Some Critical Remarks from German Chemical Industry on Certification and Accreditation in NDT

Opening Lecture
5th International Conference on Certification and Standardization in NDT
Berlin, September 26 - 27

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The BASF Site Ludwigshafen – the world’s largest integrated chemical complex
Chemical Industry: Different Plants for all Sorts of Purposes
From Naphtha to Napkins: Superabsorbers from BASF

Naphtha → Propylene → Acrylic acid crude → Acrylic acid pure → Super-absorbers
Objects in Chemical Plants Subject to NDT

- Storage Tank
- High-Pressure Reactor
- Sphere for Pressurized Gas Storage
- Column
- Process Piping
Why are Inspections (and NDT) of Chemical Equipment Necessary?

- **Economy**
  (no down-time)

- **Safety**

- **Legal Requirements**
  - European
  - National
Some Opening Statements

- This opening lecture will **not** address the discussion of differences between EN 473 and ISO 9712.

- The lecturer is no expert in all the various aspects of certification and accreditation.

- The lecturer is only an engineer concerned with certification and accreditation in NDT.

- It is inescapable that this presentation
  - is probably full of errors
  - will definitely leave out important topics
  - will not cover all the very detailed aspects of certification and accreditation

- Do not expect too many answers on your questions.
Definition of Certification:

- **Certification** (acc. to EN 473)
  Procedure used to demonstrate the qualification of NDT personnel in a method, level and sector, and leading to the issue of a certificate. Certification does not include operating authorisation.

Conformity assessment –
Vocabulary and general principles (ISO/IEC 17000:2004);
Trilingual version EN ISO/IEC 17000:2004

- **Certification** (acc. to EN ISO/IEC 17000)
  third-party **attestation** (5.2) related to products, processes, systems or persons

- **Attestation** (acc. to EN ISO/IEC 17000)
  issue of a statement, based on a decision following **review** (5.1), that fulfilment of **specified requirements** (3.1) has been demonstrated
Definition of Accreditation

- **Accreditation** (acc. to EN ISO/IEC 17000)
  third-party **attestation** (5.2) related to a **conformity assessment body** (2.5)
  conveying formal demonstration of its competence to carry out specific conformity
  assessment tasks

- **Attestation** (acc. to EN ISO/IEC 17000)
  issue of a statement, based on a decision following **review** (5.1), that fulfilment of
  **specified requirements** (3.1) has been demonstrated

- **Conformity Assessment Body** (acc. to EN ISO/IEC 17000)
  body that performs conformity assessment services
  NOTE An **accreditation body** (2.6) is not a conformity assessment body.

- **Conformity Assessment** (acc. to EN ISO/IEC 17000)
  demonstration that **specified requirements** (3.1) relating to
  a **product** (3.3), process, system, person or body are fulfilled
Explanation of Definitions of EN ISO 17000
(a desperate effort)

- **third-party conformity assessment activity** (acc. to EN ISO/IEC 17000)
  third-party **attestation** (5.2) related to a **conformity assessment body** (2.5)
  conveying formal demonstration of its competence to carry out specific conformity assessment task
Questions Arizing from Definitions of EN ISO 17000:

- Certification by third party bodies only?
- Employer based certification allowed?
- Accreditation only by accreditation bodies, which are authorized by government?
- „Private Accreditation“ by first and second party agreement?

1 Scope
This International Standard specifies general terms and definitions relating to conformity assessment, including the accreditation of conformity assessment bodies, and to the use of conformity assessment to facilitate trade. A description of the functional approach to conformity assessment is included in Annex A, as a further aid to understanding among users of conformity assessment, conformity assessment bodies and their accreditation bodies, in both voluntary and regulatory environments.

1 Anwendungsbereich

„German Problem“
regulated by law and optional (private)
NDT in Chemical Industry

Design | Manufacture | Operation

Construction of Chemical Equipment

Operation of Chemical Equipment

Manufacturers Responsibility

Owners Responsibility

Feedback

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BASF Aktiengesellschaft, Materials Engineering, Dr. Andreas Hecht
Pressure Equipment (Vessels, Process Piping) Design and Manufacture

EU - Pressure Equipment Directive (PED)
- mandatory for the EU-member-states
- essential safety-requirements of PED
- harmonized standards: e.g. EN 13445-5
- national codes: e.g. AD-2000, CODAP 2000
- pressure vessels of cat. IV are subject of NDT in any case.
- NDT of welds (3.1.3. of PED Annex 1) carried out by personnel being approved by recognized third-party organizations (RTPO)
- examination of NDT test reports carried out by notified bodies or user inspectorates

Responsibility of manufacturer

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Pressure Equipment
(Vessels, Process Piping)
Operation (German View)

national BetrSichV (safe operation of plants)
- inspection periods established by owner
  - max. values by BetrSichV (e.g. 5 years for internal insp.)
- participation of national accredited surveillance organizations
- internal inspection may be replaced or complemented by NDT
- amount and type of NDT
  - depends on type of potential damage
  - settled by
    1. owner
    2. owner and experienced person
    3. owner and surveillance organization (ZÜS)

responsibility of owner / operator

Manufacture
Design
Operation

vessel for gas - fluid group 1
Pressure Equipment
(Vessels, Process Piping)
Who carries out NDT?

