



Ti Thermal Imaging LTD

Unit 8, Weybridge Business Centre, 66 York Road, Weybridge, Surrey, KT13 9DY

Tel: 0845 458 6315 Fax: 0871 9004978 E-mail: info@thermalimaging.co.uk Web: www.thermalimaging.co.uk



RISK MANAGEMENT THERMOGRAPHIC MECHANICAL INSPECTION FOR:

SAMPLE

LOCATION:

**SAMPLE
(ADDRESS)**

DATE:

20/10/10

TI JOB NO.

TI-13513



Report generated by Ti Thermal Imaging LTD.

Company Registered in England: 04450573 VAT No. 828 6288 87





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Introduction to your Ti Thermal Imaging LTD risk management thermographic inspection

This electrical, mechanical and visual thermographic inspection has been carried out using a Flir P-series camera with data input onto a purpose built tablet PC platform for instantaneous results and report generation. A Webmanager houses all data that is permanently accessible over the internet allowing the user to track and monitor problems and their repair status.

This is a guide which should help you to fully understand how the inspection was performed and how the results were achieved

- The framework to this inspection can either be generated onsite during the inspection, building the list during the survey or a list exported to MS Excel can be imported into the tablet PC to provide comprehensive information such as item locations, tag numbers, work orders etc.
- Images are captured of all online items and a record is kept of temperature data to enable a trending programme to begin. Subsequent inspections will see the addition of a new image for each inspection so that temperatures can be monitored.
- Baseline images and anomalous pieces of equipment have been recorded as one of three types of inspection:
 - T/D Electrical – This covers transmission, distribution and instrumentation
 - Mechanical – This covers all mechanical/moving/rotary equipment
 - Visual – This covers all visual findings only
- All component baseline images are taken under normal load conditions.
- Panels have been removed where safe and possible to do so and where covered by the Permit To Work system. In addition load readings have been captured using a clamp meter only where covered by the Permit to Work system and where safe to do so. In some cases load readings have not been taken so these are left as blank intentionally so that the normalised graph will function correctly. If a 0 value is inserted then a fictitious reading will be obtained. An explanation of the Normalization graph is listed later.
- A complete inventory will be built of the equipment giving Test Status at the time of the inspection allowing transparency to the inspection and what occurred with each piece of equipment. These Test Status include:

TBT	To Be Tested	These appear in bold on the thermographers tablet to identify which items are still to be tested
TESTED	TESTED	Marked as Tested once images and faults have been documented
NTLO	Not Tested Locked Out	Selected if the item could not be opened safely
NTNL	Not Tested No Load	Selected if the item was offline at the time of inspection and could not be started
NTNA	Not Tested Not Available	Selected if the item is no longer available
NTNS	Not Tested Not Specified	Selected if an item is found to be unspecified
NTUR	Not Tested Under Repair	Selected if an item is currently under a repair procedure
NSFI	Not Scheduled For Inspection	Selected if an item is not due or needed to be tested
NTTC	Not Tested Time Constraint	Selected if the inspection has not been allocated enough time or access problems have cause it to overrun.



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- Each piece of equipment has been allocated a priority to operation taken from the following non-changeable list:

CTO	Critical To Operation
ETO	Essential to Operation
NON	Non-Essential To Operation
UNC	Unclassified

- Emissivity is the value in which an object emits it's infra-red radiation and is also directly proportional to it's reflectivity. For example if an item had 0.9 emissivity then it's reflectivity would be 0.1. This inspection uses an emissivity set to 0.96 because this value is found to be suitable when assessing the temperatures of most electrical components due to them usually being housed in plastic or rubber which has a similar emissivity value. Emissivity is only changed were absolutely necessary. An example of this would be copper busbar with no electrical tape/labels attached.
- Anomalous components are assessed in one of two ways.
 - With the use of Reference components operating under similar conditions: These would include using line/load sides or different phases with similar load patterns to compare an anomalous component with another which has a more normal temperature gradient.
 - The use of load correction formulas which results in the following value:
 - Estimated fault component temp at full load (°C) – This estimates the temperature that the component would be running at if it was loaded at 100%. This value has been arrived at using a formula correction using anomalous and ambient temperatures, measured and maximum load.
- The value of 75°C has been taken from the British Standard BS7671 (*.*). This value is the recommended cable temperatures of between 65-85C at full load.
- Using this value it is possible to use a fault rating system to grade the severity of the fault. The following fault ratings and colour coding have been used:

Fault Ratings	minor	Important	Serious	Critical
Temp above ref temp or above 75°C	0-7	8-15	16-32	33+

- This value of 75°C is also used as a threshold temperature for the captured baseline images. In certain circumstances, this value has either been increased to 100°C or decreased to 50°C. The value has been increased to 100°C where the thermographer deems this a more appropriate value due to an elevated cubicle ambient or where components are tightly arranged together causing uplift in operating temperature. The value has been decreased to 50°C where the thermographer deems this a more appropriate value due to panel covers not being able to be removed and only the surface of the component can be seen and not the actual connections. In certain circumstances where SP2 Reference temperature cannot be suitably obtained, the value has been set from the BS Ref of 75°C as the SP2 reference temp.
- The normalization graph simulates temperature at 0, 50% and 100% load and is designed to assist the prediction of component operating temperature where a reference component has been used. According to Ohms law $P=I^2R$ but the graph is designed as a quick glance tool to assist in viewing the potential that a problem may become.
- Where anomalous components are found, a knowledge base library is used to house specific statements that ensure synergy between inspections for faults, root causes and recommended remedial actions.
- Formulas:**

Normalization Graph	$P=I^2R$ where P=Power, I=Current, R=Resistance
T load corrected	Let $(T_m - T_{amb}) = Trise$; $I_{meas} / I_{full} = LF$ (Load factor) Then: $T_{corr} = (((1/ LF)^{1.68} + (1/ LF)^{1.46})/2) * Trise + T_{amb}$



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Report pages:

The combined report contains the following pages:

NB Page numbers have been left in for additional ID purposes. Page numbers run in sequence beginning at #1 for each section but do not run in sequence for the whole combined report.

1. Cover Page for TD Electrical: This is a summary report which offers the amount of problems found and their severity grade. It is for a complete site overview.
2. List of all open problems: This is the full list of equipment found with problems and includes their locations and tag numbers
3. Inspection Inventory: This is a full inventory of equipment inspected, their ID numbers and their test status.
4. Documentation pages: These pages include the details of all anomalies found for individual pieces of equipment.
5. Cost Benefit Analysis: This lists the possible cost benefits of finding the faults before they have failed and estimates how much cost has been saved by predicting a failure before it happens. These values are deliberately very conservative and loss of production has not been taken into account.

The Webmanager contains all of the above reports and lists problems, cost benefits and baseline trends in easy to source locations. To view your current and previous inspections, please logon to your personal Webmanager using your username and password already supplied. If you do not have this please contact Ti on 0845 4586315.

