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# Thermographic inspection of: T-801A

At:

TI Job No:  
TI\_14710

24 May 2011



Thermographic inspection for:

T-801A

Date

24 May 2011

**Inspection Specific Information**

<b>Client Name</b>	-
<b>C/O Client Name</b>	-
<b>Site Address</b>	D
<b>Contact Person</b>	M
<b>Telephone Number</b>	+
<b>E-mail Address</b>	m
<b>Assigned Thermographer</b>	Richard Wallace

**Inspection Overview**

This inspection is designed to assess the thermal performance of the insulation of an LPG storage tank constructed with a steel inner central holding tank from 10mm thickness; cavity separated outer shell constructed from 120mm sprayed on insulation, outer steel 5mm thickness liner, pre-cast concrete and pre-tensioning steel stiffeners.

This investigation is employing the use of thermographics and infra-red in order to assess the temperature trending from two thermographic inspections of the LPG storage tank located at Damietta. The first inspection was carried out in March 06 with the second inspection following in June 07, third in June 08 and the latest June 09. This inspection covers the images taken Jun07-09. because the images from the first inspection bear little resemblance to the trending process particularly as there was scaffolding in the way.

The object is to discover if the anomaly located at the 225° buttress has changed in any way.

**Inspection Methods**

Equipment	PPE	Thermographer Qualification
P-series ThermaCAM 45° lens Reporter 8.3 software Leico Laser distance measure Extech instrument(object parameters) Gas monitor	Hard Hat Toetectors Glasses Gloves Ear Plugs	ITC Level II

Having obtained the correct permit to work, object parameter readings were requested from the control room before the inspection began. Ambient temperature, humidity, wind speed and dew point were all recorded.

Images were captured of the anomalous area initially with a Flir P65 with wide angle lens for inspections 1 & 2 then with a large format P640 with wide angle lens for inspection 3. This camera will be used for subsequent inspections. Images were captured from various angles in order to make sure that the correct image was captured. This is important so that the data trending following in this report is as accurate and relevant as possible.

Once the anomalous area had been fully imaged, the remainder of the storage tank was captured for reference and good practice.

**Inspection Object Parameters**

Inspection Date	March 06	June 07	June 08	Jun 09	May 10
Inspection commencing	12.00	11.30	10.00	13.00	15.00
Weather	Dry	Dry	Dry	Dry	Dry
Wind	<3mph	<2mph	<4mph	<2mph	<2mph
External Temperature °C	15°C	28°C	26°C	28°C	32°C
Relative Humidity	71%	55%	87%	82%	83%
Dew Point °C	10.2°C	17°C	23.7°C	25.6°C	27.2°C
Inspection Date	May 11				
Inspection commencing	12.00				
Weather	Dry				
Wind	<3mph				
External Temperature °C	28°C				
Relative Humidity	58%				
Dew Point °C	18.5°C				



**Contents Page**

<b>Elevation</b>	<b>Section</b>	<b>Page Number</b>
225°	Lower Right	5
225°	Lower left	6
315	-	7
45°	-	8
90°	-	9
135°	-	10



**Executive Summary – T801A**

**Inspection 1 – 14 Jun 07**

This initial inspection is designed to capture the first thermograms which will be used as a baseline and reference point for each subsequent inspection. Trending between inspections can then take place in order to monitor size of the anomaly.

**Inspection 2 – 02 Jun 08**

There does show some changes between inspections however these are minimal and are not deemed particularly significant. Overall the anomaly appears to be remaining reasonably consistent in size and shape.

**Inspection 3 – 01 Jun 09**

There does show some changes between inspections however these are minimal and are not deemed particularly significant. Overall the anomaly appears to be remaining reasonably consistent in size and shape.

**Inspection 4 – 31 May 10**

There does show some changes between inspections however these are minimal and are not deemed particularly significant. Overall the anomaly appears to be remaining reasonably consistent in size and shape.

**Inspection 5 – 24 May 11**

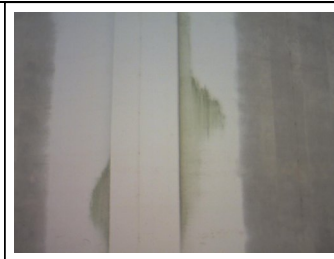
**A new report is required to be written and the format has been updated for greater measurement accuracy and easier viewing. Historical data is shown in the tables below.** There does show some changes between inspections however these are minimal and are not deemed particularly significant. Overall the anomaly appears to be remaining reasonably consistent in size and shape.

