

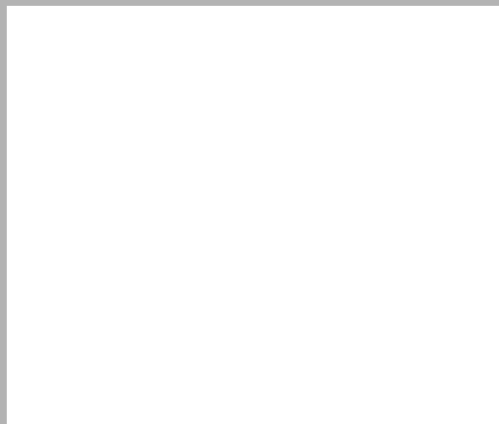


WESAM SYSTEMS

Thermal Inspection for Mechanical Equipment

Using Advanced FLIR T640 Thermal Camera

For



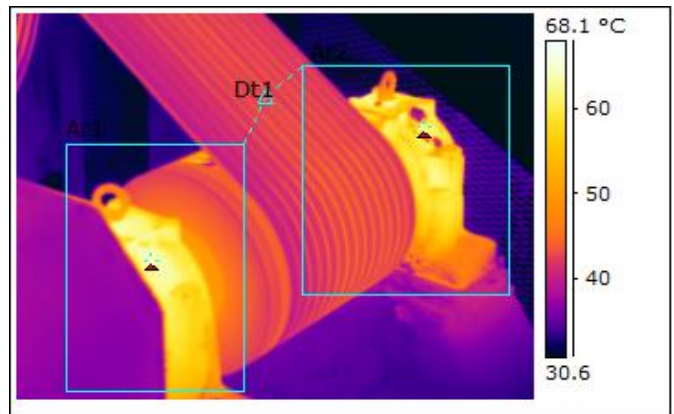
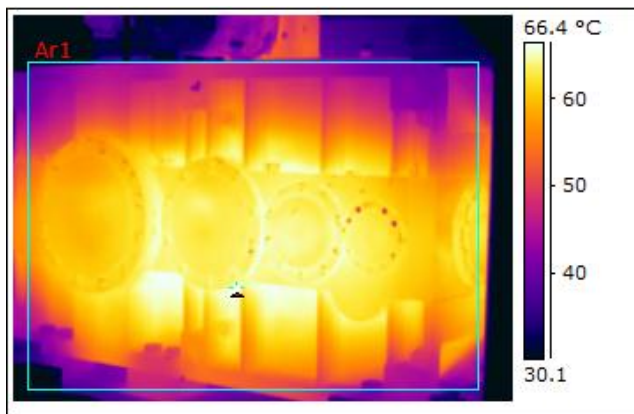
Madinah, Saudi Arabia


12/19/2016

By

Engr. Adrian Arigo

ITC Level 1 Thermographer



 WESAM SYSTEMS	Thermography Inspection for Mechanical Equipment at Part 6 of 11	Date: 12/19/2016
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Inspection Site Information	
Customer	
Address	Madinah, Saudi Arabia
Contact Person	
Mobile	
Email	
WESAM Contact person	
Phone number	
E-mail address	
Thermographer	Engr. Ahmed Abu Al-Khair

Tool used for the service:


Using Advanced FLIR T640 Thermal Camera

Engineer's Qualifications:

Engr. Adrian Arigo, ITC Level 1 Thermographer

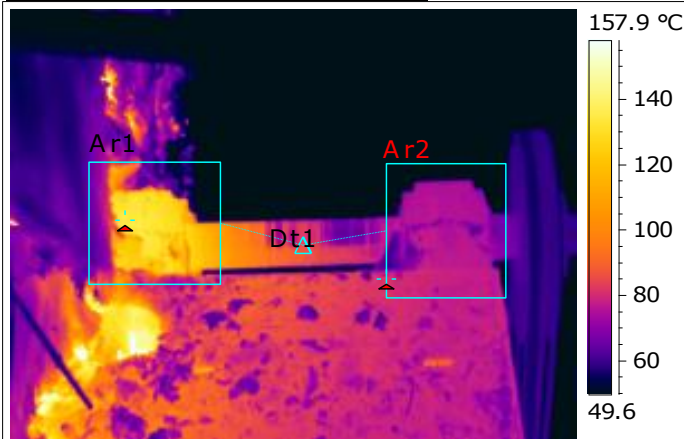
Overview of Fault Rating:

0: Normal	Temp rise 0-5 °C	No action
1: Low grade	Temp rise 5-10 °C	To be monitored – Plan new inspection
2: Medium grade	Temp rise 10-35 °C	Repair as soon a schedule permits
3: High	Temp rise >35 °C	Repair immediately

