

Die Thermal Control

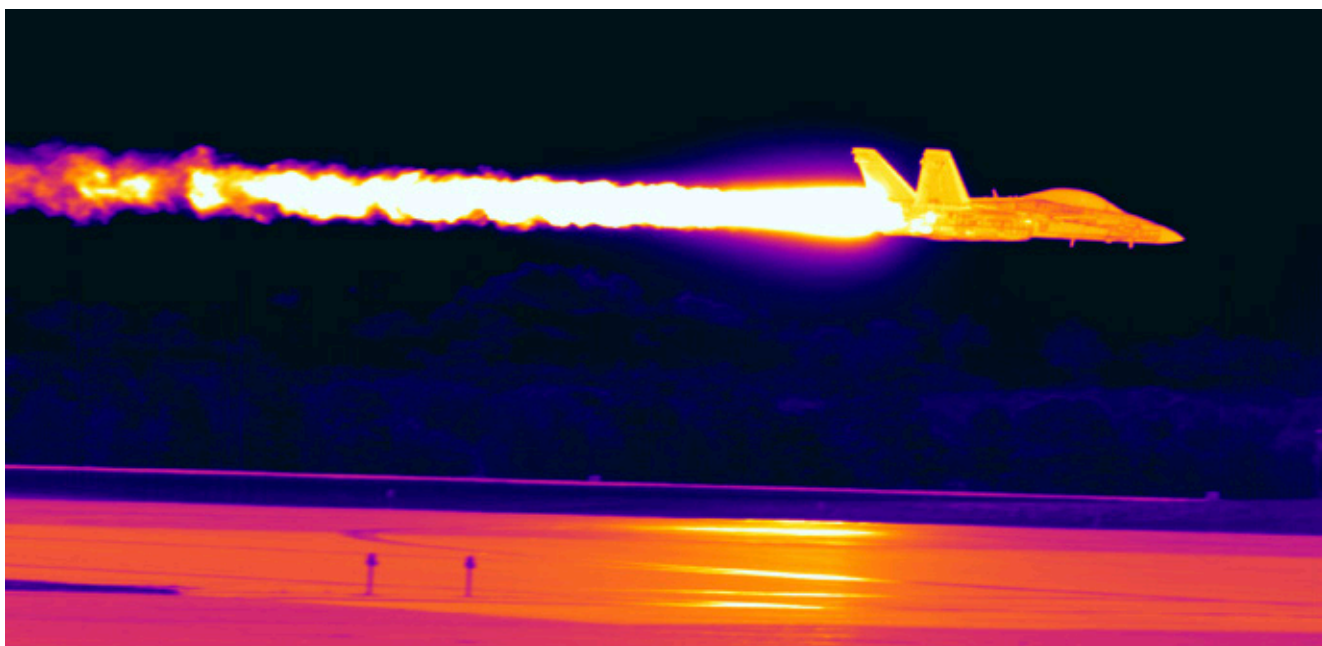


INPROTEC IRT

in partnership with

 **Chem
Trend**

THERMOGRAPHY

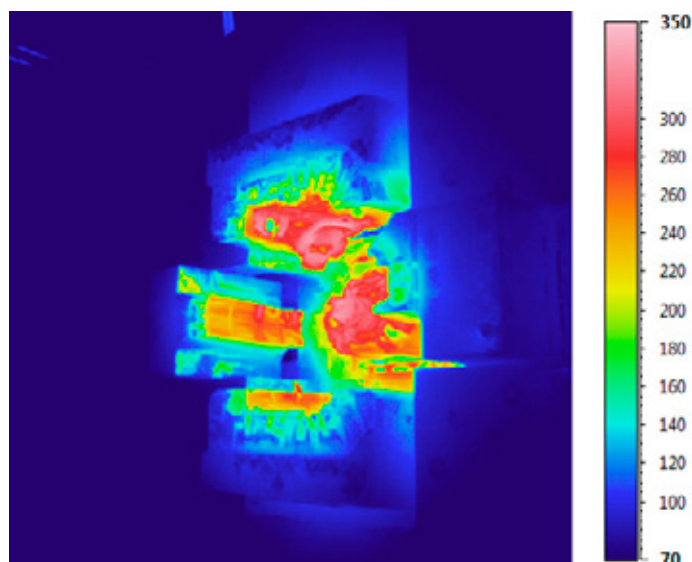
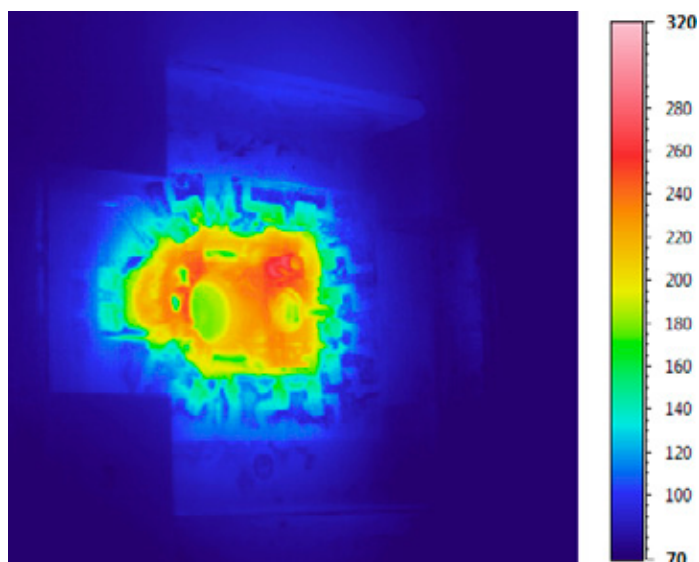


Thermal imagers are instruments capable to detect infrared radiation emitted by all bodies at a temperature above absolute zero, and producing a thermal image called "Thermogram".

Thermal images can show what the human eye cannot see: the infrared energy emitted by a body or an object.

The main advantage of this technology is the possibility to measure, at distance, the surface temperature of bodies and objects, without coming into physical contact with them.

In the die casting industry, thermography is a widely used technology, which helps to understand how to obtain a thermal balance of the mold, acting mainly on thermoregulation and correct application of the release agent.



DIE THERMAL CONTROL

INPROTEC IRT has designed and manufactured an innovative system for monitoring mold surface temperatures in repetitive processes and satisfy the increasing quality demand from the OEMs in the automotive industry.

