

Resimac Ltd

Engineered Polymer Solutions

561 Thermal Barrier Coating

HSE GUIDANCE – FACTS AND FIGURES

HSE GUIDELINES

- METAL Surfaces above 60°C must be protected
- Approximately 1.5% of all reported incidents concerned thermal burns
- Median days off was 4
- By law employers are required to protect employees and ensure their safety

BURNS AND SCALDS

- At 44°C it takes up to 6 hours to get a 1st degree burn
- At 60°C it takes less than 6 seconds
- At 100°C it takes less than a second



AREA ALSO
COVERED BY
ASTM C1055 -92

ADVANTAGES AND DISADVANTAGES OF EXISTING SYSTEMS

MINERAL WOOL INSULATION



ALTERNATIVE SYSTEMS AVAILABLE ON THE MARKET

WATER BASED THIN FILM COATINGS

- Acrylic technology
- Water Based
- Thin film coverage 100-200 microns per coat
- Based on glass bead technology
- Proven track record in industry
- 55 shore hardness
- Multi coat systems – approx 8-10 coats to achieve protection
- Restricted by weather conditions on outside applications 10°C - 30°C



EPOXY HIGH BUILD COATINGS

- Based on proven epoxy technology
- Solvent free 100% solids
- High build system 0.5mm – 1mm per coat
- Based on innovative filler technology
- New to industry – 18 months track record
- Suitable up to 160°C
- Good corrosion resistance
- Can be applied to damp, cold surfaces (condensation)
- Can be applied to hot surfaces up to 120°C

Resimac High Temperature Coatings– 561 Thermal Barrier

561 THERMAL BARRIER – product features

- Two pack epoxy system
- Standard Bis A/F resin
- Lightweight
- Solvent free
- 100% solids
- Reduces surface temperature of metallic surfaces
- Reduces heat loss by up to 40%

561 THERMAL BARRIER – application features

- Applied by Standard airless spray
- Applied in 5 coats up to 1mm per coat
- Can be applied to surfaces up to 110C
- Manual surface prep, hydroblast, abrasive blast clean
- Slump resistant upto 3mm in a single coat

HOW DO INSULATION COATINGS WORK?

THERMAL CONDUCTIVITY OF MATERIALS – k value

• Carbon Steel	43 W/mK
• Mineral wool	0.04 W/mK
• Water based	0.15 W/mK
• Epoxy based	0.10 W/mK

Definitions.....

K-value thickness matters because the thicker something is, the slower heat will pass through it.

The thermal conductivity is a measure of how easily heat passes through the material and is called the k-value. k-value is measured in W/mK. Thermal conductivity is an inherent property of a material, like stiffness or density

HEAT LOSS OF MATERIALS – u value

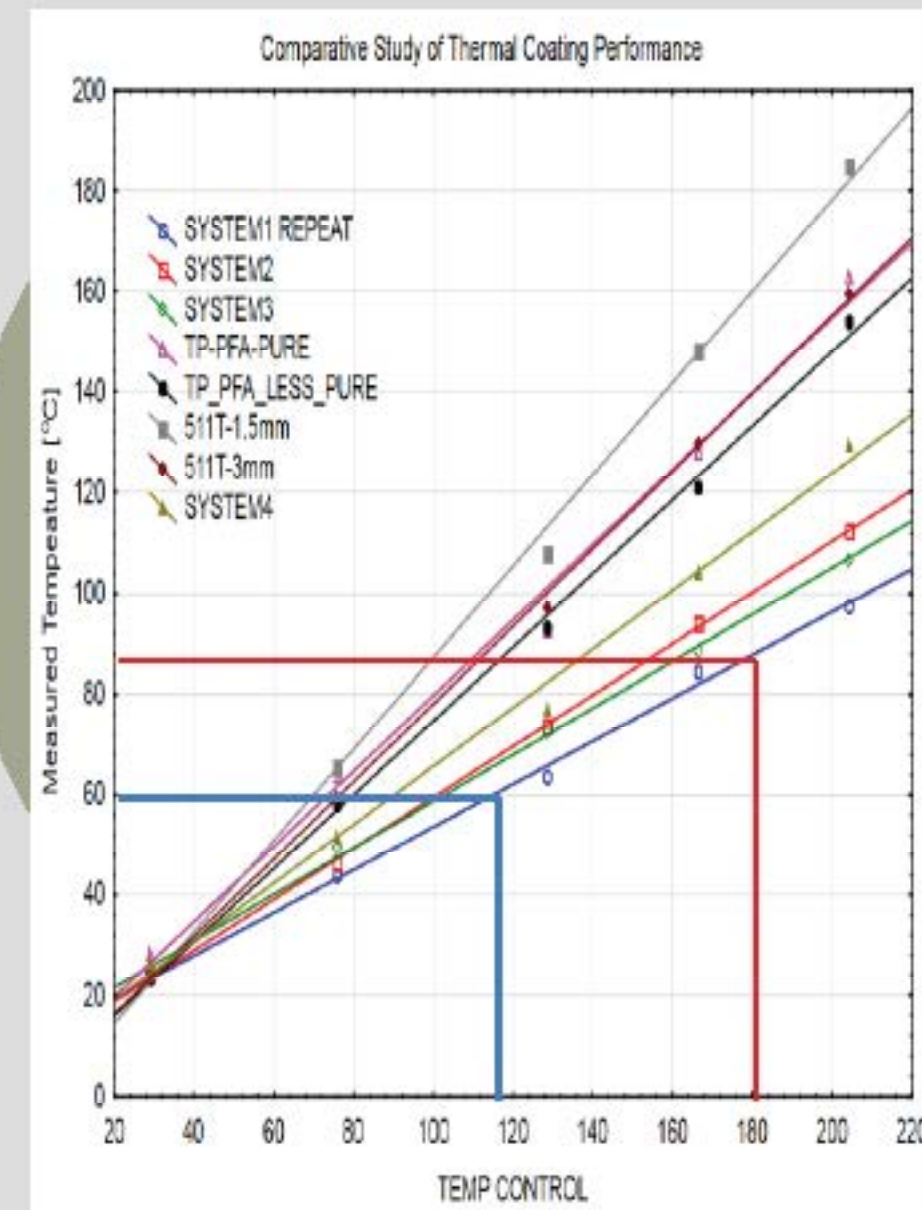
• Carbon Steel	8600 W/m ² K
• Mineral wool	8.0 W/m ² K
• Water based	30.0 W/m ² K
• Epoxy based	20.0 W/m ² K