<b>Inspection 1– 14 Jun 07</b>				<b>Inspection 2– 02 Jun 08</b>			
(Meters)	Length	Width		(Meters)	Length	Width	
Anomaly (right)	8.78	2.02		Anomaly (right)	8.89	1.98	
Anomaly (left)	3.34	1.40		Anomaly (left)	3.30	1.30	
<b>Inspection 3– 01 Jun 09</b>				<b>Inspection 4 – 31 May 10</b>			
(Meters)	Length	Width		(Meters)	Length	Width	
Anomaly (right)	11.41	2.63		Anomaly (right)	11.25	2.65	
Anomaly (left)	3.32	1.34		Anomaly (left)	3.23	1.32	
<b>Inspection 5 – 24 May 11</b>				<b>Inspection 6</b>			
(Meters)	Length	Width		(Meters)	Length	Width	
Anomaly (right)	11.19	2.60		Anomaly (right)			
Anomaly (left)	3.21	1.25		Anomaly (left)			
<b>Inspection 7</b>				<b>Inspection 8</b>			
(Meters)	Length	Width		(Meters)	Length	Width	
Anomaly (right)				Anomaly (right)			
Anomaly (left)				Anomaly (left)			



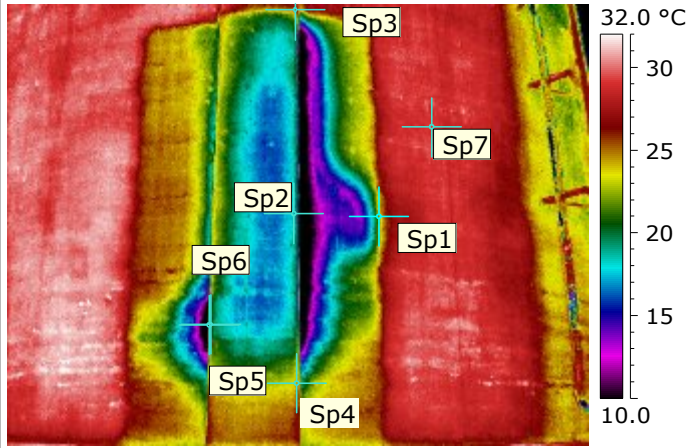
**Thermographic inspection of:**

ID	T-801A
Elevation	225°
Section	Lower Right



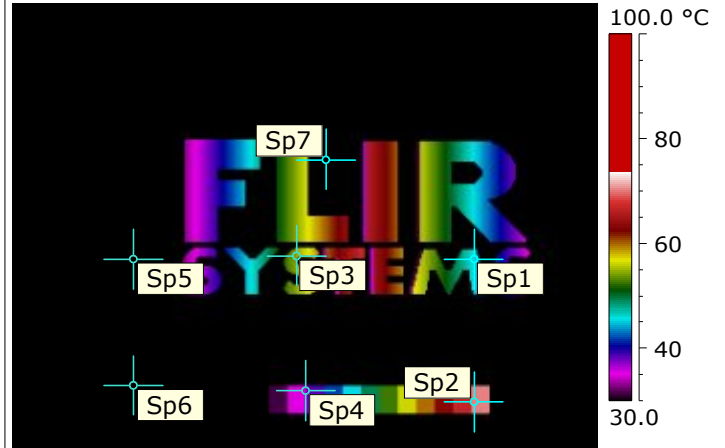
Date  
**24 May 2011**

Inspection 1 - 24/05/2011



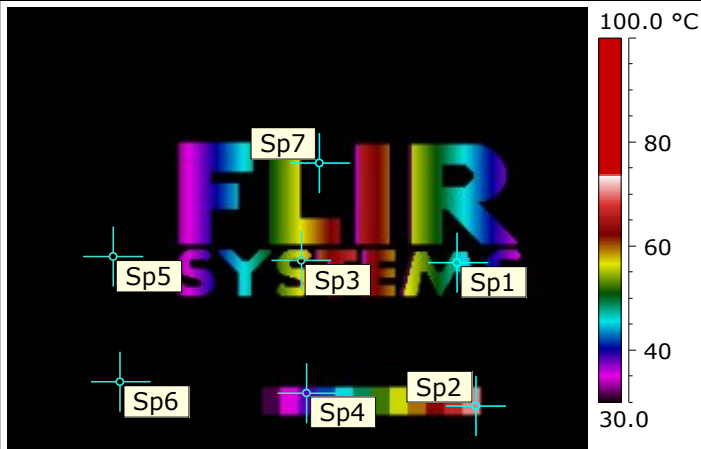
Filename	IR_6039.jpg
Sp7 Temperature	29.4 °C
Object Distance	2100.0 m
spot_dist_1-2	260
spot_dist_3-4	1119
spot_dist_5-6	6

