



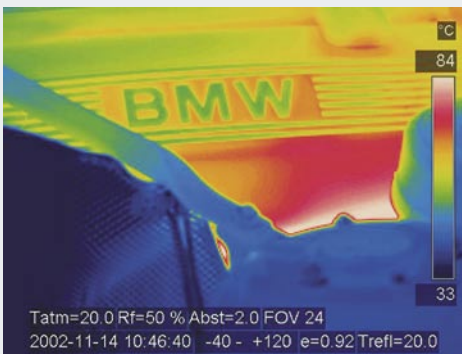
FLIR

APPLICATION STORY

FLIR SYSTEMS



Infrared thermography plays active role at BMW Group



Bayerische Motoren Werke, worldwide known as BMW, is one of the most prestigious car brands in the world. It stands for luxury, high-quality, safe and environmental friendly cars, all equipped with the latest technology. BMW also has a long history in motor sport and is now back into Formula 1, the ultimate test bench for the car industry, as the supplier of motors for the BMW WilliamsF1 Team. Both during the design of new cars and the assembly of existing models, infrared thermography, and more in particular FLIR Systems infrared cameras, play an active role.

The technological heart of the BMW Group beats in the Research and Innovation Center, also well known by its German abbreviation, the FIZ (Forschungs und Entwicklungs Zentrum).

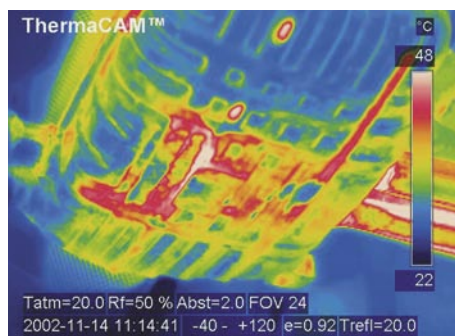
Located close to BMW's Munich headquarters, this research campus is one of the world's most modern automobile-industry development centers. Here, some 7,000 engineers, prototype builders, computer experts, and scientists from many areas - as well as purchasers and employees belonging to supplier companies - research and develop vehicles and technologies of the future for the BMW Group.

The aim of the Research and innovation Center is to develop new and even better BMW models in a faster and more cost efficient way. Being able to market new products in the shortest period of time is one of the key factors of success for the automobile industry.

One of the divisions within the Research and Innovation Center is EG-62. "Our main activity is studying and improving the heat management in cars.", explains Mr. Engelmann, head of EG-62. "We are looking at the total heat management of the car and are developing for example heat protection solutions for the engine and underbody temperature control products."

INFRARED IN RESEARCH AND DEVELOPMENT: SOME PRACTICAL EXAMPLES

When driving a car in wintertime it is important that the windshield is defrosted continuously and totally. Driving with a partly frosted windshield is dangerous. Therefore the heat dissipation over the windshield by the car heating system is being studied. Infrared thermography allows researchers to see how the hot air is distributed over the windshield and if this airflow needs to be improved.



Another practical example is the study of the heat transfer of catalysators. Located at the back, underneath the car, it disperses an enormous amount of heat. With the help of infrared thermography the heat dissipation is being studied, to avoid that, for example the trunk of the car, overheats.

"The applications for Infrared thermography are numerous. It is a perfect tool when studying heat transfer phenomena", says Mr. Nüsslein of the EG-62. "We can use it in a wide variety of applications. It gives us a real-time image of the situation so that we can see problem areas immediately. This is an enormous advantage over putting thermocouples onto the object. With the ThermaCAM™ Researcher™ package we can analyse and study all thermal events in real time."

"We have been using an infrared camera for several years but have now decided we need an extra camera. The older, but still perfectly working AGEMA 900, is less portable and will be installed permanently in one of our test bays. The new ThermaCAM S60 is far more portable and allows us to take it wherever and whenever we need it. Furthermore it has



a FireWire output so that we can analyse images in real time."

FROM DEVELOPMENT TO PRODUCTION

Once a car has been developed and thoroughly tested it goes into production. The BMW plant in Regensburg is producing all variants of the BMW 3 Series: coupés, convertibles, touring models, and saloons as well as exclusive M3 models and four-wheel-drive versions of the 3 Series. Over 9,500 employees are responsible for making sure that over 900 BMW automobiles leave the plant daily.

In order realize this enormous output each day it cannot be hindered by unforeseen outages. Therefore BMW Regensburg has established a predictive maintenance program. Infrared thermography is an important tool in this program.

"We started by having some electrical installations checked by an external service provider", explains Mr. Griesbeck.



"It became clear very rapidly that infrared thermography can detect problems well before a failure occurs so we decided to buy our own camera".

"Our first application was electrical inspections. In our factory we have over 1,600 electrical cabinets. Each is feeding a conveyor belt, robot, elevator or other piece of vital production equipment. We have inspected all cabinets with infrared and taken reference images. Regularly we scan the electrical cabinets again and compare the images with the reference image. If something should be wrong, we detect it immediately and can take the necessary action."

"Furthermore, our plant is charged more and more. This means that we need to rebuild electrical cabinets from time to time. With the infrared camera we can clearly see if they are not overcharged. And also new electrical cabinets are being thoroughly inspected before going into use."

FLIR SYSTEMS: OFFERING A TOTAL INFRARED SOLUTION

"We have chosen for a partnership with FLIR Systems because they were able to offer us more than just an infrared camera. Together with accessories, software and training, they offered us a total infrared solution."

"The ThermaCAM™ PM 695 is an easy-to-use instrument. It produces very high quality images so that we can recognize all details in the infrared image. Its built-in visual camera eliminates the need to carry a digital camera around. Furthermore, although the camera is a high precision measurement instrument and we handle it with care, we use it on a daily basis and sometimes need to carry it in hard to reach areas. Therefore it was important that it is also a rugged piece of equipment. With its IP54 rating, the ThermaCAM PM 695 fitted the requirement perfectly."

"ThermaCAM Reporter™ allows us to generate fast and easy reports to document and archive our findings. Although we do most of our analysis in the field, ThermaCAM Reporter includes all the features to do post analyzing if necessary."

"Although an infrared camera is very easy to use, it is very important to learn how to get the most out of your infrared system and to get some knowledge about the theoretical fundamentals of infrared. The FLIR Systems Infrared Training Center provided all potential users of the camera with the necessary information about emissivity, reflections and other important items. This training course was organized in our factory in Regensburg so that everyone could learn how to use the camera in everyday situations."

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