Practical guide
Thermography in preventive maintenance.

Optimise processes, reduce costs and ensure system availability.

Introduction.

This Practical Guide is intended for plant managers and maintenance engineers in manufacturing companies, who are looking to optimise their maintenance processes and system availability.

Condensed onto 16 pages, it outlines how thermal imagers and the latest thermography technologies help to guarantee increased system availability and, at the same time, reduce costs.

Contents.

Good reasons to use thermography.

For years now, the use of thermography has been on the increase in the field of preventive maintenance. Nowadays it is common knowledge that thermal images provide valuable assistance in the visual inspection of electrically and mechanically stressed components. This non-contact measurement methodology helps identify anomalies – so-called hotspots (see Fig. 1) – quickly and reliably. These are generally regarded as a reliable indication of defective or worn-out components in systems and machinery.

The use of thermography is also recommended in a wide range of standards and guidelines.

Some insurance companies even require their customers to carry out regular thermographic inspections on insured facilities and installations.

Therefore in the event of personal injury or damage to property, companies run considerable financial and legal risks if thermography has not been used.

Nonetheless, many of those responsible for maintenance still hesitate when it comes to using thermal imagers. However, in addition to the actual investments in the necessary hardware and employee training, this is mainly because they are simply unaware that thermography can enable those employees entrusted with maintenance to be deployed much more efficiently than they previously were.

Once they are made aware of this, however, they no longer query whether thermography should be used, but rather how this technology can be implemented as efficiently as possible and integrated into the existing processes.

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For those who get things done and those who make decisions.

Maintenance in industrial companies is largely characterised by the different areas of responsibility of plant managers and maintenance engineers.

The head of department (the one who makes decisions) is constantly striving to strike the right balance between system availability and cost pressure. He must ensure that the systems maintained by him do not break down, while also making sure to keep costs down.
At the same time, the head of department is also responsible for introducing safer and more efficient processes and cost optimisation measures.

The maintenance technician (the one who gets things done), on the other hand, is responsible for spotting potential breakdown risks in good time and, where necessary, using the insights gained to determine the correct measures to take. Typical tours of maintenance also need to be documented and relayed.

Thermography makes it possible to achieve system availability at minimal cost. This technology also assists both those who get things done and those who make decisions in their day-to-day work. Thus, companies who opt to use thermal imagers as part of their maintenance program benefit in many ways.

Key benefits of using thermography

- Test procedures and routine inspections can be carried out faster.
- The imaging process of thermal imagers enables errors and anomalies to be detected sooner and more clearly than they would be via spot measurements using infrared thermometers.
- The thermal imager analysis software also makes it easy to create reports. This reduces the time and effort required to create documentation.
- Thermal imagers are easy to operate and are useful when you have specialist staff with no experience of thermography.

Typical challenges
when it comes to maintenance.

In a medium-sized manufacturing company, the number of measuring points with electrically or mechanically stressed components is normally well within the triple figures. Depending on the size of the particular measurement object, up to three infrared images are required to evaluate them. This means that several hundred infrared images are generated during one single tour of inspection.

This inevitably creates the following challenges:

- How to assign the infrared images to the relevant measurement objects?
- How time-consuming were the individual measurements? Do notes need to be created and evaluated where necessary?
- How expensive and time-consuming are the evaluation and reporting processes?
- Is it possible to identify the temperature development of a component over the course of time, and derive any necessary measures based on this?

Since infrared images of electrical components are very similar, efficient manual assignment is virtually impossible. Who could possibly know after just one tour of inspection that infrared image no. 130 belongs to switching cabinet no. 48-3b, for example?

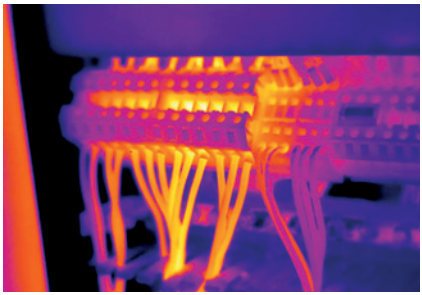


Fig. 1: Overheated connections in a control cabinet.

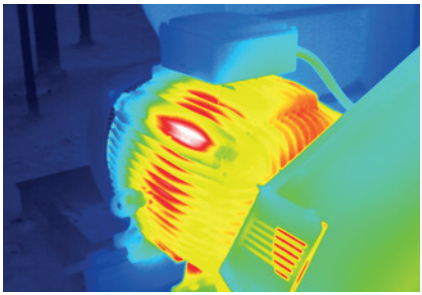


Fig. 2: Temperature distribution in an engine.

Admittedly, there is a possibility of taking written notes on site or recording voice commentaries using the thermal imager. However, considerable effort is required for this. Moreover, this method is extremely prone to error with regard to the later assignment of real image to thermal image.

However, it's the subsequent evaluation of the infrared images that involves the most effort. To this end, firstly all the thermal images recorded need to be sorted and then assigned to the correct system. It is then essential to summarise all this information in a comprehensible report.

With countless hours already having been wasted up to this point, the real problem becomes apparent: let's assume that a tour of inspection is carried out every six months and those in charge wish to evaluate the temperature development of the examined components or systems in order to be able to ascertain whether this is still within an acceptable range or whether any measures need to be taken. For all previous methods of managing and documenting thermal images, this would mean searching for and opening all the old images for each measuring location in order to be able to compare them with the matching new images. No easy task when we're talking about several hundred thermal images. Also, considering the ever-present cost and time pressures, you can no doubt think of other, more useful activities that you could be doing instead.