Inspection 2 - 24/05/2011



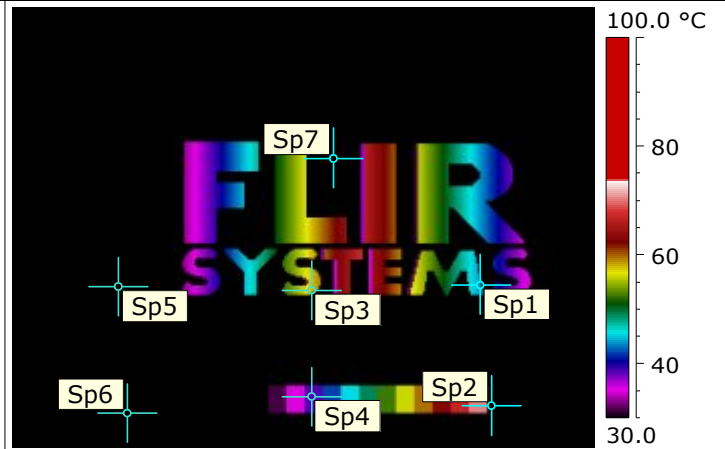
Filename	
Object Distance	100.0 m
Sp7 Temperature	7.4 °C
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 3 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 4 - 24/05/2011



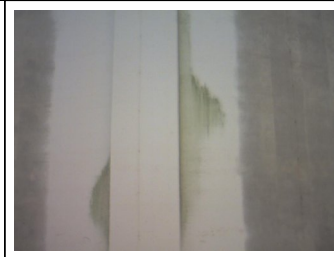
Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 1		Inspection 2		Inspection 3		Inspection 4	
Sp1-2 % level	9	Sp1-2 % level	0	sp1-2 % level	0	Sp1-2 % level	0
Sp3-4 % level	39	Sp3-4 % level	0	Sp3-4 % level	0	Sp3-4 % level	0
Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0



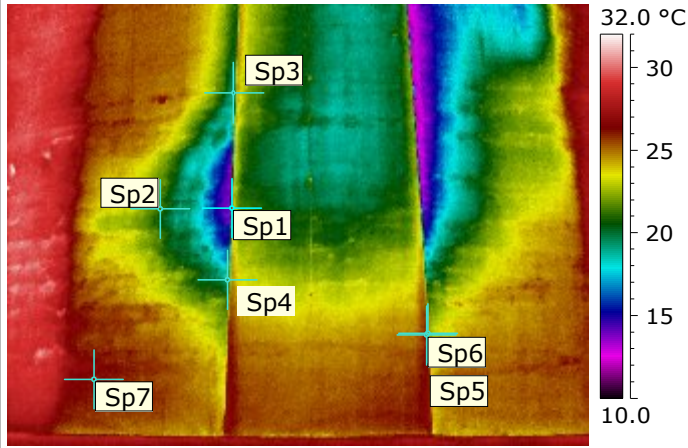
Thermographic inspection of:

ID	T-801A
Elevation	225°
Section	Lower left



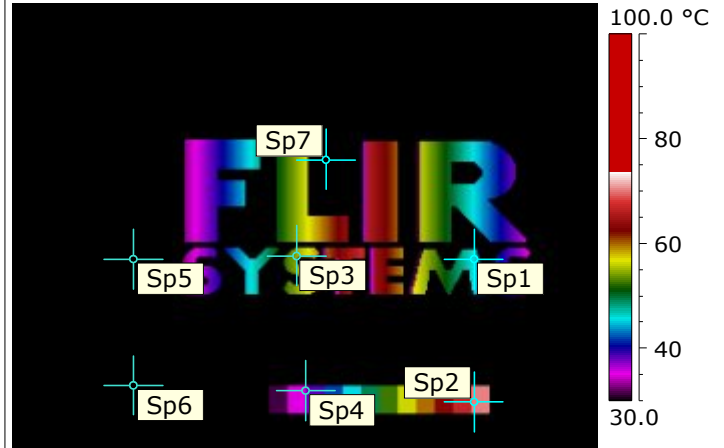
Date  
24 May 2011

Inspection 1 - 24/05/2011



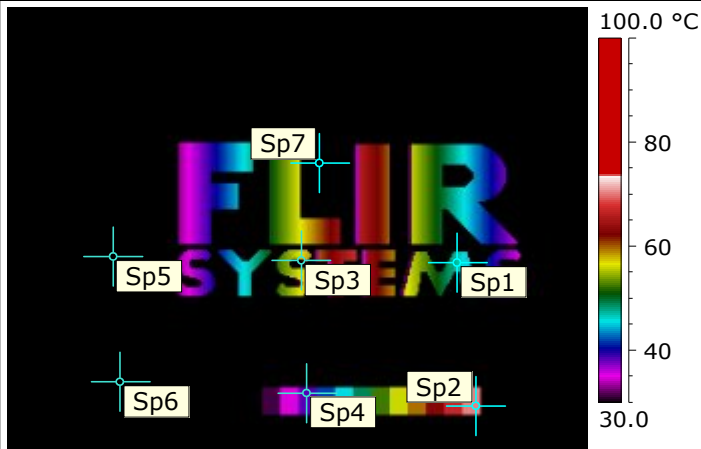
Filename	IR_6037.jpg
Sp7 Temperature	26.4 °C
Object Distance	1200.0 m
spot_dist_1-2	125
spot_dist_3-4	321
spot_dist_5-6	4

