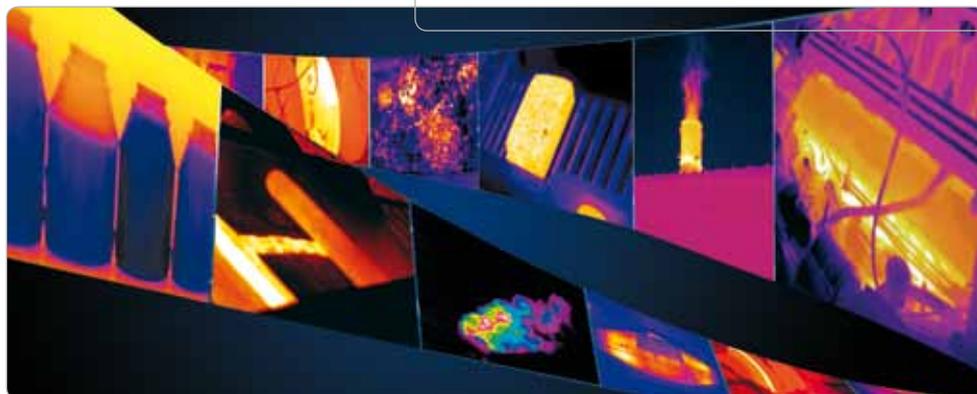


Thermal imaging cameras for Automation & Safety



Machine Vision

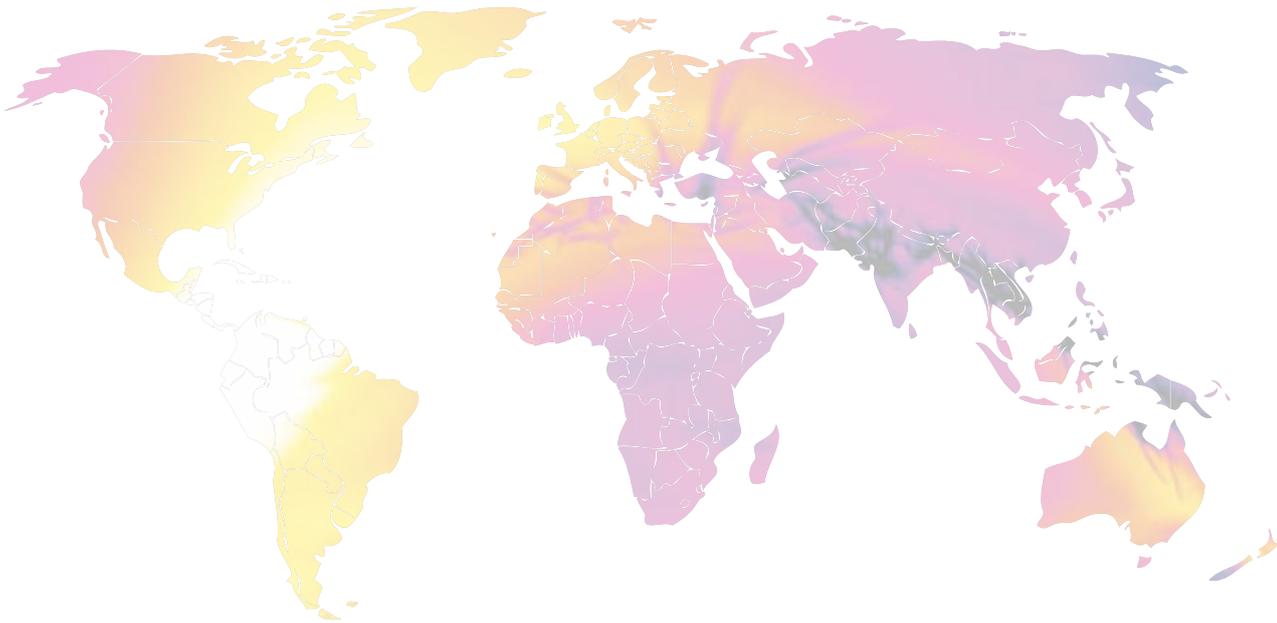
Process Monitoring

Quality Control

Fire Detection

Critical Equipment Monitoring





FLIR Systems: the world leader for thermal imaging cameras

FLIR Systems is the world leader in the design, manufacturing and marketing of thermal imaging systems for a wide variety of commercial, industrial and government applications.

FLIR Systems' thermal imaging systems use state-of-the-art infrared imaging technology that detects infrared radiation - or heat. Based on detected temperature differences, thermal imaging cameras can create a crisp image. Complicated algorithms make it also possible to read correct temperature values from this image. We design and manufacture all of the critical technologies inside our products, including detectors, electronics, and special lenses ourselves.



FLIR Systems, Stockholm



FLIR Systems, Portland



FLIR Systems, Boston



FLIR Systems Santa Barbara

Rapidly emerging markets and organization

Interest for thermal imaging has grown considerably over the last few years in a large variety of markets. To face this increased demand, FLIR Systems has expanded its organization drastically. Today we employ more than 1,900 people. Together, these infrared specialists realize a consolidated annual turnover of more than 1 billion US dollars. This makes FLIR Systems the largest manufacturer of commercial thermal imaging cameras in the world.

Manufacturing capabilities

FLIR Systems currently operates 6 manufacturing plants: three in the USA (Portland, Boston and Santa Barbara, California) one in Stockholm, Sweden, one in Estonia and one in Paris, France.

Thermal imaging: more than building a camera

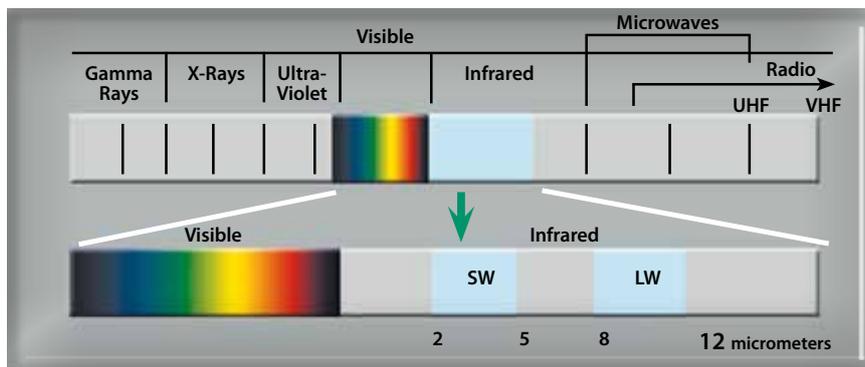
There is more to the world of thermal imaging than building a camera. FLIR Systems is not only committed to providing you with the best camera, we are also able to offer you the best software, service and training to suit your thermal imaging needs.