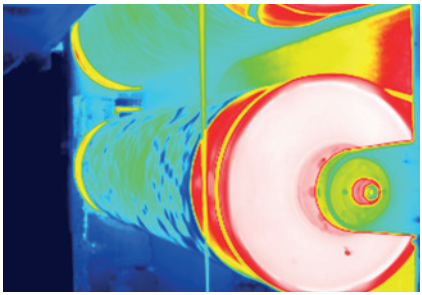


Fig. 3: Infrared image of a system in plastics production.

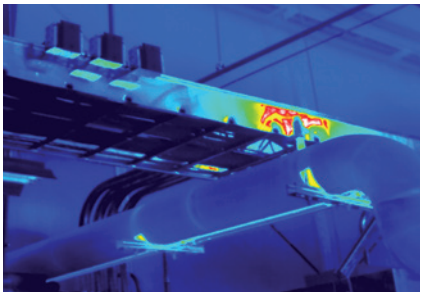


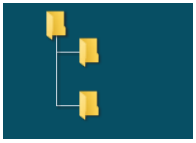
Fig. 4: Overheated bearing in a conveyor line.

testo SiteRecognition: Automatic thermal image management.

A typical problem in maintenance:
A lot of similar measuring objects mean a lot of similar thermal images. Previously, in order to clearly allocate the images after an inspection, you had to create complex lists or add a voice comment to each individual thermal image.

An innovation from Testo now solves these problems:
The testo SiteRecognition technology guarantees fully automatic site recognition, as well as storage and management of the thermal images. This rules out any mix-ups, prevents errors during evaluation and saves time by eliminating the need for manual image assignment.

How testo SiteRecognition works



1a. Create a list of your measurement objects in the testo IRSoft PC software.

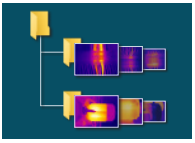
1b. Import your existing inventory list with the codes into the testo IRSoft PC software.

2a. Create the codes for the measurement objects in testo IRSoft, print them out and attach them to the measurement object.

2b. Transfer the data to the testo 883 thermal imager.

3. Activate the SiteRecognition wizard in the testo 883 thermal imager.

The testo 883 automatically recognizes the codes during the measurement and saves the respective measuring location information together with the thermal image.



4. When synchronizing the imager with testo IRSoft, the thermal images are automatically assigned correctly.

You can also export the work results again for third-party programs. This saves time and is highly intuitive.

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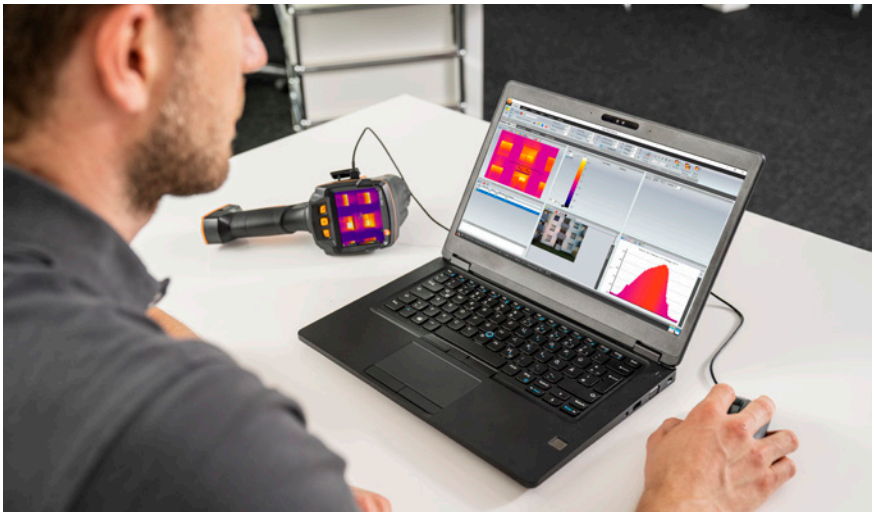
The pro software
testo IRSoft

In addition to measuring location management (testo SiteRecognition), the software also enables you to comprehensively analyze, process and document thermal images.

Download the software free of charge from **www.testo.com/irsoft**.



Conclusion: Thermography saves both time and money.

The use of thermal imagers in preventive maintenance is not just about detecting thermal anomalies (hot spots). Rather, the main concern should be to design an efficient, fault-free and resource-friendly process.

The automatic site recognition and thermal image management of the testo SiteRecognition technology helps both the plant manager in charge and the assigned engineer to establish these processes and to utilise thermography even more efficiently as part of the day-to-day working procedures.

Moreover, testo SiteRecognition makes it significantly easier to integrate thermography into existing or new standard procedures. Valuable working time can therefore be spent on other maintenance tasks, rather than sorting thermal images.

A thermal imager will also very quickly pay for itself – loss of production caused by an undetected overheated connection is considerably costlier.

Thermography also minimises the risk of fire, which can often result in significant financial repercussions or even personal injury, especially in manufacturing companies.

Therefore a thermal imager featuring testo SiteRecognition technology provides increased efficiency and safety when tackling preventive maintenance in industrial environments.

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The ideal thermal imagers for preventive maintenance.

The testo SiteRecognition technology is available for the thermal imagers testo 883 and testo 890, your ideal maintenance partners. This will enable you to identify and analyze thermal anomalies in a way that is non-contact and cost-saving, both in electrical and in mechanical maintenance. Ideal for monitoring low, medium and high-voltage systems, mechanical components or the fill level of sealed fluid tanks.

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Subject to change, including technical modifications.

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