

## General Hints & Tips

Below are general installation hints and tips. You can find other hints and tips as follows:

- ▶▶ Preparation Hints & Tips - [Click Here](#)
  - ▶▶ Installation Hints & Tips - [Click Here](#)
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### 1. Prepare your Infrared Targets

It is important to take the opportunity of standardising the emissivity of the components within the switchgear that you wish to inspect through the Infrared window. This can be done using Glyptol™ Paint, electrical tape or IRISS IR-iD high Emissivity Target Labels.

### 2. Treat Bare Metal Surfaces

Once you have cut the hole into the metal cabinet or cover you will need to treat the surface with paint or a rust inhibitor, this will ensure that the IR window installations integrity is never compromised due to corrosion (especially important in humid and outdoor environments).

This can be completed very easily and will not slow down the installation process as there are several quick drying products on the market.

### 3. Ensure you have extra cutting tools

Plant shutdowns are notoriously difficult to arrange, and every effort has to be made to maximise the amount of work that is achieved during this time, this is especially true when installing infrared windows. Cutting tools, drill bits, etc... may break or become dull during the installation, ensure that you have an adequate supply of these as you will not have time to run to a hardware store to purchase replacements.

### 4. Ensure you have additional IR windows

During the pre-assessment phase you would have completed the estimate on how many infrared windows that you require, you may find however that during the installation you need more Infrared windows or a different size than first estimated. You will not be able to get these immediately and will miss the opportunity to install the windows that you need if you do not have spares. We suggest that if you are completing an infrared window installation program that you hold an additional 10%. Speak to your IRISS stockist about how we can help you during your installation program.

### 5. Auxiliary Lighting and Power

You may be one of a dozen contractors that are on-site during a shutdown, all of whom are claiming to be completing the most important task of the day!! All of whom will be scrambling for auxiliary power and lighting. Ensure that you have made ample provisions for the provision of these, if you do not you will be scrambling around in the dark with no power for your tools.

## 6. Prepare your working Areas

The installation of infrared windows involves cutting holes in switchgear using drills, hole saws, hydraulic cutters, etc... this produces metal shavings (swarf) and other waste that you do not want in your switchgear!! Set up an area outside of the switchroom that you can use to bring the covers to for cutting. This will ensure that no metal waste ends up in the switchgear and you control the installation process in a safe area.

## 7. Verify all equipment data prior to installation

Ensure that you identify the areas that the infrared windows are being fitted and any unique panel identification numbers, etc... this will ensure that the windows are labelled correctly, very important when you have more than one infrared window in a panel... some companies even use a barcode system.

## 8. Take Plenty of High Quality Digital Images

Once the infrared windows are installed we will use infrared inspections to inspect the switchgear and the results from these inspections are then put into reports. Many infrared cameras do not have a digital camera and the windows do not normally allow for clear visual images due to issues with light, field of view or lens materials. High quality images taken of the internal components of the switchgear can be kept on report templates, and used for future reference, etc... Remember, the thermographer using the infrared windows may not be as knowledgeable about the switchgear as you are!

## 9. Know your IR cameras min focus distance

Ensure that you make a note of the distance the components that you are interested in are from the cover or infrared windows. Many entry level cameras have a minimum focus distance of up to 20 inches and will have trouble focusing on targets that are too close.

## 10. Check operation of IR window before energising the equipment

A final check should be made of the installation before fitting the covers; ensure that the window is fitted and labelled correctly, emissivity readings are standardized, no tools or debris left behind, etc... this may be the last opportunity for you to get this right for some time....

## 11. Guidance Studs

The IRISS VP ranges of infrared windows use M4 screws, once you have cut out the holes using the appropriate template use 2 x M4 studs to line up fixing holes and the inner plate. This makes it far easier to line everything up and reduces the amount of time taken to install the infrared window.

Sent to us by Tom Wasemiller, ADM Cocoa Elec Dept. (Thanks Tom)

## 12. Use Mock ups to identify where to place your infrared windows

Some clients use false fronts made from card and temporary heat sources such as portable hand warmers to identify what they can see through an infrared window; this gives the thermographer exactly what he needs to place the windows in the correct place and saves trying to calculate the FOV.



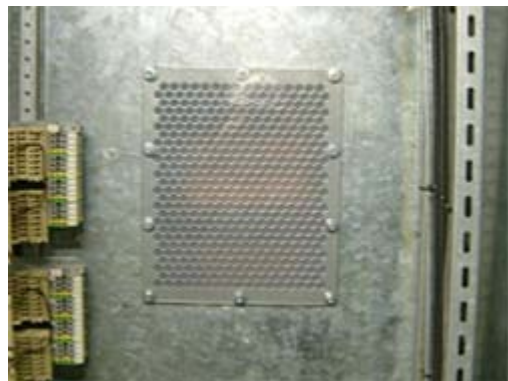
## 13. Modified Internal Perspex Covers

Infrared Cameras cannot see through Perspex / Plexiglas and this can give thermographers a great deal of problems especially when it comes to live inspections.

