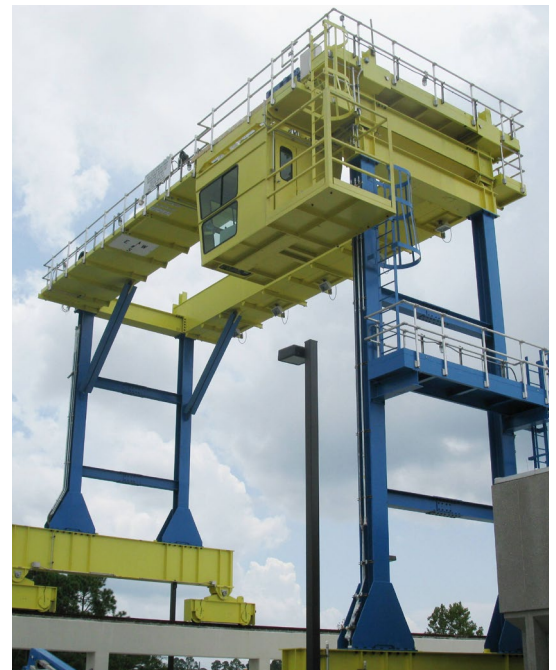


# Technical Notes for Outdoor Service

Cranes and Hoists for outdoor service must be designed for reliable operation in the harsh environment. It is prudent to take into account the effects of weather and temperature on the equipment and there are a number of steps that should be taken into consideration:

1. Severe Duty motors with special insulation, fungal protection and sealed bearings
2. Motor Strip Heaters, Stainless Steel Breather Plugs and corrosion resistant hardware
3. Sealed Motor Disc Brakes, rated IP55 minimum
4. NEMA 4X, stainless steel electrical enclosures with heaters
5. Line voltage transformer for heaters
6. NEMA 4 rated limit switches
7. Proper lubricant selection based on temperature extremes
8. Sealed cable glands
9. Stainless Steel Hoist Wire Rope for corrosion resistance
10. Three Part Painting System recommended as follows
 

Surface Preparation:	SSPC SP10 Near White Metal Blast
1st Coat:	Inorganic Zinc Primer (2-3 mils)
2nd Coat:	Epoxy Intermediate Coat (4-6 mils)
Top Coat:	Polyurethane Finish Coat (3-5 mils)
11. Conductor systems must also be considered for outdoor, service using UV resistant covers and corrosion resistant hardware.
12. Generally, hoist operation should be curtailed if the wind speed exceeds 35 MPH.



## CONSIDERATIONS FOR EXTREME COLD WEATHER OPERATION

Choosing the correct hoists, crane, or component for an application is always critically important due to the inherent risks involved in overhead lifting. If specified incorrectly, the potential for costly equipment damage, personal injury, and lost productivity can be significant. Even so, most Standards today don't consider the impact of cold temperatures on structural steel and other components. The following standards from the American Society of Mechanical Engineers provide a range of temperatures for hoist operation:



- **ASME HST-2-1999 Performance Standard for Manually Operated Chain Hoists:** Hoists and trolleys covered by this Standard are intended for industrial use in ambient temperatures from 0° to 130°F.



- **ASME HST-1-1999 Performance Standard for Electric Chain Hoists:** Hoist equipment is designed to operate in ambient temperatures between 0° F and 104°F.



- **ASME B30.20 Below the Hook Lifting Devices:** Additional considerations need to be taken if the working temperature is outside the range of 24° to 150°

## THE IMPACT OF COLD ON STEEL

It's no surprise that temperature can negatively affect the safe working capacity of cranes. Cold temperatures can adversely affect the tensile toughness of many commonly used materials. Many materials experience a shift from ductile to brittle if the temperature drops below a certain point. The temperature at which this shift occurs is commonly known as the "ductile-to-brittle-transition" temperature (DBTT). Any brittle failure will be unpredictable and catastrophic. It can occur from a random impact, dynamic loading, or even because of stressors like cracks or nicks.

In fact, ASME actually suggests that qualified engineers should either de-rate the crane capacity or use steel that is better suited for low temperature service to protect against system failure in cold-weather climates. It must be kept in mind that cranes and hoists are subject to "impact loading." Therefore, it is important to take into consideration certain precautions for operating at temperatures below 0 degrees F.



1. Check rigging. Most rigging will be provided with literature describing a minimum operating temperature. Be aware of the minimum.

2. Avoid shock loading. Sudden changes in direction or any other type of incidental loading should be avoided.

3. Check equipment regularly. Frequent inspection to look for cracking or chipping will help prevent accidents. Increased frequency of NDT may also be helpful.

4. Beware of ductile to brittle transition. The steel won't bend and deform like it does in moderate temperatures before breaking. Brittle failure happens quickly and without much warning.

5. As a general "rule of thumb", if the temperature is between -10° and -25°F, the crane or hoist should be de-rated by 25%. If the temperature is between -25°F and -40°, the crane or hoist should be de-rated by 40%. Lifting is prohibited at temperatures below -40° F.