 WESAM SYSTEMS	<p align="center">Thermography Inspection for Mechanical Equipment at</p> <p align="center">Part 6 of 11</p>	<p align="right">Date: 12/19/2016</p>
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Summary of Findings				
Location	Equipment	Fault	Recommendation	Page Number
Factory 2 – Kiln Area	Recovery Fan	High	Repair immediately	4
Factory 2 – Rapid Cooling Area	Motor 1	Normal	No Action	5
Factory 2 – Rapid Cooling Area	Motor 2	Normal	No Action	6
Factory 2 – Rapid Cooling Area	Motor 3	Normal	No Action	7
Factory 2 – Rapid Cooling Area	Motor 4	Normal	No Action	8
Factory 2 – Rapid Cooling Area	Motor 5	Normal	No Action	9
Factory 2 – Diesel Burners	Motor 1	Normal	No Action	10
Factory 2 – Diesel Burners	Motor 2	Low Grade	To be monitored-plan new inspection	11
Factory 2 – Diesel Burners	Motor 3	Normal	No Action	12
Factory 2 – Diesel Burners	Motor 4	Normal	No Action	13
Factory 2 – Diesel Burners	Motor 5	Normal	No Action	14
Factory 2 – Diesel Burners	Motor 6	Normal	No Action	15
Factory 2 – Diesel Burners	Motor 7	Normal	No Action	16
Factory 2 – Diesel Burners	Motor 8	Normal	No Action	17
Factory 2 – Diesel Burners	Motor 9	Normal	No Action	18
Factory 2 – Diesel Burners	Motor 10	Normal	No Action	19
Factory 2 – Diesel Burners	Motor 11	Normal	No Action	20
Factory 2 – Diesel Burners	Motor 12	Normal	No Action	21
Factory 2 – Diesel Burners	Motor 13	Normal	No Action	22

Infrared Thermogram 12/19/2016



Location	Factory 2 – Kiln Area
Equipment	Recovery Fan

Image File Name	GR_10208.jpg
Image Date	12/19/2016
Image Time	2:39:18

Ar1 Max. Temperature	135.1 °C
Ar2 Max. Temperature	81.4 °C
Dt1 Value	53.7 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input checked="" type="checkbox"/>

Analysis:

Impending bearing failure – which indicate overheating bearing / Out bearing problem

Corrective action:

Recommendation: Generate a maintenance order to either replace the bearing or lubricate the bearing. While somewhat expensive and requiring an expert, vibration analysis can often help you determine the best course of action. Do another thermal inspection

Reported by :

Engr. Adrian Arigo Signature:.....

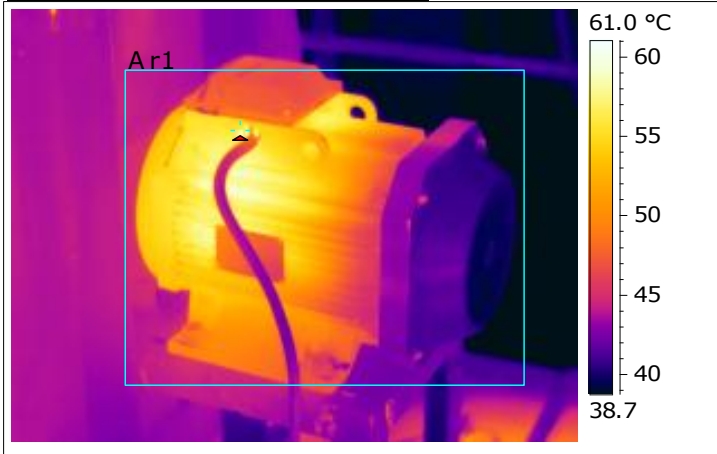
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

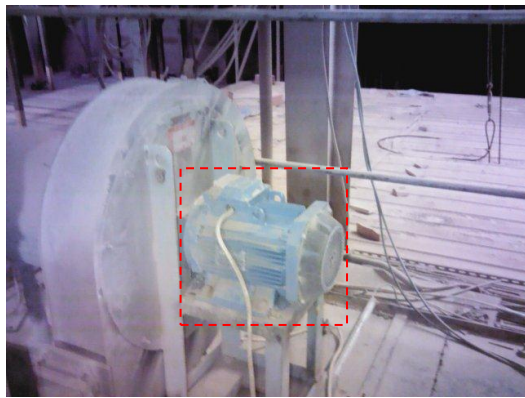


Location	Factory 2 – Rapid Cooling Area
Equipment	Motor 1

Image File Name	GR_10212.jpg
Image Date	12/19/2016
Image Time	2:49:52

Ar1 Max. Temperature	60.1 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal.

Reported by :

Engr. Adrian Arigo Signature:.....

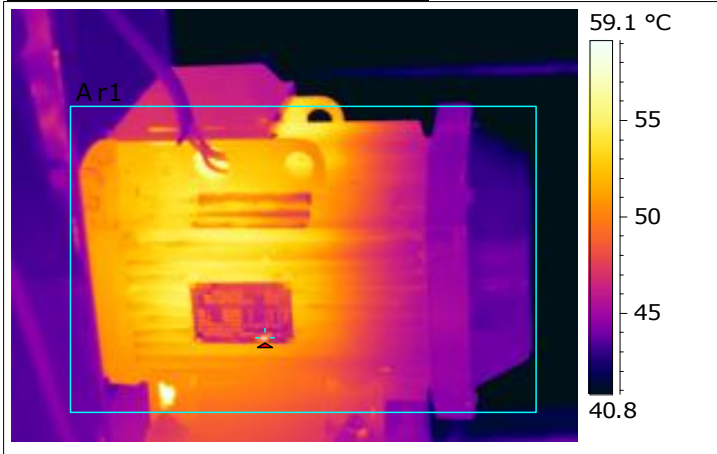
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

