# EMERGENCY TEMPERATURE CONTROL PLANNER:

**Your PRACTICAL GUIDE to sustaining comfort and protecting critical processes during electric utility outages.**

Temperature control is critical to your business. You need reliable cooling and heating to maintain process efficiency and output and keep your employees comfortable and productive. It's critical to prepare for outages; a failure can put your profits at risk. With a solid contingency plan, you'll know what to do and whom to call to keep your critical temperatures in control, your business functioning and your revenues flowing.

This Temperature Control Planner will guide you and your team through the basic steps of building a contingency plan. The checklist format will help you cover the key elements quickly and easily. To fill in the details, consult with an established supplier of rental temperature control equipment, supplies, and service. Remember, the next storm or natural disaster may already be brewing. The time to plan is now.

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## 1

**Step 1: DECIDE WHAT KIND OF EQUIPMENT YOU NEED.** There are three basic types of short-term temperature-control equipment. Decide which will best suit your facility's purposes:

- ☐ Fluid cooling systems use a heat exchanger or process tank to maintain the temperature of a liquid.
- ☐ Air conditioners maintain air temperature, moisture, movement and cleanliness in a work space, and can be combined with fluid cooling systems to achieve unlimited cool air production.
- ☐ Dense air injection supplies chilled, oxygen-rich air to maintain efficiency in a gas turbine, or petrochemical refining process.

## 2

**Step 2: DETERMINE THE CAPACITY REQUIRED.** In an emergency, you can provide temporary equipment for all your cooling loads or for critical loads only. You must decide where optimum temperatures need to be maintained:

| | | | | | |
|---|---|---|---|---|---|
| ☐ Computer/server rooms | _____kW | _____ tons | ☐ Office space heating/cooling | _____kW | _____ tons |
| ☐ Refrigerators/freezers | _____kW | _____ tons | ☐ Plant heating/cooling | _____kW | _____ tons |
| ☐ Process _____ | _____kW | _____ tons | ☐ Other _____ | _____kW | _____ tons |
| ☐ _____ | _____kW | _____ tons | ☐ _____ | _____kW | _____ tons |
| ☐ _____ | _____kW | _____ tons | ☐ _____ | _____kW | _____ tons |
| ☐ _____ | _____kW | _____ tons | | | |
| ☐ _____ | _____kW | _____ tons | **TOTAL** | _____kW | _____ tons |

**Step 3: CONSIDER SITE-SPECIFIC REQUIREMENTS.** There are a number of factors you will need to consider and discuss with your temperature control rental equipment supplier, including:

- ☐ Approximate length of time equipment will be needed. _____
- ☐ Electric power supply voltage. _____
- ☐ Supply temperature required. _____
- ☐ Return temperature required. _____
- ☐ Chilled fluid flow rate required. _____
- ☐ Amount of fluid pressure on the chiller. _____
- ☐ Kind of fluid running through the chiller. _____
- ☐ Contaminants present in the fluid. _____

**Step 4: DETERMINE THE NECESSARY EQUIPMENT FEATURES.** There are many kinds of temperature control equipment on the rental market. You can choose from a variety of features to suit your site's specific requirements. Features to consider include:

CHILLERS

- ☐ Complete package including pumps, triple-duty valves and suction strainers reduces after-order expense.
- ☐ Standard connections provide fast, easy, flexible hookup to the existing system.
- ☐ Air cooled eliminates cost of water treatment, cooling tower inspections, additional piping.
- ☐ Water cooled for larger tonnage applications with low kW/ton power usage.
- ☐ Variable-flow water pumps accommodate a wide range of cooling and head requirements.
- ☐ Computerized controls enable hands-free starting and stopping.
- ☐ Motor-control center with disconnect switches ensures full compliance with NEC or CE codes.

AIR HANDLERS & SELF-CONTAINED AIR CONDITIONING UNITS

- ☐ Multiple air supply and return connections provide maximum on-site flexibility.
- ☐ Variable-frequency drive enables airflow adjustments to suit the application. (Smaller units may use adjustable inlet guide vanes.)
- ☐ Double-wall construction with insulation reduces noise for employee comfort and compliance with noise ordinances and regulations.
- ☐ Heating elements provide precise control of temperature and relative humidity in heating and cooling applications.

ALL TEMPERATURE CONTROL UNITS

- ☐ Sound attenuation is recommended if your facility is close to homes or other businesses. Ask for ratings below 92 db(A) at full load. Ratings as low as 70-72 db(A) available.
- ☐ Sight gauges simplify monitoring of critical fluid levels.
- ☐ Security features such as lockable doors, interior-mounted oil/water drains, and hidden exterior fuel drains help prevent tampering.
- ☐ Fuel priming pump facilitates start-up after transport.

## 5

**Step 5: IDENTIFY REQUIRED ANCILLARY EQUIPMENT & ACCESSORIES.** Determine which accessories your installation will require, and the quantities, sizes or capacity of each.

