

# Understanding your thermal report



Peace of mind  
for NZ business

A helpful guide from NZI's Electrical Inspectors






# Completing a thermal assessment **helps ensure your electrical installation is safe** and running smoothly.

A thermographic report can provide valuable information to support safe electrical practices in your building. This guide provides tips to help you assess your report.

## Thermal imaging offers some strong risk management benefits to businesses:

- ▶ It helps to locate thermal anomalies, loose connections, overloads and defects before they become bigger problems
- ▶ It can catch issues early so you can plan maintenance and avoid unexpected failures and costly repairs
- ▶ Thermal imaging won't disrupt your operations. It's contact-free and non-invasive
- ▶ It can improve the performance of your electrical systems by identifying areas of excessive heat
- ▶ It helps avoid unplanned downtimes, cut energy waste and increase the lifespan of your electrical equipment.

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If required for NZI's insurance purposes, your thermal imaging report must be completed by a Category 1 Thermographer who is a registered and licensed electrician or electrical inspector.



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# Understanding your thermography report

## A thermal imaging survey or inspection report should be produced by a Category 1 trained Thermographer.

Professional reports should start with a title page including the following:

- ▶ name and address of site being thermally imaged
- ▶ name of company completing the report
- ▶ date of inspection
- ▶ recipient's name
- ▶ thermographer's name and qualifications
- ▶ type of thermal camera used
- ▶ assistant's name (if applicable)
- ▶ thermographer's contact details.

The report should include a summary table of exceptions, listing items not tested or included and reasons for their exclusion.

Each page should feature both a thermal and digital image of the object of interest, and the report should include a key explaining the severity index for reference.



## Each thermal image in the report should include:

- ✓ The registered temperature of the item, along with a reference temperature if needed.
- ✓ A temperature scale to indicate surrounding temperatures.
- ✓ Clear, focused imagery showing the components, even if cropped compared to the digital image.

## Each page should also contain:

- ✓ The name of panel, location, or area of testing.
- ✓ A thermal image of the object of interest.
- ✓ A digital image of the object of interest.
- ✓ Component identification.
- ✓ A description of the object's condition and comments on any repairs needed.
- ✓ The recommended priority level for repair with a statement explaining how priorities are determined.

## Example Thermal Imaging Report

THERMAL IMAGING REPORT			
Prepared by [NAME OF COMPANY]			
For:		Date:	
[CUSTOMER BUSINESS NAME]		[DD/MM/YYYY]	
Address:			
[ADDRESS]			
Attn:			
[SITE CONTACT]			
Technician	Certification:	Camera used:	
[ATTENDING TECH]	ITC or ITP xxx-xxx	[MAKE] [MODEL]	[IR RESOLUTION]
PH:	02x-xxx-xxxx		
We have carried out an infrared thermography survey of your site on the above date and list our findings below. Issues identified will be rated using the Severity Index below, which indicates the urgency of repair.			
Exceptions:			
The following items could not be adequately assessed due to access and/or operational requirements. [ITEMS NOT SURVEYED]			
Severity Index:			
Delta T	Rating	Colour	Priority
0 to 5°C	Minor	Green	Investigate at next scheduled maintenance
5 to 20°C	Intermediate	Yellow	Developing issue, attend at next opportunity
20 to 30°C	Serious	Orange	Acute Overheating, Investigate ASAP
>30°C	Immediate	Red	Severe overheating, Shut down and repair immediately

All repairs must be completed by a licensed electrician.



# What good **thermographic imagery** looks like

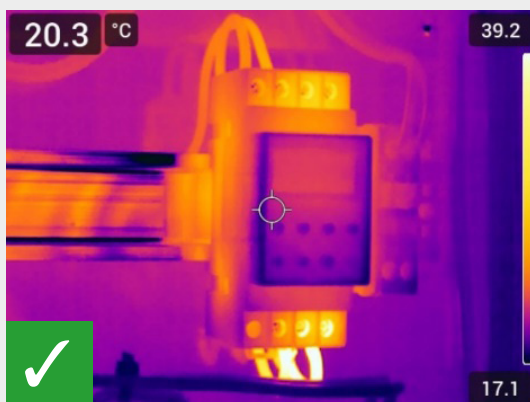
If you have received a thermography report from your electrician here are some tips on what high-quality thermographic images should look like. These guidelines can help your business verify that the thermographic images you receive are good quality.

