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Thermographic inspection of:

Single pane and Secondary double glazing

At: Chapel Pavillion

TI Job No: TI_12893

23 June 2009

	Thermographic inspection of: Single and secondary double glazing	Date 23 June 2009

Inspection Specific Information	
Client Name	
C/O Client Name	
Site Address	**Chapel Pavillion**
Contact Person	
Telephone Number	
E-mail Address	
Assigned Thermographer	**Mark Doodson**
Thermographic Qualification	**level II**

Inspection Overview
This investigation is employing the use of thermographics and infra-red in order to assess the surface temperature differentials between existing single pane windows and secondary double glazing installed by Storm Windows with a view to offering a clear visual interpretation of the reduction in energy losses.

Theory
Single pane windows will have a lower U-value than that of secondary double glazing meaning that they will have a higher degree of energy loss through their surface. This is due to energy will have to pass through only a single pane of glass before it reaches the external of the building whilst secondary double glazing has a single pane initially followed by a sealed cavity and then a second pane drastically reducing thermal transfer between internal and external ambients.

Inspection methods
Images were captured of the windows which were to be replaced initially. This is to gain solid thermograms to be used as baseline or comparative images. After the secondary double glazing had been installed, images were re captured and directly compared.

Statement
The suggestions and opinions in this report are interpretations of the thermograms by the thermographer at the time of inspection. These are not definitive comments and do not claim to be absolutes. It is recommended that these interpretations be used in conjunction with other NDT inspection methods to determine the overall condition of the asset. Conclusions are not the responsibility of the thermographer as these should be drawn by the appropriate integrity personnel collating all NDT inspection data.

Thermographic Inspection Specification:

1. IR camera: Flir ThermaCAM P65
2. Software: Reporter 8.3
3. Thermographer: ITC Level II
4. Extech Instruments for humidity/wind speed etc
5. Leico laser distance measurements

	Thermographic inspection of: Single and secondary double glazing	Date 23 June 2009

Inspection Parameters				
	Insp. 1	Insp. 2	Insp. 3	Insp. 4
Inspection Commencing	09.00	09.00		
Weather	Dry	Dry		
Wind Speed	<2mph	<2mph		
Ambient Temperature	7°C	13°C	°C	°C
Humidity	63 %	72%	%	%
Internal Temperature	24°C	21°C	°C	°C

	Thermographic inspection of: Single and secondary double glazing Summary of inspection	Date 23 June 2009

Contents Page

	Thermographic inspection of: Executive and operations snap-shot summary Single and secondary double glazing	Date 23 June 2009

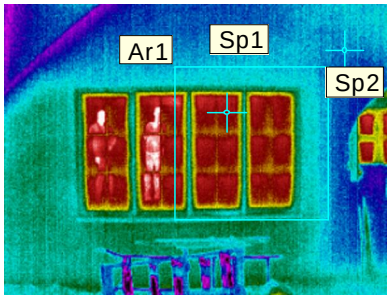
Executive Summary - _Single and Double glazed windows

Inspection 1 02/04/09	Initial capture of baseline thermogram. Single pane windows show a temperature differential of around 4C between windows and the elevation itself.
Inspection 2 17/06/09	Differential between glass and elevation is now beneath 1C indicating better insulating property for the double glazing
Inspection 3 (Insert date):	
Inspection 4 (Insert date):	

Thermographic inspection of:

ID	Living room
Elevation	East
Section	Windows
Viewed	Standing

Date
23 June 2009



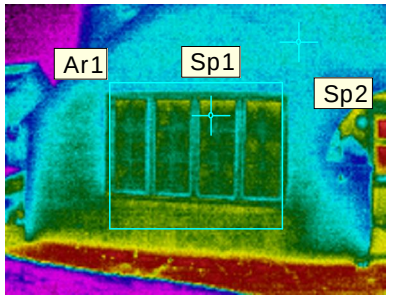
Inspection 1
02/04/2009

Date	02/04/2009
Filename	IR_0372.jpg
Atmospheric Temperature	7.0 °C
Object Distance	6.0 m
Ar1 Max. Temperature	14.2 °C
Ar1 Min. Temperature	8.3 °C
Sp1 Temperature	13.0 °C
Sp2 Temperature	8.8 °C

img_width	4.8
boxarea_size	3.8
spot_dist	1.69

(in M or M²)

