Heresite Corrosion Protection

Heresite is a unique baked phenolic coating thermal Transfer uses to protect air cooled heat exchangers from external corrosion.

The following information has been supplied to Thermal Transfer by Heresite-Saekaphen Inc.:

Introduction The first HERESITE coating application to the exterior surfaces of finned tube coils took place over thirty years ago. Since that time, the HERESITE baking phenolic coating has effectively demonstrated its value in protecting heat transfer coils from corrosive attack, hereby appreciably increasing equipment service life. the excellent chemical and temperature resistance coupled with the good heat transfer properties of the HERESITE coating have made possible the outstanding results being obtained.

Description The HERESITE coating of finned tube coils is accomplished by a multiple coat application of dipping and baking resulting in complete coating coverage of the fins, tubes, headers, casings, etc. Consequently, protection against corrosion is provided for the entire coil. Due to specialized surface preparation techniques plus the good adhesive properties of the HERESITE coating, it is possible to efficiently HERESITE coat all the usual metals used in fabricating finned tube coils.

The HERESITE coating applied to finned tube coils is a Flexible Brown Baking Phenolic Coating. This coating is applied to either aluminum, copper or steel with equal results.

We feel it is important to emphasize that HERESITE baking phenolic coatings are manufactured and sold only by HERESITE-SAEKAPHEN, INC. Further, the application of the HERESITE baking phenolic coating to finned tube coils is performed only at our plant in, Manitowoc, Wisconsin.

Practically all types of finned tube coils used for oil, water, air, gas and process cooling (and heating) as well as large condensing coils can be HERESITE protected against damaging environments. Currently, the HERESITE coating of air-conditioning and industrial process coils exposed to corrosive fumes and salt atmosphere is on the increase.

HERESITE coating offers a more economical solution than special metals for these applications. For example, we understand that aluminum fin coils coated with HERESITE are more economical than copper fin coils. Special metal casing materials are unnecessary since the HERESITE coating is applied to the casing as well as to the finned tubes. Additionally, HERESITE coating aluminum fins will resist attack from most cleaning agents more successfully than copper fin coils. It is noted that the HERESITE coating is applied to both plate fin coils as well as spiral wound tubing.

Chemical Resistance The HERESITE baking phenolic coating will withstand exposure to practically all corrosive and chemical fumes with the exception of strong alkalis such as sodium hydroxide, strong oxidizing agents such as aqua regia and concentrations of bromine, chlorine, and fluorine in excess of 100 parts per million. Complete chemical resistance data is shown on the following page.

Temperature Resistance Maximum temperature resistance of 450°F. However, HERESITE baking phenolic coatings cannot be recommended for all chemical atmospheres at temperatures up to 450°F since corrosive activity and permeation may be greater at higher temperatures depending upon the chemicals involved. Excellent adhesion and flexibility enable HERESITE coating to withstand thermal shock. Also, the HERESITE lining will operate at sub zero temperatures without loss of chemical and mechanical properties.

Thermal Conductivity The HERESITE baking phenolic coating is a good thermal conductor and its thermal conductivity is expressed as approximately 2000 BTU per hour per square foot per degree Fahrenheit based on an average 3 mil coating thickness. The "K" factor = 6.0.

Coil manufacturers have indicated there is no need to add additional heating or cooling surface due to the presence of the HERESITE coating.

Guide to Chemical Resistance of HERESITE Bake Phenolic Linings: HERESITE baked phenolic linings will withstand exposure to practically all corrosive atmospheres with the exception of strong alkalis, strong oxidizers and wet bromine, chlorine and fluorine in concentrations greater than 100 PPM. Due to the fact that resistance of HERESITE is dependent upon conditions of service, environment, fabrication details plus other factors, Thermal Transfer Products, Ltd. should be consulted for specific recommendation.