The result is the **Die Thermal Control (DTC)** thermographic system.

The **DTC** thermographic system consists of a trolley on wheels (also in Fix or Remote versions) and two radiometric thermal imagers integrated in special air-cooled housings.

The IR camera acquires real-time thermal images of the molds, providing in real time useful information for process optimization.

Region of Interest (ROI) or Points are available on the thermal image. They can be positioned in specific areas of the mold, showing temperature diagrams and data related with previous and current production batches (historical trends).

All thermal images and data are processed on a PC and saved on SSD.

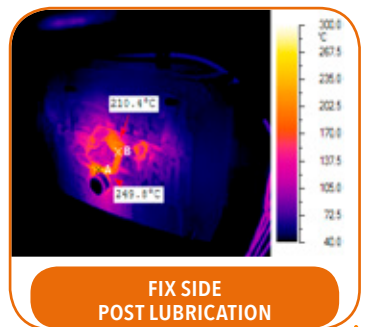
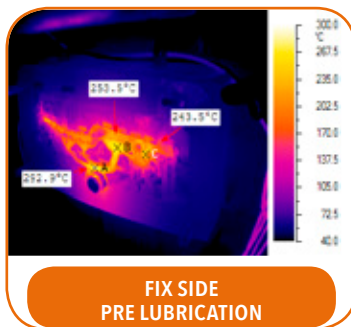
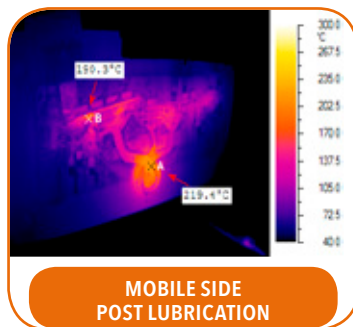
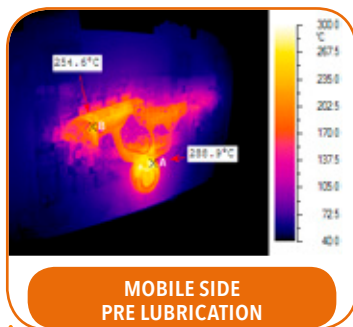
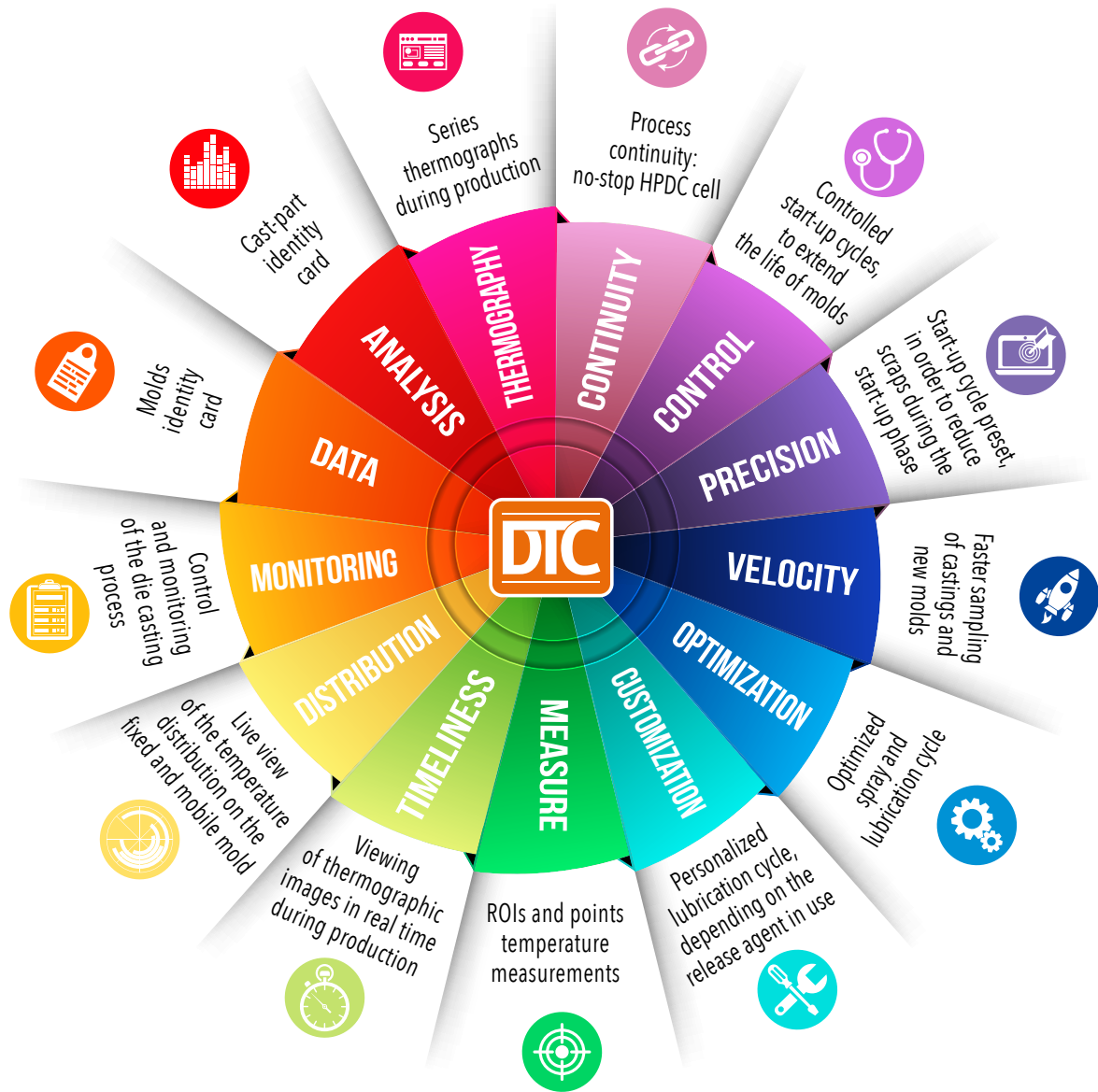
Post-analysis of thermal images can be achieved on DTC or on PC remote located, transferring the images from the DTC to a USB stick, or by saving them directly on the company's server.

The DTC thermographic system integrates all electrical and pneumatic equipment for controlling the thermal imagers, the protective housings (with an opening and closing system for the protection of the germanium window).

