

**JET M/C INSULATION REPORT
OF
M/S MAHAVIR TEXTILE MILL**

DATE OF REPORT: 17 OCT 2024

**ADDRESS: MAHAVIR TEXTILE MILL, SURAT TO BARDOLI ROAD,
VILL.-TANTITHAIYA, PALSANA, GUJARAT-394327.**

PREPARED BY

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INTRODUCTION

ENERGY SAVING PROPOSAL

During our visit we observe that all Jet machines and so many valves & flanges are not covered by any insulation or neither were painted by thermal insulation or any heat resistant paint over the entire surface of the valves, in view of energy saving we have to insulate it first. as it does not conserve the energy. It only (Open Jets) dissipates the heat/thermal energy from surface or applied area at a very fast rate of heat transfer as it carries higher thermal conductivity along with.

Currently there are no any insulations in Jet M/c's, valves and flanges. Nearly temperature at this place is between 110 To 115 Degree temperature.

So prevention of heat loss we have to cover full jet body or many insulated area of valves and flanges.

Why Insulate

According to Bureau of energy (BEE) Govt of India if You have 100 sq meter un insulated area your Per annum energy losses is Rs 12 lacs @ 100 to 115 Degree such a very heavy energy losses are there.

Global competition forces manufacturing companies to reduce production costs, where energy and metal prices are increasing rapidly.

Therefore a good way to decrease production cost is to make maximum use of the energy available and to install systems with much longer usable lifetime.

We need to use more technology in both insulation and corrosion protection.

It is possible to insulate with conventional materials only to a Degree because;

- 1) You cannot insulate wet areas.
- 2) Conventional insulation does not prevent corrosion, sometimes increases it.
- 3) Useful lifetime of conventional insulation is much less.
- 4) Application of coating is simple and cheap, but takes a longer time.
- 5) Conventional systems do not offer long term protection against moisture.

We used coating in textile dyeing and finishing plant; especially for thermal insulation of JET dyeing machines which operate at 120 C. Our aims were

- i) With a minimum surface temperature reduction of 55 °C Ambient + 15 °C
 - a) Decrease energy cost
 - b) Increase process stability (which would mean increased product quality and
- ii) Increase machine metal parts lifetime by increased protection against corrosion
- iii) Increase usable lifetime of cold water and steam valves
- iv) Decrease dyeing process times.

In this respect, we are aiming to achieve a minimum of 20% gain in energy consumption, and overall 10% reduction in unit material production cost.

You cannot buy energy cheaper, but with a good insulation, you can achieve maximum gains.

For minimize oscillation of the reaction temperature for dyeing machine to improve reproducibility (color consistency). Insulate to decrease amount of energy used in equipment process.

SOLUTION:**For Long-Term Thermal Insulation AND Oxidation Protection for Metals at high temperature.**

ALTIC SI SYSTEM is a water-based coating that provides extended reduction in temperature, surface oxidation and protection of metals from gaseous chemical attack during thermal cycles. This can be used up to 200 deg C.

Key Features.

- 1 ALTIC SI SYSTEM is designed as three coat system based on temperature range. It contains ALTIC SI PRIMER, ALTIC SI BASECOT and ALTIC SI TOPCOAT.
- 2 Forms Sealed-Porosity-Coating That Prevents High-Temperature Gaseous Reactions with Metal Surfaces
- 3 Works for all Metal surfaces
- 4 Applied with Texture Gun to make it easy online application.
- 5 Primer Forms Sealed-Porosity-Coating That Stops Oxidation: withstands up to 400 deg C.
- 6 Base coat is Safe, Water-Based, Easy to Clean Up tools After Use
- 7 Reduces Shell exterior temperature thereby reducing exterior heat transfer and hence reducing energy consumption.
- 8 Being inorganic in nature it is ecofriendly.
- 9 It is Fire resistant. It does not catch fire or does not spread fire.
- 10 Economical, safe and affordable to install
- 11 No-Itch as conventional glass, fiber or mineral wool.
- 12 Up to 85% recycled content
- 13 Made Using 1 Ox less energy to produce than other types of insulation
- 14 Does not promote mold, mildew or fungi growth
- 15 It is anticorrosive and does not allow the base pipe to corrode.
- 16 Has conduction, convection and radiation heat transfer control. Hence great energy saving will be achieved.
- 17 Does not require shutdown. Application is to be done online.

Ideal Use

Protecting Stainless, Alloy Steels, Carbon Steels, Low-Alloy Steels from Oxidation or Gaseous Chemical Attack. As fire proof and thermal insulation coating on Ducts, fire walls, steam or other hot pipelines. etc. Also, to eliminate glass wool insulation as the maintenance cost is high and with moisture, the thermal conductivity of glass wool increases and the surface corrosion occurs. The effectiveness of glass wool also decreases over time and energy consumption increases. On the other hand, the coating performance is stable and does not vary over time. Being weather resistant, can be used exterior also.

Application Procedure.