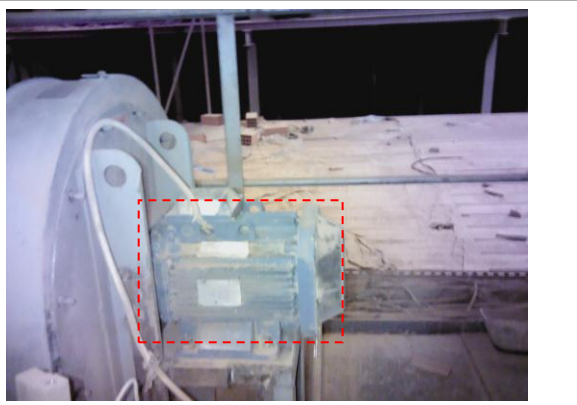


Location	Factory 2 – Rapid Cooling Area
Equipment	Motor 2

Image File Name	GR_10214.jpg
Image Date	12/19/2016
Image Time	2:50:49

Ar1 Max. Temperature	73.6 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by :

Engr. Adrian Arigo Signature:.....

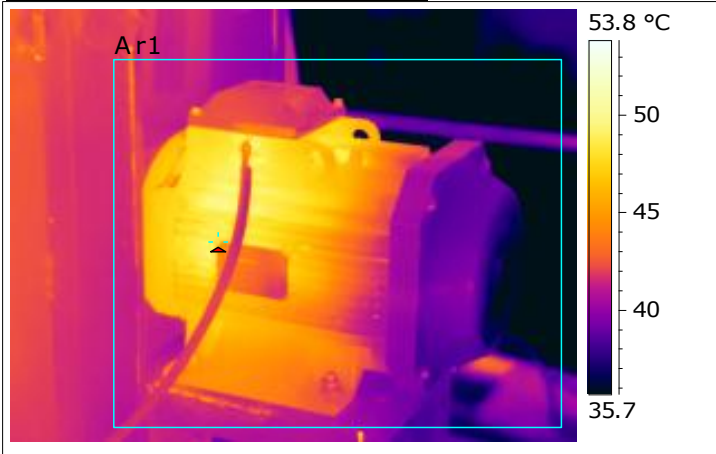
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

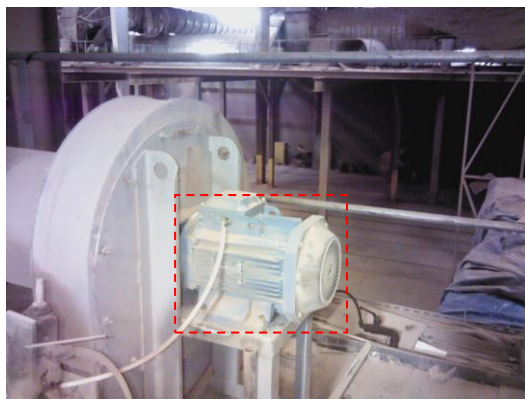


Location	Factory 2 – Rapid Cooling Area
Equipment	Motor 3

Image File Name	GR_10216.jpg
Image Date	12/19/2016
Image Time	2:51:29

Ar1 Max. Temperature	52.1 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal.

Reported by :

Engr. Adrian Arigo Signature:.....

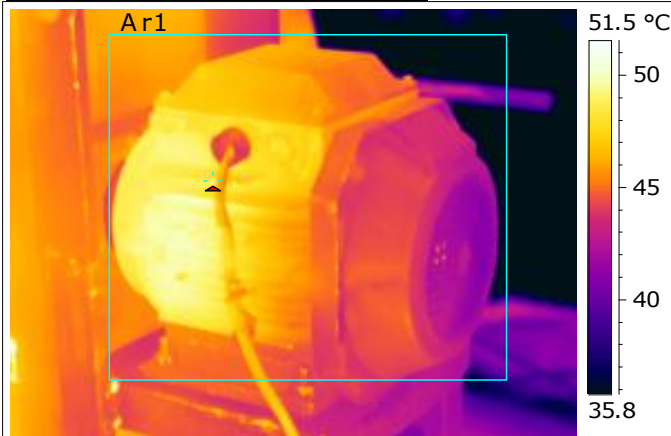
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