The camera housing and the trolley (or Fix or Remote control unit) are connected by industrial conduits equipped with special connectors, containing all the cables and air pipes.



ADVANTAGES

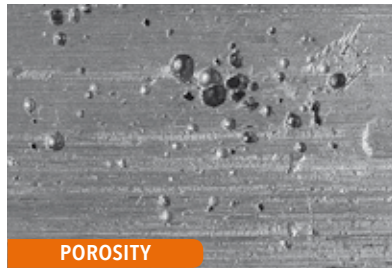


MAJOR DEFECTS

- Macro Shrinkages
- Porosity
- Cold Joints
- Thermal fatigue/Crack
- Die-soldering
- Flash/Burrs
- Deformed parts



DIE-SOLDERING



POROSITY



SHRINKAGES

PROJECTED TOWARD THE QUALITY

High Pressure Die Casting (HPDC) or "Die Casting" is used for high volume production of components; however, it is a technology that, if not strictly controlled produces great differences as final result.

Due to high production rate, the quality of the castings and the performance of the molds may get worse, and sometimes the conditions of the molds can be seriously and irreversibly damaged.

The technological evolution is increasingly oriented to the thermal control of the process in order to have an almost automatic regulation.

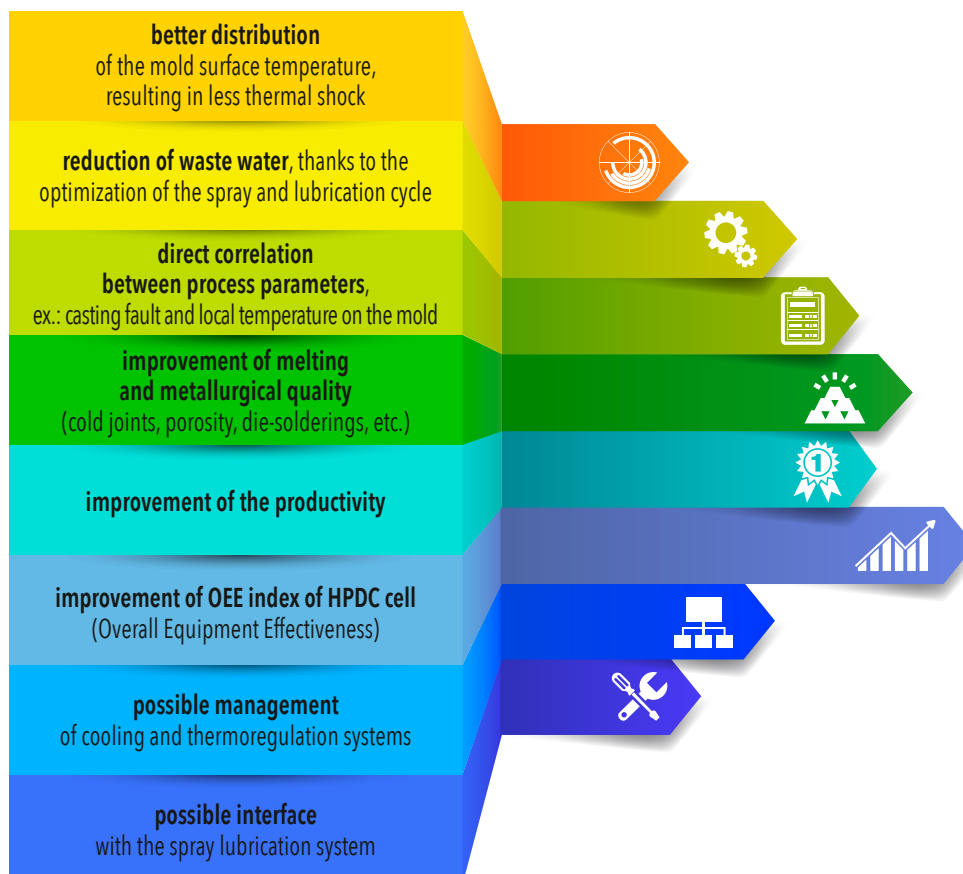
Thermal conditions of HPDC can be known using data collection and process modelling.

The control of the thermal process is constantly evolving thanks to specific lubricants for molds cooling, and thanks thermal imagers controlling the mold surface temperature during the whole process.

The surface temperature of the mold is a dynamic process parameter that must be kept within an optimal and uniform range during each casting cycle, because this affects not only the castings produced but also the life of the mold.

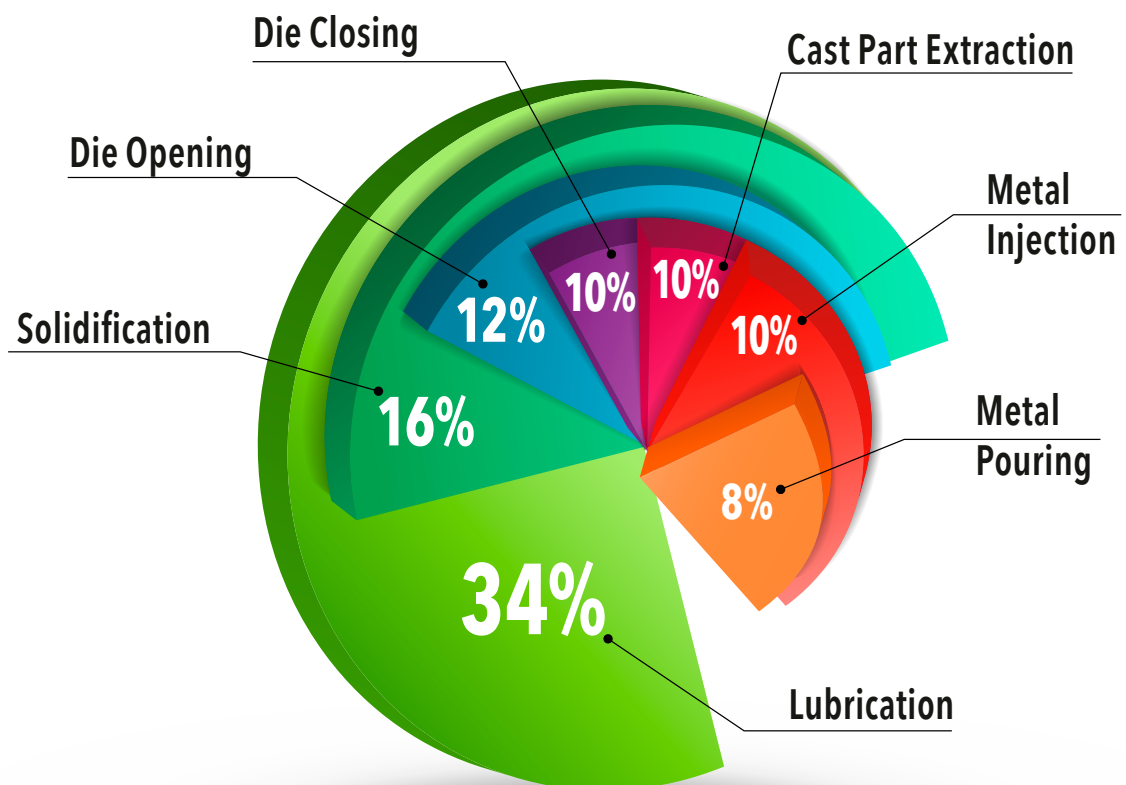
To monitor a process means to keep it under control and ensure its repeatability; the **DTC** is a fundamental tool for monitoring in real time the surface temperature of the molds in order to detect defects and understand how to obtain a thermal balance of the mold (acting mainly on thermoregulation and correct application of the release agent).