<http://193.228.155.40/inspectrend> or www.thermalimaging.co.uk then 'Login to Webmanager' tab

Webmanager tutorial snapshot:

Navigate to the area you need using one of the 6 tabs at the top of the screen:

REP'S/ELECTRICIANS ENTER CORRECTIVE WORKORDERS INTO WEBMANAGER HERE	Overview	Summary listing all problems active or closed with severity grade.
	Inspection	Select site and then hit search to reveal historical list of inspections. Select 'more' next to the inspection that you want to see further details of. At the bottom is a 'reports' button that highlights in red, hit this to reveal a list of your reports. Your combined report will be prefixed by 1_ to ensure it the very first report.
	Inventory	Select site and then hit search to reveal a full inventory of surveyed equipment, test status, priority to site operation and last inspected date.
	Problems	Select site and then hit search to reveal a list of all open/closed problems found with severity grade, repair status and date found. Attach a work order here for remedial action and view the problem in its own individual report page.
	Cost Benefit	Select site and then hit search to reveal the savings you have made by having this inspection carried out. Typical ratio is spend £1 and save £4.
	Baseline	Select site and then hit search to reveal baseline trend data for all equipment surveyed. Here you can view individual trend reports for each piece of equipment where the latest IR/DC images are displayed with a historical temperature graph for baseline temp/current insp. Temp and threshold temp.



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Cover Page for Mechanical Executive and Operations summary of problems found



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INFRARED THERMOGRAPHIC INSPECTION
OF
MECHANICAL INSPECTION

Provided for

Report Date: 26/10/2010

TI , TI Site 6 Mechanical

Overview:

The Infrared Electrical Inspection was performed by TI Thermal Imaging, by a certified infrared Thermographer. All of the items inspected are listed in this InspecTrend report. Any anomalies are listed in order of priority based on the component's temperature rise, as measured from a reference component of equal type and load at the time of the inspection. TI Thermal Imaging assumes no liability directly or indirectly as a result of this inspection.

Current Inspection No: 1367 October 26, 2010

Prior Inspection No:

Priority	Temp Rise	Current Inspection	Prior Inspection	Percent of Change
1-Critical	33 - Above	1 = 25%	NA	NA
2-Serious	16 - 32	0 = 0%	NA	NA
3-Important	8 - 15	2 = 50%	NA	NA
4-Minor	1 - 7	1 = 25%	NA	NA
5-Normal	0	0 = 0%	NA	NA
Total Tested Problems:		4	NA	NA
Number of New Documented Problems:		4 = 100%	NA	NA
Number of Tested re-occurring Problems:		0 = 0%	NA	NA

Number of prior problems which were Not Tested this inspection : NA

Number of Total Open Problems : **4**

Number of prior problems which tested Normal this inspection : NA

I hereby certify the above project was inspected by myself or under my direction and that the enclosed data is the direct result of this inspection.

TI Thermal Imaging

Wallace, Richard

Certification Level/No.: ITC Level II

* Summary of reoccurring problems on following page(s)



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List of Open Problems

Full list of thermal, mechanical and visual issues found



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TI

TI Site 6 Mechanical

List of All Open Problems

Operation Priority Key

CTO = Critical to operation
ETO = Essential to operation
NON = Non-essential to operation
UNC = Un-Classified

Report Date: 26/10/2010

Prior Inspection No :

Current Inspection No : 1367 October 26, 2010

Prob#	Asset ID		Insp#	Temp Rise	% Load	Severity	Status
M 2	1S-HCOM7703	Equipment: COMPRESSOR 12 Component: Overheated cylinder head on Compressor	1367	91 C		1-Critical	TESTED
M 3	LSB-4002B-BF8D	Equipment: EXTRACT FAN MOTOR RESERVE TANK Component: Elevated bearing temperature on 22KWH 3 PHASE MOTOR	1367	14 C		3-Important	TESTED
M 4	1G-2376YF4-1B	Equipment: TRAIN 1 FIN FAN BANK Component: Elevated temperature on Fin Fan	1367	12 C		3-Important	TESTED
M 1	1K-P53202	Equipment: WATER PUMP NO. 2 Component: Elevated bearing temperature on 22kwh 3 Phase Motor	1367	7 C		4-Minor	TESTED



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Inspection Inventory Pages

Equipment listing and test status



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Current Inspection Inventory Status By Inspection Order

Other

NI = Not Issued

Test Status Note

SCE = Safety Critical

Problem Type Key

TD = T/D Electrical

M = Mechanical

V = Visual Inspection

Equipment Test Status Key

TBT = To Be Tested

NT/NL = Not Tested/No Load

NT/TC = Not Tested/Time Constraint

NT/UR = Not Tested/Under Repair

NT/LO = Not Tested/Locked Out

NT/NA = Not Tested/Not Available

NT/NS = Not Tested/Not Specified

NSFI = Not Selected for this insp.

Operation Priority Key

CTO = Critical to operation

ETO = Essential to operation

NON = Non-essential to operation

UNC = Un-Classified

Prior Inspection No:

Current Inspection No: 1367

TI

TI Site 6 Mechanical

Report Date: 26/10/2010

Inspected By : Wallace, Richard

Work Order	Asset ID	Equipment Description
NI	1K-P53202	WATER PUMP NO. 2
NI	1S-HCOM7703	COMPRESSOR 12
NI	LSB-4002B-BF8D	EXTRACT FAN MOTOR RESERVE TANK
NI	1G-2376YF4-1B	TRAIN 1 FIN FAN BANK

CTO	Tested	Problem #	Test Status Notes
CTO	TESTED	M1	
CTO	TESTED	M2	
CTO	TESTED	M3	
CTO	TESTED	M4	



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Documentation pages for Mechanical findings

Details of Mechanical problems found



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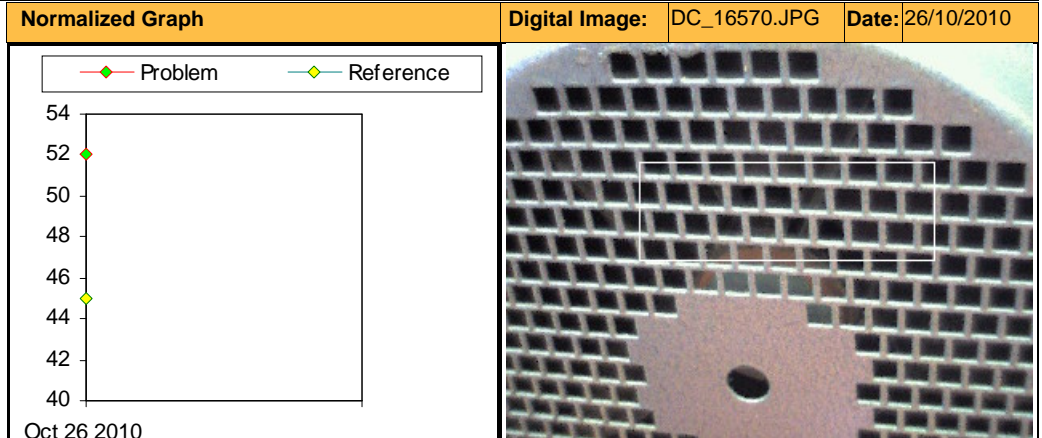
Company Registered in England: 04450573 VAT No. 828 6288 87





