Infrared Thermography and the 70E

In this cycle of the NFPA 70E, several proposals were submitted concerning infrared thermography and the use of the tables in Article 130. To summarize these proposals, using a very wide and dull brush, the basic theme of many of the proposals was “If I’m not making contact and am not breaking the plane of the switchgear, I am not at the same risk as someone who is removing covers; therefore, I should not have to wear the same level of PPE as those people performing that task.” Again, this is a broad statement and there were specifics contained in those proposals that we did leave out, but hopefully you get the idea…

This topic of infrared inspections was the subject of discussion among several of the 70E Committee members, as there were many proposals dealing with this subject and more than a few differences between them. The general consensus, at least on the hand vote at the ROC, was that this made a great deal of sense and tasks related to infrared inspection should be added to the tables at various locations. The consensus was by way of hand vote, and the final balloting and approval by the Technical Correlating Committee, which oversees the 70E Technical Committee, is yet to come. Things can change between the hand vote and when the actual document is published. As members of the task group updating the tables, we also had an interest in making certain thermographers were adequately protected but could also perform their job. The point is driven home to us since several NETA Accredited Companies have thermographers in the field and are exposed to the hazards on a daily basis.

Like most subjects, there are two sides to the story. On the one hand, wearing arc-flash PPE and equipment can be cumbersome and interfere with the task of using the camera effectively. Since the [assumption is] thermographer is not removing the covers and is not breaking the plane of the switchgear, the chance for an arc flash is greatly reduced. On the other hand, if there is an arc-flash, what the person is doing will not matter; he will have the same exposure as anyone else at that distance from the arc flash.

When it comes to panel removal, in the last several years we have modified the policy and procedures that our thermographers use. In the past we sent one person to pull covers and perform the infrared inspection. If the customer wanted to speed things up we sent two technicians, one to pull covers and one to perform the inspection. We now hire qualified electrical contractors with whom we are familiar to pull covers while our technician performs the infrared thermography. This contractor has trained his personnel on how to use the 70E tables, the hazards of electricity and the OSHA regulations. This relieves us of the burden of suiting up to pull the panel covers and allows our infrared technician to stay back an appropriate distance for the level of arc-flash hazard. Even with the changes to the tables reflecting the reduced PPE needed for infrared thermography, arc-flash PPE and equipment will still be necessary for virtually all inspections; it is just the level of PPE that will be reduced.

Everyone should consider the hazard as well as the risk whenever performing work around exposed, energized conductors or parts. Just because the risk is lowered does not mean it is eliminated. If you are inside the Flash Protection Boundary and an arc occurs, you need to be protected. The arc doesn’t care what you are doing at the time it’s initiated, it’s going to do whatever it wants to do with no consideration for you. So there are two protection schemes; 1) wear PPE and equipment appropriate for the arc-flash hazard and 2) increase your distance from the arc source. There is also a third option, infrared sight glasses which allow for inspection without the removal of the panels, thereby eliminating the exposure hazard.

The NFPA 70E and OSHA allow some latitude in what protection a worker must wear. 29 CFR 1910.335(a)(1)(i) states, “Employees working in areas where there
are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.” If the wearing of PPE creates a hazard that is greater than that posed by the original hazard, it might be justifiable to wear reduced PPE or no PPE. This could include things like heat stress or issues where the equipment causes an increased hazard instead of relieving a hazard. Be aware though, if there is an accident with multiple injuries or a fatality, your chances of winning the argument in court are pretty slim. This same line of reasoning is reflected in the tables in Article 130. The required level of PPE is reduced based on the risk, in some cases.

Infrared sight glasses are another option. These are viewing windows made of crystal and, when installed properly, allow an infrared inspection without panel or cover removal. There are various sizes to meet most equipment viewing requirements and no PPE is required, since there are no exposed, energized conductors or parts. Illustrating the differences in PPE requirements, Figure 1 shows an infrared survey being performed without a sight glass; and Figure 2 shows the same task being performed with a sight glass. Going back to the core message of the 70E, if you remove the hazard the hazard does not exist.

Summary
The issue of PPE when performing an infrared inspection is one that has different sides to the issue. The new tables in the 2009 70E should provide some guidance, even for those who do not use them. Since the 70E considers the risk of an arc flash to be low when performing the actual scan of the equipment with the IR camera, this would indicate lesser PPE might be appropriate when performing infrared surveys.

But several factors must be weighed, including the question of, “What if an arc flash occurs?” It is a judgment call that can carry serious consequences for a company that chooses incorrectly. It would be great if the 70E could just say, “No need for arc-flash PPE and equipment when performing an infrared inspection,” but that can’t happen.

As a qualified worker performing infrared surveys, use your brain and knowledge of the equipment, because there are too many variables and situations that cannot be foreseen. Work smart, work safe – and do it with a high degree of caution.

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