ADVANTAGES USING THE DTC



BENEFITS AND SAVINGS USING THE DTC

ADVANTAGES



CUSTOMIZATION

The DTC is ready for installation of different models of thermal imagers from standard resolution to **high resolution** (sensors with 320 x 240 pixel resolution - 76,800 temperature points) up to 640 x 512 pixel resolution sensors - 327,680 temperature points).

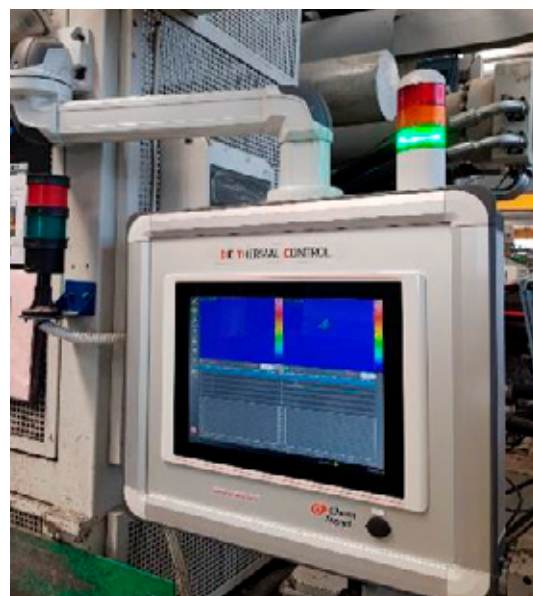
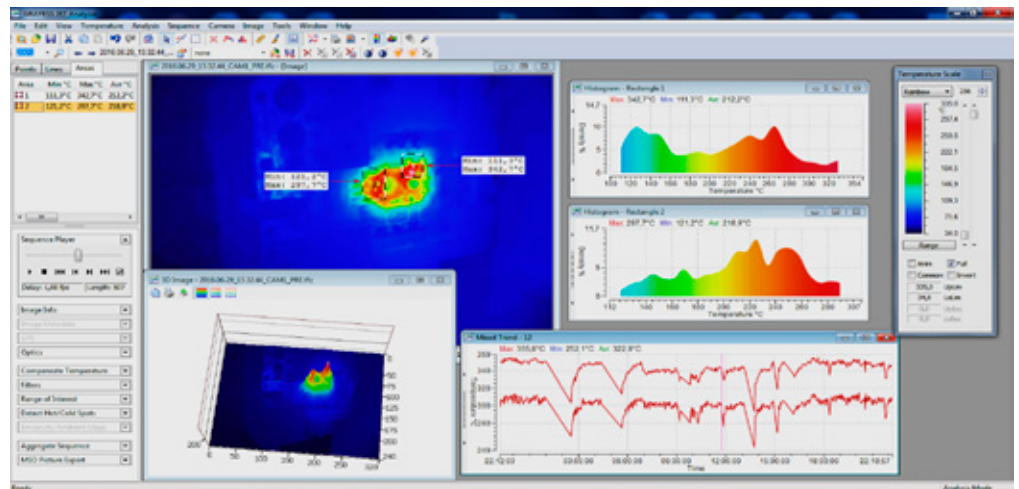
Thermal imagers can be supplied with quick and easy manual focus or with motorized focus/Autofocus.

Each thermal camera model can be supplied with different Field Of View (FOV) to offer the best solution depending on distance and dimensions of molds.