## **Helpful tip:** Images in focus

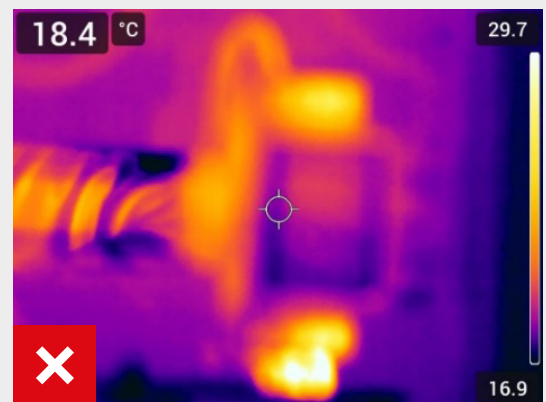
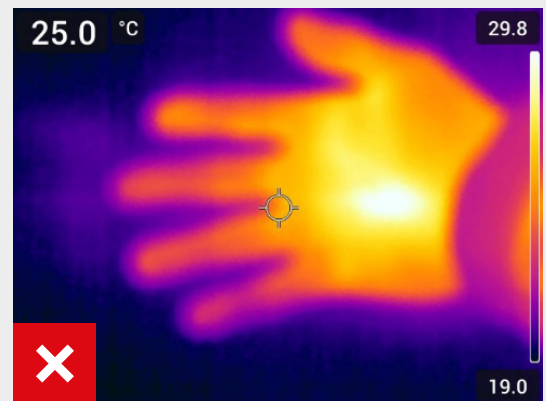
- ▶ Images should have a focused sharp line showing clear edges.



Good quality **in focus image**



Poor quality **blurry image**

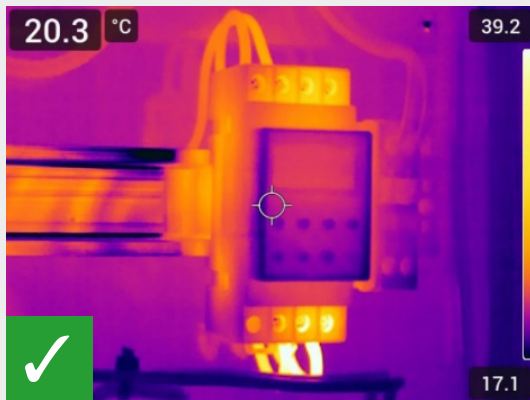


## Helpful tip: Colour contrast

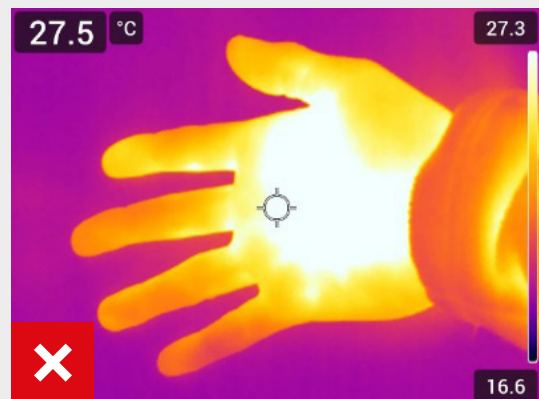
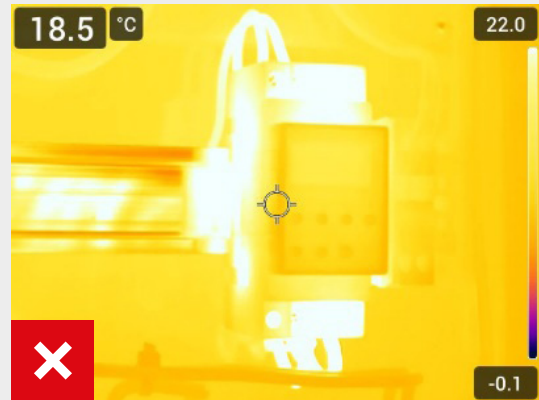


- ▶ A good quality image will also show a thermal colour scale, with 90% of the colours visible on the object.
- ▶ The colour contrast needs to be optimised for the entire image and not just the target, giving you a complete picture of the surface temperature across the object.
- ▶ The images below show a range of colours (good quality) vs one colour imaging (poor quality).

