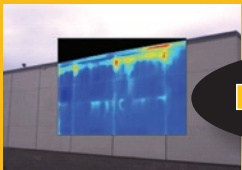# FLUKE ®

Fluke TiR Series
Thermal Imagers

Find building problems faster.

IR-Fusion® Technology—infrared and visual images fused together—makes infrared easy to understand

Designed especially for building and restoration applications

Rugged, reliable, easy to use... what Fluke tools reputation has been for over 50 years

Models for any application and budget

IR·Fusion®

TiR1
IR FUSION
TECHNOLOGY

Locate building problems quickly and easily

Fluke TiR Series Thermal Imagers are built specifically for the building diagnostic industry. **Property managers** and **facility managers** use thermal imaging to protect investments and keep buildings in a well maintained, healthy state.

Restoration professionals are using thermal imaging to increase their business, differentiate themselves from their competitors and generate documentation in case they need to defend a future liability claim.

Typical thermal imaging building applications:

Thermal imaging is an efficient, non–destructive testing method to detect (potential) problem areas such as:

- Moisture intrusion in roof systems, walls, flooring, ceilings and other building areas
- Leaks in water pipes, buried steam lines, water lines or underground heating systems and sprinkler systems
- Missing or inadequate insulation areas
- Heat or cooling loss, HVAC/R problem areas
- Connection problems in low voltage electrical systems
- Termite and pest issues
- Construction failure areas
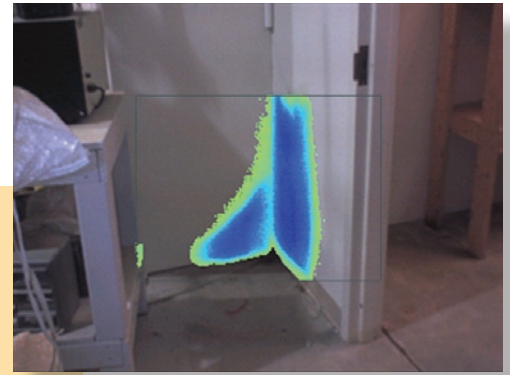
Moisture detection: Accurately detect moisture behind interior walls, in ceilings, and under carpets.
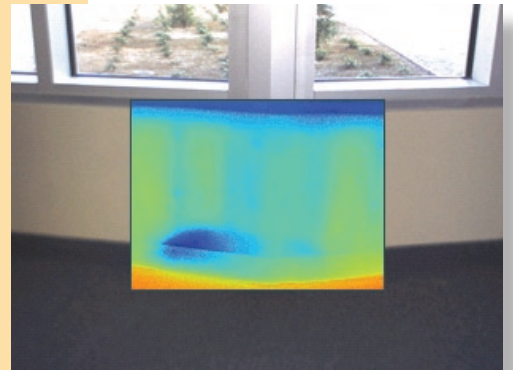
Mold remediation: Control mold by revealing undetected sources of moisture
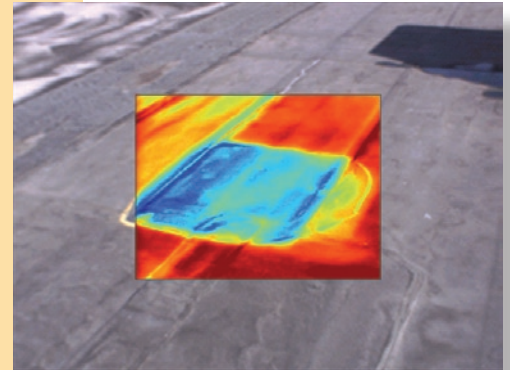
Roofing: Detect water–saturated insulation in flat–roof systems to locate damaged portions of roofing structure.
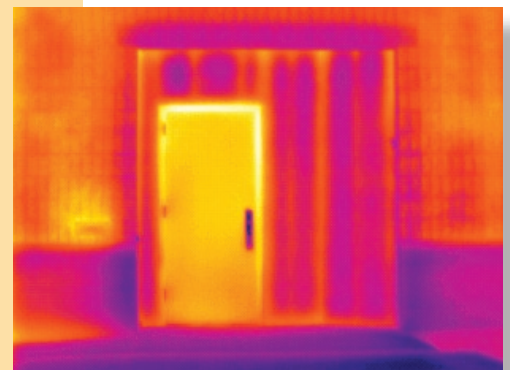
Energy audits: Perform residential and commercial energy audits by scanning for heating or cooling (energy) loss, moisture invasion, and HVAC/R problems.