Inspection 2 - 24/05/2011



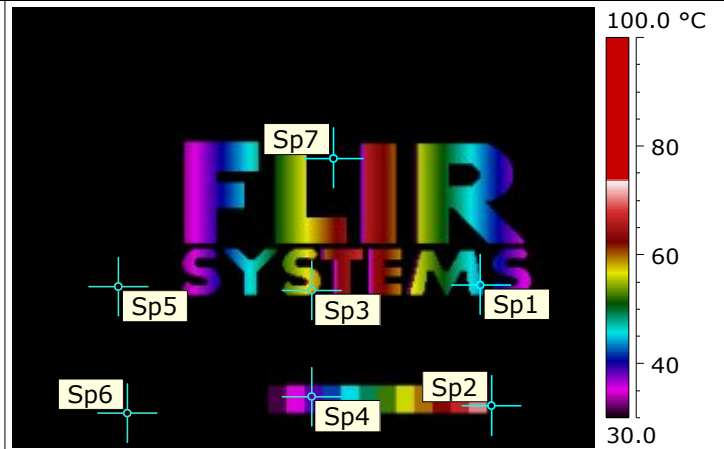
Filename	
Object Distance	100.0 m
Sp7 Temperature	7.4 °C
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 3 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 4 - 24/05/2011



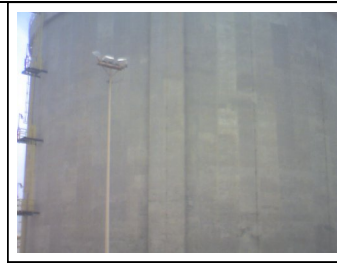
Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 1		Inspection 2		Inspection 3		Inspection 4	
Sp1-2 % level	4	Sp1-2 % level	0	sp1-2 % level	0	Sp1-2 % level	0
Sp3-4 % level	11	Sp3-4 % level	0	Sp3-4 % level	0	Sp3-4 % level	0
Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0