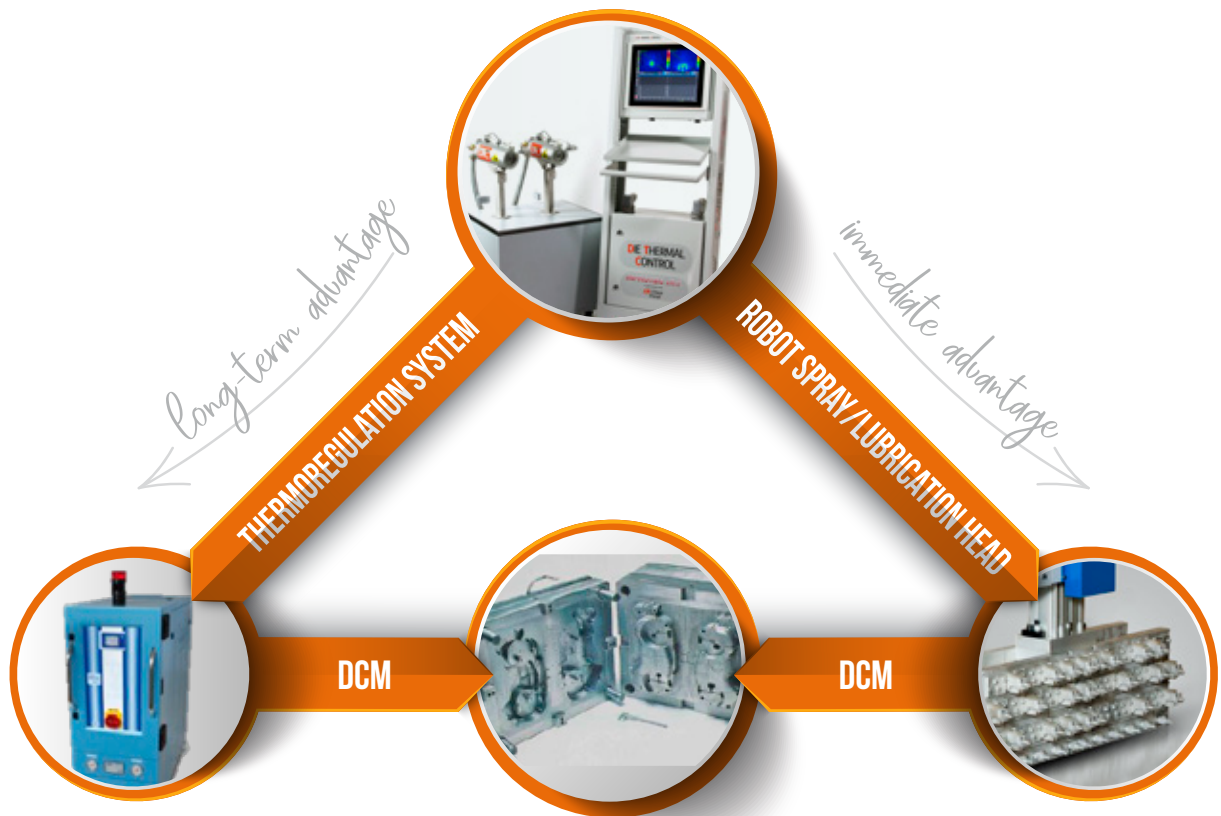
The DTC system is available in different hardware solutions to satisfy any customer need. It is available in TROLLEY version to move it quickly from a DCM to another DCM, in FIX version for fixed installation on the DCM, and in REMOTE version to adapt it to existing HPDC cell with limited space.

The DTC software has a simple and intuitive graphical interface, and is constantly evolving to meet the demands coming from the foundry and device manufacturers in the die-casting HPDC cell.

With the supply of the DTC is also licensed an advanced software to be installed on PC, for thermal analysis of recorded thermographs, for graphic processing of images and data, for the export of data and images in different formats (JPEG, PNG, CSV, TXT, BIN, MAT, EMF), for the preparation of thermographic reports in MS-Word format.



INTERACTION



DTC can interact with different communication protocols such as PROFINET, OPC UA, MODBUS, PROFIBUS, for data exchange with other HPDC cell devices.

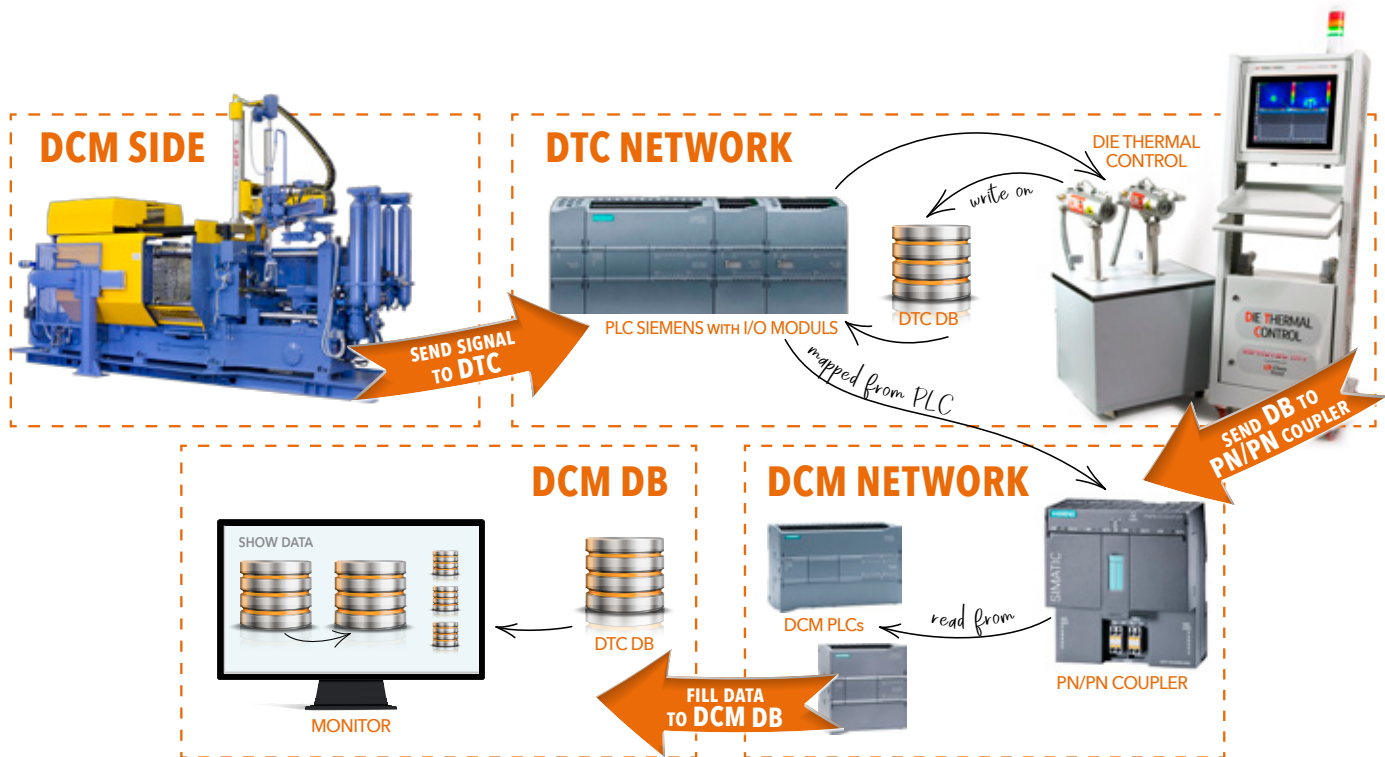
Through Server on board it is possible to visualize and control the DTC inside the company network through the "mirroring" function.