IR-Fusion® Technology*

See things both ways—Infrared and visual (visible light) images fused together communicating critical information faster and easier—traditional infrared images are no longer enough.

Patent-pending IR-Fusion Technology, pioneered by Fluke, simultaneously captures a digital photo in addition to the infrared image and fuses it together taking the mystery out of IR image analysis.

Images enhanced with IR-Fusion help identify and locate problems enabling repairs to be done right the first time.
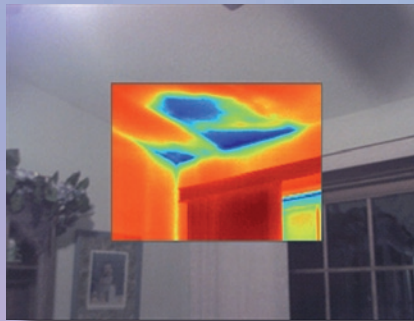
IR-Fusion images are also extremely effective when communicating findings to a customer, insurance company or the person who will be performing the repairs.
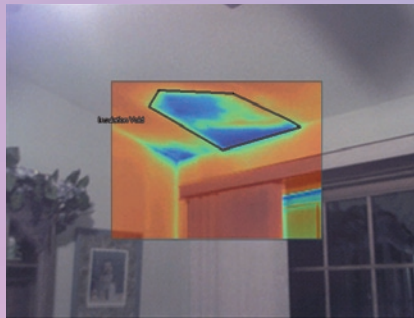
*Patent-pending IR-Fusion Technology from Fluke links the infrared image to full visual (visible light) image automatically. No need to carry a digital camera or spend additional time and energy to manage the infrared and visual images. IR-Fusion links the two together so image management is effortless.
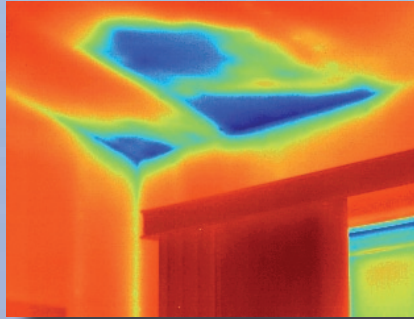
Full (traditional) IR Full screen infrared view for maximum infrared detail.

IR-Fusion - Multiple viewing modes

Identify problems quickly using different on-screen modes– the user selects the mode that works best for each situation. While some viewing modes are not included in every model, all are available for viewing and analysis in the included free SmartView™ software.

Picture-in-Picture
Creates an IR "window" surrounded by a visual (visible light) frame to easily identify problems, while maintaining a frame of reference with surroundings.

IR/visible alarm
For displaying only temperatures that fall above, below, or in between a specified range as IR image, leaving the rest of the scene as a fully visible light image.

Alpha/Automatic Blend
A blend of the visual (visible light) and infrared image together to create a single image for optimal viewing. Easy menu options give you access the different blending options from full thermal image to full visual image. Automatic blend provides enhanced detail to help locate problems precisely along with a visual frame of reference and helps to better focus the image.

Full visible light – A bright, detailed pixel-for-pixel reference image of subject areas for documentation and reporting.

Fluke TiR1/R Thermal Imagers

New

Optimized for building envelope inspection, restoration and remediation and roofing applications.

The new Fluke TiR1 and TiR Thermal Imagers are the perfect imagers for any building application.

- Enhanced problem detection and analysis capabilities with patent-pending IR-Fusion® Technology – only available from Fluke.
- Optimized for tough environments
  - Engineered and tested to withstand a 2 meter (6.5 foot) drop
  - Withstands dust and water—tested to an IP54 rating
- Delivers the clear, crisp images needed to find problems fast
  - Identify the smallest temperature differences common in building and roofing applications with their optimized thermal sensitivity (NETD)

- High performance, low noise sensor provides high quality image and stable temperature reading
- Even the smallest details become visible with the large, widescreen full color LCD display
- Intuitive, three-button menu is easy to use … simply navigate with the push of a thumb.
- No need to carry pen and paper— record findings by speaking into the camera— voice annotation comments are saved with the image. (TiR1 only)
- Store more than 3,000 screen images (.bmp format) or 1,200 IR-Fusion images on included 2 GB SD memory card.

