

Personnel Certification for Thermographers - Status and Trends –

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Introduction

In summer 1994, the American Society for Nondestructive Testing (ASNT) administered a conference in Long Beach, California. One of the main topics was a seminar chaired by John Snell, introducing the new test method Thermal Infrared Testing (TIR). The presentations were impressive and from different industries such as automotive, electric utilities and buildings maintenance. At the same time, ASNT decided to incorporate TIR into their Level III program (central certification by ASNT) and into their certification guideline SNT-TC1A.

Since then, Infrared training centers and Infrared camera manufacturers sell training courses, certification examinations and certificates to this standard, mostly under the logo of “ASNT certification”. People understand this as certification by ASNT or under license of ASNT, but it is just a certification to a guideline issued by ASNT, named SNT-TC-1A. This guideline is a recommendation how employers should certify their own employees. For this purpose, the level 3 person of employer modifies SNT-TC-1A to meet specific needs and develops a special certification procedure, the so-called “Written Practice”. A valid certificate in accordance with SNT-TC-1A. would consequently bear the name of the employer and not the name of the training organization or the camera manufacturer. Because of such frequent abuse and inadequate certification, certificates to SNT-TC-1A lost reputation and certification by independent bodies deemed more and more favorable.

Development in Germany

The German Association for Applied Thermography (VATh) and SECTOR Cert founded a joint program committee in order to define and update rules for the certification of thermographers. So, since 1999, SECTOR Cert certifies IT personnel in compliance with EN 473. SECTOR Cert issued around 600 certificates until the end of 2006. Training is done by training centers which are recognized by the certification body. Those training centers are:

- ITC
- METEG
- VECTOR
- University of Kaiserslautern

Three years ago, the German Society for NDT (DGZfP) started their own certification program for Thermography, originally for active thermography only. As EN 473 does not detail regulations for thermography, SECTOR Cert, VATh and DGZfP developed a DIN standard, to define a joint certification program. DIN 54162 was issued in July 2006 and is used in Germany and Austria.

Contents of DIN 54162

We took EN 473 as a basis and changed what was necessary to meet the specific needs of thermography. The main changes were:

1. *EN 473 does not contain any regulations concerning thermography. It just states under clause 1: “The system described in this standard may be applied to other NDT methods provided a recognized certification program exists.” Therefore a recognized program had to be developed; and we decided to develop it in form of a DIN standard. We introduced training times and a detailed body of knowledge.*
2. *EN 473 certifies people not only to three level but also to sectors. Main sectors in EN 473 are: castings, forgings, welds, wrought products and tubes. These sector may hardly be applicable to active thermography, but not at all to passive thermography. Therefore DIN 54162 refers certification to the main techniques: active and passive. Passive thermography may be further subdivided into Buildings (B), Electric Installations (E) and Industry/Machinery (I).*
3. *All EN 473 Level 3 candidates must pass a so-called basic examination before they are allowed to take the examination in the desired NDT method. This basic exam contains questions on the certification system, on material science and on details of other NDT methods. This may be adequate for active, but not at all for passive thermography. Therefore a special basic exam for condition monitoring is defined in DIN 54162.*

Moreover the standard reflects regulations in all other certification systems (see below) especially concerning the contents and duration of specific knowledge lessons.

Other Initiatives

Since the start of the program, we realized many other initiatives, at national or at international level, that tried to cover the personnel certification field in IT, partly or fully.

Electro-Thermography:

VdS (German association of insurances) developed a program for the certification of thermographers working in electric installations. This program is based on the level 1 EN 473 and transports mostly knowledge about electric installations, failure modes and their analysis to thermographers. Also, prerequisites to attend this course consist of experience times and formal education as electrical engineer or specialist (“Elektrofachkraft”) in order to have the legal permission to work in this environment. The thermographer must have a camera of a certain specification available and the applicable electric standards in order to evaluate hot spots. Recertification is required all the 3 years based on some training and a small test.