CUSTOMIZATIONS ON CUSTOMER REQUEST



Alarm and Automatic Reaction

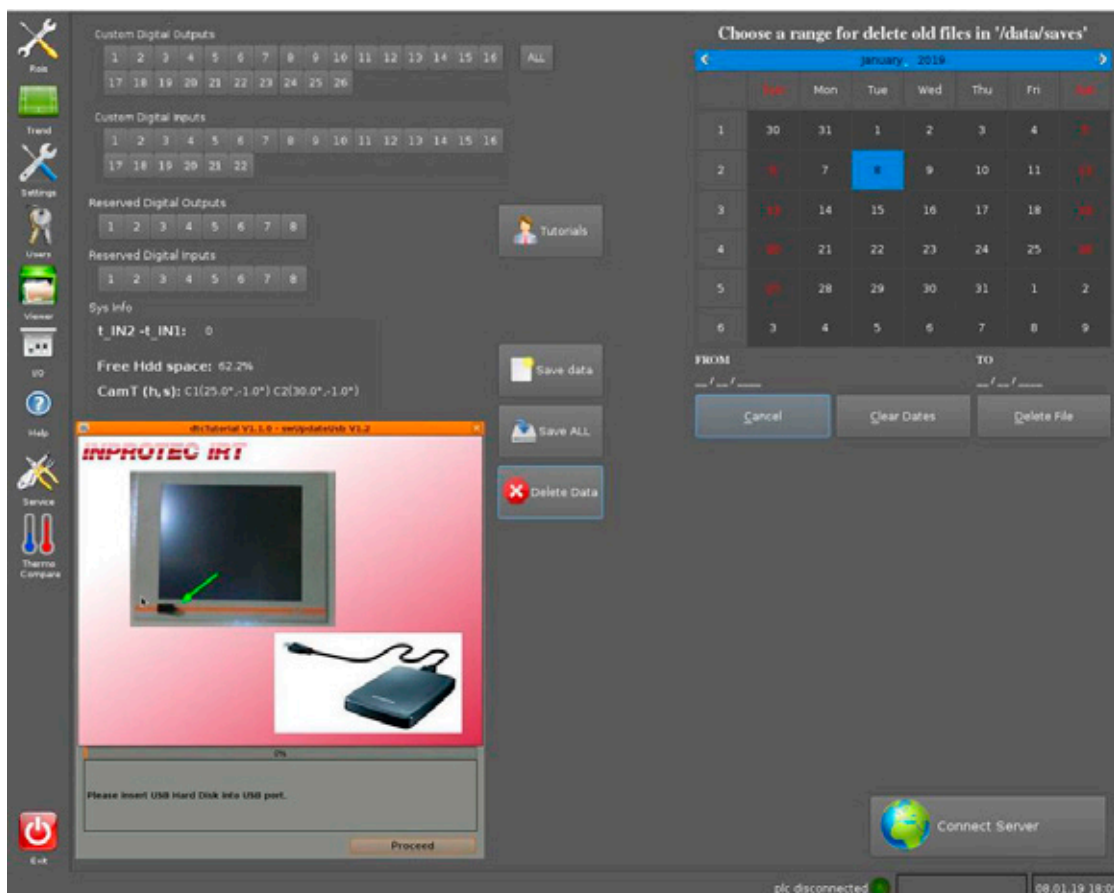
COMMUNICATION



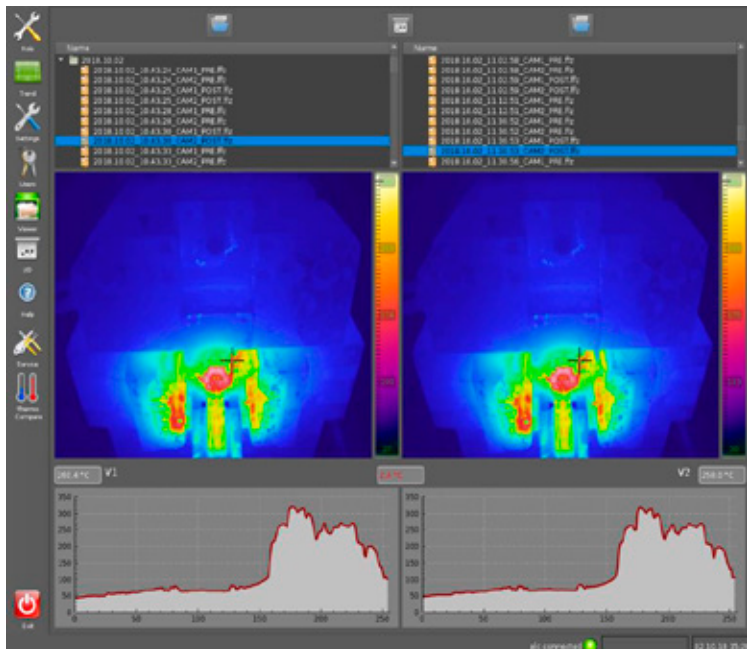
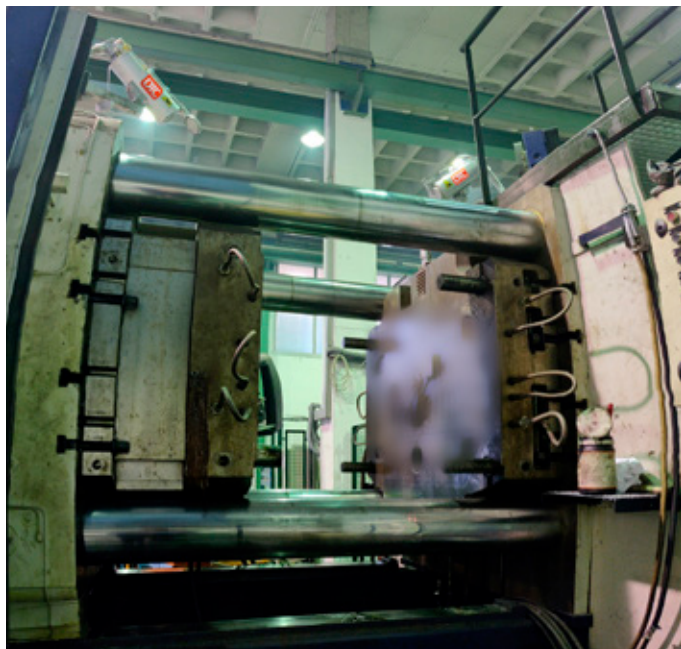
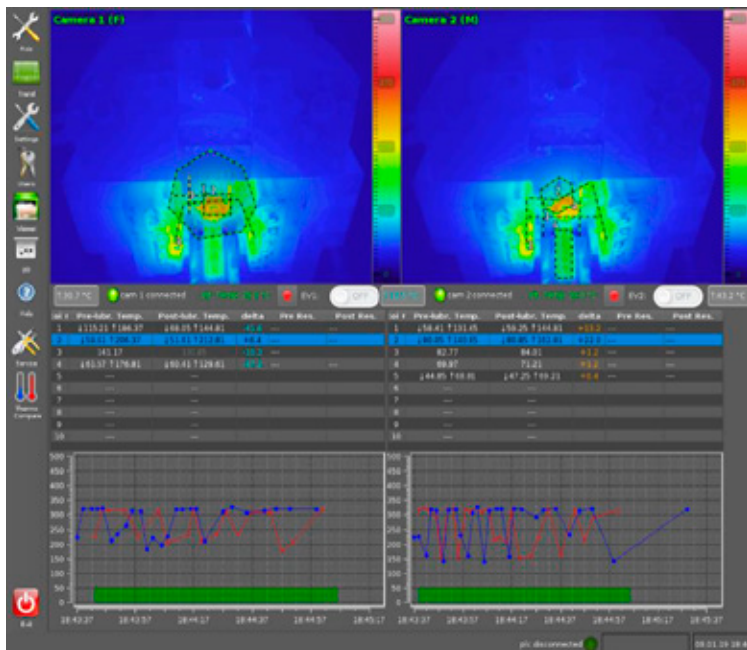
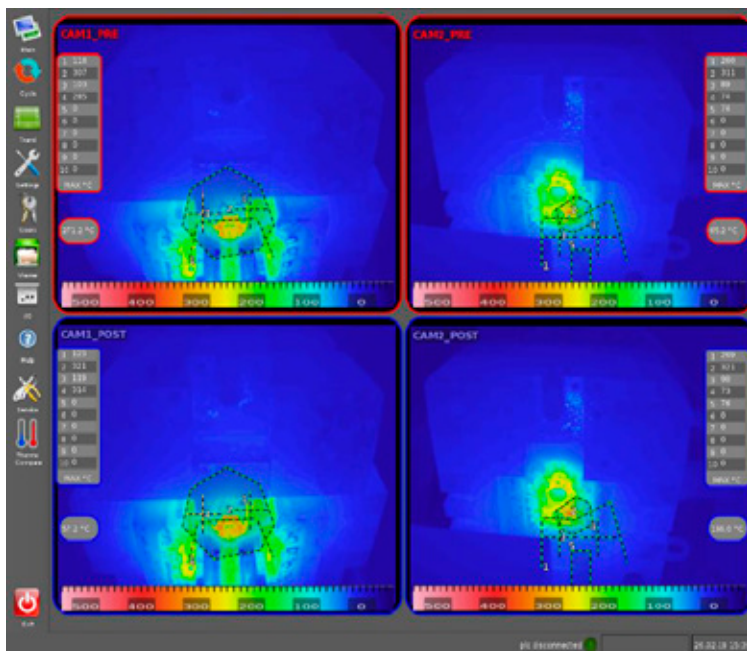
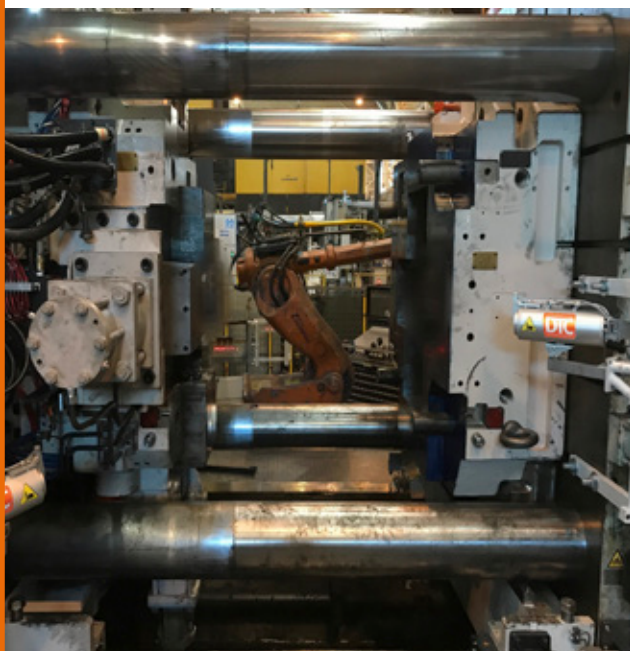