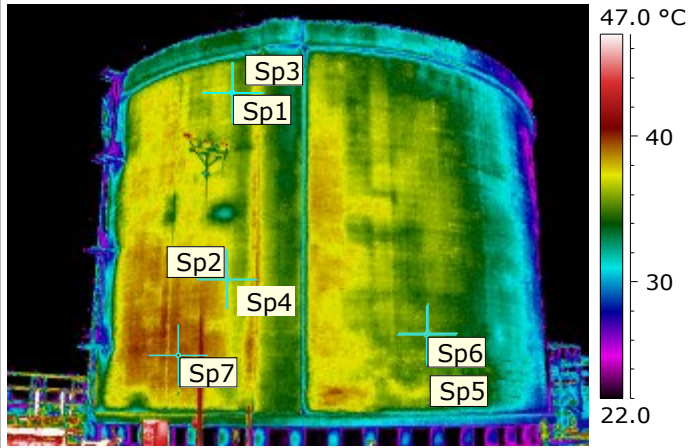
**Thermographic inspection of:**

ID	T-801A
Elevation	315
Section	-



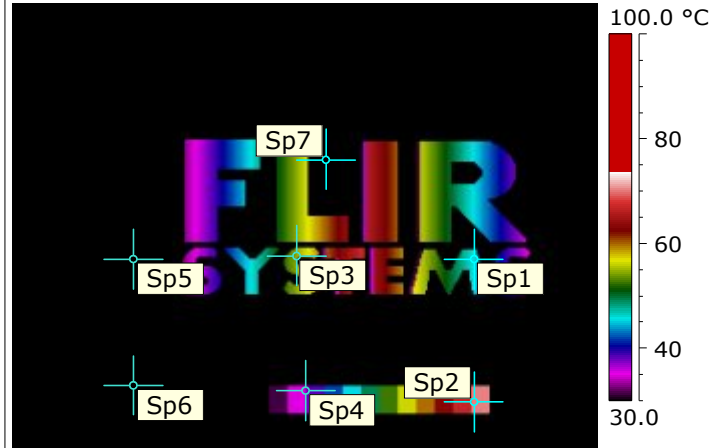
Date  
**24 May 2011**

Inspection 1 - 24/05/2011



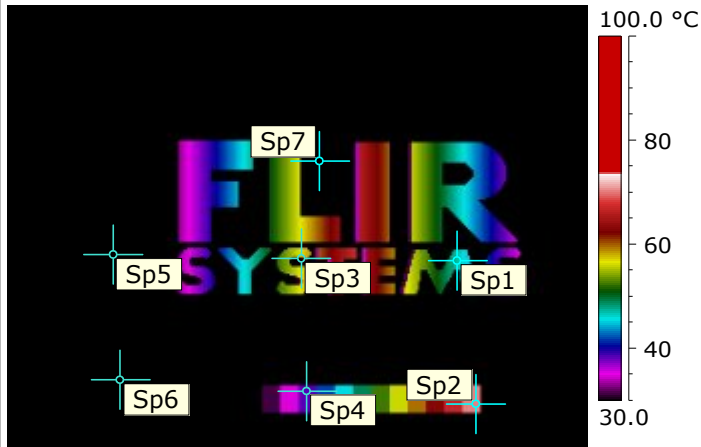
Filename	IR_6043.jpg
Sp7 Temperature	39.5 °C
Object Distance	5000.0 m
spot_dist_1-2	1330
spot_dist_3-4	1336
spot_dist_5-6	19

Inspection 2 - 24/05/2011



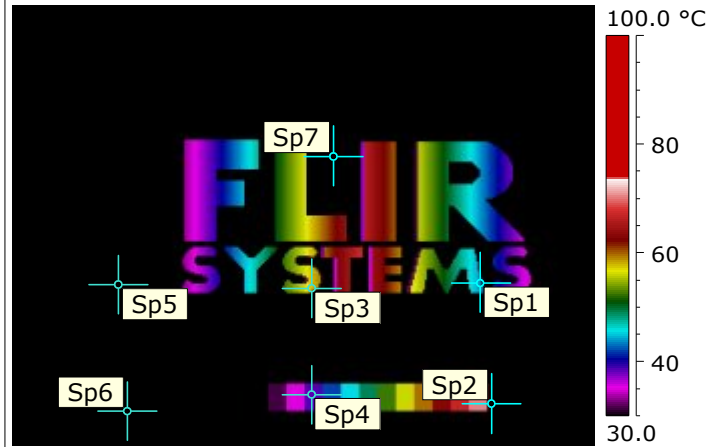
Filename	
Object Distance	100.0 m
Sp7 Temperature	7.4 °C
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 3 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 4 - 24/05/2011



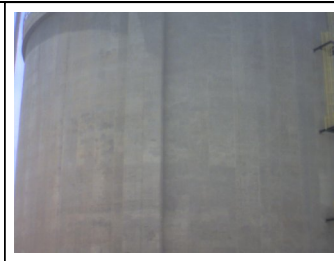
Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 1		Inspection 2		Inspection 3		Inspection 4	
Sp1-2 % level	47	Sp1-2 % level	0	sp1-2 % level	0	Sp1-2 % level	0
Sp3-4 % level	47	Sp3-4 % level	0	Sp3-4 % level	0	Sp3-4 % level	0
Sp5-6 % level	1	Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0