INFRARED: more than meets the eye

Infrared - part of the electromagnetic spectrum

Our eyes are detectors that are designed to detect visible light (or visible radiation). There are other forms of light (or radiation) that we cannot see. The human eye can only see a very small part of the electromagnetic spectrum. At one end of the spectrum we cannot see ultraviolet light, while at the other end our eyes cannot see infrared. Infrared radiation lies between the visible and microwave portions of the electromagnetic spectrum. The primary source of infrared radiation is heat or thermal radiation.

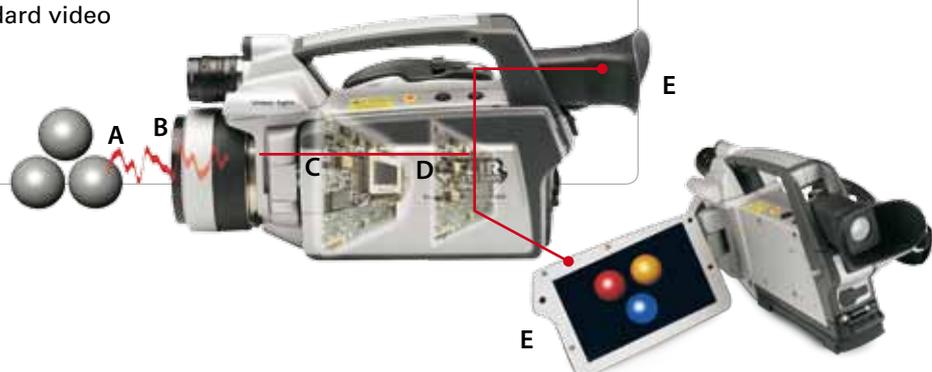
Any object that has a temperature above absolute zero (-273.15 degrees Celsius or 0 Kelvin) emits radiation in the infrared region. Even objects that we think of as being very cold, such as ice cubes, emit infrared radiation. We experience infrared radiation every day. The heat that we feel from sunlight, a fire or a radiator is all infrared. Although our eyes cannot see it, the nerves in our skin can feel it as heat. The warmer the object, the more infrared radiation it emits.



The infrared camera

Infrared energy (A) coming from an object is focused by the optics (B) onto an infrared detector (C). The detector sends the information to sensor electronics (D) for image processing. The electronics translate the data coming from the detector into an image (E) that can be viewed in the viewfinder or on a standard video monitor or LCD screen.

Infrared thermography is the art of transforming an infrared image into a radiometric one, which allows temperature values to be read from the image. In order to do this, complex algorithms are incorporated into the infrared camera.



Why use thermal imaging cameras?

Why would you choose a FLIR thermal imaging camera? There are other technologies available to help you measure temperatures in a non-contact mode. Infrared thermometers for example.

Infrared thermometers vs thermal imaging cameras

Infrared (IR) thermometers are reliable and very useful for single-spot temperature readings, but for scanning large areas or components, it's easy to miss critical components that may be near failure and need repair.

A FLIR thermal imaging camera can scan entire motors, components, or panels at once - never missing any overheating hazards, no matter how small.

Use thousands of infrared thermometers at the same time

With an infrared thermometer you are able to measure the temperature at one single spot. FLIR thermal imaging cameras can measure temperatures on the entire image. The i5 has an image resolution of 80 x 80 pixels. This means that it is equal to using 6,400 IR thermometers at the same time. If we look at the FLIR P660, our top model, which has an image resolution of 640 x 480 pixels, this means 307,200 pixels or using 307,200 infrared thermometers at the same time.



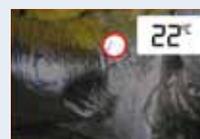
IR thermometer, temperature measurement in one spot



FLIR i5, temperature in 6,400 spots

Find problems faster and easier with extreme accuracy.

It's easy to miss critical problems with a spot IR thermometer. A FLIR thermal imaging camera scans entire components giving you instant diagnostic insights showing the full extent of problems.



What an IR Thermometer sees.



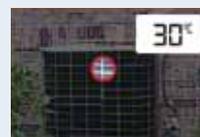
What a thermal imaging camera sees.



What an IR Thermometer sees.



What a thermal imaging camera sees.



What an IR Thermometer sees.



What a thermal imaging camera sees.

Thermal imaging cameras for automation and safety

Production engineers and technicians are faced by the demand for higher production output at a constant quality and at lower cost. The FLIR A-series infrared cameras are the most effective tool available for Infrared Machine Vision, Closed loop Process control and Quality Assurance imaging, helping you to validate and increase product quality and throughput and thereby give your products a competitive edge and increased profitability.

The FLIR A-Series thermal imaging cameras are also great tools for safety applications. Safety applications exist in any industry where protection of lives and assets is of importance and where an early warning of a potential critical condition is of utmost importance.



Inspection of car windscreen defrosting.

Automation

Problems can occur at any time in a production process. In most cases, it will not be possible to see the problem with the naked eye or to quickly spot potentially harmful temperature variations. For many applications, such as the production of parts and components for the automotive or electronics industry, thermal data are critical.

While machine vision can see a production problem, it cannot detect thermal irregularities. Infrared imagery provides much more information to production specialists and decision makers. Indeed, for non-contact precision temperature measurement there is nothing to equal infrared. It adds a new dimension to machine vision and is the perfect solution for applications involving non-contact precision temperature measurement and non-destructive testing.