HERESITE Advantages

- Elimination of costly metals
- Extended service life
- Smooth surface - reduced cleaning
- Complete coverage by dipping
- Good thermal conductor
- Good abrasion resistance
- Resistant to many corrosive environments
- Good temperature resistance

Note

4-5 week lead time adder

HERESITE

Fume Resistance

HERESITE is resistant to Fumes of the Following

acetates - all
acetic acid
acetone
acetylene
acrylonitrile
alcohols - all
aldehydes - all
alum
amines - all
ammonia
ammonium hydroxide
ammonium nitrate
aniline
benzoic acid
benzol
boric acid
brine
butane
carbolic acid
carbonates - all
carbon monoxide
carbon tetrachloride
chlorides - all
chlorinated solvents - all
chlorine - less than 100 ppm
chloroform
chromic acid
citric acid
coke oven gas
esters - all
ethers - all
ethylene oxide
fatty acids
fluosilicic acid
formaldehyde
formic acid
freon
fuels - all
gases - inert
gases - manufactured
gases - natural
glycerin
glycols - all
hydrocarbons - all
hydrochloric acid
hydrogen
iodides - all
ketones - all
lacquers
lactic acid
maleic acid
malic acid
methanol
methylene chloride
naphthalene
nitrates - all
nitric acid (dilute)
nitrates - all
nitrobenzene
nitrogen fertilizers
oils, mineral and vegetable - all
oxalic acid
oxygen
perchloric acid (dilute)
phenol
phosphoric acid
picric acid
propane
salicylic acid
silicic acid
steam vapor
stearic acid
sulfate liquors
sulfonic acid
sulfur dioxide
sulfuric acid
sulfurous acid
surfactants
tannic acids
tetraethyl lead
toluene
trisodium phosphate
urea
saltwater
water
xylene

HERESITE is not resistant to Fumes of the Following

aluminum fluoride
ammonium fluoride
aqua regia
bleaching compounds
brass plating solutions
bromine - over 100 ppm
bronze plating solutions
cadmium cyanide
calcium hypochlorite
caustic soda
chlorine - over 100 ppm
cyanide plating solutions
fluorine - over 100 ppm
hydrofluoric acid (conc.)
hydrogen peroxide
hypochlorites
nitric acid (conc.)
nitrogen oxides
potassium hydroxide
sodium fluoride (conc.)
sodium hydroxide (conc.)

High Elevation — Air Cooled Oil Coolers

When sizing air cooled heat exchangers for high elevation applications, consideration should be given to the loss in performance because of the lower density of the cooling air. Use one of the following formulas that has an added factor CE1 or CE1 to offset this loss of performance. The net result of these calculations is a larger cooler.

C_{E1}

1. For AO (Bulletin 15.02), ACOC (Bulletin 17.02), AOVH (Bulletin 18.01), Air or Gas Aftercoolers (Air Cooled - Bulletin 32.06) coolers, AOC - Industrial (Bulletin 13.02) and RM (Bulletin 24.02)

$$\frac{\text{Horsepower to be removed x 2545 x Cv x CE1}}{\text{°F (Oil Leaving - Ambient Air Entering)}}$$

C_{E2}

2. For AOL (Bulletin 16.01), ACOC (Bulletin 34.01), Mobile (Bulletin 25.04), AOC - Mobile (Bulletin 21.02), MF (Bulletin 25.04), DF (Bulletin 36.02, DH (Bulletin 28.03), and AOHM and AOVHM (Bulletin 19.04)

HORSEPOWER AT ELEVATION = HORSEPOWER HEAT LOAD X C_{E2}

<table>
<tr><th>Elevation</th><th>C_{E1}</th><th>C_{E2}</th></tr>
<tr><td>0</td><td>1.00</td><td>1.00</td></tr>
<tr><td>1000</td><td>1.03</td><td>1.02</td></tr>
<tr><td>2000</td><td>1.05</td><td>1.04</td></tr>
<tr><td>3000</td><td>1.08</td><td>1.07</td></tr>
<tr><td>4000</td><td>1.10</td><td>1.08</td></tr>
<tr><td>5000</td><td>1.12</td><td>1.10</td></tr>
<tr><td>6000</td><td>1.14</td><td>1.11</td></tr>
<tr><td>7000</td><td>1.16</td><td rowspan="2">1.12</td></tr>
<tr><td>8000</td><td>1.18</td></tr>
<tr><td>9000</td><td>1.20</td><td>1.13</td></tr>
<tr><td>10000</td><td>1.22</td><td rowspan="2">1.14</td></tr>
<tr><td>11000</td><td>1.24</td></tr>
<tr><td>12000</td><td>1.25</td><td rowspan="3">1.15</td></tr>
<tr><td>13000</td><td>1.27</td></tr>
<tr><td>14000</td><td>1.28</td></tr>
<tr><td>15000</td><td>1.30</td><td>1.16</td></tr>
</table>