COMMUNICATION & SUPPORT

SUPPORT

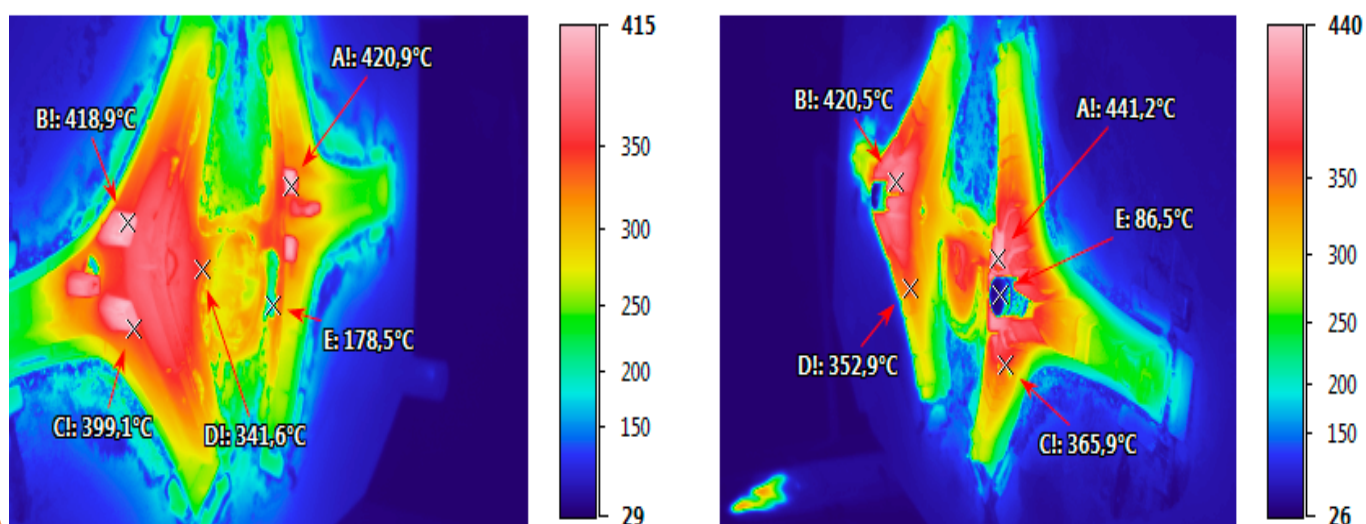
In addition, DTC has a remote assistance service, via Wi-Fi, Android and iOS smartphones, or via company network. An easy to use Tutorial is available to configure the type of communication and to update the DTC software.