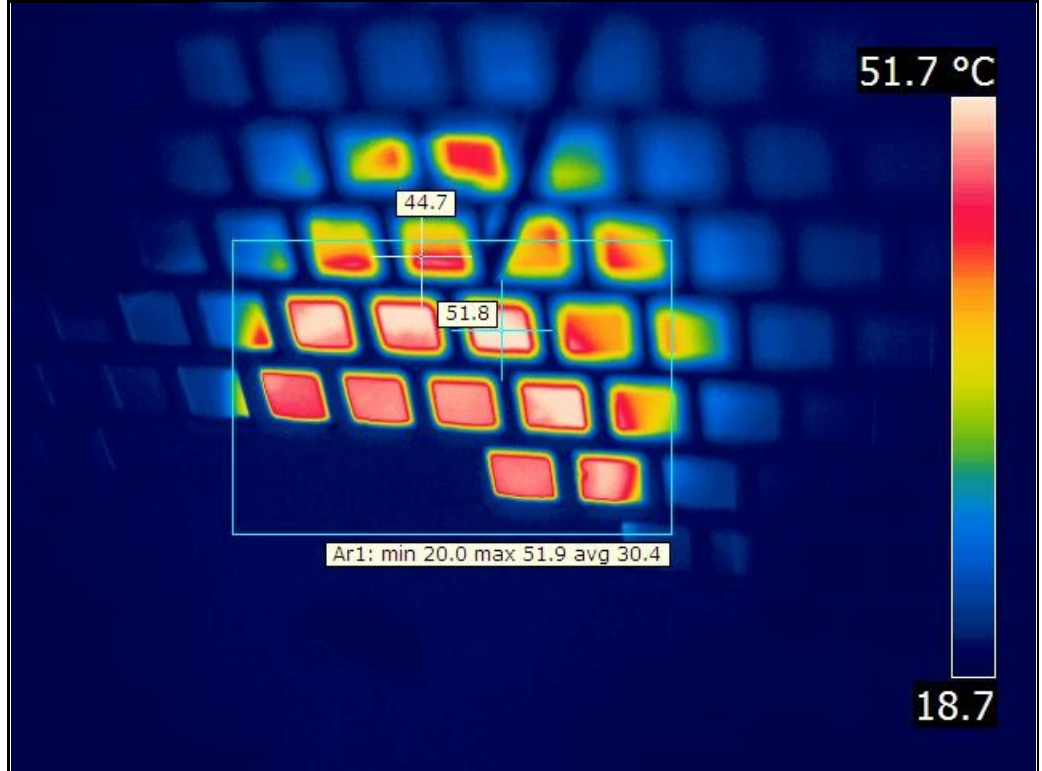
Client	Asset	Inspection Number	Report Date	Inspection Type
TI	TI Site 6 Mechanical	1367	26/10/2010	Mechanical

Location / Equipment Information	
Work Order	NOT ISSUED
Equipment ID	1K-P53202
Location	
Description	WATER PUMP NO. 2
Severity	4-Minor
Anomaly	Elevated bearing temperature on 22kwh 3 Phase Motor
Possible Root Cause	Deteriorated running bearing
Recommendation	Investigate bearing internals and either recondition or replace



Equipment Information	
Component:	PUMP MOTORS
Manufacturer:	Brook Compton
Model No:	Unavailable
Rated Amps:	40
Circuit Voltage:	415 Volts

Infrared Image: IR_16569A.jpg	Date: 26/10/2010
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Current Prob No: Mechanical/1	
Operation Priority:	Critical to operation
Max Component Temperature - Ar1 Max Temperature	52 C
Reference Temperature or SP2 Temperature	45 C
Temperature Rise Above Reference	7 C
Maximum allowable Temperature British Standard Reference	75 C
British Standard Reference - BS7671	

Temperature Information	
Cubicle ambient:	21 C
Emissivity:	0.96
Environment:	Indoors
Adjusted Temperature Rise above reference:	7 C
Estimated Temp Rise over reference @ 50% Load: (See * 1)	C
Estimated Temp Rise over reference @ 100% Load: (See * 2)	C



Client	Asset	Inspection Number	Report Date	Inspection Type
TI	TI Site 6 Mechanical	1367	26/10/2010	Mechanical

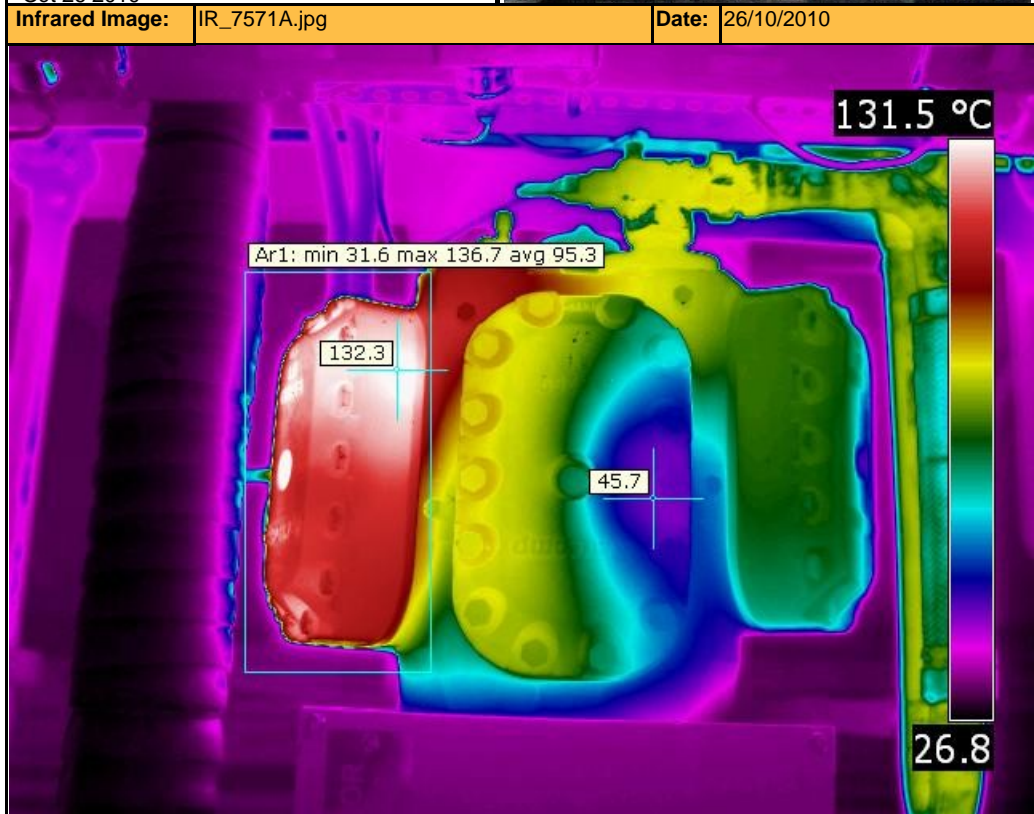
Location / Equipment Information	
Work Order	NOT ISSUED
Equipment ID	1S-HCOM7703
Location	
Description	COMPRESSOR 12
Severity	1-Critical
Anomaly	Overheated cylinder head on Compressor
Possible Root Cause	Unknown
Recommendation	Investigate and repair or replace