### Good colour contrast quality



### Poor colour contrast quality



To get good images, a **high-quality infrared camera** is required. The images must be **clear and precise** to identify thermal anomalies.



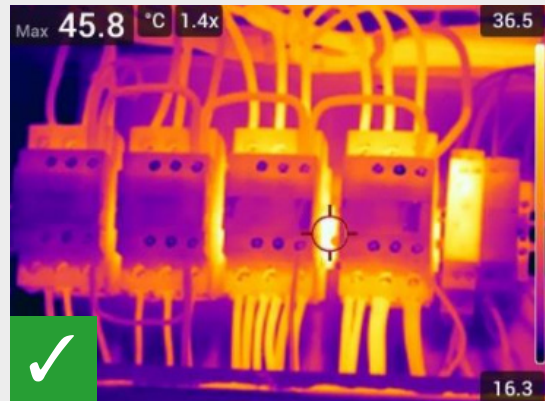
The thermal camera must be of a **resolution of 320 x 240 minimum sensor size** and appropriate for electrical inspections.

## Helpful tip: Visible objects of interest



- ▶ For accurate thermal imaging, you should be able to see cabling and connections in every shot.
- ▶ The example on the right below shows a clear image focused on the objects of interest, with cabling and connections visible and the full colour range represented.

Ensure you can **see cabling and connections** in every shot



## Helpful tip: Taking images at the right time



- ▶ Images should only be taken when the electrical system is under load or running normally otherwise the test will be inaccurate.

## Helpful tip: Camera proximity



- ▶ Thermal images need to be taken close to electrical components, not from a distance.

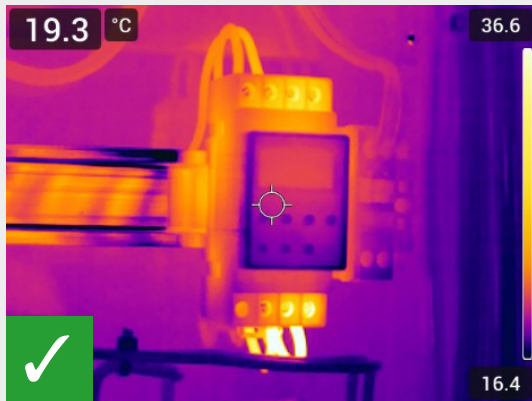


## Helpful tip: Exposed subject

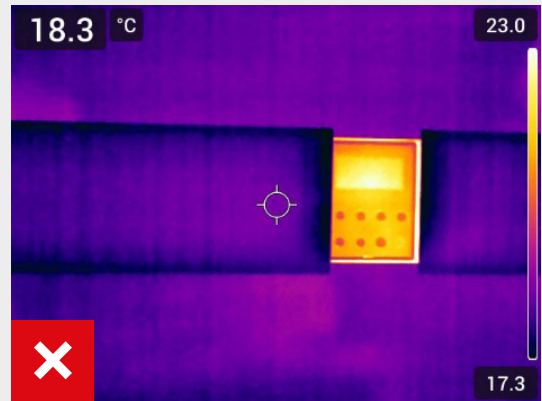


- ▶ Thermal cameras can't see through covers, walls or switchboard doors.
- ▶ Infrared energy is detected on surfaces, not through acrylic (transparent or opaque) or metal covers. If a switchboard cover is in the way, the image should be rejected.

