

Fire Engineering

Thermal Imaging Camera (TIC)

10 Minute short training drills



Minute
TIC Short Drills

- The Thermal Imaging Camera (TIC) short training drills are designed to provide a reference for skills acquisition and maintenance for a range of fire service thermal imaging subjects.
- The drills include concepts of thermal imaging theory, camera operation, and the application of skills and knowledge for a range of operational incidents.
- They can be done with readily available equipment and resources; are quick and easy to set up; and the drill itself should be able to be achieved in about 10 minutes, including some discussion about the drill.
- For best results, rehearse the drill or check results prior to presenting it in front of a group.
- Each drill has a brief description of how the drill can be set up with some images of how it can be achieved. There is a section describing the objectives and included in the notes section is some further information as required and some topics for general discussion during or after the drill.
- The drills are generic where possible, but some cameras may have specific camera features that can also be used.
- Be careful with hot objects. Use appropriate PPE/PPC.
- Care should be taken to avoid cross-contamination with the use of operational equipment in clean areas.

For conducting drills, use only suitable items and equipment in an appropriate area to avoid contamination of food, food preparation, and cooking equipment, as well as other clean areas.



Senior Station Officer (SSO) Gavin Parker

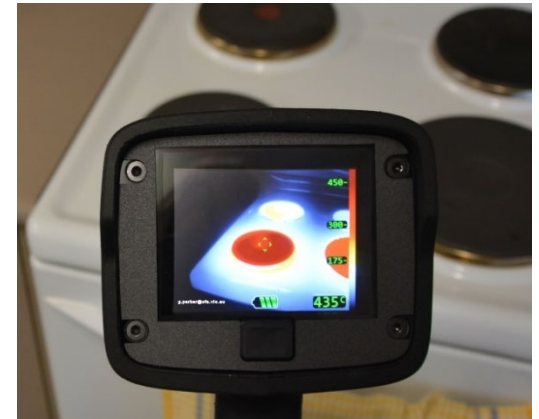
Gavin is a Senior Station Officer with Fire Rescue Victoria (FRV), commencing his firefighting career with Country Fire Authority (CFA) - Victoria in 1995.

He has undertaken international study on two occasions. The most recent was an Emergency Services Foundation (ESF) scholarship in the USA and Canada.

The views expressed are that of the author and not necessarily that of CFA or FRV.

TIC Short Training Drills Contents

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Infrared (IR) Concepts – Visual light & Infrared

Visual light and infrared are part of the electromagnetic spectrum. Visual light has a shorter wavelength than IR and therefore behaves differently. Visually we can distinguish between colors. IR indicates the surface temperature of the object as a thermogram and not visual color. A simple drill to demonstrate the principle can be achieved by the following:

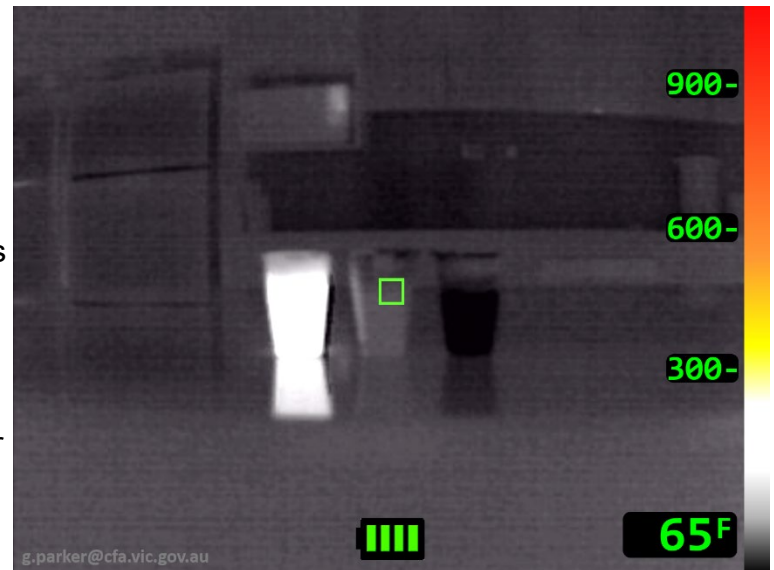
- Position two or more different colored cups and fill one with warm water and the others with cold or cooler water.
- View the cups both visually and with the TIC.

Objectives:

- Identify that visually we can distinguish colors but may not be able to determine the temperature of the cups. With IR we can identify temperatures, but IR can't distinguish between the color of the cups.

Notes and discussion:

- Reinforce that in “standard mode” the TIC displays hotter/warmer objects as white or lighter shades relative to the Field of View.
- Note that white does not reflect hot or warm per se. It merely uses the gray scale to depict objects that are warmer and colder than others relative to the environment.
- Our eyes detect the visible region of the electromagnetic spectrum and the different wavelengths of energy which make up white light as colors. For example, a red object appears red because it reflects the red energy which we see and absorbs the other colors that make up light.
- Discuss the differences in what we see visually and what is detected in IR and that they can complement each other when investigating or analyzing a scene.



Infrared (IR) Concepts – Visual light & Infrared

Both visual light and infrared radiation (IR) form part of the electromagnetic (EM) spectrum. All other forms of EM radiation other than visible light, such as infrared, are invisible to the human eye. EM radiation travels in waves. These waves travel at the speed of light. The wavelength determines its properties from the shortest wavelength of gamma rays, then x-rays, Ultraviolet (UV), visible light, infrared, microwaves and radio waves as the longest wavelength.

Visible Light:

The human eye can detect and process visible light as colors. When viewing an object such as a red item located outside for example; white light is emitted from the sun, the reflected red light from the object is detected by the eyes, all other colors are absorbed by the object.

Infrared (IR)

IR energy is emitted by all objects. The camera processes the detected energy and displays it as an image (thermogram) on the screen. A TIC cannot distinguish the color of the object, only the energy. For fire service cameras in standard mode (TI Basic) the display is in shades of gray with lighter shades indicating warmer objects. At higher temperatures, colors such as yellow, orange and red may be introduced (refer to camera manual for specific color temperature settings).