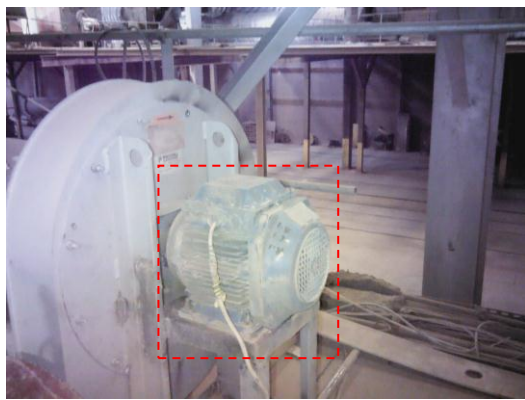


Location	Factory 2 – Rapid Cooling Area
Equipment	Motor 4

Image File Name	GR_10218.jpg
Image Date	12/19/2016
Image Time	2:51:56

Ar1 Max. Temperature	51.9 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

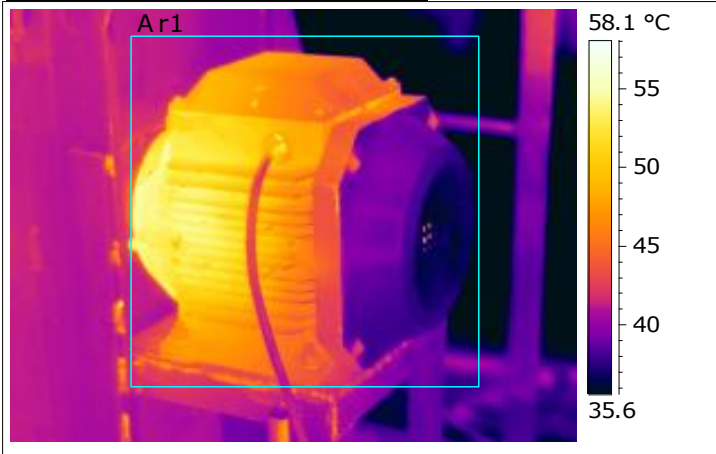
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

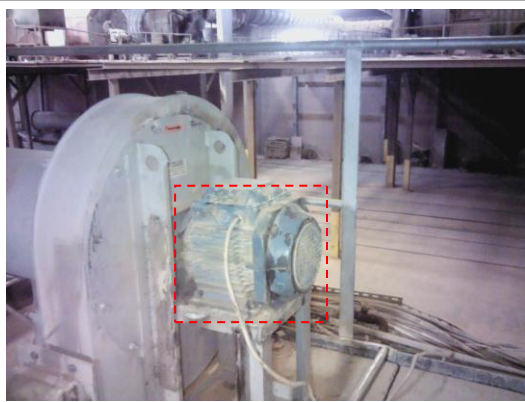


Location	Factory 2 – Rapid Cooling Area
Equipment	Motor 5

Image File Name	GR_10220.jpg
Image Date	12/19/2016
Image Time	2:52:32

Ar1 Max. Temperature	61.2 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

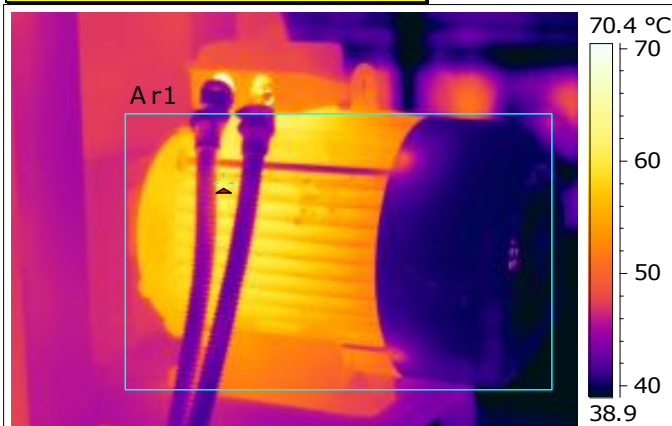
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

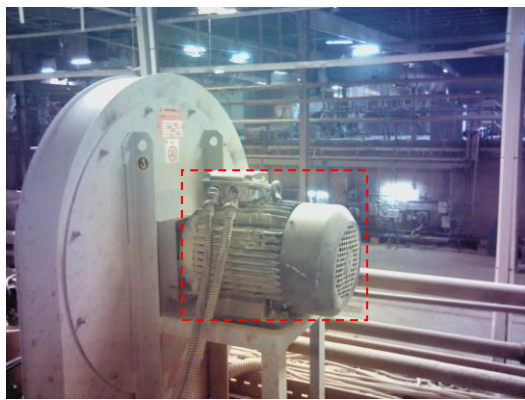


Location Factory 2 – Diesel Burners
Equipment Motor 1

Image File Name GR_10222.jpg
Image Date 12/19/2016
Image Time 2:56:36

Ar1 Max. Temperature 61.6 °C

Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

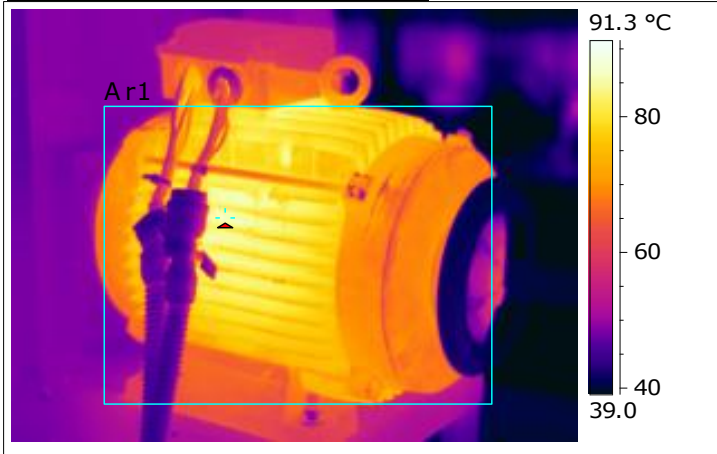
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016