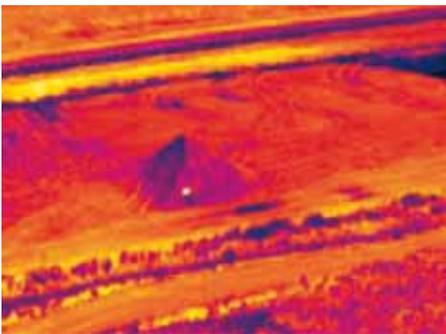
Safety

Safety applications can be found in many industries. Just a few examples are oil and gas production, power generation or distribution, steel manufacturing, or any industry which has some type of storage area where goods or material is kept that can self combust. Examples on this is storage of splint wood, batteries, waste, coal and more. All these applications have in common that there is a fundamental need to detect hot spots and then prevent that this turns in to a fire or a costly break down.

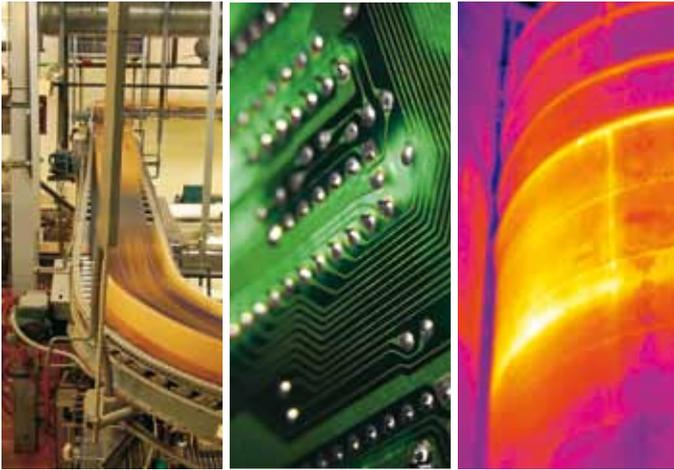
Thermal imaging cameras

Advanced thermal imaging cameras allow you to monitor what you can't see, providing quality assurance and safety in the fastest and easiest way possible. They can be installed almost anywhere to monitor the efficiency and safety of your production process by detecting and measuring temperature differences.

Thermal imaging cameras have proven to be an invaluable tool for safety monitoring and to improve production quality.

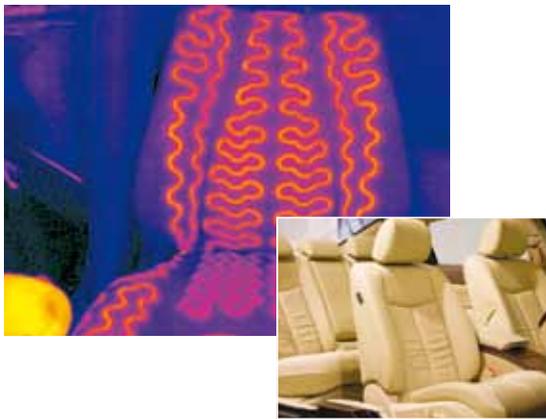


Coal pile monitoring.



The advantages of infrared thermography at a glance!

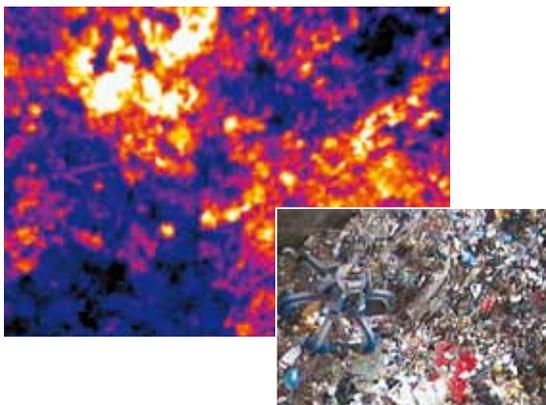
- Sees the heat produced
- Can trigger alarms
- Non-contact, quick and easy to use
- Performs inspections when systems are in production
- Identifies and locates the problem
- Measures the temperature
- Stores the information
- Saves you valuable time and money



Automation

Function test and quality assessment of car windows and seats

Due to the high quality demands of the automobile industry all front and rear windows, car seat heatings and various other components are assessed with thermal imaging cameras. In addition to the traditional presence check and the search for weak points in the material on the heating wires in the rear windows, the product quality of a heated front window is also monitored continuously. Furthermore infrared cameras are used for air conditioning test benches in order to acquire valuable temperature data.



Safety

Fire detection in waste bunkers

In vast storage warehouses at waste incineration plants, many different materials are collected. Spontaneous fires can be caused by the composting processes. Also the inclusion of highly combustible objects is a fire hazard. An infrared camera prevents spontaneous fires by identifying fire pockets in an early stage so that a fire alarm can be triggered.



Outdoor fire detection

After coal has been mined the various product grades are homogenised on different storage areas. As spontaneous combustion, due to an increase in temperature, cannot be disregarded, the storage areas are monitored continuously for hot spots, so that an early fire alarm may be triggered and fires can be avoided.

FLIR A300 / A310

Safety: the infrared eye that never sleeps

Fixed mounted infrared cameras like FLIR A300/A310 can be installed almost anywhere to monitor your critical equipment and other valuable assets. It will safeguard your plant and measure temperature differences to assess the criticality of the situation. This allows you to see problems before they become costly failures, preventing downtime and enhancing worker safety.



Built-in extensive analysis functions (only FLIR A310)

Spot, area measurement and difference temperature functions.



Built-in alarm functions (only FLIR A310)

As function of analysis, internal temperature or digital input.



Ethernet/IP and Modbus TCP compliance (only FLIR A310)

Easy sharing of analysis, alarm results to PLC:s.



Messaging functionality (only FLIR A310)

The camera automatically sends analysis results, IR images and more as an e-mail on schedule or at alarm. Autonomous dispatch of files or e-mails, acting as an FTP- or SMTP-client.



Image masking functionality (only FLIR A310)

Select only the relevant part of the image for your analysis.



MPEG-4 streamed video

MPEG-4 streamed video output over Ethernet to show live images on a PC, 640x480 with overlay up to 30 Hz, system dependent.



