

Essential tips for temperature management in the food industry

Rittal

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Food processing is a sector that demands high levels of efficiency to meet daily production targets. And productivity is a growing issue for food production worldwide. The United Nations Department of Economic and Social Affairs expects the global population to be in excess of 11 billion by 2100. That's more than twice what it was in 1990 and so, preparing for tomorrow, there needs to be an even keener focus on productivity to make sure there's enough food for everyone to thrive.

It's one reason why breakdowns of critical control and automation equipment in food production are such a cause for concern. Not only are valuable resources redirected away from more strategic, long term activities, such as developing new processes, but production lines can also be stopped. The cost of the breakdown increases dramatically if this is the case, as it includes not only the cost of repairing or replacing damaged components, but also the cost of lost manufacturing time. Stopping one line on which even the humblest of food

products is made can cost businesses tens of thousands of pounds for every hour that it doesn't restart.

Protection of critical equipment

Enclosures protect sensitive electronic and electrical items from the atmosphere in which they're installed, providing an environment that allows them to function as required and which prolongs their service life.

Maintaining an internal temperature within required parameters is of fundamental importance. This often requires an active cooling solution because heat is trapped inside enclosures designed to protect against the ingress of solid objects and water to a level appropriate for many manufacturing facilities. This can be a problem in particular for enclosures that are suitable for washdown environments, which protect equipment to an ingress protection category of IP 69K. As the temperature rises due to the summer months or random heat waves throughout the year, internal temperature parameters can be breached. In turn, the life expectan-

cy of the equipment within the enclosures is reduced and the probability of an unexpected system failure increases drastically.

Care needs to be taken when selecting climate control equipment to ensure it's suitably robust enough to handle the rigours of the environment in which it's situated. Below are some key aspects to consider when reviewing your climate control solutions.

Is your solution the right one for your environment?

The type of product being processed and/or the location of the equipment on site are likely to have a heavy influence on the suitability of your climate control system.

1) Let's consider the ambient temperature of your facility. If it remains lower throughout the entire year than the desired temperature inside the enclosure, then fan-and-filter units and air-to-air heat exchangers can be particularly effective. They use ambient air to remove heat energy from the enclosure and dissipate it into the local environment.

If the ambient temperature rises above the required internal temperature then units with active cooling circuits must be used. Wall/roof-mounted cooling units use refrigerant as an intermediate medium to remove the excess heat from enclosures, transferring it to the surrounding ambient air, and maintain the desired conditions. Air-to-water heat exchangers, as the name suggests, transfer unwanted heat to water, transporting it away from the enclosure to a centralised cooling plant, possibly outdoors, where it may be more easily dissipated. Air-to-water heat exchangers have the further advantage that they are a more hygienic solution than cooling units. They don't require a supply of ambient air and therefore have no louvres. They can have a simple housing that has no dirt traps and is easy to clean.

Already in 2018 we have seen unexpected jumps in average temperatures across the country, and this will only increase as we move into the summer months. Peaks in temperature, as indicated before, put cooling equipment under the most strain, therefore reviewing existing equipment sooner rather than later can reduce the likelihood of unexpected breakdowns.

2) Dusty or acidic contamination (e.g. flour or yeast/vinegar extracts) can interfere with switch-gear and cause short circuits or a reduction in service life.

Applying filter mats to fan and filter units will help, but if the environment is extremely contaminated you might be better off installing an air-to-air heat exchanger, cooling unit or air-to-water heat exchanger, which all have sealed internal air-paths and thus ensure contaminated air isn't drawn into the enclosure.

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Cleaning/maintenance regime

Establishing a regular inspection and cleaning routine for cooling equipment is very good practice. For example, vacuum cleaning units with filter mats to remove any dust and debris, which may starve the fan and the cooling circuit of air. This will result in the unit working harder for longer and a reduced cooling capacity.

Cooling systems must also be kept clean to maintain the highest levels of hygiene. Some will be cleaned daily with pressure washers and jet steam cleaners, in which case use a solution that meets the ingress protection rating demanded by your site and install additional cowls or covers as needed.

Increasing energy efficiency = reduced costs

It's important, from both an environmental and a cost saving standpoint, for the producers of foods and beverages to adopt

energy efficient technologies. With a spotlight on carbon footprints and energy prices rising globally, it's vital that the energy consumed by manufacturing processes is reduced where possible.

The Rittal Blue e+ cooling unit incorporates heat pipe technology and, as such, delivers cooling in a similar manner to an air-to-air heat exchanger, using fans alone, when the ambient temperature is sufficiently low. As the ambient temperature rises and the heat pipe can't satisfy demand, speed-controlled components provide additional mechanical cooling, but only as much as is needed. If the ambient temperature exceeds the temperature required in the panel, active cooling alone is supplied, but no more than is necessary.

Many food production facilities work around the clock and throughout the whole year. Heat pipe and inverter technology allow the Blue e+ to uniquely capitalise on the daily and seasonal temperature fluctuations in your factory to deliver typical energy savings of 75 per cent. The best course of action in all instances is to undertake a survey of your existing cooling equipment, taking into account the points discussed above.

Rittal are happy to offer you a free Ri-Assure Cooling Inspection, for which one of its trained representatives will visit your site and provide you with honest, clear advice on your existing equipment and its suitability within the chosen environment/process.

Rittal will then provide you with a short report which includes feedback on the next best steps forward for your installation, whether it is implementing a maintenance contract to prolong the life of existing equipment or the replacement of units that are either undersized or inefficient to improve performance and increase the energy efficiency of your site.