Internal Temp (C)	24



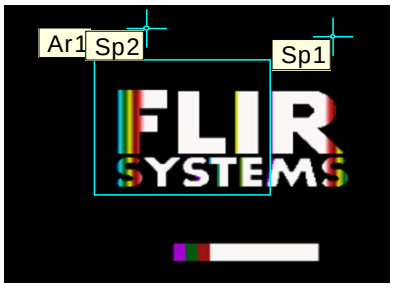
Inspection 2
17/06/2009

Date	17/06/2009
Filename	IR_00396.jpg
Atmospheric Temperature	13.0 °C
Object Distance	6.0 m
Ar1 Max. Temperature	15.0 °C
Ar1 Min. Temperature	13.5 °C
Sp1 Temperature	14.4 °C
Sp2 Temperature	13.7 °C

img_width	4.8
boxarea_size	4.1
spot_dist	1.45

(in M or M²)

Internal Temp (C)	21



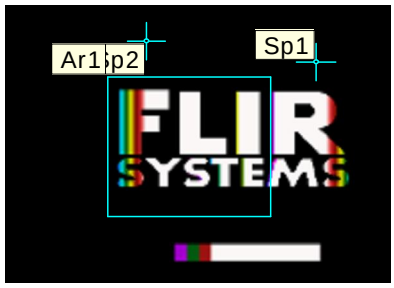
Inspection 3
23/06/2009

Date	23/06/2009
Filename	
Atmospheric Temperature	35.0 °C
Object Distance	0.0 m
Ar1 Max. Temperature	66.9 °C
Ar1 Min. Temperature	7.4 °C
Sp1 Temperature	7.4 °C
Sp2 Temperature	7.4 °C

img_width	0.0
boxarea_size	0.0
spot_dist	0.00

(in M or M²)

Internal Temp (C)	24



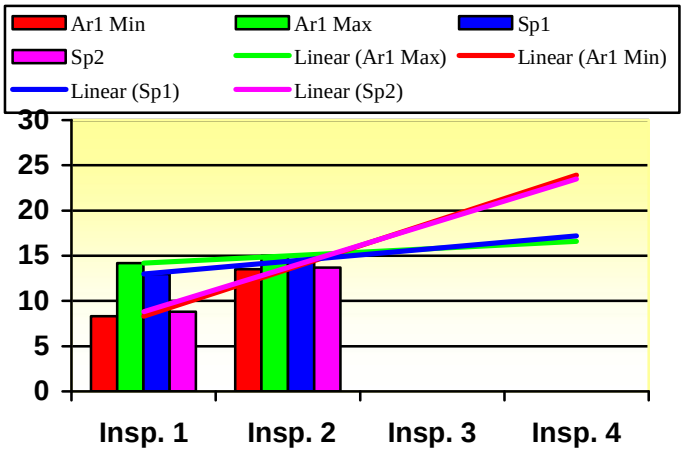
Inspection 4
23/06/2009

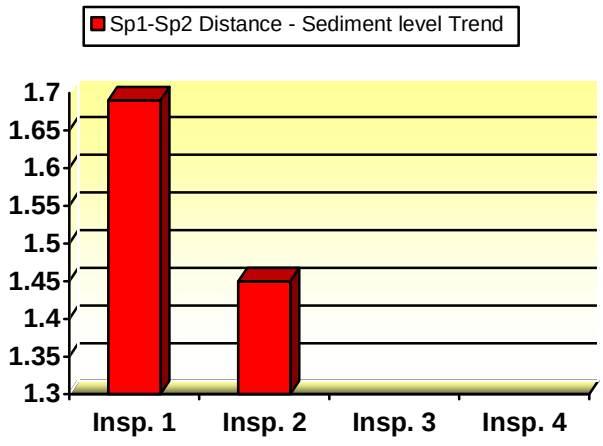
Date	23/06/2009
Filename	
Atmospheric Temperature	20.0 °C
Object Distance	0.0 m
Ar1 Max. Temperature	66.9 °C
Ar1 Min. Temperature	7.4 °C
Sp1 Temperature	7.4 °C
Sp2 Temperature	7.4 °C

img_width	0.0
boxarea_size	0.0
spot_dist	0.00

(in M or M²)