Normalized Graph	Digital Image: DC_7572.JPG	Date: 26/10/2010
<p>Legend: Problem (red diamond), Reference (blue diamond)</p> <p>Oct 26 2010</p>		
Infrared Image: IR_7571A.jpg	Date: 26/10/2010	

Equipment Information	
Component:	Compressors
Manufacturer:	RetComp
Model No:	Unavailable
Rated Amps:	
Circuit Voltage:	

Current Prob No: Mechanical/2	
Operation Priority:	Critical to operation
Max Component Temperature - Ar1 Max Temperature	137 C
Reference Temperature or SP2 Temperature	46 C
Temperature Rise Above Reference	91 C
Maximum allowable Temperature British Standard Reference	75 C
British Standard Reference - BS7671	

Temperature Information	
Cubicle ambient:	21 C
Emissivity:	0.96
Environment:	Indoors
Adjusted Temperature Rise above reference:	91 C
Estimated Temp Rise over reference @ 50% Load: (See * 1)	C
Estimated Temp Rise over reference @ 100% Load: (See * 2)	C





Client	Asset	Inspection Number	Report Date	Inspection Type
TI	TI Site 6 Mechanical	1367	26/10/2010	Mechanical

Location / Equipment Information	
Work Order	NOT ISSUED
Equipment ID	LSB-4002B-BF8D
Location	
Description	EXTRACT FAN MOTOR RESERVE TANK
Severity	3-Important
Anomoly	Elevated bearing temperature on 22KWH 3 PHASE MOTOR
Possible Root Cause	Deteriorated running bearing
Recommendation	Investigate bearing internals and either recondition or replace

Normalized Graph	Digital Image: DC_19238.JPG	Date: 26/10/2010
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Equipment Information	
Component:	PUMP MOTORS
Manufacturer:	ABB
Model No:	Unavailable
Rated Amps:	16
Circuit Voltage:	400 Volts

Infrared Image: IR_19237A.jpg	Date: 26/10/2010
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Current Prob No: Mechanical/3	
Operation Priority:	Critical to operation
Max Component Temperature - Ar1 Max Temperature	57 C
Reference Temperature or SP2 Temperature	43 C
Temperature Rise Above Reference	14 C
Maximum allowable Temperature British Standard Reference	75 C
British Standard Reference - BS7671	

Temperature Information	
Cubicle ambient:	21 C
Emissivity:	0.96
Environment:	Indoors
Adjusted Temperature Rise above reference:	14 C
Estimated Temp Rise over reference @ 50% Load: (See * 1)	C
Estimated Temp Rise over reference @ 100% Load: (See * 2)	C



Client	Asset	Inspection Number	Report Date	Inspection Type
TI	TI Site 6 Mechanical	1367	26/10/2010	Mechanical

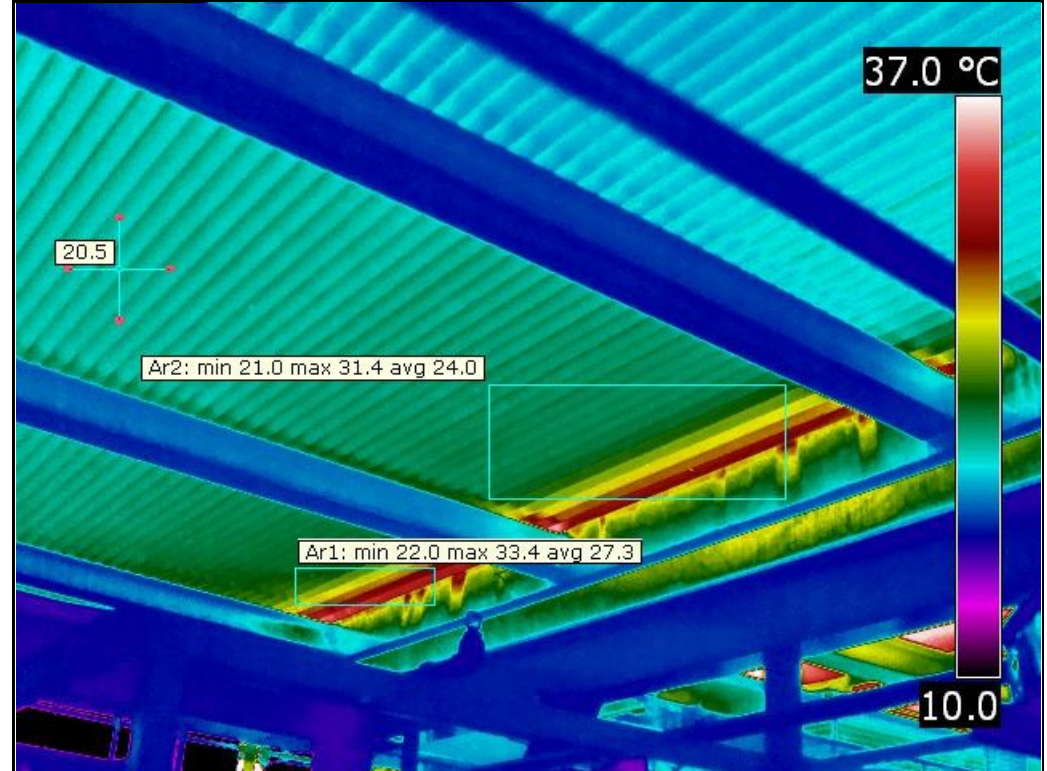
Location / Equipment Information	
Work Order	NOT ISSUED
Equipment ID	1G-2376YF4-1B
Location	
Description	TRAIN 1 FIN FAN BANK
Severity	3-Important
Anomaly	Elevated temperature on Fin Fan
Possible Root Cause	Unknown
Recommendation	Investigate and repair or replace

Normalized Graph	Digital Image: DC_2.JPG	Date: 26/10/2010
<p>Oct 26 2010</p>		

Equipment Information	
Component:	Fin Fan Bank
Manufacturer:	Unknown
Model No:	Unavailable
Rated Amps:	
Circuit Voltage:	

Infrared Image: IR_2010-02-05_0095.jpg	Date: 26/10/2010
--	------------------

Current Prob No: Mechanical/4	
Operation Priority:	Critical to operation
Max Component Temperature - Ar1 Max Temperature	33 C
Reference Temperature or SP2 Temperature	21 C
Temperature Rise Above Reference	12 C
Maximum allowable Temperature British Standard Reference	75 C
British Standard Reference - BS7671	



Temperature Information	
Cubicle ambient:	21 C
Emissivity:	0.96
Environment:	Indoors
Adjusted Temperature Rise above reference:	12 C
Estimated Temp Rise over reference @ 50% Load: (See * 1)	C
Estimated Temp Rise over reference @ 100% Load: (See * 2)	C