Location Factory 2 – Diesel Burners

Equipment Motor 2

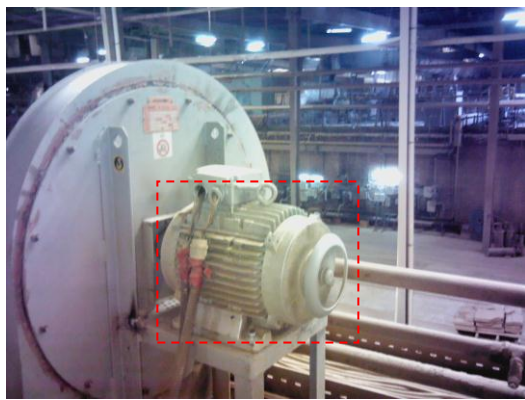
Image File Name GR_10224.jpg

Image Date 12/19/2016

Image Time 2:57:21

Ar1 Max. Temperature 86.0 °C

Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input checked="" type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Internal winding problem of motor

Corrective action:

Recommendation: If motor is not equipped with installed sensors: record Stator temperature using thermographic imaging. This data should be trended. The monitoring should be completed at similar motor loading and ambient temperature to allow for accurate trending.

Reported by : Engr. Adrian Arigo Signature:.....

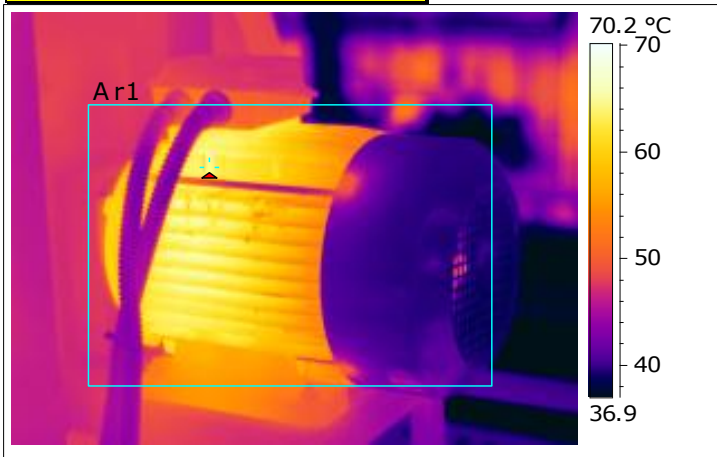
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016



Location	Factory 2 – Diesel Burners
Equipment	Motor 3

Image File Name	GR_10226.jpg
Image Date	12/19/2016
Image Time	2:58:03

Ar1 Max. Temperature	65.6 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

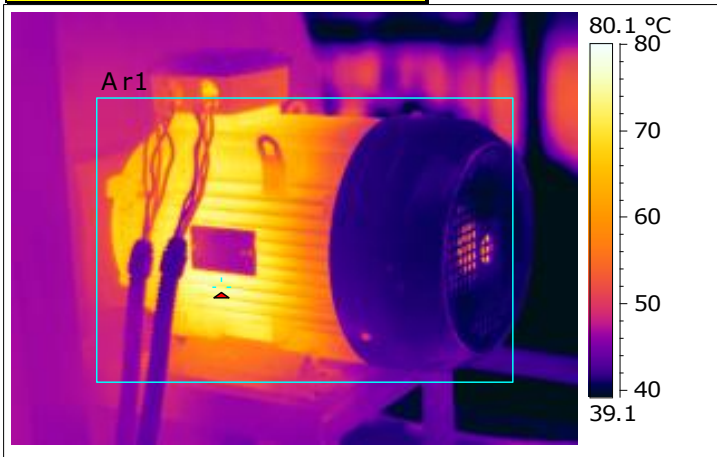
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016



Location Factory 2 – Diesel Burners
Equipment Motor 4

Image File Name GR_10228.jpg
Image Date 12/19/2016
Image Time 2:58:41

Ar1 Max. Temperature 75.9 °C

Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

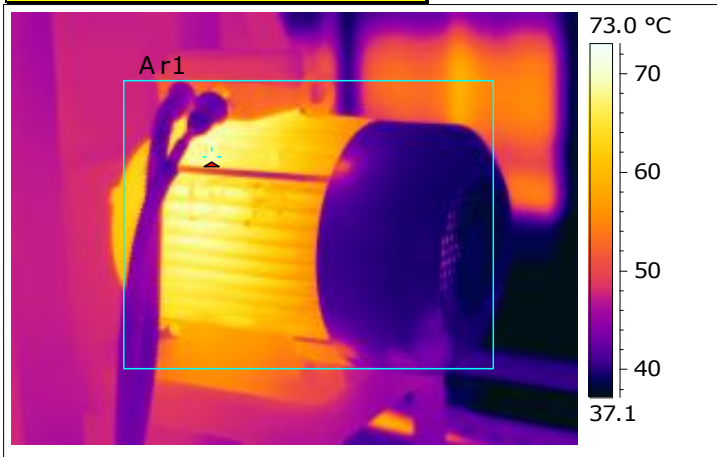
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

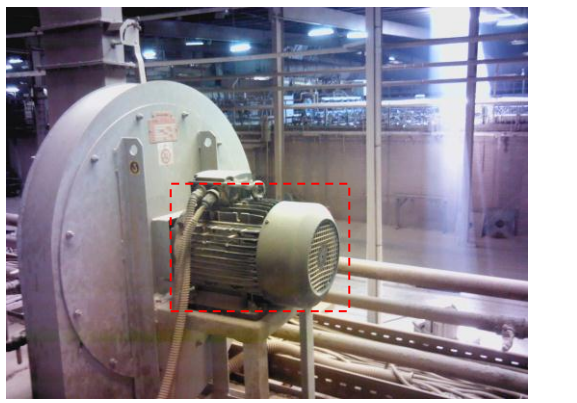


Location	Factory 2 – Diesel Burners
Equipment	Motor 5

Image File Name	GR_10230.jpg
Image Date	12/19/2016
Image Time	2:59:25

Ar1 Max. Temperature	70.6 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by :