At the same time when this certification system was developed in Germany, the European Federation of Fire Protection Associations (CFPA) issued its guideline No. 1 entitled: “Certification of Thermographers”. In clause 1 it reads: “These guidelines specify requirements for thermographers who work on electrical installations ...” The requirements contained therein are similar to the national regulations except that a level 1 to SNT-TC-1A would be good as basis qualification.

Thermography of Buildings

Five years ago, the German Association for Leak Tightness in Buildings (FLIB) was formed. This organization developed their own certification programs where thermography is used as a tool for the detection of moisture or air leaks. One of the seminars is based on “Blower Door Method” and uses thermography to locate leaks. Certification is not by independent bodies but by the Association itself.

The Vibration and Shock Initiative

ISO TC-108 is a group in the International Standardization Organization which deals with vibration and shock. SC 5 is a subcommittee of TC-108 and entitled “Condition Monitoring and Diagnostics of Machines” and under US American and Australian leadership. This subcommittee is clearly dedicated to machines and not to any other condition monitoring task. This committee develops standards for

- *Vibration Analysis*
- *Acoustic Emission*
- *Lubrication Analysis*
- *Thermal Imaging*

in several working groups. Working Group 11 “Thermal Imaging” works on two Standards:

- **ISO 18434: Condition monitoring and diagnostics of machines — Thermography — General procedures**
- **ISO 18436-8: Condition monitoring and diagnostics of machines — Requirements for training and certification of personnel — Part 8: Thermography**

Whereas the technical standard contains nothing surprising, parts of the draft of the certification standard is discussed controversially. In contradiction to all other certification standards, this standard contains no requirements for a practical exam; except as an option for level 1 only. The practical part is substituted by extensively controlled and very long experience times. This should be changed, because as it reads now, certificates to this standard cannot be accepted under other certification standards, because it is not comparable. Moreover, the transition regulation is totally insufficient. The transition regulation in **ISO 18436-1 (“General requirements for training and certification”)** stipulates the authorization of examiners only, and not for those persons who monitor and control the experience times of persons of lower certification level. It can be expected that these standards will be finalized by end of this year or early 2008.

Active Thermography - NDT

Another ISO Standard, ISO 9712 entitled “Personnel Certification in Nondestructive Testing” has been designed very similar to EN 473. So, concerning thermography, this standard contains all strengths and weaknesses as EN 473. But one thing is very different: ISO 9712 defines explicitly a method called “Thermographic Testing” (TT). As certification refers to the same industry sectors as EN 473, it can be assumed that TT is active thermography only.

Essentials for a unique Certification System for Thermographers

It can be derived from the above, that the following essentials should be fulfilled by a unique certification system for thermographers:

1. **The certification system shall be described in a standard:** The certification system must be standardized by an international recognized standard, so that the certification system can be applied europeanwide or globally by everyone in the same manner.
2. **Certificates shall portable and independent:** The certificates shall not just be valid for a specific company or employer and shall remain valid upon termination of the employment of a certificated person. Consequently, the certification body shall be independent from the employer preferentially reinforced by accreditation.
3. **Certification examination shall consist of a general and application parts:** Knowledge and skills to be acquired for certification consist of basic items which are the same for all industries and of applications specific for each of the industries. Consequently, basic knowledge and skills should only be examined once and remain valid for all industries.

The thermographer's community should work on a unique certification standard, which can be applied in any industry branch. This unique standard should serve as a roof covering all other initiatives and enabling comparison between different standards covering just the need of one industry. This would open the possibility of mutual recognition or reciprocity between certificates of limited scope. As service providers in thermography very often work in different industries, they will not be forced to go through several courses and exams with partly identical contents.

In the interest of their members, the European Association for Thermography should define such unique certification standard as one of their main goals. SECTOR Cert and VATH propose DIN 54162 as basis document for the development of a European personnel certification standard for thermographers.