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Cost Benefit Analysis Report Summary of cost benefit findings



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Cost Benefit Analysis Report

TI
TI Site 6 Mechanical

Operation Priority Key
 CTO = Critical to operation
 ETO = Essential to operation
 NON = Non-essential to operation
 UNC = Un-Classified

Report Date: 26/10/2010

Prior Inspection No :
 Current Inspection No : 1367 October 26, 2010

Operation Priority	Prior Inspection			Current Inspection		
	Prior Insp#	Prior Prob#	Temp Rise	Current Prob#	Temp Rise	% Load

Location: EXTRACT FAN MOTOR RESERVE TANK

Equipment: EXTRACT FAN MOTOR RESERVE TANK CTO M3 14 C 3-Important
 Component: Elevated bearing temperature on 22KWH 3 PHASE MOTOR
 Failure of This Component Could Cause a Loss to Production: Yes No Unknown
 Consequences of Component Failure : Loss of EXTRACT FAN MOTOR RESERVE TANK

Cost Estimate:	Labor Hrs	Cost/Hr	SubTotal	Lost Revenue	Cost/Hr	SubTotal	Parts Replacement	Total Cost
Before Failure:	2.00	£50	£100.00	0.00	£0	£0.00	£50	£150.00
After Failure:	8.00	£50	£400.00	0.00	£0	£0.00	£2,000	£2,400.00
Increased Revenue/Savings:			£300.00			£0.00		£2,250.00

Location: TRAIN 1 FIN FAN BANK

Equipment: TRAIN 1 FIN FAN BANK CTO M4 12 C 3-Important
 Component: Elevated temperature on Fin Fan
 Failure of This Component Could Cause a Loss to Production: Yes No Unknown
 Consequences of Component Failure : Loss of TRAIN 1 FIN FAN BANK

Cost Estimate:	Labor Hrs	Cost/Hr	SubTotal	Lost Revenue	Cost/Hr	SubTotal	Parts Replacement	Total Cost
Before Failure:	2.00	£50	£100.00	0.00	£0	£0.00	£0	£100.00
After Failure:	6.00	£50	£300.00	0.00	£0	£0.00	£3,000	£3,300.00
Increased Revenue/Savings:			£200.00			£0.00		£3,200.00



Cost Benefit Analysis Report

TI
TI Site 6 Mechanical

Operation Priority Key

CTO = Critical to operation
ETO = Essential to operation
NON = Non-essential to operation
UNC = Un-Classified

Report Date: 26/10/2010

Prior Inspection No :
Current Inspection No : 1367 October 26, 2010

Operation Priority	Prior Inspection			Current Inspection		
	Prior Insp#	Prior Prob#	Temp Rise	Current Prob#	Temp Rise	% Load
						Repair Priority

Report Summary:

Cost Estimate Summary:				
	Total Labor Cost	Total Lost Revenue	Total Parts Cost	Grand Total Cost
Before Failure:	£300.00	£0.00	£100.00	£400.00
After Failure:	£1,100.00	£0.00	£7,000.00	£8,100.00
Increased Revenue/Savings:	£800.00	£0.00	£6,900.00	£7,700.00



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Benchmark Baseline Trending

Full list of equipment baseline trends



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Equipment Baseline Trending Report By Inspection Order

TI
TI Site 6 Mechanical

Prior Inspection No:
Current Inspection No: 1367 October 26, 2010

Report Date: 26/10/2010

WATER PUMP NO. 2

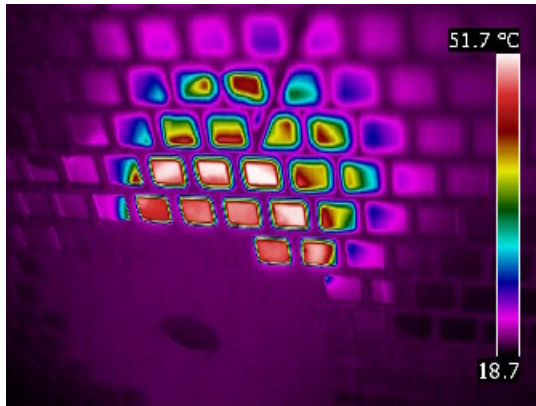
Equipment ID: 1K-P53202

Work Order: NI

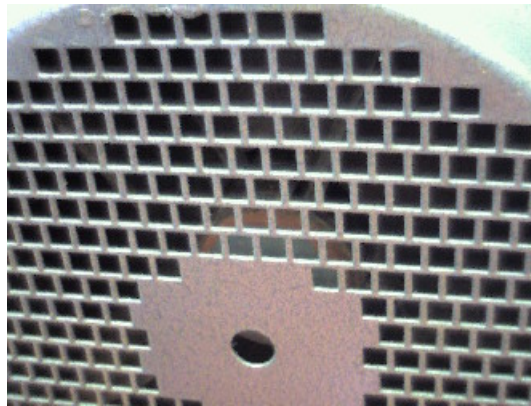
Key

- CTO = Critical to operation
- ETO = Essential to operation
- NON = Non-essential to operation
- UNC = Un-Classified
- NI = Not Issued

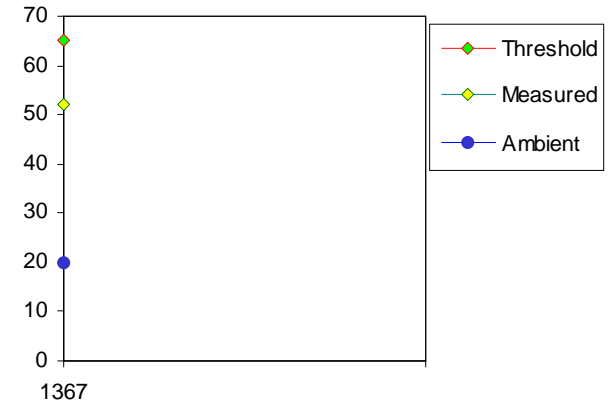
Operation Priority: CTO



IR_16569.JPG



DC_16570.JPG



Inspection History:

Inspection No	Date Inspected	Test Status	Measured Temp	Threshold Temp	Ambient Temp	Status Note	Customer Notes
1367	26/10/2010	TESTED	52 C	65 C	20 C		