Engr. Adrian Arigo Signature:.....

date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

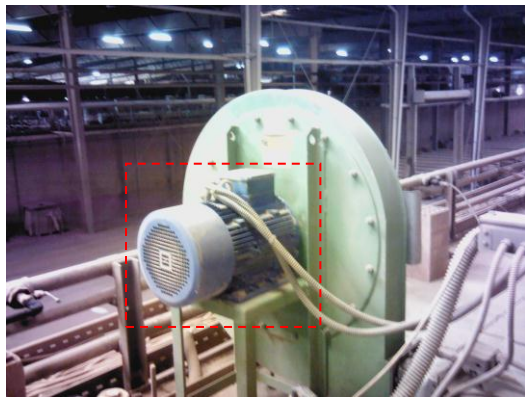


Location	Factory 2 – Diesel Burners
Equipment	Motor 6

Image File Name	GR_10232.jpg
Image Date	12/19/2016
Image Time	2:59:47

Ar1 Max. Temperature	59.3 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

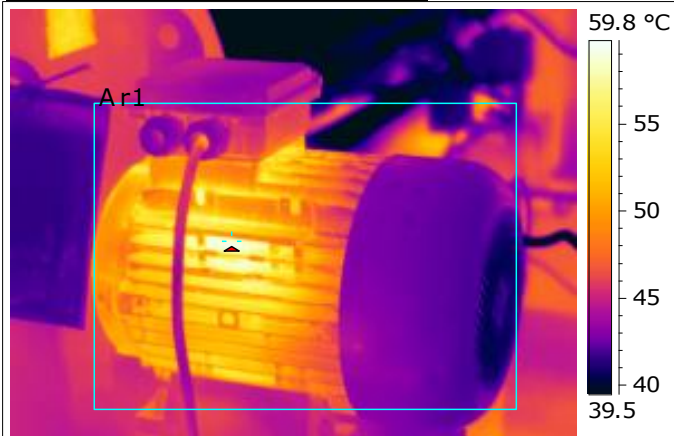
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

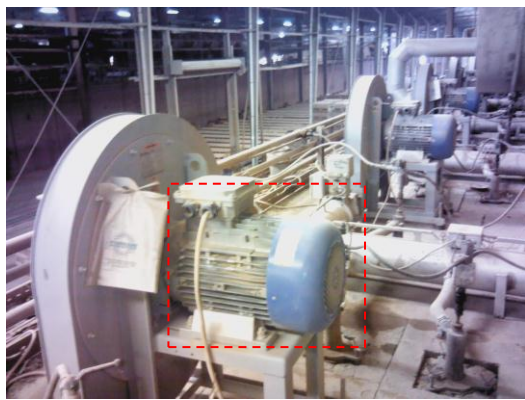


Location	Factory 2 – Diesel Burners
Equipment	Motor 7

Image File Name	GR_10234.jpg
Image Date	12/19/2016
Image Time	3:00:24

Ar1 Max. Temperature	59.8 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal.

Reported by :

Engr. Adrian Arigo Signature:.....

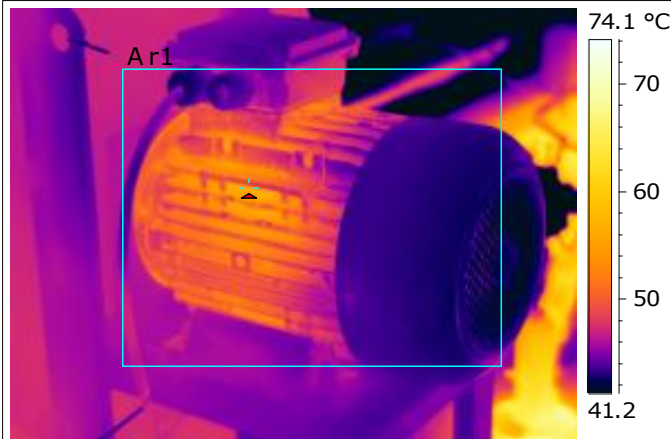
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/09/2016

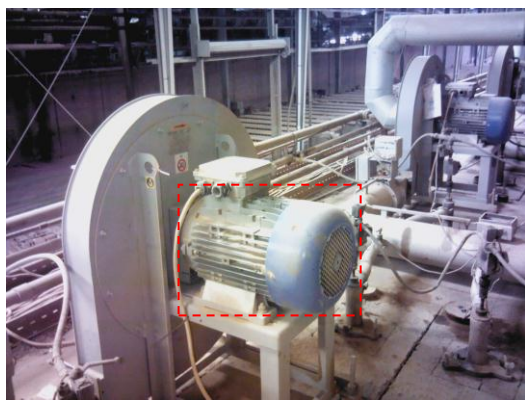


Location	Factory 2 – Diesel Burners
Equipment	Motor 8

Image File Name	GR_10236.jpg
Image Date	12/09/2016
Image Time	3:00:53

Ar1 Max. Temperature	56.8 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by :

Engr. Adrian Arigo Signature:.....