Protective lens cover

Visual camera lens

Large, landscape format LCD display

Speaker for sound and voice annotation playback

2 GB SD memory card slot

Microphone for voice annotation

Picture-in-picture, full IR or blended high-quality image

AC adapter terminal

Easy to use three-buton menu

Focus ring

Thermal imager lens

Image capture trigger

Rugged, withstands 2 m (6.5 ft) drop

Wrist strap (adjusts for right or left handed use)

Fluke TiR1/R specifications

	Fluke TiR1	Fluke TiR
Imaging performance		
Field of View (FOV)	23° horizontal x 17° vertical	
Minimum focus distance	Thermal lens: 15 cm (approx. 6 in), Visible (visual) light lens: 46 cm (approx. 18 in)	
Thermal sensitivity (NETD)	≤ 0.07 °C at 30 ° C (70 mK)	≤ 0.1 °C at 30 ° C (100 mK)
Minimum span (Auto/Manual)	5 °C / 2.5 °C	5 °C / 2.5 °C
Focus	Manual	
Detector size	160 x 120	
On camera operating modes	Picture-in-Picture (Blending is user selectable between MAX, MID and MIN) and full screen IR (Blending is user selectable between MAX, MED and MIN)	Full Picture-in-Picture and full screen IR
Visual (Visible light) camera	640 x 480 pixels, full color	
Temperature measurement		
Temperature range	–20 °C to +100 °C (–4 °F to +212 °F), 2 ranges	–20 °C to +100 °C (–4 °F to +212 °F)
Accuracy	± 2 °C or 2 % (whichever is greater)	± 5 ° C or 5 % (whichever is greater)
Measurement modes	Center point and hot and cold markers	Center point
On-screen emissivity correction	Yes	No
Image presentation		
Digital display	9.1 cm (3.6 in) diagonal landscape color VGA (640 x 480) LCD	
LCD backlight	Selectable bright or auto	
Palettes	Ironbow, blue-red, high contrast, amber, hot metal, grey	Ironbow, blue-red, high contrast, grey
Image and data storage		
Fully radiometric	Yes	
Storage medium	2 GB SD card stores up to 3000 .bmp IR images or 1200 .IS2 IR-Fusion images	
File formats supported	Exportable to JPEG, BMP, GIF, PNG, TIFF, WMF EXIF, and EMF	
Voice memo recorder (voice annotation)	Yes	No
Software Controls and adjustments		
Software	SmartView ; Full analysis and reporting software included	
Set-up controls	Date/time, °C/°F, language, emissivity, hot spot and cold spot on image	Date/time, °C/°F, language
Language selection	English, German, French, Spanish, Portuguese, Italian, Swedish, Finnish, Russian, Czech, Polish, Turkish, Simplified Chinese, Traditional Chinese, Korean, Japanese	
Image controls	Smooth auto scaling and manual scaling	
On-screen indicators	Battery status, real time clock and center point temperature, range and span indication and high and low alarm settings	
Power		
Battery type	Internal rechargeable battery (included)	
Battery operating time	3 to 4 hours continuous operation	
Battery charging	2 hours with ac charger or dc car charger (charges battery while operating)	
AC operation	AC adapter/charger 110/230 V ac, 50/60 Hz	
Power saving	Automatic shutdown and sleep modes (user specified)	
Environmental and mechanical design		
Operating temperature	–10 °C to +50 °C (+14 °F to +122 °F)	
Storage temperature	–20 °C to +50 °C (–4 °F to +122 °F)	
Relative humidity	Operating and storage 10 % to 90 %, non-condensing	
Water and dust resistant	IP54	
Two meter (6.5 feet) drop test	Yes	
Protective lens cover	Yes	
Weight (including battery)	1.2 kg (2.6 lbs)	
Imager size (HxWxD)	267 mm x 127 mm x 152 mm (10.5 in x 5.0 in x 6.0 in)	
Other		
Warranty	Two-years	
EN 61010-1 2nd edition and EN61326-1	Yes	

TiR4FT, TiR3FT and TiR2FT IR FlexCam® Thermal Imagers

The experts' choice for building diagnostics

The Fluke TiR4FT, TiR3FT and TiR2FT IR FlexCam® Thermal Imagers are for professionals demanding the best and most thorough solution in building diagnostics applications

- Enhanced problem detection and analysis capabilities with patent-pending IR-Fusion® Technology – only available from Fluke.

- View crisp, clear images on large LCD screen

- Industry leading thermal sensitivity (≤ 0.05 °C NETD on TiR4FT) (≤ 0.07 °C NETD on TiR3FT and TiR2FT) provides solid resolution and ultra high-quality images.