PoE (Power over Ethernet)

Communication and power supplied with only one cable.



Digital inputs/outputs (only FLIR A310)

For alarms and control of external equipment.



IR monitor software

In house developed software with support to up to nine cameras simultaneously.



Video output

Composite video output, PAL and NTSC compatible.



Lens

Built-in 25 degree lens with both motorized focus and autofocus. Optional lenses available.



High sensitivity < 50 mK

< 50 mK thermal sensitivity captures the finest image details and temperature difference information.



Remote control

Remote control of the camera over the Web and TCP/IP protocol.



16 bit image

16 bit image transfer to PC for analysis.



Built-in 100 Mb Ethernet connection

100 Mb Ethernet.



Digital photo and IR image of a substation showing a transformer with excessive temperature.



Germanium lens

Easy mounting on three sides

Rugged aluminium housing

Composite video output

Ethernet connection

Power connection

Digital input/output connection

Who will benefit from this technology?

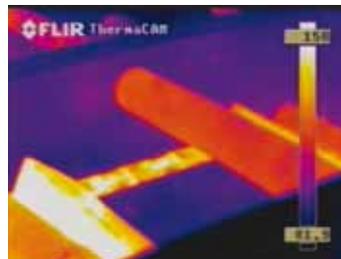
Oil and Gas

Oil refineries and exploration, petrochemical plants:

- Natural gas processing, transport and storage
- Fire prevention in storage areas
- Refractory lining monitoring
- Flare detection
- Process quality control

Power Generation and Distribution

- Fire prevention on coal piles
- Fire prevention in wood storage areas
- Fire prevention in waste storage areas
- Sub-station monitoring
- Critical equipment monitoring



IR offers another pair of "eyes" to see through the steam into the log vat for proper log alignment.



Operators cannot see through the steam cloud caused by condensation in cooler air temperatures.

FLIR A315 / A615



Automation: speed up your design cycle with infrared

Fixed mounted infrared cameras like FLIR A615/A315 can be installed almost anywhere to monitor your production process by detecting and measuring temperature differences and visualize heat patterns. The FLIR A-cameras is a series of compact and affordable infrared cameras, fully controlled by a PC. Due to their compliance to standards, FLIR A-cameras are Plug&Play device with 3rd parties Machine Vision software like National instruments, Cognex, Matrox, MVtec and Stemmer Imaging.



GigE Vision™ standard compatibility

An industry first. GigE Vision is a new camera interface standard developed using the Gigabit Ethernet communication protocol. GigE Vision is the first standard to allow for fast image transfer using low cost standard cables even over long distances. With GigE Vision, hardware and software from different vendors can interoperate seamlessly over GigE connections.



Image flow control

Let an external signal control the image streaming.



High sensitivity < 50 mK

< 50 mK thermal sensitivity captures the finest image details and temperature difference information.



GenICam™ protocol support

An industry first. The goal of GenICam is to provide a generic programming interface for all kinds of cameras. Regardless of interface technology (GigE Vision, Camera Link, 1394 DCAM, etc.) or features implemented, the application programming interface (API) will always be the same. The GenICam protocol also makes third party software being possible to use with the camera.



Built-in Gigabit Ethernet connection

Real time 16-bit image streaming to computer.



Lens (only FLIR A315)

Built-in 25 degree lens with both motorized focus and autofocus. Optional lenses available.



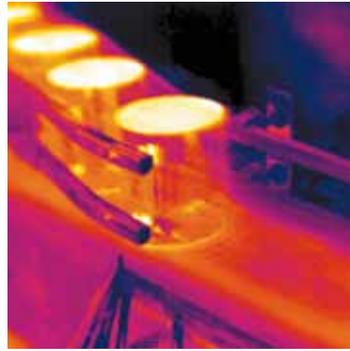
640x480 pixels (only FLIR A615)

The FLIR A615 has a resolution pixel detector of 640x480 pixels that allows more accuracy and shows more details at a longer distance.



High speed infrared windowing (only FLIR A615)

The FLIR A615 has a high speed infrared windowing option.



Process monitoring of production line



Who will benefit from this technology?

Automotive

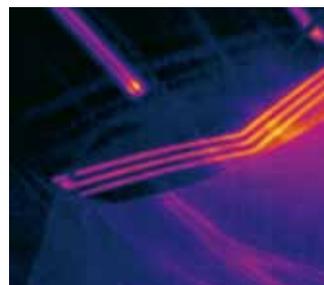
Cars and commercial vehicles, engine manufacturing and subcontractors serving the industry:

- Soldering and welding
- Car seat heating
- Verification of window defrosting
- Heating, air conditioning functions
- Casting of plastic or metallic parts
- Quality checking of laminated parts such as dashboards
- Quality checking of leather upholstery
- Friction control of tires

Electronics

Electronics design, PCB and component manufacture and electronics assembly:

- PCB testing, validation and verification
- Fault tracing in board assemblies
- Power electronics design



Infrared image of a windshield defroster.



Infrared image of a car engine.

Software

Turning tools into solutions

In order to fully utilize the FLIR A-Series cameras and integrate them into working systems for safety and automation the A-Series offer a set of software tools and utilities. Further information regarding downloads and updates is available at <http://flir.custhelp.com/>



General

IP Config

Utility program for network camera detection and IP address setting, the program comes with the Utility CD in the delivery box or can be downloaded from FLIR Custhelp.