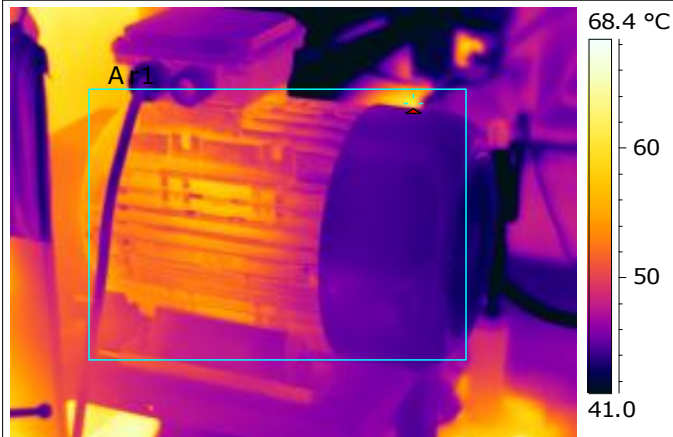
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

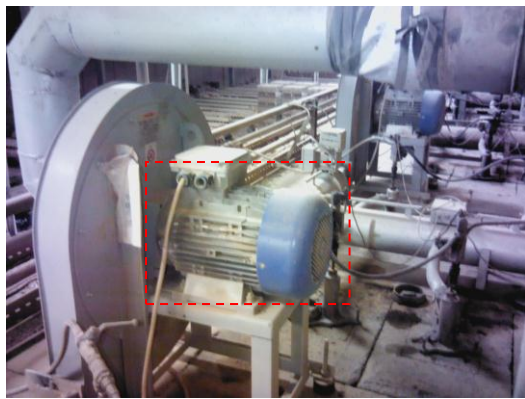


Location	Factory 2 – Diesel Burners
Equipment	Motor 9

Image File Name	GR_10238.jpg
Image Date	12/19/2016
Image Time	3:01:37

Ar1 Max. Temperature	60.6 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

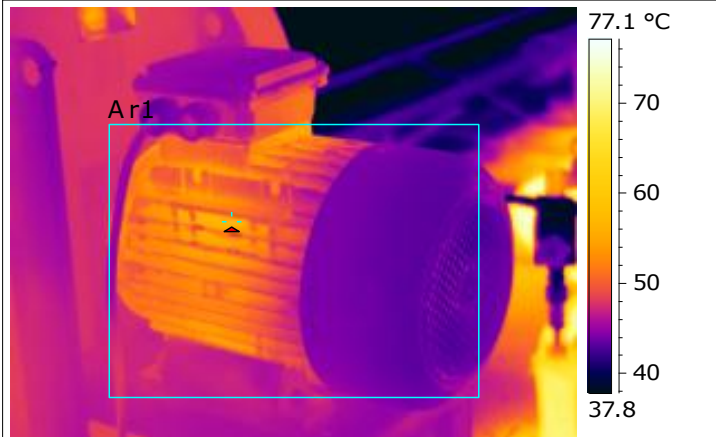
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

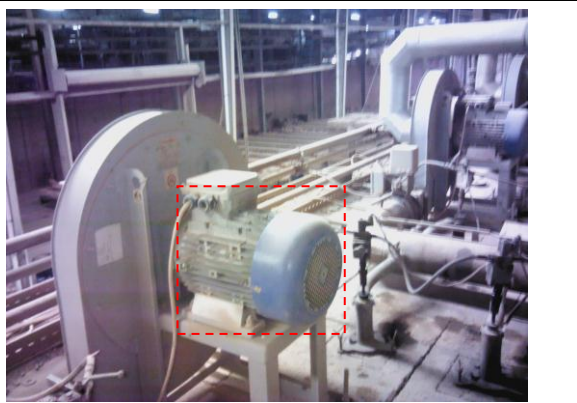


Location	Factory 2 – Diesel Burners
Equipment	Motor 10

Image File Name	GR_10240.jpg
Image Date	12/19/2016
Image Time	3:01:59

Ar1 Max. Temperature	57.2 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by :

Engr. Adrian Arigo Signature:.....

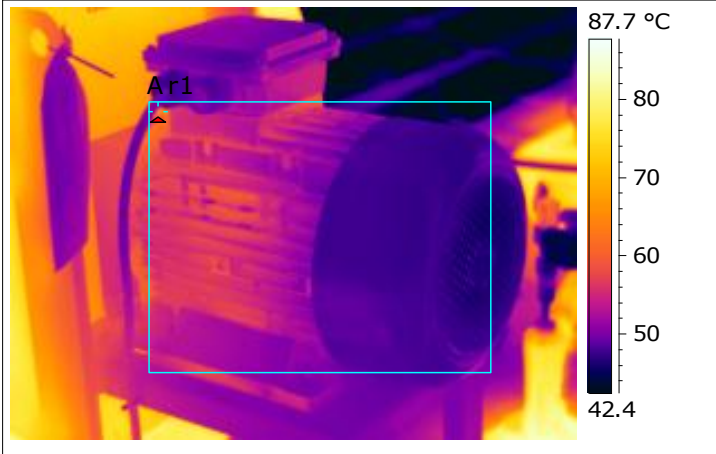
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