### Good quality image without the cover



### Poor quality image as the object is covered

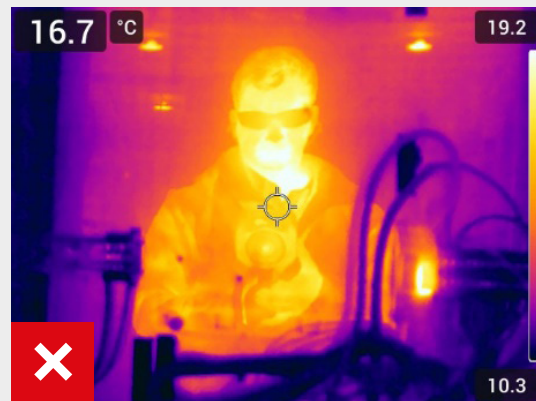
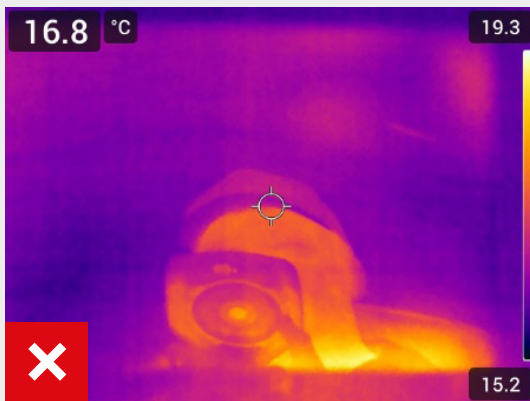


## Helpful tip: Reflections



- ▶ Since thermal cameras are highly sensitive to heat, take extra care to ensure the thermographer's reflection isn't included in the image like the two images below.

### Poor quality images with reflections visible

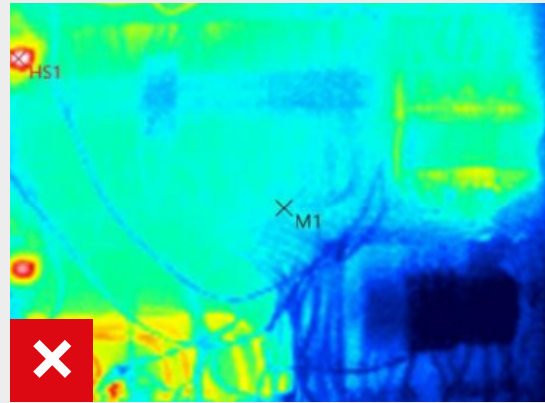
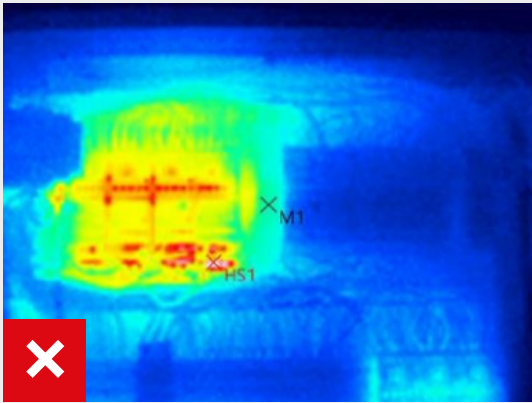


## Other helpful tips to ensure good quality images



- ▶ Make sure the images are clearly defined, not blurry and that you can see the cabling and connection.
- ▶ Check colour saturation: High colour saturation can distort thermal images, making temperature readings less accurate and harder to distinguish.
- ▶ Check that the camera has been calibrated correctly so it can record and show the temperatures effectively.

## Poor quality images



If required for NZI's insurance purposes, your thermal imaging report must be completed by a Category 1 Thermographer who is a registered and licensed electrician or electrical inspector.



# Thermography checklist

	Yes	No
Are your images of good quality? (See above thermal imagery guide).	<input type="checkbox"/>	<input type="checkbox"/>
Have you been provided a professional thermography report that includes all the details above?	<input type="checkbox"/>	<input type="checkbox"/>
Is the report formatted in the correct way?	<input type="checkbox"/>	<input type="checkbox"/>
Does the report summarise the defects and a timeframe for them to be fixed?	<input type="checkbox"/>	<input type="checkbox"/>
Does the report list the repairs that are required or recommended?	<input type="checkbox"/>	<input type="checkbox"/>
Is the person completing the Thermography, trained to Category 1?	<input type="checkbox"/>	<input type="checkbox"/>
Are the images blurry?	<input type="checkbox"/>	<input type="checkbox"/>
Can you see the wires in each of the images?	<input type="checkbox"/>	<input type="checkbox"/>
Were the electrical systems tested under normal operating loads?	<input type="checkbox"/>	<input type="checkbox"/>
Are there clear images of the open switchboards?	<input type="checkbox"/>	<input type="checkbox"/>
Have you arranged to fix any defects?	<input type="checkbox"/>	<input type="checkbox"/>

If your business answered 'No' to any of the questions on the checklist above, please talk to your NZI representative or insurance broker for support.