BASED ON 50MM OF ROCKWOOL, 5MM THICKNESS OF CARBON STEEL, WATER BASED AND EPOXY BASED COATINGS.

U-value is measured in W/m²K – that is, Watts per square metre per degree Kelvin (1 degree Kelvin is the same as 1 degree Centigrade, but with a different zero).

So if a wall has a U-value of 1.0, then 1 m² of wall will let 1 Watt pass through it when there is a temperature difference of 1 degree between the inside and outside.

WHAT THIS EQUATES TO IN SURFACE TEMPERATURE REDUCTION USING STANDARD DEFINITIONS AND TESTING EQUIPMENT



- Based on the graph, if you apply 5mm of epoxy high build the temperature will be reduced from 118°C to 60°C

* Blue line on the graph

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561 THERMAL BARRIER – testing

- Independently tested by Gearing Scientific
- Conforms to ISO 8301
- Proven to reduce surface temperature
- Proven to have insulating qualities
- Reduces heat loss by 40% compared to bare steel pipe

Test No:	Plate No:	Material thickness (mm)	Lower temperature set (C°)	Actual Temperature Recorded (C°)	Lambda Value @ C° Mean	Steel Plate Temperature (C°)
8	6	3.93	35.0	38.3	0.10 @ 69	100
8	6	3.93	40.0	40.4	0.10 @ 80.2	120
10	5	4.03	40.0	40.5	0.10 @ 80.2	120
8r	6	3.93	45.0	45.8	0.10 @ 93	140
8r	6	3.93	50.0	51.6	0.11 @ 106	160
8r	6	3.93	55.0	57.5	0.11 @ 117	180

Resimac High Temperature Coatings– 561 Thermal Barrier



95°C Evaporator

- All surfaces mechanically abraded
- Filler allowed to cure for 15 minutes
- Thin film of 561 thermal barrier applied to all surfaces
- Approx DFT ranging from 150 -250 microns
- Coating allowed to cure off for 2 hours

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Surface after 2nd coat at 500 microns



Surface after 1st coat at 150-250 microns

95°C Evaporator

- 2nd coat of material applied at 500 microns on to all surfaces
- Surface of the evaporator can be touched with out fear of burns

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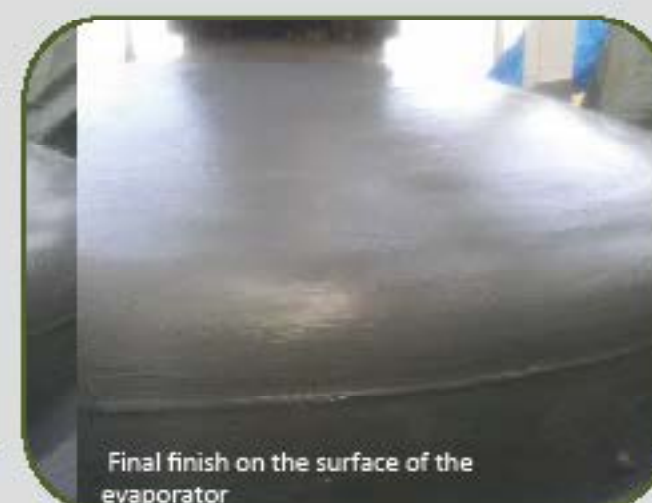
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Surface after 3rd coat at 750 microns



Surface after 4th coat at 750 microns



Final finish on the surface of the evaporator



Photo highlighting the WFT on 3rd and 4th coats

95°C Evaporator

- 3rd coat of material applied at 750 microns on to all surfaces
 - Surface heat so reduced thicker WFT of material can be applied
- | | |
|----------------------|-----------------|
| 1 st coat | 150-250 microns |
| 2 nd coat | 500 microns |
| 3 rd coat | 750 microns |
| 4 th coat | 750 microns |

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Resimac High Temperature Coatings– 561 Thermal Barrier



95°C Evaporator
DOES IT WORK????????????

JOB COMPLETED – CUSTOMER HAPPY

NEW ORDER FOR 7 X EVAPORATORS ON SITE
WORK COMMENCES MAY 2014

HIGH BUILD EPOXY APPLICATIONS



Pipework at 160°C

- Surface manually prepared using coarse sandpaper
- Material brush applied in 5 coats
- Surface touch temperature reduced to 59°C

HIGH BUILD EPOXY APPLICATIONS



US Chemical plant

- Pipe T's in areas where operators work coated in thermal barrier
- Surfaces abrasive blast cleaned and coated in workshop in a controlled environment
- Touch up finished in situ at 90°C
- Coating used as standard on site