In some cases companies have adopted the approach that they will never open the covers live and have removed the Plexiglas shields all together and installed IR windows to allow constant monitoring of the internal components. They then labelled the switchgear accordingly to ensure that the covers are never removed live; this is of course at the discretion of the companies involved.

There are times however when the internal Plexiglas can not be removed as there may be fuses or resets within the cabinets. A way of allowing IR to be completed under these circumstances is to modify the switchgear with internal grills in the Plexiglas.

Note: Any proposed modifications to these systems will require full consultation with the persons responsible with the electrical plant on site.



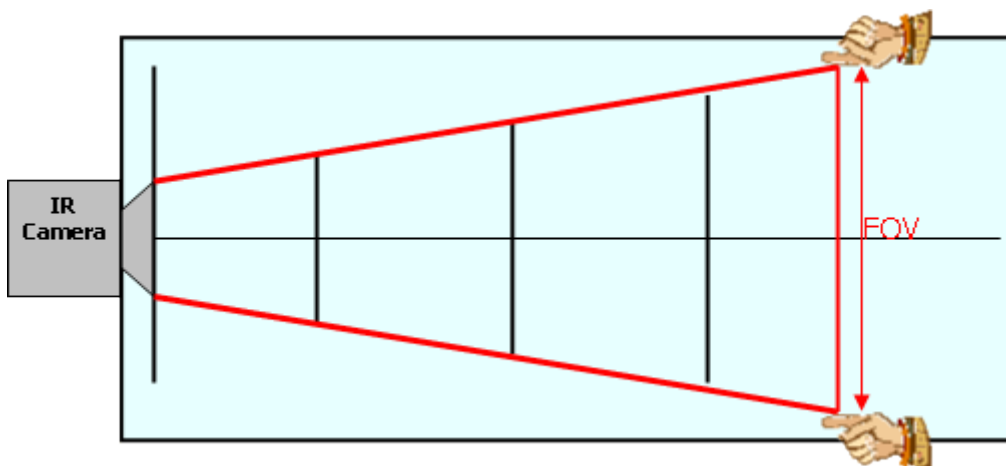
14. Ensure you put the following on the window label

You must ensure that all relevant data is placed on the labels provided with your IRISS infrared windows, this will ensure that the thermographers using the window will have all the information Necessary to ensure they get all the inspection points and inspection parameters correct, these may include:

LOCATION:	MCC1 North Plant Room
IR WINDOW NO:	
LENS MATERIAL:	No 2
TRANSMISSION:	IR Polymer
	100000%
	100000%
NOTES:	
	Bus Bar CONNECTIONS 3 O' CLOCK E = 0.95
	Bus Bar CONNECTIONS 8 O' CLOCK E = 0.95

- ▶▶ Unique identification number.
- ▶▶ IR window Transmission Rate (short and long wave)
- ▶▶ Number of targets (may be more than one)
- ▶▶ Location of targets (use clock face method)
- ▶▶ Target Emissivity (try to standardize)
- ▶▶ Calculated setting for IR camera if using emissivity setting to compensate for window transmission losses or:
- ▶▶ Calculated setting for IR camera if using distance and emissivity to compensate for window transmission losses

15. Using an IR camera to measure FOV



Some thermographers find it easier to let the camera show them what it can see rather than completing a number of calculations, the following procedure is a quick method of working out what you can see at set distances with your own equipment, lenses, etc....

Place a piece of paper on a flat even surface and mark out a line with increments of 2 inches up to approx 24 inches.

Place the camera lens at the 0 datum line.

using a heat source (finger, warm coffee cup, etc...) move the object in from the LH side outside the visual frame until it can be seen and mark the paper, repeat the same procedure for the RH side and mark the paper. (see fig 13)

Measure the distance between the 2 points and this will give you what you can see using the camera and lens at a set distance.

Note: once you have worked out the FOV distance that you can see you will need to add on a factor to take into account the IR Viewing Window that you intend to use, this is done by subtracting the camera lens diameter from the FOV and adding the IR Viewing Window diameter that you intend to use e.g.

Example:

FOV of a 24 degree lens at 16 inches as measured using the above process = 8 inches. The camera lens = 1.75 inches, thus the FOV of the camera = 6.25 inches.

- ▶▶ Using a 2 inch IR Viewing Window would give an approx FOV of 8.25 inches
- ▶▶ Using a 3 inch IR Viewing Window would give an approx FOV of 9.25 inches
- ▶▶ Using a 4 inch IR Viewing Window would give an approx FOV of 10.25 inches

Most thermographers measure a point at 18 inches and then join the points together at the increments marked on the paper and then keep a chart with their camera for easy reference.

At this point you should complete the exercise using any other lens assemblies that you may have, and you should also use this exercise to work out the minimum focus distance of your camera by moving the target a close to the lens as possible until it is out of focus.

Note:

Although the above technique is not 100 % accurate it gives an extremely good result. Try it for yourself; it is a simple technique that really works well!!

## 16. Fit Additional Locking Screws if required

Each IRISS infrared inspection window is provided with an additional stainless steel Torx locking screw; this is used where additional security is required. The IRISS locking tool has both a Phillips and Torx bit and is designed specifically to fit the IRISS range of infrared inspection windows, ports and grills.