- ☐ Cooling towers _____
- ☐ Air handlers _____
- ☐ Heat exchangers _____
- ☐ Circulation tanks _____
- ☐ Ductwork _____
- ☐ Diffusers _____
- ☐ Pumps _____
- ☐ Hoses _____
- ☐ Hose ramps _____
- ☐ Valves _____
- ☐ Oil-free air compressors _____
- ☐ Generators _____
- ☐ Other _____ _____
- _____ _____

## 6

**Step 6: PLAN THE LOGISTICS OF DELIVERY AND OPERATION.** Your equipment supplier must be able to deliver and park the chillers or air conditioners where they will be easily accessible for connecting, operating, servicing and fueling. Planning considerations must include:

- ☐ Environmentally sound location away from drains, work areas and residences.
- ☐ Location with adequate surrounding open space.
- ☐ Location away from traffic, trees and obstructions.
- ☐ Level, paved area for parking.
- ☐ Identification of connection points.
- ☐ Designated access route for delivery.
- ☐ Openings for hoses, piping, ductwork (louvers, weatherhead, access door).
- ☐ Planned route for hoses, piping, ductwork inside and outside the building.
- ☐ Security fencing.

## 7

**Step 7: CHOOSE YOUR TEMPERATURE CONTROL EQUIPMENT SUPPLIER.** To implement a successful plan, look for a rental dealership that has the equipment and accessories you need and personnel qualified to provide:

- ☐ Well maintained and pre-tested equipment.
- ☐ Rental units in stock that meet your load requirements.
- ☐ Modern, emissions-compliant equipment designed for rental use.
- ☐ Complete ancillary equipment in stock.
- ☐ Ability to deliver to meet your time constraints.
- ☐ Quick, efficient delivery and pickup.
- ☐ Spare parts inventory in stock.
- ☐ Staff qualified to deliver turnkey service and technical support.
- ☐ Experience in your industry.
- ☐ Capability to train your staff.
- ☐ Flexible financial options that include weekly and monthly rental contracts; Rental Purchase Options.
- ☐ Pre-approved credit arrangements.
- ☐ 24-hour response including weekends and holidays.

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**Step 8: PROVIDE FOR GENERATOR FUELING IF APPLICABLE.** A reliable fuel supply is essential for emergency operation. You should arrange for fuel service in advance, ideally through your rental equipment supplier, or through another source if necessary. Considerations include:

- ☐ Tank capacity. Determine the fuel consumption rate of the generator set that powers your temperature control system. The unit should be able to operate for at least eight hours between refuelings.
- ☐ Auxiliary fuel. Having an auxiliary fuel tank enables longer runs between refuelings.
- ☐ Delivery access. Make sure you can provide a clear and easily navigable access route for fuel delivery vehicles.
- ☐ Spill containment. Regulations typically require containment equal to 110% of tank capacity.
- ☐ Credit approval. Prior credit approval from the fuel supplier is essential to keep emergency operations on track.

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**Step 9: CONDUCT A DRY RUN.** Practice makes perfect. If you want your plan to work in a real emergency, you must practice its execution beforehand. Stage a drill in which your team and, ideally, your equipment supplier run through the plan step by step, just as if an emergency were really happening.

- ☐ Make sure that each person fully understands his or her role in the event of an actual equipment outage.
- ☐ Estimate how long it takes from the time the temperature control system goes down until your emergency temperature control system is back on line.

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**Step 10: DESIGNATE EMERGENCY PERSONNEL.** On the enclosed sheet, list the key contacts who will be in charge during emergencies and shutdowns. Make this list accessible to your team members and keep it up-to-date. Be sure to include a primary contact and alternate for each of the following job functions:

- ☐ In-house operations / maintenance
- ☐ IT, security, data recovery
- ☐ Electric utility representative
- ☐ Rental equipment representative
- ☐ Equipment hookup
- ☐ Equipment operation
- ☐ Process engineer or contractor
- ☐ Electrical engineer or contractor
- ☐ Fuel supplier

**A FINAL WORD.** We are a supplier of complete temperature control systems for emergencies, special events, planned shutdowns and other short-term events. Our engineers and field technicians are experienced in applications of every size, in every sector. We are prepared to answer your questions about temperature control contingency planning and to be your business partner the next time the need arises. For more information, contact us.

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## USEFUL FORMULAS

| | | |
|---|---|---|
| Temperature Differential (TD) | = | $\frac{TR \times 24}{GPM}$ |
| Flow Rate (GPM) | = | $\frac{TR \times 24}{TD}$ |
| Tons of Refrigeration (TR) | = | $\frac{TD \times GPM}{24}$ |
| Blended Temperatures (BT) | = | $\frac{F1 \times T1}{ft} + \frac{F2 \times T2}{ft}$ |
| Heat Loss / Gain (Q) | = | U x A x (tI – tO) |
| Cooling Tower Ton (CTR) | = | $\frac{GPM \times TD \times 500}{15000}$ |
| Cooling Tower BTUs Per Hour (Btu/Hr) | = | GPM X TD X 500 |
| Cooling Tower Evaporation Rate | = | 3 GPM / 100 TR / Hr = ½ Evap Rate w/ Treatment |
| Cooling Tower Bleed Rate | = | Evap Rate w/o Treatment |

## COMMON ABBREVIATIONS

| | |
|---|---|
| TD | Temperature Differential (Delta T or ΔT) |
| TR | Tons of Refrigeration |
| GPM | Gallons per Minute |
| BTU | British Thermal Unit |
| F (1,2,3 etc) | Flow in Stream |
| T (1,2,3 etc) | Temperature of Stream |
| FT | Flow Total |
| Q | Quantity of Heat either Lost or Gained |
| tI | Temperature Inside |
| tO | Temperature Outside |
| A | Surface Area |
| U | U Factor (inverse of R factor) |


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## EMERGENCY PERSONNEL

| NAME & FUNCTION | E-MAIL | OFFICE PHONE | MOBILE PHONE | HOME PHONE |
|---|---|---|---|---|
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