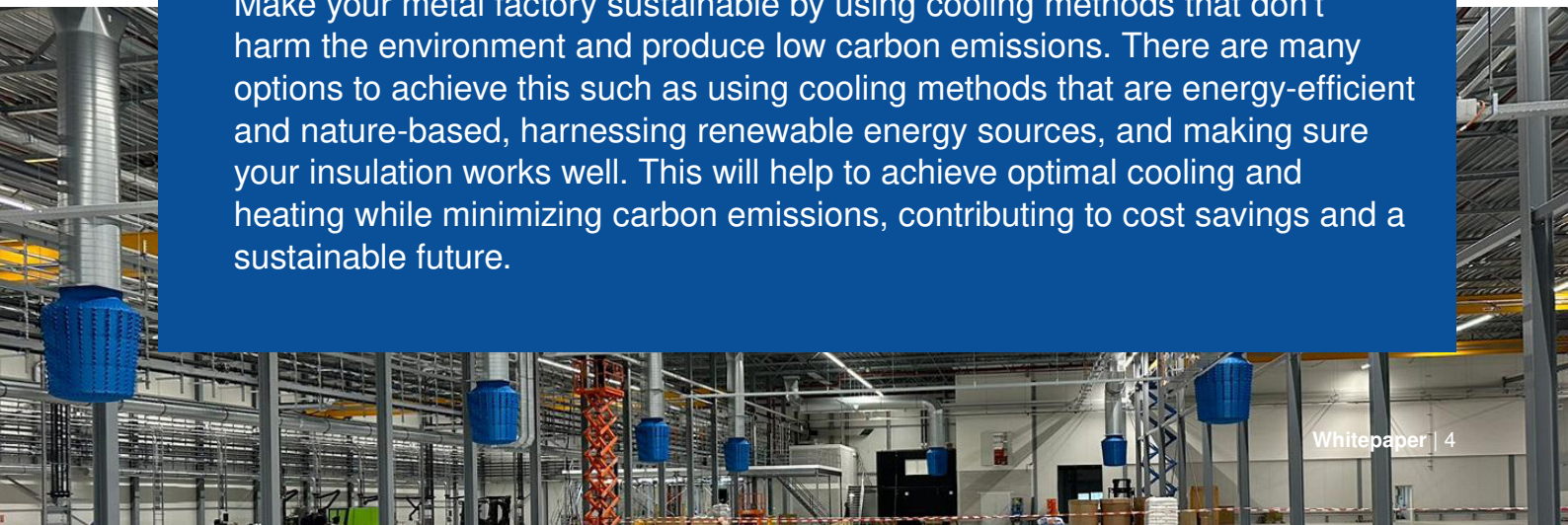
Tip #2: Energy-efficient alternative to mechanical cooling.

Consider using evaporative cooling, a natural process that cools air through water evaporation. It consumes far less energy than traditional cooling methods and is environmentally friendly. **Evaporative cooling** provides fresh air, low operating costs, and provides a comfortable working climate. In the case of two-stage evaporative cooling, it is easier to achieve lower temperature and lower relative humidity at lower costs.

#3

Tip #3: Sustainable and low-carbon emission.

Make your metal factory sustainable by using cooling methods that don't harm the environment and produce low carbon emissions. There are many options to achieve this such as using cooling methods that are energy-efficient and nature-based, harnessing renewable energy sources, and making sure your insulation works well. This will help to achieve optimal cooling and heating while minimizing carbon emissions, contributing to cost savings and a sustainable future.



#4

Tip #4: Fresh indoor air quality, preventing gases/ fumes.

Metal processing can release a lot of heat, oil vapors, and welding fumes (dust and toxic gases). These conditions have a negative effect on the comfort and well-being of employees. Therefore, energy-efficient cooling/heating/filtering and optimal ventilation are fundamental. IntrCooll-systems cool and heat your factory with fresh, filtered outside air. The steady flow of ventilation refreshes the inside air completely up to several times an hour.

#5

Tip #5: Keep flash rust to a minimum.

Depending on the metal manufacturing processes, controlling humidity might be crucial. High humidity can cause corrosion. So, it is important to maintain relative humidity below 65%. Direct evaporative cooling can pose challenges in maintaining optimal humidity levels. However, Indirect/direct (two-stage) evaporative cooling adds up to 70% less moisture is added to the air, and is therefore a better option.

#6

Tip #6: Precision metalworking always demands stable temperatures.

Ensure precision in metalworking by maintaining consistent and stable temperatures at all times. High fluctuations in a short time can lead to dimensional variations and quality issues. Invest in temperature control systems and regular monitoring to uphold accuracy and achieve high-quality results in your metalworking processes.

#7

Tip #7: Optimum indoor air temperature and relative humidity.

Maintain a comfortable and healthy indoor environment by ensuring optimum indoor air temperature and relative humidity levels. This typically ranges between 20-24 °C (68-75 °F) and 30-60% relative humidity. Regularly monitoring and adjusting these factors can enhance indoor air quality.