Internal Temp (C)	24



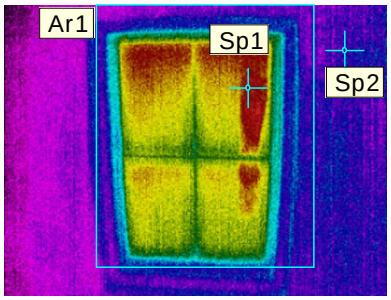


Insp. 1:	Initial capture of baseline thermogram. 4C differential between glass and elevation temp indicating heat loss at the single pane windows.
Insp. 2:	Differential between glass and elevation is now beneath 1C indicating better insulating property for the double glazing
Insp. 3:	
Insp. 4:	

Thermographic inspection of:

ID	**Living room**
Elevation	**South**
Section	**Windows**
Viewed	**(Area)/standing or crouched**

Date
23 June 2009



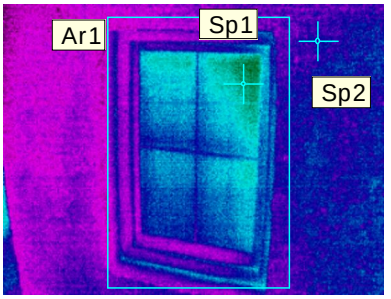
Inspection 1
02/04/2009

Date	02/04/2009
Filename	IR_0374.jpg
Atmospheric Temperature	7.0 °C
Object Distance	2.0 m
Ar1 Max. Temperature	14.0 °C
Ar1 Min. Temperature	8.5 °C
Sp1 Temperature	13.0 °C
Sp2 Temperature	9.7 °C

img_width	1.6
boxarea_size	1.0
spot_dist	0.44

(in M or M²)

Internal Temp (C)	24



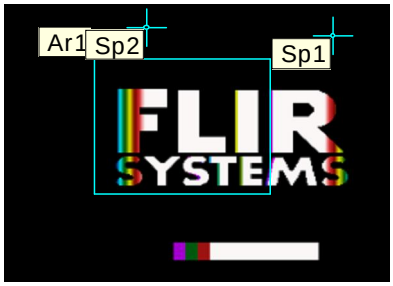
Inspection 2
17/06/2009

Date	17/06/2009
Filename	IR_00398.jpg
Atmospheric Temperature	13.0 °C
Object Distance	2.0 m
Ar1 Max. Temperature	15.5 °C
Ar1 Min. Temperature	13.2 °C
Sp1 Temperature	15.1 °C
Sp2 Temperature	14.2 °C

img_width	1.6
boxarea_size	0.9
spot_dist	0.36

(in M or M²)

Internal Temp (C)	21



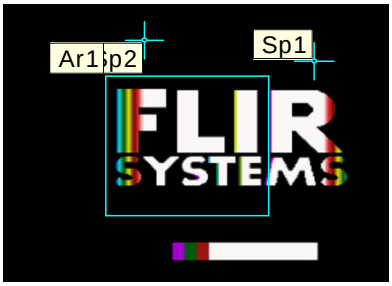
Inspection 3
23/06/2009

Date	23/06/2009
Filename	
Atmospheric Temperature	35.0 °C
Object Distance	0.0 m
Ar1 Max. Temperature	66.9 °C
Ar1 Min. Temperature	7.4 °C
Sp1 Temperature	7.4 °C
Sp2 Temperature	7.4 °C

img_width	0.0
boxarea_size	0.0
spot_dist	0.00

(in M or M²)