- 1 DO NOT DILUTE.
- 2 Re suspend the paint properly with low speed mechanical stirrer.
- 3 Clean surface of oils, dirt, scale etc.
- 4 Apply single coat of AL TIC SI PRIMER with conventional spray gun.
- 5 Allow it to cure for minimum two hours on hot surfaces and four hours for cold surfaces.
- 6 If the surface is not online or is cool, take the system online and let the surface achieve its normal operation temperature.
- 7 Then apply AL TIC SI BASE COAT with help of texture gun having one mm opening.
- 8 Apply one coat and allow to dry with temperature.
- 9 On drying apply second coat and allow to dry.
- 10 Apply required number of coats until the material consumption is 3 .25kg per square foot (wet paint). The weight of dry coating will be around 1.3 kg per sq. ft,
- 11 Allow final coat to dry completely and become free of moisture. It may take 3 to 4 days depending on temperature.
- 12 Apply two coats of AL TIC SI TOPCOAT with conventional spray to achieve covering of 15 sq. ft per liter. It may take three to four coats with interval of four hours between coats.

Specifications

| | | |
|---------------------|---|--|
| Active Ingredient | : | Inorganic binders with temperature insulating |
| Max Use Temperature | : | 250 'C |
| Use Atmosphere | : | All |
| Fired Composition | : | Mixed Non-reactive Oxides |
| Liquid Carrier | : | Water |
| Color | : | Off white. |
| Shelf Life (months) | : | 12 |
| Coating pH | : | 10-12 |
| Substrate Use | : | All |
| Other | : | Nearly water-insoluble after drying; fully water-insoluble after heating |
| Normal Emittance | : | 93% |

Size

AL TIC SI SYSTEM is available in only 10 and 20 Kg packing in buckets.

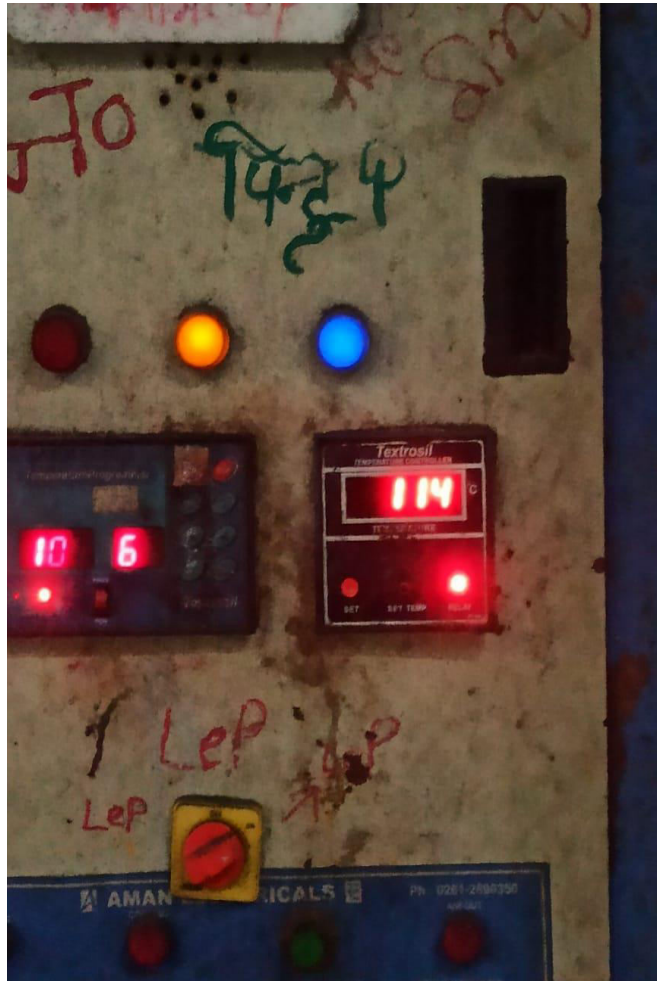
Coating

First AL TIC SI PRIMER coat of around 30-40 microns thick followed by AL TIC SI BASECOAT of around 15 mm thick depending on requirement of temperature reduction followed by ALTIC SI TOPCOAT of around 80-100 microns thick for weather protection.