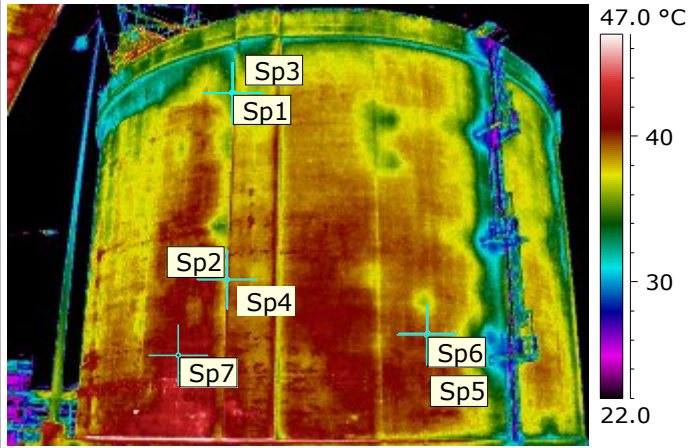
**Thermographic inspection of:**

ID	T-801A
Elevation	45°
Section	-



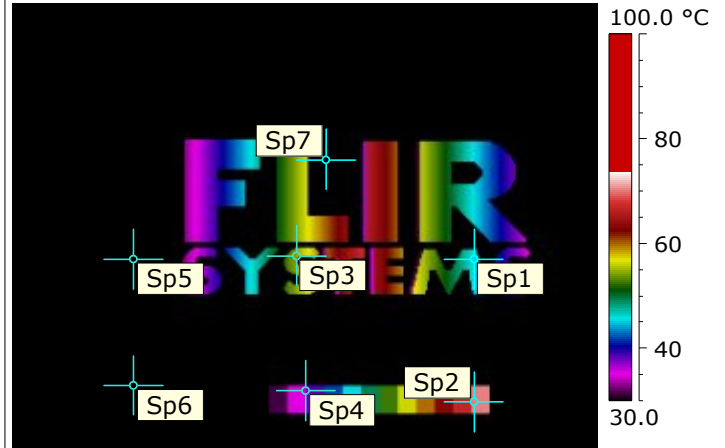
Date  
**24 May 2011**

Inspection 1 - 24/05/2011



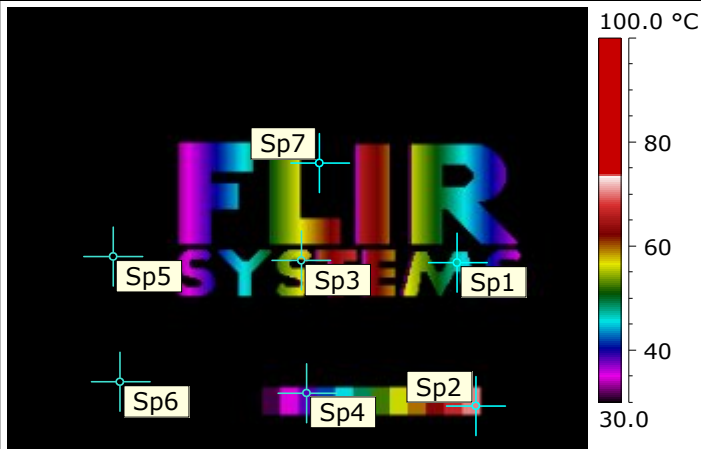
Filename	IR_6045.jpg
Sp7 Temperature	41.5 °C
Object Distance	5000.0 m
spot_dist_1-2	1330
spot_dist_3-4	1336
spot_dist_5-6	19

Inspection 2 - 24/05/2011



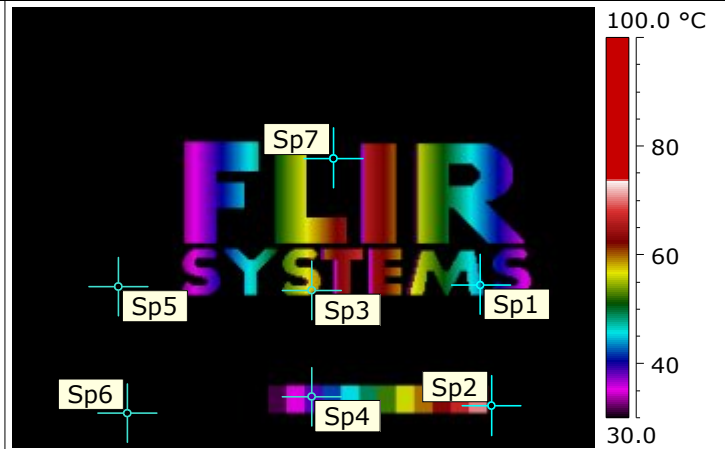
Filename	
Object Distance	100.0 m
Sp7 Temperature	7.4 °C
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 3 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 4 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 1		Inspection 2		Inspection 3		Inspection 4	
Sp1-2 % level	47	Sp1-2 % level	0	sp1-2 % level	0	Sp1-2 % level	0
Sp3-4 % level	47	Sp3-4 % level	0	Sp3-4 % level	0	Sp3-4 % level	0
Sp5-6 % level	1	Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0