Internal Temp (C)	24



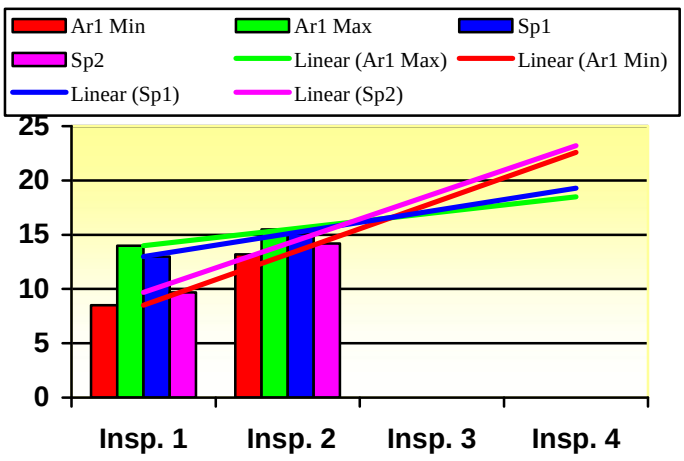
Inspection 4
23/06/2009

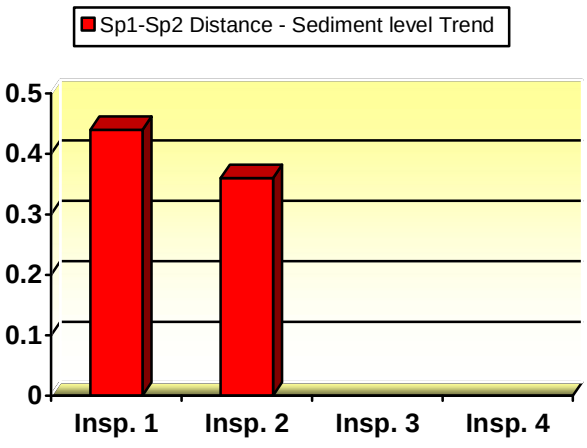
Date	23/06/2009
Filename	
Atmospheric Temperature	20.0 °C
Object Distance	0.0 m
Ar1 Max. Temperature	66.9 °C
Ar1 Min. Temperature	7.4 °C
Sp1 Temperature	7.4 °C
Sp2 Temperature	7.4 °C

img_width	0.0
boxarea_size	0.0
spot_dist	0.00

(in M or M²)

Internal Temp (C)	24



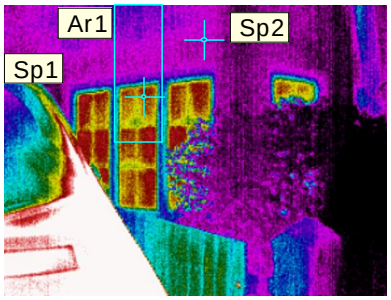


Insp. 1:	Initial capture of baseline thermogram. 4C differential between glass and elevation temp indicating heat loss at the single pane windows.
Insp. 2:	Differential between glass and elevation is now beneath 1C indicating better insulating property for the double glazing
Insp. 3:	
Insp. 4:	

Thermographic inspection of:

ID	Dining Room
Elevation	East
Section	Windows
Viewed	Standing

Date
23 June 2009



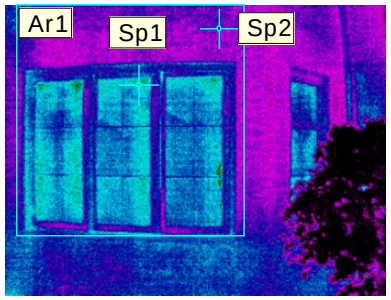
Inspection 1
02/04/2009

Date	02/04/2009
Filename	IR_0376.jpg
Atmospheric Temperature	7.0 °C
Object Distance	4.0 m
Ar1 Max. Temperature	13.2 °C
Ar1 Min. Temperature	8.2 °C
Sp1 Temperature	12.6 °C
Sp2 Temperature	8.6 °C

img_width	3.2
boxarea_size	0.5
spot_dist	0.69

(in M or M²)