- Easily view around obstructions with the 180 ° articulating lens

- Exceptional image resolution delivered with 320 x 240 focal plan array and 20 mm high quality germanium lens on TiR3FT and TiR4FT models (TiR2FT available with 160 x 120 FPA)

- SmartFocus allows for easy one finger continuous focus

- Generate fast, easy customizable reports with included SmartView™ software

- Intuitive, easy to use operation with Windows CE® interface.

Light (torch and flash) for working in dark areas

Laser

Visible (visual) light lens

Mouse/joystick controller

Compact Flash memory card slot

Menu button

Mouse-click (select) button

High precision Germanium (infrared) lens

Trigger button

RCA video output port

Programmable function buttons

Power on/off

Large landscape display

Automatic level/ span adjustments

Hand strap

Fluke TiR4FT, TiR3FT and TiR2FT specifications

		TiR4FT	TiR3FT	TiR2FT
Imaging performance	**Thermal**			
	Field of view (FOV)*	23° horizontal x 17° vertical		
	Spatial resolution (IFOV)*	1.30 mrad		2.60 mrad
	Minimum focus distance*	0.15 m		
	Thermal sensitivity (NETD)	≤ 0.05 °C at 30 °C	≤ 0.07 °C at 30 °C	
	Detector data acquisition / Image frequency	60 Hz		30 Hz
	Focus	SmartFocus; one finger continuous focus		
	IR digital zoom	2x, 4x, 8x	2x	
	Detector type	Focal Plane Array (FPA) Uncooled Microbolometer		
	Detector size	320 x 240 FPA		160 x 120 FPA
	Spectral band	8 µm to 14 µm		
	Digital image enhancement	Automatic full-time enhanced		
	Visual			
	On camera operating modes	Full thermal, full visual light or merged thermal-visual images. Picture-in-picture. Alarm.		
	Visible light camera	1280 x 1024 pixels, full color (1.3 Mega pixel)		
	Visible light digital zoom	2x, 4x	2x	
Temperature measurement	Calibrated temperature range	–20 °C to 100 °C (–4 °F to 212 °F)		
	Accuracy	± 2 °C or 2 % (whichever is greater)		
	Measurement modes	TiR2FT/TiR4FT - Centerpoint, center box (area min/max, average) moveable spot, TiR3FT - Centerpoint, center box (area min/max, average)		
	Emissivity correction	0.1 to 1.0 (0.01 increments)		
Image presentation	Digital display	5" large high-resolution digital display		
	LCD backlight	Sunlight readable color LCD		
	Video output	RS170 EIA/NTSC or CCIR/PAL composite video		
	Palettes	Grayscale, grayscale inverted, blue red, high contrast, hot metal, iron		
Optional lens	**10.5 mm wide-angle lens**	High precision Germanium lens		
	Field of view (FOV)	42° horizontal x 32° vertical		
	Spatial resolution (IFOV)	2.45 mrad		4.9 mrad
	Minimum focus distance	0.3 m		
Image and data storage	Storage medium	Compact flash card stores more than 1000 IR images (512 MB card standard)		
	File formats supported	14 bit measurement data included. Exportable BMP, GIF, JPEG, PNG, TIFF		
Interfaces and software	Interface	Compact flash card reader included		
	Software	SmartView; full analysis and reporting software included		
Laser	Classification	Class II		
	Laser targeting	Laser dot visible on screen when blending thermal and visible image		
Controls and adjustments	Set-up controls	Date/time, temperature units C/F, language, calibration range, LCD intensity (high/normal/low)		
	Image controls	Level, span, auto adjust, emissivity and background (continuous/manual)		
	On-screen indicators	Battery status, target emissivity, background temperature and realtime clock		
Power	Battery type	Li-Ion smart battery, rechargeable, field-replaceable		
	Battery operating time	Two hours continuous operation		
	Battery charging	2 bay intelligent charger powered via AC outlet		
	AC operation	AC adapter 110/220 VAC, 50/60 Hz (TiR2FT/TiR4FT only)		
	Power saving	Automatic shutdown and sleep modes (user specified)		
	DC operation	Vehicle 12 volt adaptor optional		
Environmental and mechanical design	Operating temperature	–10 °C to +50 °C (14 °F to 122 °F)		
	Storage temperature	–40 °C to +70 °C (–40 °F to 158 °F)		
	Relative humidity	Operating and storage 10 % to 95 %, non-condensing		
	Water and dust resistant	IP54		
	Weight (including batteries)	1.95 kg (4.29 pounds)		
	Camera size (HxWxD)	162 mm x 262 mm x 101 mm (6.5 in x 10.5 in x 4.0 in)		
Other	Warranty	Two-years		

*standard 20 mm Germanium lens

Thermal imaging terminology explained

Palette—Color representation of the temperatures (temperature scale) in a displayed image. Certain color palettes meet personal preferences or optimize the image for different applications and/or problems. An example of the different palettes appear to the right.