Equipment Baseline Trending Report By Inspection Order

TI
TI Site 6 Mechanical

Prior Inspection No:
Current Inspection No: 1367 October 26, 2010

Report Date: 26/10/2010

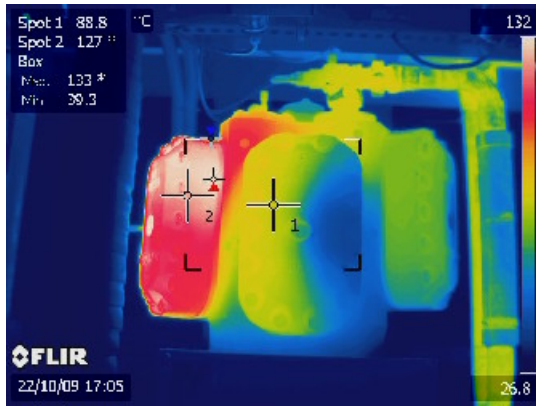
COMPRESSOR 12

Equipment ID: 1S-HCOM7703

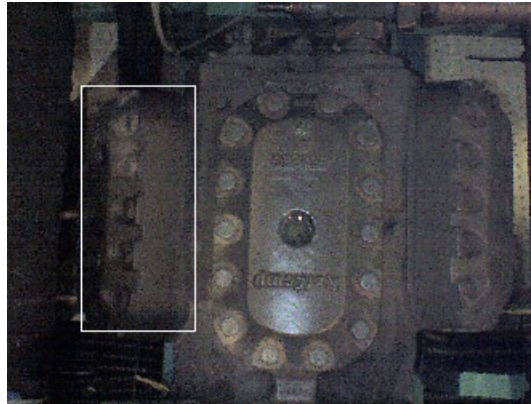
Work Order: NI

Key
CTO = Critical to operation
ETO = Essential to operation
NON = Non-essential to operation
UNC = Un-Classified
NI = Not Issued

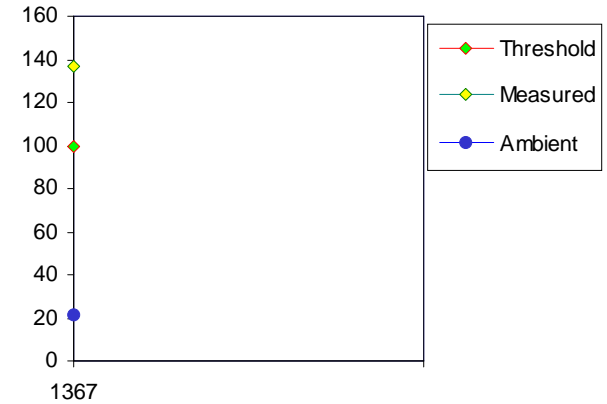
Operation Priority: CTO



IR_7571.jpg



DC_7572.JPG



Inspection History:

Inspection No	Date Inspected	Test Status	Measured Temp	Threshold Temp	Ambient Temp	Status Note	Customer Notes
1367	26/10/2010	TESTED	137 C	100 C	21 C		



Equipment Baseline Trending Report By Inspection Order

TI
TI Site 6 Mechanical

Prior Inspection No:
Current Inspection No: 1367 October 26, 2010

Report Date: 26/10/2010

EXTRACT FAN MOTOR RESERVE TANK

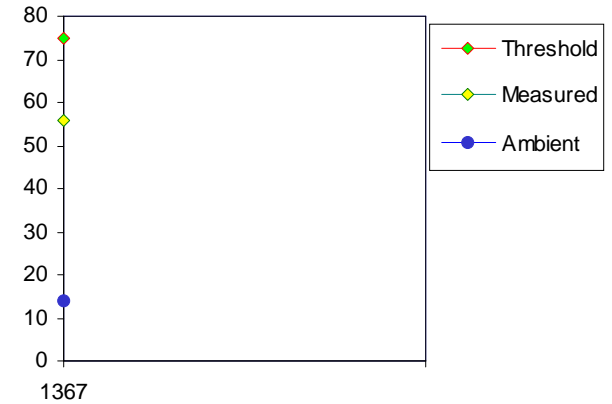
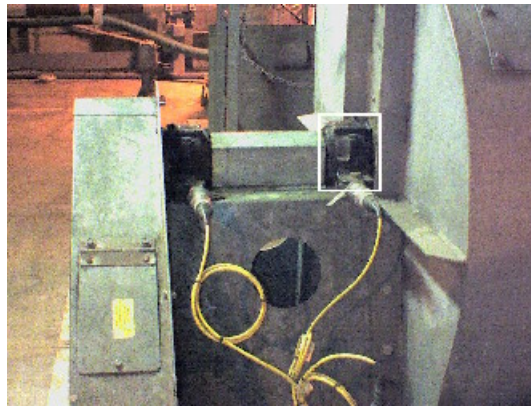
Equipment ID: LSB-4002B-BF8D

Work Order: NI

Key

- CTO = Critical to operation
- ETO = Essential to operation
- NON = Non-essential to operation
- UNC = Un-Classified
- NI = Not Issued

Operation Priority: CTO



Inspection History:

Inspection No	Date Inspected	Test Status	Measured Temp	Threshold Temp	Ambient Temp	Status Note	Customer Notes
1367	26/10/2010	TESTED	56 C	75 C	14 C		



Equipment Baseline Trending Report By Inspection Order

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Prior Inspection No:
Current Inspection No: 1367 October 26, 2010

Report Date: 26/10/2010

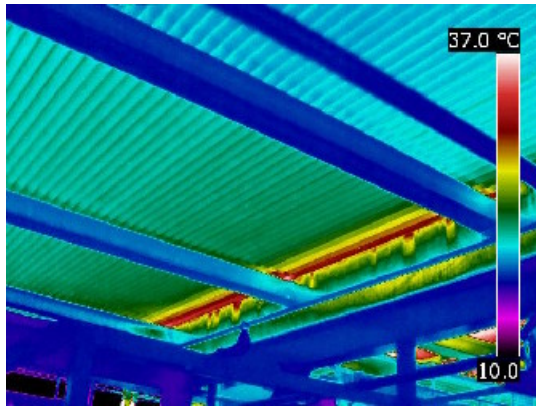
TRAIN 1 FIN FAN BANK

Equipment ID: 1G-2376YF4-1B

Work Order: NI

Key
 CTO = Critical to operation
 ETO = Essential to operation
 NON = Non-essential to operation
 UNC = Un-Classified
 NI = Not Issued

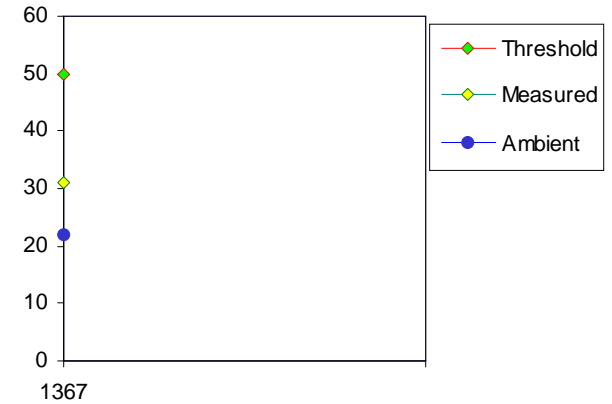
Operation Priority: CTO



IR_1.jpg



DC_2.JPG



Inspection History:

Inspection No	Date Inspected	Test Status	Measured Temp	Threshold Temp	Ambient Temp	Status Note	Customer Notes
1367	26/10/2010	TESTED	31 C	50 C	22 C		



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Tel: 0845 458 6315 Fax: 0871 9004978 E-mail: info@thermalimaging.co.uk Web: www.thermalimaging.co.uk