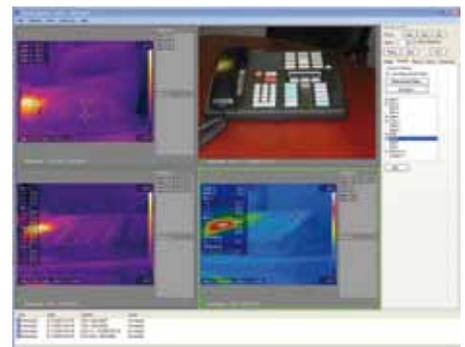
For Safety (A300/A310)

- **FLIR IR Monitor**
Utility program for first camera connection and control and setup of internal features/functions, supports up to 9 cameras simultaneously, the program comes with the Utility CD in the delivery box or can be downloaded from FLIR Custhelp
- **Built in WEB server**
Simple built in camera control and image viewer, connect using `http://"camera ip adress"` in a WEB browser or connect through the IP Config program
- **Ethernet/IP or ModbusTCP (A310 only)**
Industrial Field bus protocols, allows that Analyse, Alarm and Camera control is shared with PLC's. This function is always turned on in the A310 Camera.
- **ThermoVision SDK**
An ActiveX component that allows camera control and image grabbing and transformation, purchased separately.
- **AXXX Control & Imaging interfaces**
A set of ICD's that describes the camera control and image streaming on a low level. Includes also a set of code samples. Should only be used by expert coders, can be downloaded at FLIR Custhelp free of charge.

For Automation (A315/A615)

- **FLIR Camera Player**
Utility program for first camera connection and streamed image viewing, the program comes with the Utility CD in the delivery box or can be downloaded from FLIR Custhelp
- **GigE Vision and GenICam compliance**
Machine Vision camera standard supported in many 3:rd party image processing software's like National Instruments IMAQ Vision and MVTec's Halcon software.
- **ThermoVision SDK**
An ActiveX component that allows camera control and image grabbing and transformation, purchased separately.
- **AXXX Control & Imaging interfaces**
A set of ICD's that describes the camera control and image streaming on a low level. Includes also a set of code samples. Should only be used by expert coders, can be downloaded at FLIR Custhelp free of charge.

EtherNet/IP™
conformance tested



GigE™
VISION

GEN<i>CAM

Accessories



Flexible systems
that meet your changing needs

In today's fast-changing environment, requirements for purchased capital equipment can change from year to year or from project to project. Things that are vital today can be redundant tomorrow.

That makes it important for the equipment in which you invest to be flexible enough to meet the ever-changing needs of your applications. No other infrared camera manufacturer offers a wider range of accessories than FLIR Systems.

Hundreds of accessories are available to customize our cameras for a wide variety of imaging and measurement applications.

From a comprehensive range of lenses, through LCD screens to remote control devices, everything is available to tailor your camera to your own, specific application.



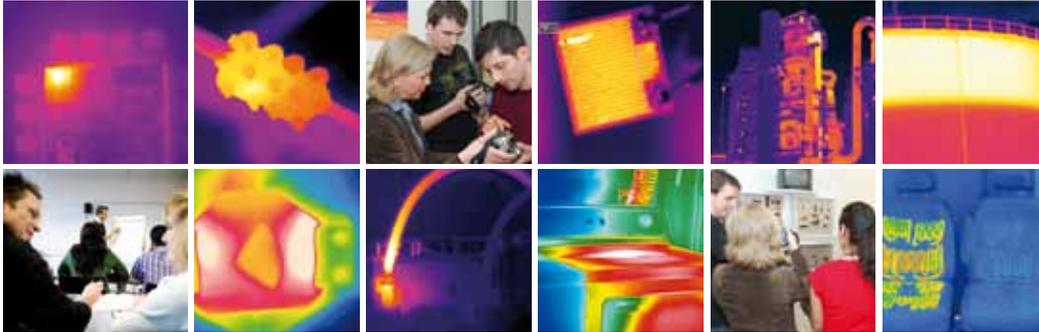
A wide variety of accessories is available for every FLIR thermal imaging camera





FLIR Infrared Training Center

The Infrared Training Center (ITC) offers the world's leading infrared training and thermographer certification programs.



Although all our cameras are designed for easy installation and operation, there is a lot more to thermal imaging than just knowing how to handle the camera. As the leading company for thermal imaging technology, we like to share our knowledge with our customers and other interested parties.

We therefore organize regular courses and seminars. We also organize in-company training on request, so that you, or your staff, can gain familiarity with thermal imaging and its applications.

The ITC not only welcomes FLIR Systems customers but also users of other brands of cameras. In fact, anyone who wants to learn more about thermal imaging for any applications, before deciding to purchase a camera, is also invited.

The mission of the ITC is to make our customers and partners successful by enhancing their knowledge of IR technology, thermal imaging products, and relevant applications. The ITC offers a portfolio of courses that presents the right mix of theoretical and practical content to help professionals quickly apply thermal imaging technology to real life applications.

All our instructors are experienced thermal imaging specialists. Not only do they have a profound theoretical knowledge but they also have practical experience with numerous applications. For our customers, this means that attending one of the ITC's courses will give them a real hands-on learning experience.

Follow one of our courses and become a thermal imaging expert.



Each ITC course is a perfect combination of theoretical fundamentals and practical exercises. It guarantees participants a real hands-on learning experience.

After Sales

FLIR After Sales

At FLIR Systems, building a relationship with a customer takes more than just selling a thermal imaging camera. After the camera has been delivered, FLIR Systems is there to help meet your needs.



Once purchased, thermal imaging cameras are vital pieces of equipment. To keep them running at all times, we operate a worldwide service network with subsidiaries in Belgium, China, France, Germany, Hong Kong, Italy, the Netherlands, Sweden, United Arab Emirates, the United Kingdom and the USA.

If there should be a problem with one of our camera systems, these local service centers have all the know-how and equipment to solve it within the shortest possible time. Local camera service gives you the assurance that your system will be ready for use again within an extremely short timeframe.

Buying a thermal imaging camera is a long-term investment. You need a reliable supplier who can provide you with support over a long period of time.

Our service personnel regularly follows training programs at our production facilities in Sweden or the USA. Not only to learn about the technical aspects of the products, but also to familiarize themselves with your individual customer requirements and the latest applications.

Different types of maintenance contracts can be offered to make sure that, whatever happens, your thermal imaging camera is always available for use.