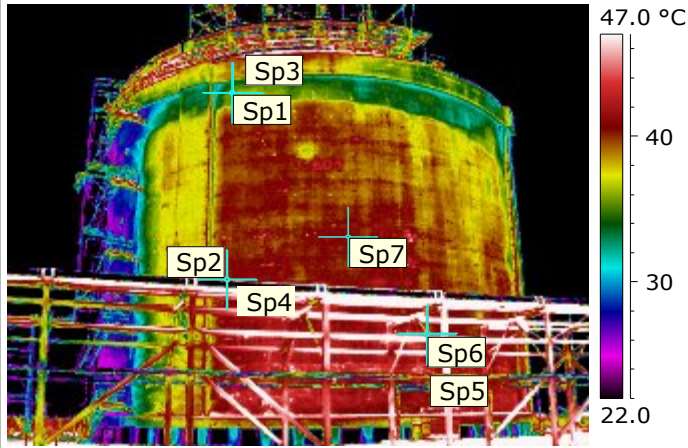
**Thermographic inspection of:**

ID	T-801A
Elevation	90°
Section	-



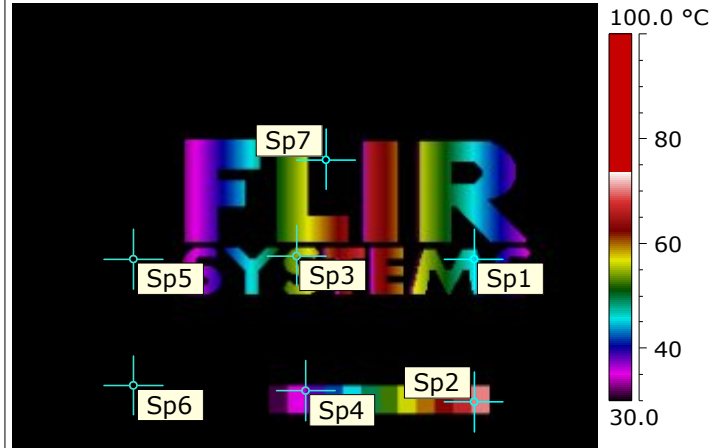
Date  
**24 May 2011**

Inspection 1 - 24/05/2011



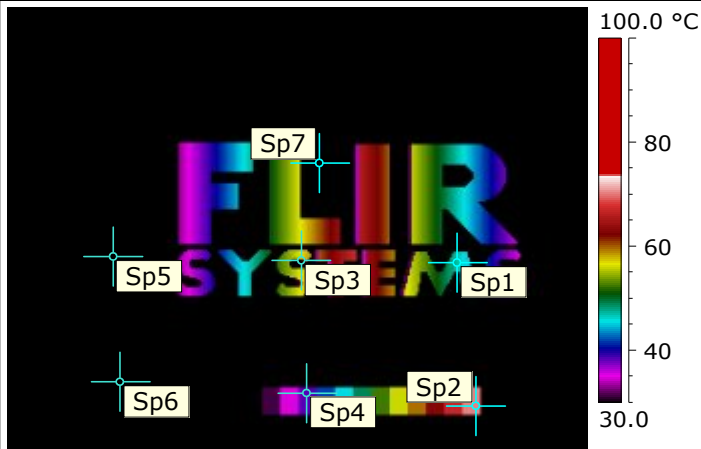
Filename	IR_6047.jpg
Sp7 Temperature	40.9 °C
Object Distance	5000.0 m
spot_dist_1-2	1330
spot_dist_3-4	1336
spot_dist_5-6	19

Inspection 2 - 24/05/2011



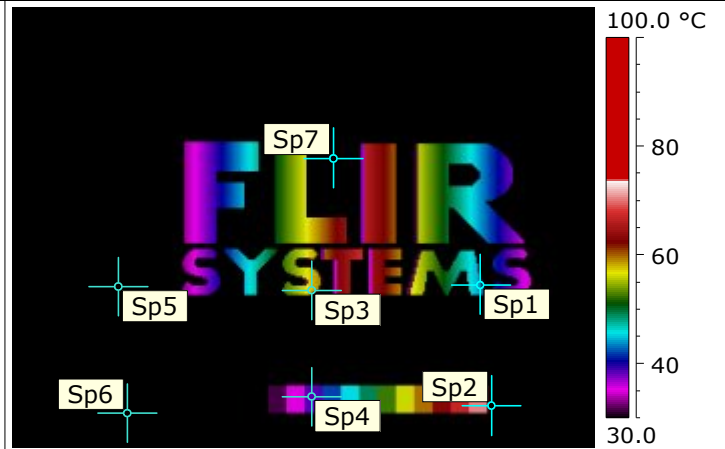
Filename	
Object Distance	100.0 m
Sp7 Temperature	7.4 °C
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 3 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 4 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 1		Inspection 2		Inspection 3		Inspection 4	
Sp1-2 % level	47	Sp1-2 % level	0	sp1-2 % level	0	Sp1-2 % level	0
Sp3-4 % level	47	Sp3-4 % level	0	Sp3-4 % level	0	Sp3-4 % level	0
Sp5-6 % level	1	Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0