Work Order Documentation pages Fax or Email back Corrective Work Orders



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TI

TI Site 6 Mechanical

Documentation/ Work Order Mechanical: Please add Corrective Work Order

Work Order #: NOT ISSUED

Corrective Work Order #:

1367-1

Current Prob No: Mechanical/1

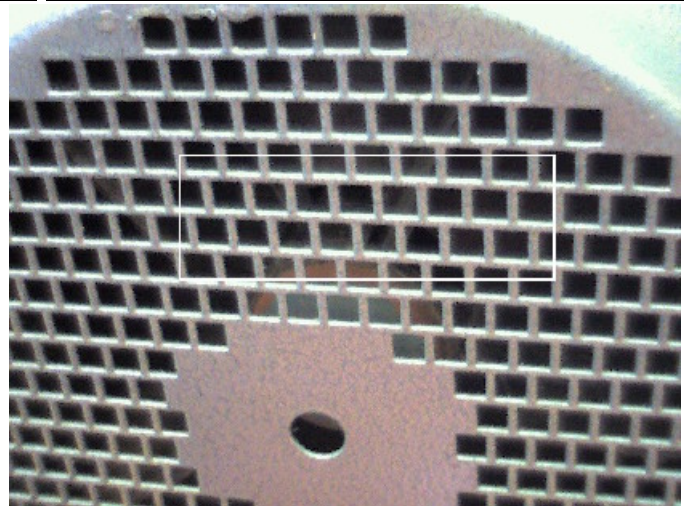
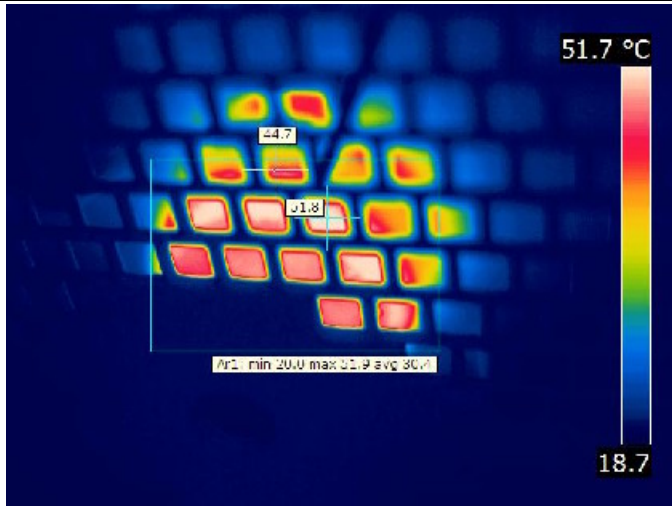
InspectionNo: 1367
Report Date: 26/10/2010

Location/Equipment Information	
Asset ID:	1K-P53202
Barcode:	NI
Location:	WATER PUMP NO. 2
Problem:	Elevated bearing temperature on 22kwh 3 Phase Motor

Operation Priority:	Critical to operation
Repair Priority:	4-Minor
Ambient:	21 C Enviroment: Indoors
Component Temperature:	52 C
Reference Temperature:	45 C
Temperature Rise Above Reference:	7 C
ANSI/EEE/NEMA Max Allowable Temp @ 100% Load:	65 C

ANSI/IEEE/NEMA Max Temp Criteria:	
Component Type:	PUMP MOTORS
Manufacturer:	Brook Compton
Catalog No:	
Model No:	Unavailable
Oil Type:	
Circuit Voltage:	415 Volts
Bearing Type:	
Component Rated Load:	40
Horse Power (HP) :	
RPM's:	

Load Test Results	
Rated Load:	
Component:	amps
Reference:	amps



IR File: IR_16569A.jpg

IR Date: 26/10/2010

Photo File: DC_16570.JPG

Photo Date: 26/10/2010

Repair Information

PLEASE FAX BACK AFTER REPAIR TO:
0871 900 4978 OR
INFO@THERMALIMAGING.CO.UK

Loss to Production

Yes No Unknown

Consequences of Failure:

Loss of WATER PUMP NO. 2

Repair Date:

Repaired By:

Root Cause:

Parts Req. Before Failure:

Repair

Parts Req. After Failure:

Procedure:

Repair Notes:

Repair Recommendation:

Investigate bearing internals and either recondition or replace



TI

TI Site 6 Mechanical

Documentation/ Work Order Mechanical: Please add Corrective Work Order

Work Order #: NOT ISSUED

Corrective Work Order #:

1367-2

Current Prob No: Mechanical/2

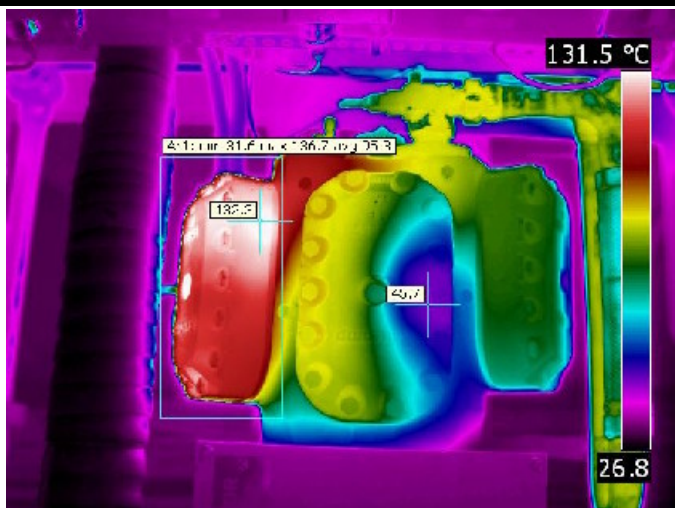
InspectionNo: 1367
Report Date: 26/10/2010

Location/Equipment Information	
Asset ID:	1S-HCOM7703
Barcode:	NI
Location:	COMPRESSOR 12
Problem:	Overheated cylinder head on Compressor

Operation Priority:	Critical to operation
Repair Priority:	1-Critical
Ambient:	21 C Enviroment: Indoors
Component Temperature:	137 C
Reference Temperature:	46 C
Temperature Rise Above Reference:	91 C
ANSI/EEE/NEMA Max Allowable Temp @ 100% Load:	100 C

ANSI/IEEE/NEMA Max Temp Criteria:	
Component Type:	Compressors
Manufacturer:	RetComp
Catalog No:	
Model No:	Unavailable
Oil Type:	
Circuit Voltage:	
Bearing Type:	
Component Rated Load:	
Horse Power (HP) :	
RPM's:	