**CUSTOMER CARE is not just a slogan.
We write it in capital letters at FLIR.**



FLIR A300 / A310

Technical specifications

Camera specific



	FLIR A300	FLIR A310
Measurement analysis		
Spotmeter	N/A	10
Area	N/A	10 boxes with max./min./average/position
Isotherm	N/A	1 with above/below/interval
Measurement option	N/A	Measurement Mask Filter Schedule response: File sending (ftp), email (SMTP)
Difference temperature	N/A	Delta temperature between measurement functions or reference temperature
Reference temperature	N/A	Manually set or captured from any measurement function
Atmospheric transmission correction	N/A	Automatic, based on inputs for distance, atmospheric temperature and relative humidity
Optics transmission correction	N/A	Automatic, based on signals from internal sensors
Emissivity correction	N/A	Variable from 0.01 to 1.0
Reflected apparent temperature correction	N/A	Automatic, based on input of reflected temperature
External optics/windows correction	N/A	Automatic, based on input of optics/window transmission and temperature
Measurement corrections	N/A	Global and individual object parameters
Alarm		
Alarm functions	N/A	6 automatic alarms on any selected measurement function, Digital In, Camera temperature, timer
Alarm output	N/A	Digital Out, log, store image, file sending (ftp), email (SMTP), notification
Ethernet		
Ethernet	Control and image	Control, result and image
Ethernet, protocols	TCP, UDP, SNTP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP	Ethernet/IP, Modbus TCP, TCP, UDP, SNTP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP
Ethernet, image streaming	16-bit 320 x 240 pixels at 3 Hz - Radiometric	16-bit 320 x 240 pixels at 7-8 Hz - Radiometric



General

Imaging and optical data	
Field of view (FOV) / Minimum focus distance	25° × 18.8° / 0.4 m
Lens identification	Automatic
Thermal sensitivity/NETD	< 0.05°C at +30°C / 50 mK
Focus	Automatic or manual (built in motor)
F-number	1.3
Image frequency	30 Hz
Zoom	1–8× continuous, digital, interpolating zooming on images
Detector data	
IR resolution	320 × 240 pixels
Detector pitch	25 µm
Detector time constant	Typical 12 ms
Focal Plane Array (FPA) / Spectral range	Uncooled microbolometer / 7.5–13 µm
Measurement	
Object temperature range	–20 to +120°C
	0 to +350°C
Accuracy	±2°C or ±2% of reading
Set-up	
Color palettes	Color palettes (BW, BW inv, Iron, Rain)
Set-up commands	Date/time, Temperature°C
Storage of images	
Image storage type	Built-in memory for image storage
File formats	Standard JPEG, 16-bit measurement data included
Composite video	
Video	Composite video output, PAL and NTSC compatible
Video, standard	CVBS (ITU-R-BT.470 PAL/SMPTE 170M NTSC)
Digital input/output	
Digital input	2 opto-isolated, 10–30 VDC
Digital output, purpose	As function of ALARM, Output to ext. device (programmatically set)
Digital output	2 opto-isolated, 10–30 VDC, max 100 mA
Digital I/O, isolation voltage	500 VRMS
Digital I/O, supply voltage	12/24 VDC, max 200 mA
Digital I/O, connector type	6-pole jackable screw terminal
Digital input, purpose	Image tag (start/stop/general), Input ext. device (programmatically read)
Ethernet	
Ethernet, standard	IEEE 802.3
Ethernet, connector type	RJ-45
Ethernet, type	100 Mbps
Ethernet, communication	TCP/IP socket-based FLIR proprietary
Ethernet, video streaming	MPEG-4, ISO/IEC 14496-1 MPEG-4 ASP@L5
Ethernet, power	Power over Ethernet, PoE IEEE 802.3af class 0
Power system	
External power operation	12/24 VDC, 24 W absolute max
External power, connector type	2-pole jackable screw terminal
Voltage	Allowed range 10–30 VDC
Environmental data	
Operating temperature range	–15°C to +50°C
Storage temperature range	–40°C to +70°C
Humidity (operating and storage)	IEC 60068-2-30/24 h 95% relative humidity
	+25°C to +40°C
EMC	<ul style="list-style-type: none"> • EN 61000-6-2:2001 (Immunity) • EN 61000-6-3:2001 (Emission) • FCC 47 CFR Part 15 Class B (Emission)
Encapsulation	IP 40 (IEC 60529)
Bump	25 g (IEC 60068-2-29)
Vibration	2 g (IEC 60068-2-6)
Physical data	
Weight	0.7 kg
Camera size (L × W × H)	170 × 70 × 70 mm
Tripod mounting	UNC ¼"-20 (on three sides)
Base mounting	2 × M4 thread mounting holes (on three sides)
Housing material	Aluminium
Scope of delivery	
Hard transport case or cardboard box, Infrared camera with lens, Utility CD-ROM, Calibration certificate, Ethernet™ cable, Mains cable, Power cable (pig-tailed), Power supply, Printed Getting Started Guide, Printed Important Information Guide, User documentation CD-ROM, Warranty extension card or Registration card, 6-pole screw terminal (mounted on camera)	

FLIR A315 / A615

Camera specific



	FLIR A315	FLIR A615
Imaging and optical data		
Spatial resolution (IFOV)	1.36 mrad	0.69 mrad
Focal length	18 mm	24.5 mm
F-number	1.3	1.0
Image frequency	60 Hz	50 Hz (100/200 Hz with windowing)
Detector data		
IR resolution	320 × 240 pixels	640 × 480 pixels
Detector pitch	25 μm	17 μm
Detector time constant	Typical 12 ms	Typical 8 ms
Measurement		
Object temperature range	-20 to +120°C	-20 to +150°C
	0 to +350°C	0 to +650°C
		+300 to +2000°C
USB		
USB	N/A	Control and image
USB, standard	N/A	USB 2 HS
USB, connector type	N/A	USB Mini-B
USB, communication	N/A	TCP/IP socket-based FLIR proprietary
USB, image streaming	N/A	16-bit 640 × 480 pixels at 25 Hz
		16-bit 640 × 240 pixels at 50 Hz
		16-bit 640 × 120 pixels at 100 Hz
		- Signal linear - Temperature linear - Radiometric
USB, protocols	N/A	TCP, UDP, SNTP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP
Ethernet		
Ethernet, image streaming	16-bit 320 × 240 pixels at 60 Hz - Signal linear - Temperature linear - Radiometric GigE Vision and GenICam compatible	16-bit 640 × 480 pixels at 50 Hz
		16-bit 640 × 240 pixels at 100 Hz
		16-bit 640 × 120 pixels at 200 Hz
		- Signal linear - Temperature linear - Radiometric GigE Vision and GenICam compatible