#8

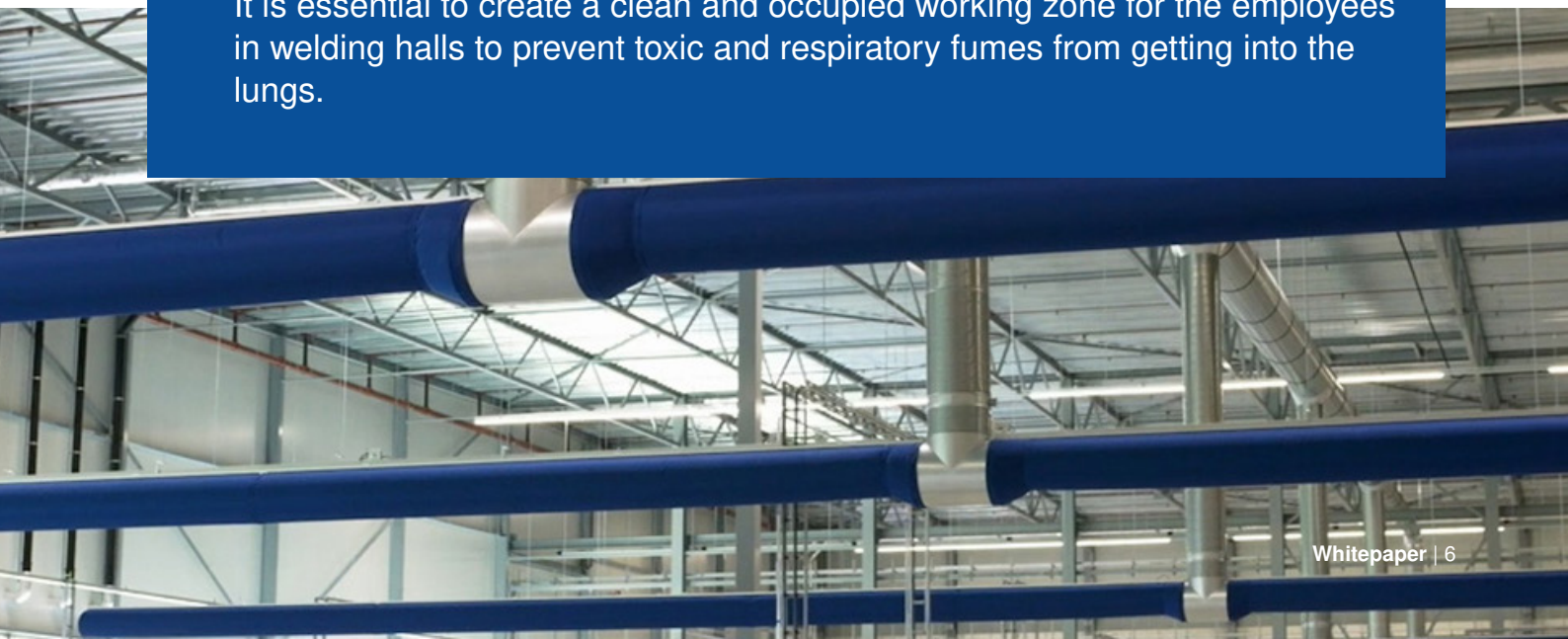
Tip #8: All year-round desired temperature.

For bending machines, it is important that hydraulic oil stays at a good working temperature. Condensation on metal machinery can cause corrosion. So, it is critical to maintain optimal working temperatures all year round.

#9

Tip #9: Displacement ventilation in welding halls.

It is essential to create a clean and occupied working zone for the employees in welding halls to prevent toxic and respiratory fumes from getting into the lungs.



Oxycom's indirect/direct evaporative cooling system

Our patented indirect/direct (two-stage) evaporative cooling technology provides a sustainable and stable climate, saving up to 90% of energy for precision metalworking. Our natural cooling delivers up to 7 °C lower temperatures, up to 20% - 40% lower humidity levels than traditional direct evaporative cooling systems and provides heating combined with ventilation.

After years of innovative developments, the system delivers outstanding new features of comfort, energy savings, and indoor air quality in all seasons. IntrCooll cools your factory with fresh, filtered outside air. The steady flow of ventilation refreshes the inside air completely several times an hour. Achieving up to 70% less moisture input and up to 30% less water consumption than direct evaporative cooling systems, our innovative system helps provide a rust-free indoor environment in your metal factory. This is all done with 100% ventilation using fresh, filtered outdoor air.

Easy and straightforward like Lego

Compared with other climate systems, the IntrCooll system is relatively easy to install and maintain. Extra functionalities can be added to the IntrCooll, such as a Heat Reclaim or the Natural Ventilation module; each module fits perfectly with the next. It fits perfectly for your needs of cooling, heating, ventilation, or filtration. IntrCooll is the perfect fit for all activities within the metal industry:

Chipless machining - including cutting, punching, setting, rolling, bending and forming.
Machining - including turning, CNC milling, boring.
Fine machining operations - including sparks.
Thermal processing - including plasma cutting, laser cutting.
Surface treatment - including cleaning, gluing, coating, grinding.

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Four-season sustainable climate control for a leading company in customized laser-cut sheets and bending

247TailorSteel, a leader in customized laser-cut sheets and bending, was facing many complex issues like high internal heat load, negative pressure, unstable temperature, lack of fresh air, and insufficient ventilation. To find a sustainable and innovative solution, it conducted extensive research and chose Oxycom due to its unique two-stage evaporative cooling. After positive feedback from employees from the first project, Oxycom's climate control solution expanded to its other factories. Read the case study for a complete overview of this business case with the diverse perspectives from management, production, and the operations team.

Read case study →

Free and tailored advice for your metal factory

Oxycom's indirect/direct evaporative cooling system is a natural and sustainable alternative to mechanical cooling. With the innovative two-stage evaporative cooling technology, the IntrCooll, you can save up to 90% in energy consumption. Furthermore, IntrCooll guarantees a comfortable and healthy climate for employees. For more information on climate control in metal factories, go to "**Two-stage evaporative cooling for the metal industry**." Or contact us directly:

Get advice →