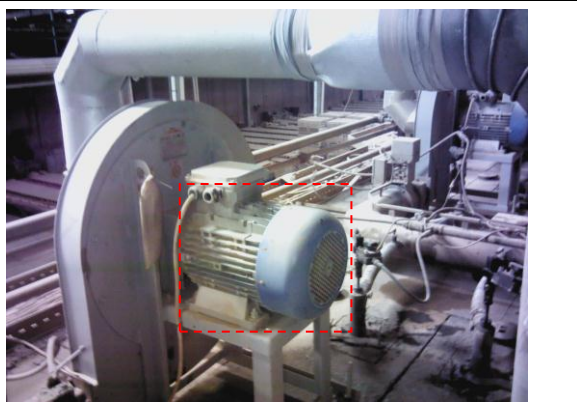


Location	Factory 2 – Diesel Burners
Equipment	Motor 11

Image File Name	GR_10242.jpg
Image Date	12/19/2016
Image Time	3:02:26

Ar1 Max. Temperature	64.7 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by :

Engr. Adrian Arigo Signature:.....

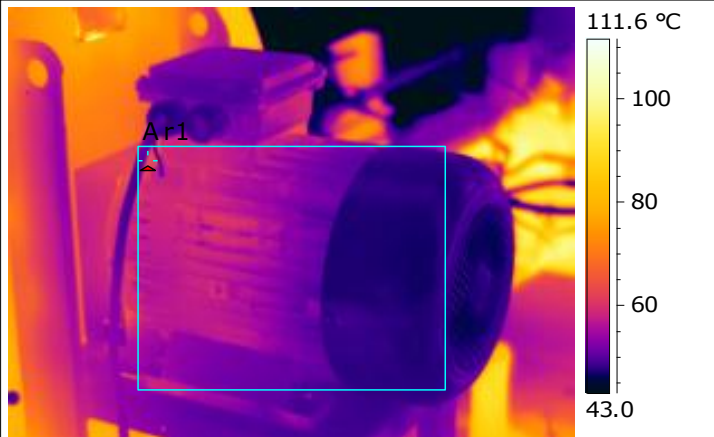
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016



Location	Factory 2 – Diesel Burners
Equipment	Motor 12

Image File Name	GR_10244.jpg
Image Date	12/19/2016
Image Time	3:02:54

Ar1 Max. Temperature	63.7 °C
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Photo and Identification



Severity Rating & Recommendation

1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by :

Engr. Adrian Arigo Signature:.....

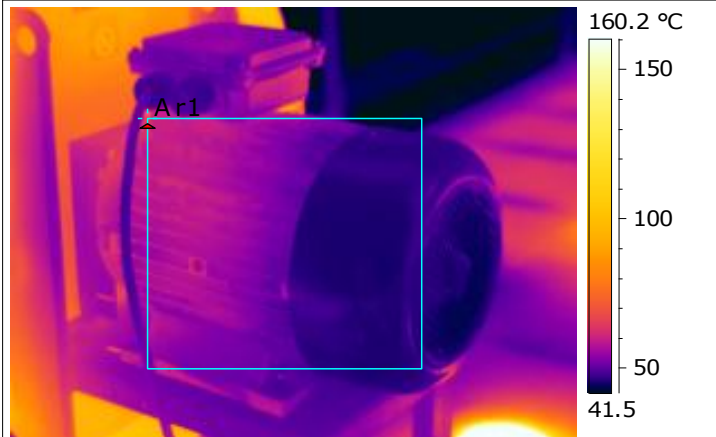
date:12/19/2016

Repaired by:

date:

Comment:.....

Infrared Thermogram 12/19/2016

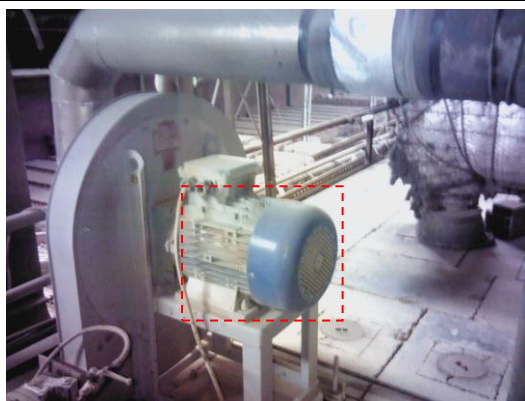


Location	Factory 2 – Diesel Burners
Equipment	Motor 13

Image File Name	GR_10246.jpg
Image Date	12/19/2016
Image Time	3:03:32

Ar1 Max. Temperature	65.9 °C
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Photo and Identification



Severity Rating & Recommendation			
1	Low ($\Delta = 5-10^{\circ}\text{C}$)	To be monitored	<input type="checkbox"/>
2	Medium ($\Delta = 10-35^{\circ}\text{C}$)	Repair as soon as schedule permits	<input type="checkbox"/>
3	High ($\Delta > 35^{\circ}\text{C}$)	Repair immediately	<input type="checkbox"/>

Analysis:

Corrective action:

. Recommendation: Nothing to do since the temperature reading was normal

Reported by : Engr. Adrian Arigo Signature:.....

date:12/19/2016

Repaired by:

date:

Comment:.....