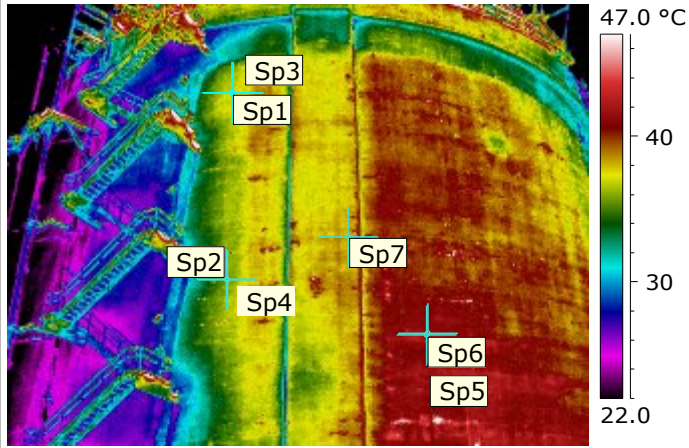
**Thermographic inspection of:**

ID	T-801A
Elevation	135°
Section	-



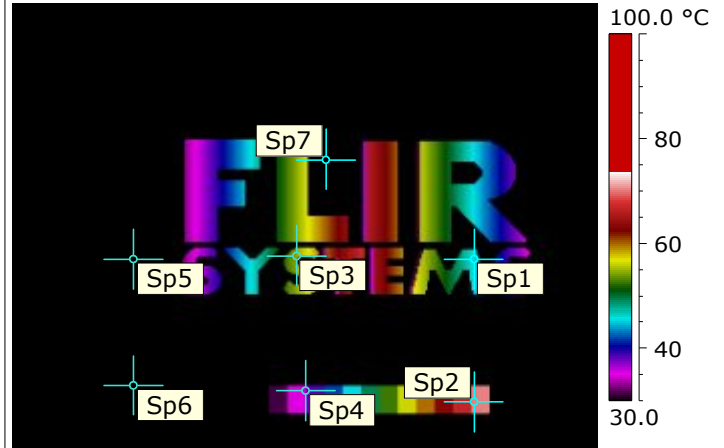
Date  
**24 May 2011**

Inspection 1 - 24/05/2011



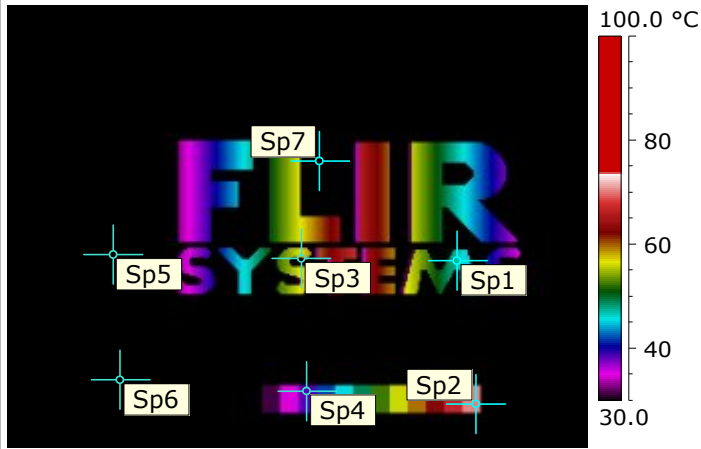
Filename	IR_6049.jpg
Sp7 Temperature	38.8 °C
Object Distance	3000.0 m
spot_dist_1-2	798
spot_dist_3-4	802
spot_dist_5-6	11

Inspection 2 - 24/05/2011



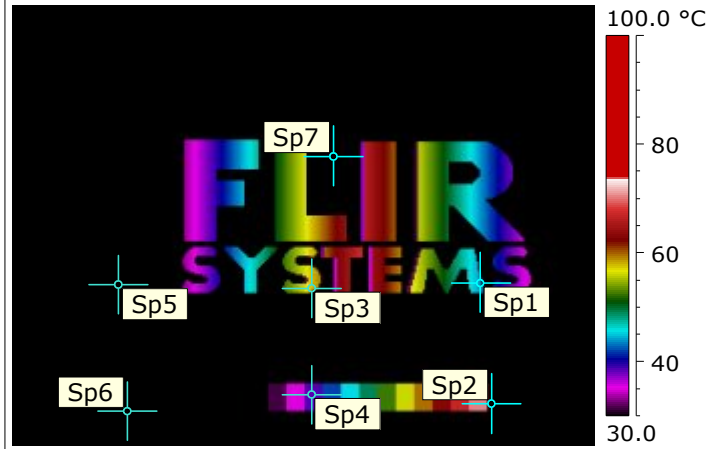
Filename	
Object Distance	100.0 m
Sp7 Temperature	7.4 °C
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 3 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 4 - 24/05/2011



Filename	
Sp7 Temperature	7.4 °C
Object Distance	100.0 m
spot_dist_1-2	0
spot_dist_3-4	0
spot_dist_5-6	0

Inspection 1		Inspection 2		Inspection 3		Inspection 4	
Sp1-2 % level	28	Sp1-2 % level	0	sp1-2 % level	0	Sp1-2 % level	0
Sp3-4 % level	28	Sp3-4 % level	0	Sp3-4 % level	0	Sp3-4 % level	0
Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0	Sp5-6 % level	0