- Annex I, 3.1.3 of PED requires **approved personnel** for NDT of welds at cat. III - and cat. IV – vessels
- approval of personnel by recognized third-party organizations (article 13)
  actual list: http://ec.europa.eu/enterprise/newapproach/nando
- harmonized and supporting standards require personnel certified acc. to **EN 473**
- **no accreditation of NDT - company required** (PED-guideline 6/9)

**Operation**
- PED does not apply
- national regulations apply
- NDT based on
  - NDT EN-standards
  - NDT qualification procedure
- NDT personnel certified acc. to EN 473 if required
- **accreditation of NDT-company based on EN ISO 17025 recommended / required ??**
Pressure Equipment (Vessels, Process Piping)
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- PED does not apply
- national regulations apply
- NDT based on
  - NDT EN-standards
  or
  - NDT qualification procedure
- NDT personnel certified acc. to EN 473 if required
- accreditation of NDT-company based on EN ISO 17025 recommended / required ????
NDT Inspectors at Work
What is Certification good for?

Answer: Provide Confidence

Owner (second party) must have confidence into the manufacturers (first party) products - and into the NDT, too

Owner must have confidence into his own plant-operation and plant-maintenance - and into the NDT, too

Public (government) must have confidence into the owners reliable plant-operation - and into the NDT, too
Certification of NDT-Personnel acc. to EN473

- training
- knowledge
- skill
- experience

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**duties and responsibilities**

- employer
- certification body

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**employer**’s responsibility on certificated personnel:
- physical fitness
- continuity of NDT-work
- operating authorization (based on certification)

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**certification body**’s responsibility:
- certification scheme
- authorized qualifying bodys
- examination centers
- issue of certificates
- maintain all records

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**NDT candidate:**
- sign code of ethics

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Certification of NDT-Personnel acc. to EN473

simple summary

**independant certification body**
- provides courses and training
- provides examination
- carries out certification (formal act)
- maintains records

**employer** cares for
- skills and experience
- continuous work
- physical and mental ability
- **authorization** of NDT personnel

Who is responsible for confidence into NDT-personnel?

The **employer**!

The certification body renders assistance
Responsibilities of the Employer

from a draft by John Thompson

- introduce the candidate to the Certification Body
- ensure annually that employees meet the visual acuity requirements

- accept full responsibility for the authorisation to operate
- accept overall responsibility for the results of NDT operations
- maintain records of work experience necessary as a basis for confirming continuity of satisfactory work activity
- organise additional job-specific training

- To fulfil these responsibilities the employer must prepare a quality procedure ("written practice")
Renewal / Recertification

Renewal is a formal process, where
- the employer takes full responsibility on the abilities of NDT - personnel
- the certification body renders assistance

Recertification of a Level III with structured credit system is a process, where
- the employer takes full responsibility on the abilities of NDT - personnel
  - 70 points needed
    - 50 points by confirmation of employer
    - remaining 20 points by proof of participation at conferences, etc. (job specific activity)
- the certification body renders assistance
Recertification of Level I / Level II

All NDT operators are equal, but some NDT operators are more equal following George Orwell

Proposal:

Recertification of Level I / II personnel with structured credit system, where

- the employer takes full responsibility on the abilities of NDT - personnel
  - records of work-experience (NDT-reports)
  - records of job-specific training
  - ........
- the certification body renders assistance
Overall NDT Quality Management
from a draft by Mike Farley

NDT – Quality Chain:

- Research & Development: results implemented into practice
- Standards: existing and applicable
- Procedures: qualified and approved
- Equipment: existing and applicable
- Personnel Training: responsibility of employer
- Personnel Certification: responsibility of employer
- Human factors: “minus or plus” ???
- Audits / Surveillance: accreditation of NDT organisations / lab’s
Qualification / Validation of an NDT-system / NDT-process

- **Routine NDT** is typically based on EN-standards
  - If an EN-standard applies, NDT-validation is not required or necessary

- **On-stream NDT** methods / systems are typically not covered by standards:
  - In this case: validation / qualification of an NDT system is required acc. to EN ISO 17025
  - CEN technical report CEN/TR 14748:2004 Methodology for qualification of non-destructive tests
### Overall NDT Quality Management

from a draft by Mike Farley

<table>
<thead>
<tr>
<th>NDT – Quality Chain:</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; Development</td>
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</tr>
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</tr>
<tr>
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<td><em>responsibility of employer</em></td>
</tr>
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Various Requirements on NDT - Companies / NDT - Laboratories

- ISO 9000 certification
- EN ISO 17025 accreditation
  - calibrated equipment
  - approved procedures
  - participation in round-robin tests
  - ........
- SCC certification (safety)
- approval for RT - operation
- certified personnel
  - EN 473 (and PED)
  - SNT-TC-1A (for ASME)
  - ISO 9712 ?
- personnel authorized
  - as inspector or supervisor
  - for RT - operation (radiation)
  - ...........

All this paperwork will be checked!

Who checks the real NDT - work?
Some Critical Remarks from German Chemical Industry on Certification and Accreditation in NDT

- This was an opening lecture only

- 30 presentations will follow

- Thank you for your attention