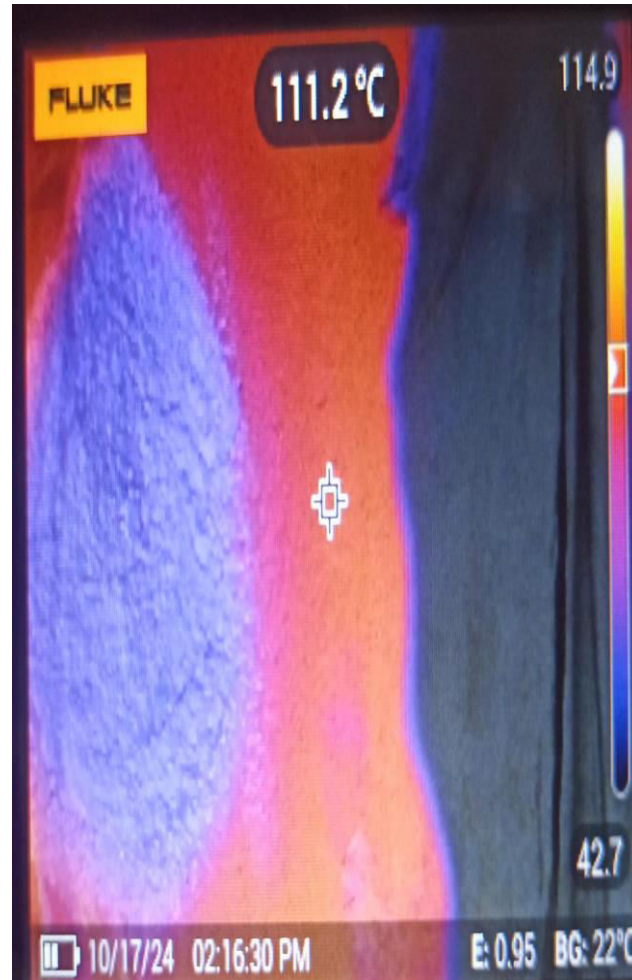
DEALER

Pragati Enterprises

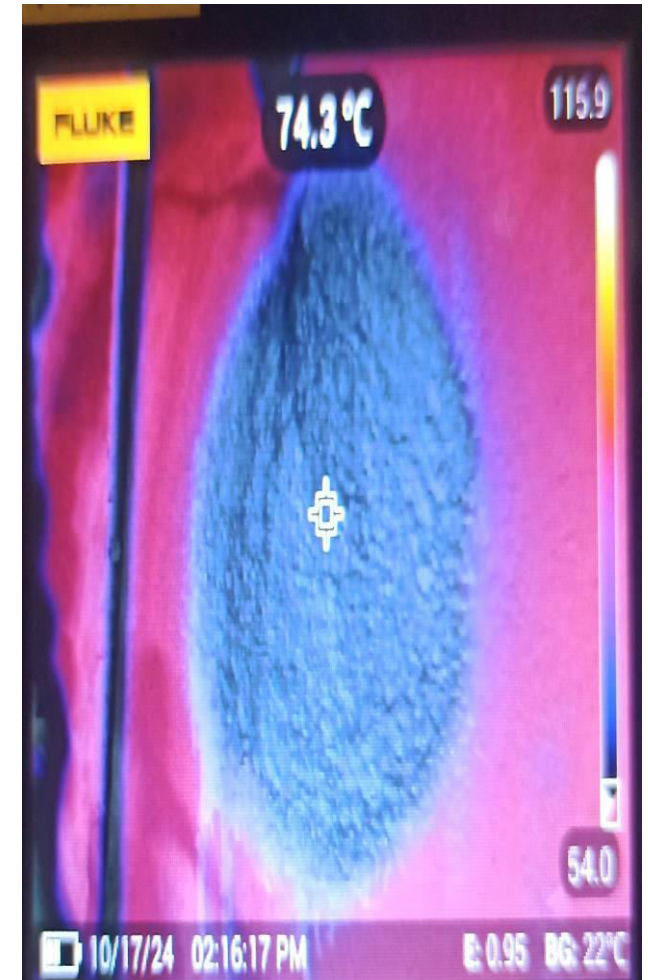
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BEFORE AND AFTER HEAT LOSS IMAGES

**Temperature 114 'C Of Jet
M/c.**



**Temperature 111.2 'C -Uncoated
Surface.**



**Temperature 74.3 'C - Coated
Surface.**

BEFORE AND AFTER HEAT LOSS CALCULATION

| STEAM HEATING EQUIPMENT INSULATION SURVEY | | | | | | | | | |
|--|--------------------------|-----------------|-------------------|---|--------------------------|------------------------------|-----------------------------|---------------------------------|-----------------------------|
| SR. NO. | M/C NAME/LOCATION | DIA. (M) | LENGTH (M) | SURFACE AREA (3.14DL/LXB)(M²) | AMBIENT TEMP. 'C | AVG. SURFACE TEMP. 'C | HEAT LOSS PER SQ.MTR | HEAT LOSS TIME (HRS/DAY) | T.HEAT LOSS KCAL/DAY |
| 1 | Jet No.11 (BEFORE) | 1.1 | 6.7 | 23.14 | 40 | 110 | 945 | 12 | 262428.0 |
| | Jet No.11 (AFTER) | 1.1 | 6.7 | 23.14 | 40 | 74 | 398 | 12 | 110469.7 |
| | | | | | SAVE KCAL PER HR. | | 547.2 | TOTAL | 151958.3 |

| ECONOMICS OF INSULATION PAINT IN U-JET M/C | |
|--|--------|
| Hence Total heat save of jet m/c body insulation in Kcal per day | 151958 |
| Now GCV of 3600 GAR Coal used in.(Kcal per kg) | 3400 |
| Efficiency of Steam Boiler | 70.0 |
| Hence Fuel save in kg per day | 63.9 |
| Now cost of Fuel in Rs. Per kg | 6.20 |
| Hence Daily Fuel save in Rs. | 396 |
| Now cost of Insulation in meter square | 3650 |
| Hence annual Saving by Insulation in Rs. | 133008 |
| Total investment of insulation in Rs. | 84468 |
| Hence simple Payback in Months | 7.62 |