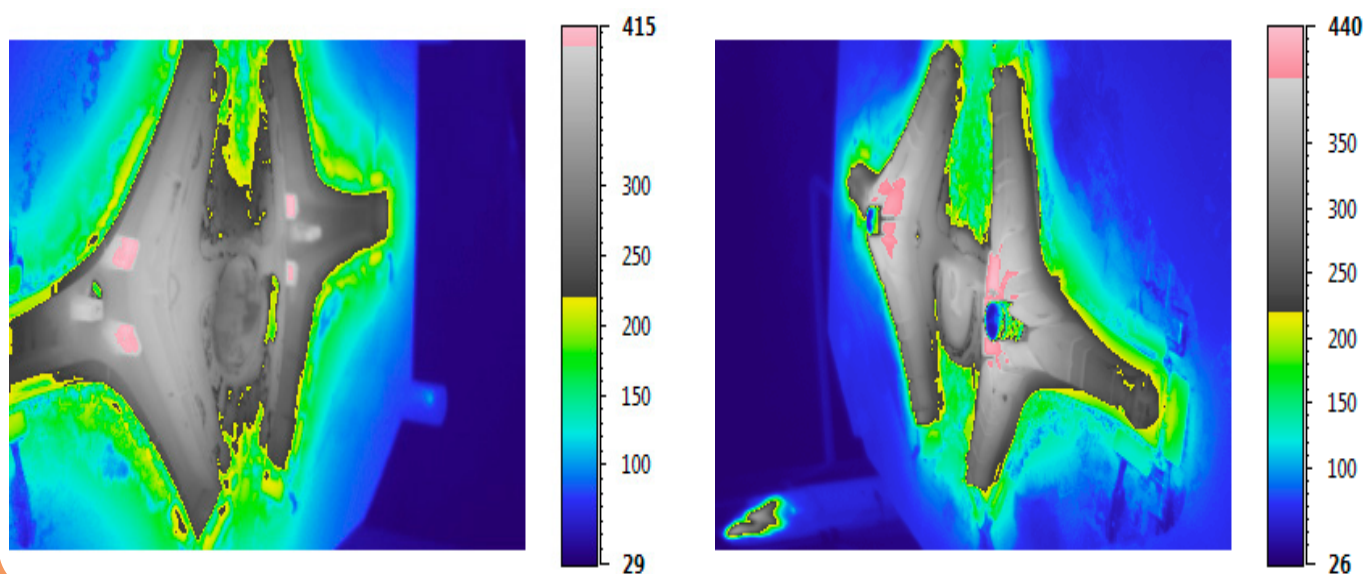
DTC in ACTION



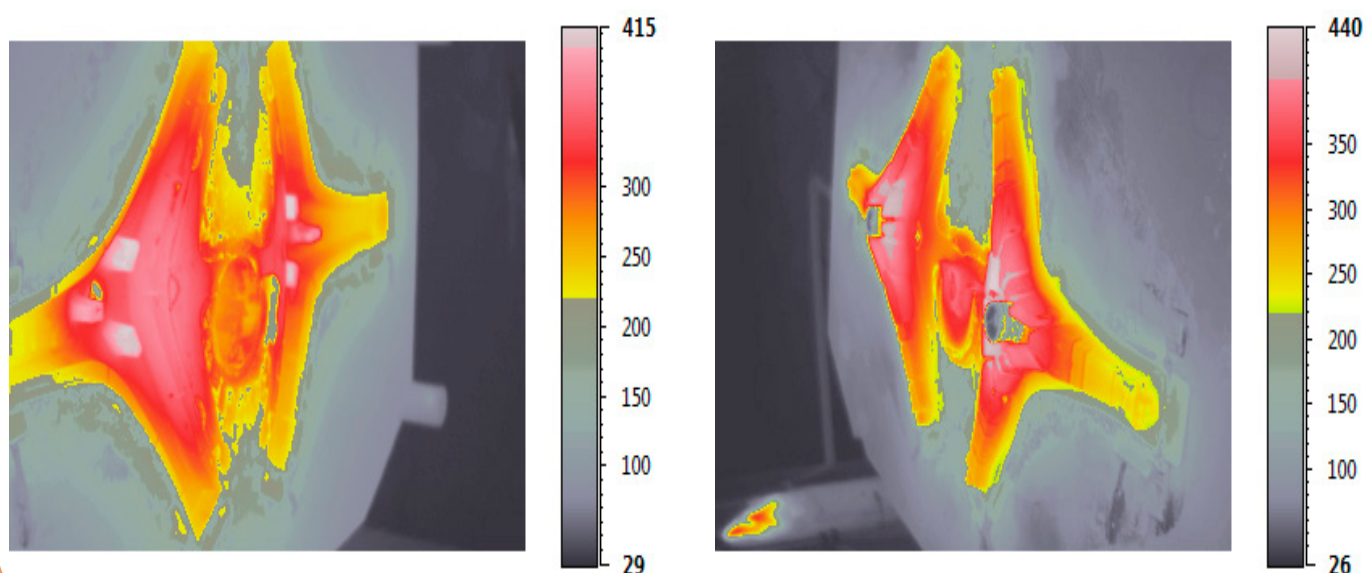
DATA ANALYSIS



ISOTHERM



RANGE OF INTEREST



INPROTEC IRT

Specialized in thermography, INPROTEC IRT integrates thermal imagers, for monitoring temperature in production process, Thermographic systems for the early detection of fires in industrial machinery as well as in storage sites of fire-risk materials. We also supply Custom thermographic systems for special applications.

in partnership with



For over 50 years, Chem-Trend has been committed to find solutions that help the Customers to improve quality, reduce costs and increase productivity, in order to meet modern challenges in the field of die-casting and satisfy the growing demands of the automotive industry.



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