Sensor Size—Similar to digital cameras the sensor size describes the amount of displayed points per image of a thermal imager. A sensor size of 160 x 120 captures and displays more than 19,000 measurement points with each measurement. If the imager is fully radiometric then it also truly measures and stores all captured points with the image.

Field of view (FOV)—Indicates what the thermal imager sees or measures at a given moment. The combination of the Field Of View specification and the distance to the measured object determines which surface or part of an object will be measured as a total. A thermal imager with a FOV of 23° x 17° (20 m), F=0.8 lens) can detect an object that is 6 m (20 ft) wide by 4.5 m(15 ft) high. This same imager can infer a temperature measurement of a smaller section within that object of 3.8 cm X 3.8 cm (1.5 in x 1.5 in). A FOV calculator on www.fluke.com/FOV helps you calculate the measurement surface at various distances to the object.

Thermal sensitivity—Indicates what the smallest temperature difference is which can be measured/displayed in an image. It basically is the maximum resolution of the image and is referred to as NETD (noise equivalent temperature difference).

Emissivity adjustment—All surfaces emit infrared energy or heat. The level of emission varies much per surface and is described with the term emissivity. Painted coatings and materials usually have a high emissivity while polished aluminum has a low emissivity. Visit www.fluke.com/emissivity for a table with emissivities for different materials. If you perform qualitative inspections with the imager (most applications) then emissivity does not have to be adjusted. To measure the temperature of a material accurately it will be necessary to adjust for the material's emissivity in specific applications.
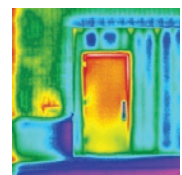
Span—The set of temperature values that can be measured within a preset range. Adjusting the span allows you to see more subtle temperature gradients (or contrast) in a captured image. When the span is optimized the imager shows 256 different shades of color in an image.
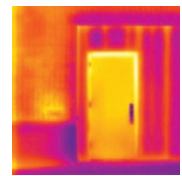
Ironbow
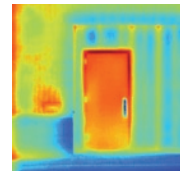
Blue-red

High contrast

Amber

Hot metal

Fluke SmartView™ Software

Easy to use IR analysis and reporting for Fluke thermal imagers.

Fluke SmartView™ software is included with each Fluke thermal imager.

- Powerful, modular suite of software tools for viewing, annotating, editing and analyzing infrared images.
- Generate fully customizable and professional–looking reports in a few easy steps.
- Full support of IR–Fusion® Technology lets you edit images in five viewing modes.
- Easy to use, yet delivers high–end analysis performance

Image viewing and editing

- Display an array of open images for convenient selection and analysis
- Scroll across the image to display the temperature at any given point
- Edit color palettes, reference images, markers, emissivity, and more

Extensive annotation possibilities

- Add annotations (text comments) to images and reports
- Input information such as locations, category and other notes
- Reference images can be linked for good/bad and before/after analysis

Detailed analysis and total image control

- Alter the level, span and palette selection to enhance contrast or display detail more effectively
- Unlimited standard and user–defined analysis markers
- Five viewing modes allows you to choose the best image presentation for your application needs
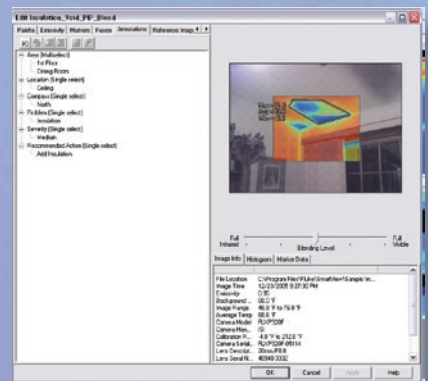
Simplified report generation

- Generate professional customized reports fast
- One–click standardized report generation for a quick results
- Choice of features including: Before/after, IR plus visible light, annotations, supporting data, graphics and charts
- Report wizard guides the user through report generation