Load Test Results	
Rated Load:	
Component:	amps
Reference:	amps



IR File: IR_7571A.jpg

IR Date: 26/10/2010

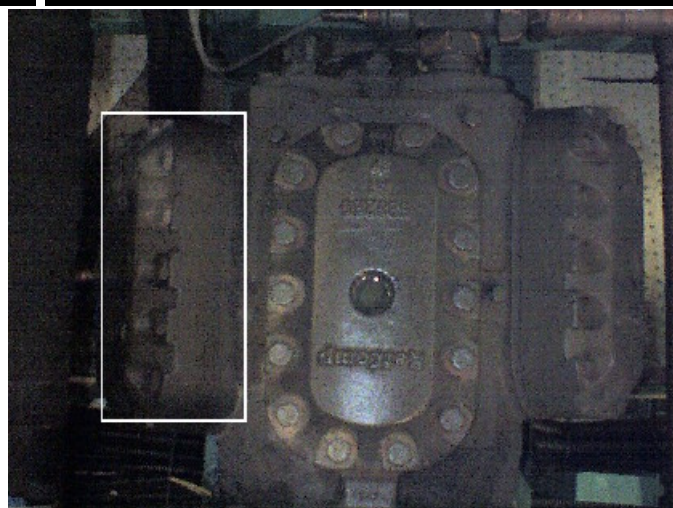


Photo File: DC_7572.JPG

Photo Date: 26/10/2010

Repair Information

PLEASE FAX BACK AFTER REPAIR TO:
0871 900 4978 OR
INFO@THERMALIMAGING.CO.UK

Loss to Production

Yes No Unknown

Consequences of Failure:

Loss of COMPRESSOR 12

Repair Date:

Repaired By:

Root Cause:

Parts Req. Before Failure:

Repair

Parts Req. After Failure:

Procedure:

Repair Notes:

Repair Recommendation:

Investigate and repair or replace



TI

TI Site 6 Mechanical

Documentation/ Work Order Mechanical: Please add Corrective Work Order

Work Order #: NOT ISSUED

Corrective Work Order #:

InspectionNo: 1367
Report Date: 26/10/2010

1367-3 Current Prob No: Mechanical/3

Location/Equipment Information	
Asset ID:	LSB-4002B-BF8D
Barcode:	NI
Location:	EXTRACT FAN MOTOR RESERVE TANK
Problem:	Elevated bearing temperature on 22KWH 3 PHASE MOTOR

Operation Priority:	Critical to operation
Repair Priority:	3-Important
Ambient:	21 C Enviroment: Indoors
Component Temperature:	57 C
Reference Temperature:	43 C
Temperature Rise Above Reference:	14 C
ANSI/EEE/NEMA Max Allowable Temp @ 100% Load:	65 C

ANSI/IEEE/NEMA Max Temp Criteria:	
Component Type:	PUMP MOTORS
Manufacturer:	ABB
Catalog No:	
Model No:	Unavailable
Oil Type:	
Circuit Voltage:	400 Volts
Bearing Type:	
Component Rated Load:	16
Horse Power (HP) :	
RPM's:	

Load Test Results	
Rated Load:	
Component:	amps
Reference:	amps



IR File: IR_19237A.jpg

IR Date: 26/10/2010

Photo File: DC_19238.JPG

Photo Date: 26/10/2010

Repair Information

PLEASE FAX BACK AFTER REPAIR TO:
0871 900 4978 OR
INFO@THERMALIMAGING.CO.UK

Loss to Production

Yes No Unknown

Consequences of Failure:

Loss of EXTRACT FAN MOTOR RESERVE TANK

Repair Date:

Repaired By:

Root Cause:

Parts Req. Before Failure:

Repair

Parts Req. After Failure:

Procedure:

Repair Notes:

Repair Recommendation:

Investigate bearing internals and either recondition or replace



TI

TI Site 6 Mechanical

Documentation/ Work Order Mechanical: Please add Corrective Work Order

Work Order #: NOT ISSUED

Corrective Work Order #:

1367-4

Current Prob No: Mechanical/4

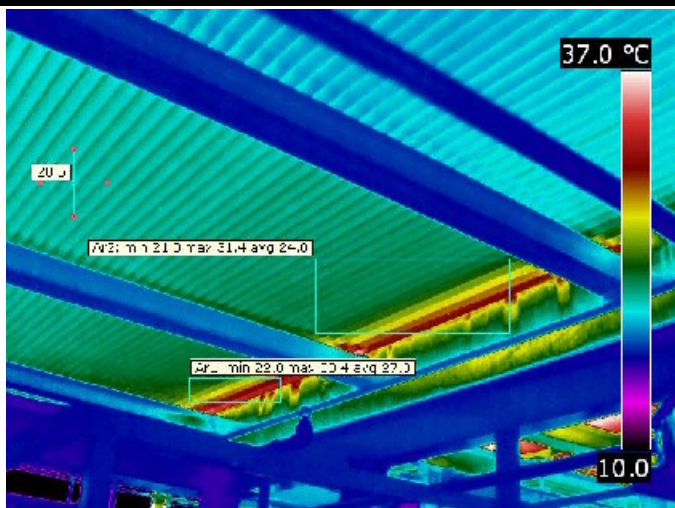
InspectionNo: 1367
Report Date: 26/10/2010

Location/Equipment Information	
Asset ID:	1G-2376YF4-1B
Barcode:	NI
Location:	TRAIN 1 FIN FAN BANK
Problem:	Elevated temperature on Fin Fan

Operation Priority:	Critical to operation
Repair Priority:	3-Important
Ambient:	21 C
Environment:	Indoors
Component Temperature:	33 C
Reference Temperature:	21 C
Temperature Rise Above Reference:	12 C
ANSI/EEE/NEMA Max Allowable Temp @ 100% Load:	40 C

ANSI/IEEE/NEMA Max Temp Criteria:	
Component Type:	Fin Fan Bank
Manufacturer:	Unknown
Catalog No:	
Model No:	Unavailable
Oil Type:	
Circuit Voltage:	
Bearing Type:	
Component Rated Load:	
Horse Power (HP) :	
RPM's:	

Load Test Results	
Rated Load:	
Component:	amps
Reference:	amps



IR File: IR_2010-02-05_0095.jpg

IR Date: 26/10/2010

Photo File: DC_2.JPG

Photo Date: 26/10/2010

Repair Information

PLEASE FAX BACK AFTER REPAIR TO:
0871 900 4978 OR
INFO@THERMALIMAGING.CO.UK

Loss to Production

Yes No Unknown

Consequences of Failure:

Loss of TRAIN 1 FIN FAN BANK

Repair Date:

Repaired By:

Root Cause:

Parts Req. Before Failure:

Repair

Parts Req. After Failure:

Procedure:

Repair Notes:

Repair Recommendation:

Investigate and repair or replace



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Client Work Appraisal

We are continually trying to improve our service and ensure that all our inspections are carried out to the highest standards. Please use the form below to add your comments, anonymously if you prefer and send back to us at the address above or:

Email: info@thermalimaging.co.uk

Fax: +44 870 9004971

Ti Job Number: (Optional)	Excellent	Good	Mediocre	Poor	Comments
Office:					
Response time to enquiry					
Content of information sent on enquiry					
Telephone and email manner					
Price					
Value					
Engineer:					
Time keeping					
Appearance					
Code of conduct					
Subject knowledge					
Method of work					
Engineer flexibility					
Inspection Specification:					
Equipment and software					
Report content					
Report delivery time					
Report retrieval					
Other Comments:					



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