Internal Temp (C)	24



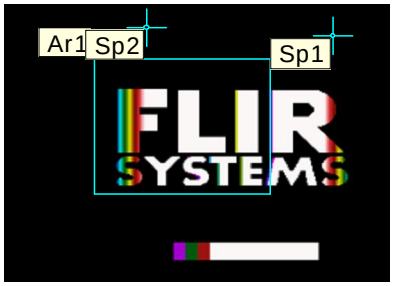
Inspection 2
17/06/2009

Date	17/06/2009
Filename	IR_00400.jpg
Atmospheric Temperature	13.0 °C
Object Distance	4.0 m
Ar1 Max. Temperature	15.7 °C
Ar1 Min. Temperature	13.2 °C
Sp1 Temperature	14.6 °C
Sp2 Temperature	13.6 °C

img_width	3.2
boxarea_size	3.8
spot_dist	0.83

(in M or M²)

Internal Temp (C)	21



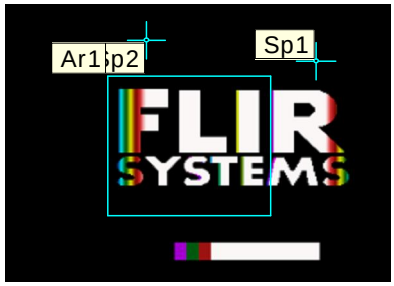
Inspection 3
23/06/2009

Date	23/06/2009
Filename	
Atmospheric Temperature	35.0 °C
Object Distance	0.0 m
Ar1 Max. Temperature	66.9 °C
Ar1 Min. Temperature	7.4 °C
Sp1 Temperature	7.4 °C
Sp2 Temperature	7.4 °C

img_width	0.0
boxarea_size	0.0
spot_dist	0.00

(in M or M²)

Internal Temp (C)	24



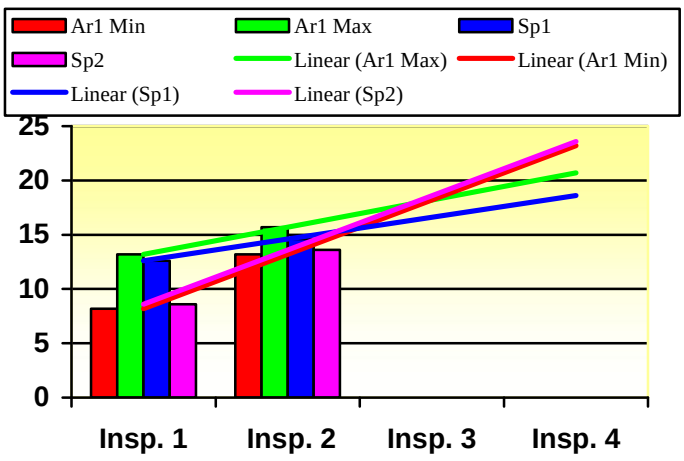
Inspection 4
23/06/2009

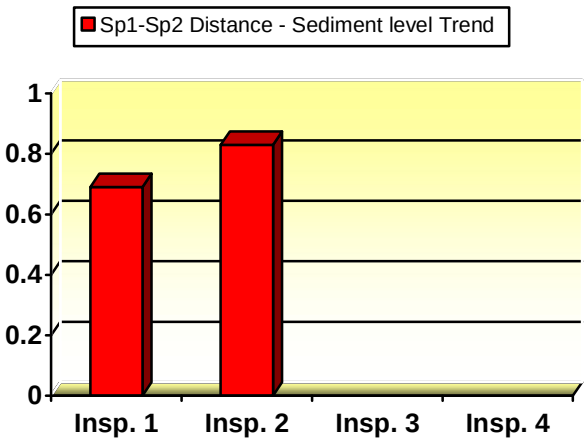
Date	23/06/2009
Filename	
Atmospheric Temperature	20.0 °C
Object Distance	0.0 m
Ar1 Max. Temperature	66.9 °C
Ar1 Min. Temperature	7.4 °C
Sp1 Temperature	7.4 °C
Sp2 Temperature	7.4 °C

img_width	0.0
boxarea_size	0.0
spot_dist	0.00

(in M or M²)

Internal Temp (C)	24





Insp. 1:	Initial capture of baseline thermogram. 4C differential between glass and elevation temp indicating heat loss at the single pane windows.
Insp. 2:	Differential between glass and elevation is now 1C indicating better insulating property for the double glazing
Insp. 3:	
Insp. 4:	