General

Imaging and optical data	
Field of view (FOV) / Minimum focus distance	25° × 18.8° / 0.4 m
Lens identification	Automatic
Thermal sensitivity/NETD	< 0.05°C @ +30°C / 50 mK
Focus	Automatic or manual (built in motor)
Detector data	
Focal Plane Array (FPA) / Spectral range	Uncooled microbolometer / 7.5–13 μm
Measurement	
Accuracy	±2°C or ±2% of reading
Measurement analysis	
Atmospheric transmission correction	Automatic, based on inputs for distance, atmospheric temperature and relative humidity
Optics transmission correction	Automatic, based on signals from internal sensors
Emissivity correction	Variable from 0.01 to 1.0
Reflected apparent temperature correction	Automatic, based on input of reflected temperature
External optics/windows correction	Automatic, based on input of optics/window transmission and temperature
Measurement corrections	Global object parameters
Ethernet	
Ethernet	Control and image
Ethernet, standard	IEEE 802.3
Ethernet, connector type	RJ-45
Ethernet, type	Gigabit Ethernet
Ethernet, communication	TCP/IP socket-based FLIR proprietary and GenICam protocol
Ethernet, protocols	TCP, UDP, SNTP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP
Digital input/output	
Digital input	2 opto-isolated, 10–30 VDC
Digital output, purpose	Output to ext. device (programmatically set)
Digital output	2 opto-isolated, 10–30 VDC, max 100 mA
Digital I/O, isolation voltage	500 VRMS
Digital I/O, supply voltage	12/24 VDC, max 200 mA
Digital I/O, connector type	6-pole jackable screw terminal
Digital input, purpose	Image tag (start, stop, general), Image flow ctrl. (Stream on/off), Input ext. device (programmatically read)
Power system	
External power operation	12/24 VDC, 24 W absolute max
External power, connector type	2-pole jackable screw terminal
Voltage	Allowed range 10–30 VDC
Digital input/output	
Digital input, purpose	Image tag (start, stop, general), Image flow ctrl. (Stream on/off), Input ext. device (programmatically read)
Environmental data	
Operating temperature range	–15°C to +50°C
Storage temperature range	–40°C to +70°C
Humidity (operating and storage)	IEC 60068-2-30/24 h 95% relative humidity
EMC	+25°C to +40°C <ul style="list-style-type: none"> • EN 61000-6-2:2001 (Immunity) • EN 61000-6-3:2001 (Emission) • FCC 47 CFR Part 15 Class B (Emission)
Encapsulation	IP 40 (IEC 60529)
Bump	25 g (IEC 60068-2-29)
Vibration	2 g (IEC 60068-2-6)
Physical data	
Weight	0.7 kg
Camera size (L × W × H)	170 × 70 × 70 mm
Tripod mounting	UNC ¼"-20 (on three sides)
Base mounting	2 × M4 thread mounting holes (on three sides)
Housing material	Aluminium
Scope of delivery	
Hard transport case or cardboard box, Infrared camera with lens, Utility CD-ROM, Calibration certificate, Ethernet™ cable, USB cable (FLIR A615), Mains cable, Power cable (pig-tailed), Power supply, Printed Getting Started Guide, Printed Important Information Guide, User documentation CD-ROM, Warranty extension card or Registration card, 6-pole screw terminal (mounted on camera)	

FLIR A300 / A310 / A315 / A615

Accessories



FLIR A300/ A310/ A315:

Lenses

**IR lens f = 30 mm, 15° incl. case**[\[1196961\]](#)

When the target in question is a distance away it may be useful to use a telescope lens. The 15° lens is a popular lens accessory and provides almost 2X magnification compared to the 25° lens. Ideal for small or distant targets.

**IR lens f = 10 mm, 45° incl. case**[\[1196960\]](#)

Sometimes there isn't enough room to step back and see the whole picture. This wide angle lens has a field of view almost double than the one of the standard 25° lens. Perfect for wide or tall targets.

**Close-up lens 2x, 50 µm, incl. case**[\[T197214\]](#)

This macro lens provides resolution of extremely small targets.

**Close-up lens 4x, 100 µm, incl. case**[\[T197215\]](#)

This macro lens provides resolution of extremely small targets.

**Lens 76 mm (6°) with case and mounting**[\[T197407\]](#)

For maximum magnification, the 6° lens is the only choice. This optic provides almost 3.5X magnification compared to the 25° lens.

**Lens 4 mm (90°) with case and mounting support**[\[T197411\]](#)

This wide angle lens has a field of view almost four times the one of the standard 25° lens.

**Close-up 1x (25 µm) incl. case and mounting support**[\[T197415\]](#)

This macro lens provides resolution of extremely small targets.

Extended measurement ranges

High temperature option to +1200°C[\[T197000\]](#)

Allow to measure temperatures of up to +1200°C with the camera.

Power

**Power supply**[\[1910585\]](#)

Power supply to charge the camera.

**Power cord EU**[\[1910400\]](#)

Power cord with EU plugs for the power supply.

**Power cord US**[\[1910401\]](#)

Power cord with US plugs for the power supply.



Power cord UK
Power cord with UK plugs for the power supply.

[1910402]



Ethernet cable CAT-6, 2m
This cable is used to connect the infrared camera to Ethernet.

[T951004]



Power cable, pigtailed
This cable is used, when a separate power supply is used (not the one supplied with the camera).

[1910586]



Video cable (only FLIR A300/A310)
Video cable 3 m.

[908929]

Transport



Hard transport case
Rugged watertight plastic shipping case. Holds all items securely.

[1196940]



Delivery Box
Cardboard delivery box with plastic handle. Holds all items neatly.

[1196962]

FLIR A615

Power



Power supply
Power supply to charge the camera.