SmartView software system requirements

- Windows® /2000 SP4 with update roll up 1/XP SP2/Vista
- A web browser for product registration. Internet
- Explorer 5.0 or newer or Netscape® 5.0 or newer
- 500 MB available disk space, not counting space requirements for web browser
- 16–bit color, 800 x 600 resolution video or better
- Color printer for printing the images
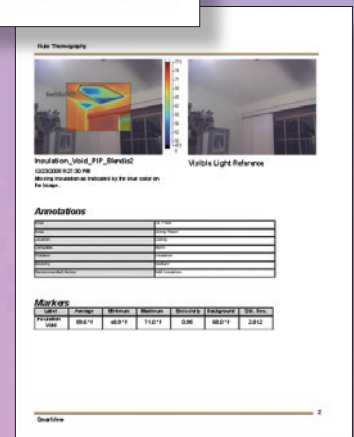- CD–ROM drive (for installing SmartView software)
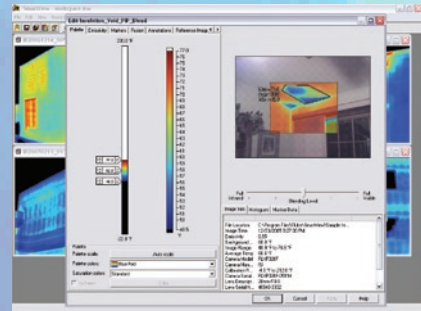
Navigate, analyze and enhance IR images

Organize data with extensive annotations

Simplified report generation

Fluke keeps your world up and running

Fluke also offers a wide range of indoor air quality tools for the industry. With our long experience in delivering top quality, easy-to-use and safe tools, we understand your job and the challenges you face day in-day out. Fluke tools are designed to improve your ability to do a better job by offering rugged, reliable and innovative instruments.

Fluke 975 AirMeter™

Fluke 983 Particle Counter

Fluke 922 Airflow Meter

Fluke 971 Temperature Humidity Meter

Fluke CO-220 Carbon Monoxide Meter

Electrical and industrial professionals all over the globe have been reaching for Fluke tools for over 50 years, confident in their rugged, reliable design and high performance. Fluke is known the world over as the leading manufacturer of digital multimeters (DMMs) and other test and measurement tools—known as the tools of choice for electricians and industrial technicians.

Fluke is now bringing that innovation, expertise and rugged, reliable designs to the building diagnostics industry with thermal imaging and indoor air quality products.

Fluke listens to our customers as they develop new products—the customer becomes a design partner—to ensure that tools we design meet our customers' needs and are manufactured to the highest level of quality standards and meet the rugged and reliability standards our customers have come to expect.

Fluke employees strive to bring this commitment to their everyday jobs, its our culture and has become part of every employee's daily goal. Our founder John M. Fluke, Sr. once said at an employee meeting:

"We must always recognize the customer is our boss. We exist to serve their needs and they have the right to get a little more than they thought they paid for."

And for the past 50 years we have worked to deliver on this promise.
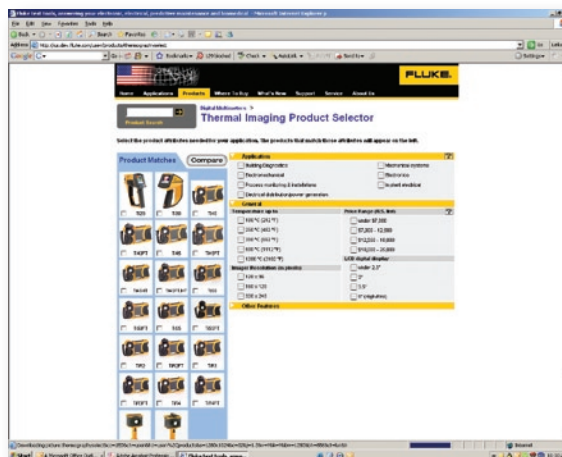
Check out the interactive Thermal Imager Selection Tool. Enter your application requirements and the selection tool will match the best imagers to your application. Go to **www.fluke.com/select**

Ordering Information

FLK-TIR1
Thermal Imager

FLK-TIR
Thermal Imager

FLK-TIR2/FT-20
IR FlexCam BD Thermal Imager with IR-Fusion

FLK-TIR3/FT-20
IR FlexCam BD Thermal Imager with IR-Fusion

FLK-TIR4/FT-20
IR FlexCam BD Thermal Imager with IR-Fusion

To find out more about Fluke thermal imagers go to **www. fluke.com/thermal_imaging** or in the United States call 1-800-760-4523.