[1910585]



Power cord EU
Power cord (EU) for the power supply.

[1910400]



Power cord US
Power cord (US) for the power supply.

[1910401]



Power cord UK
Power cord (UK) for the power supply.

[1910402]



Ethernet cable CAT-6, 2m
This cable is used to connect the infrared camera to Ethernet.

[T951004]



Power cable, pigtailed
This cable is used, when a separate power supply is used (not the one supplied with the camera).

[1910586]



USB cable
USB cable to connect the camera with a computer, using the USB protocol.

[1910423]



Hard transport case
Rugged watertight plastic shipping case. Holds all items securely.

[1196940]

FLIR Systems

Export Licensing

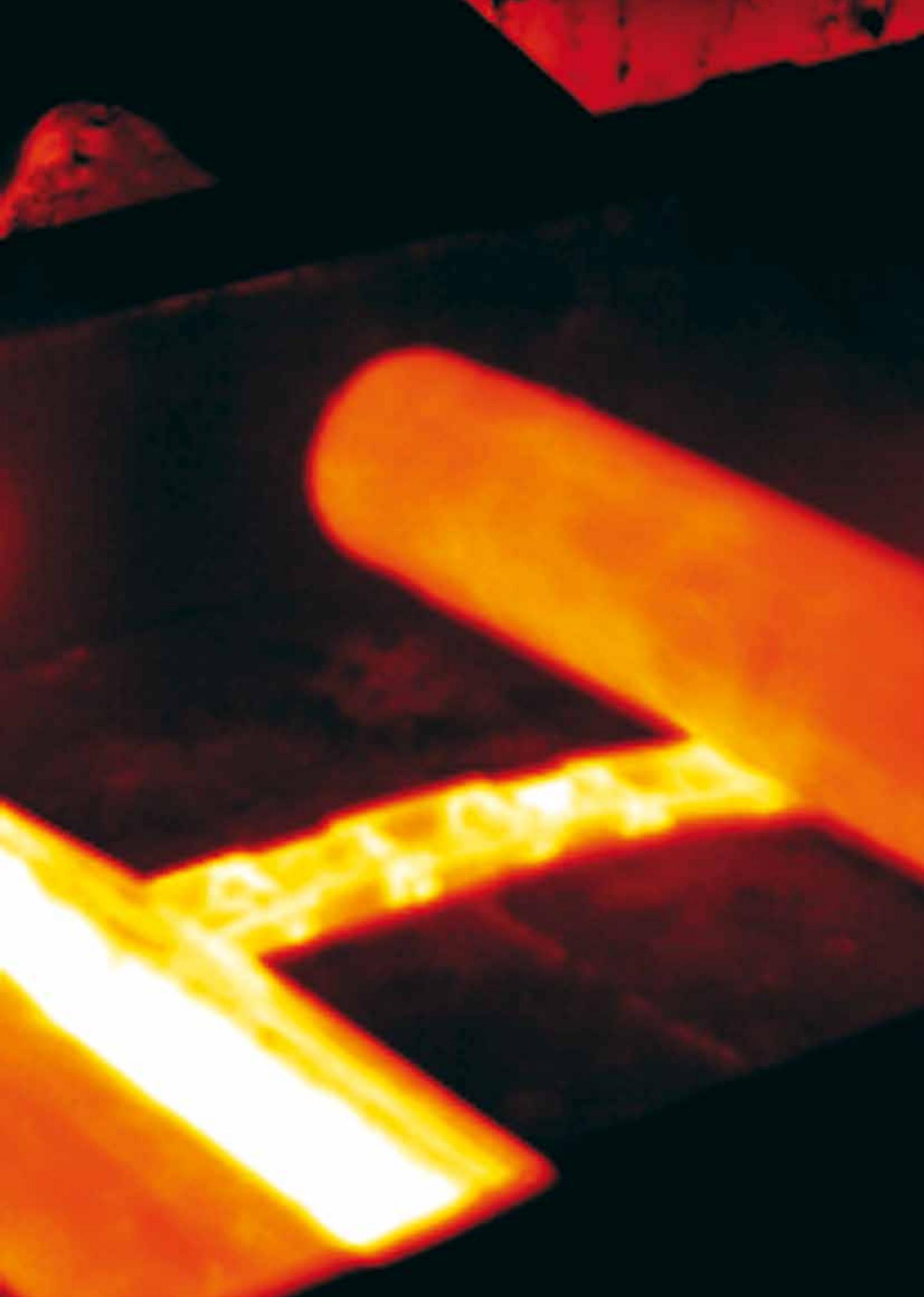


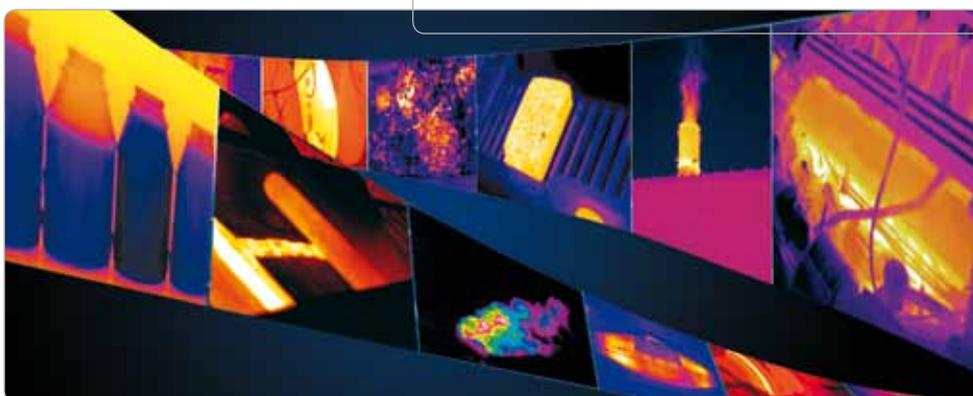
The products described in this publication may require government authorization for export/re-export, or transfer. Contact FLIR Systems for details.

*Specifications are subject to change without notice.
Weights and dimensions are indicative.*

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