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Vervangt NEN-EN 14584:2003 Ontw.

Nederlandse norm

# **NEN-EN 14584** (en)

Non-destructive testing - Acoustic emission -  
Examination of metallic pressure equipment  
during proof testing - Planar location of AE  
sources

ICS 17.140.20; 77.040.20  
september 2005

Als Nederlandse norm is aanvaard:  
 - EN 14584:2005, IDT

Voorbeeld  
 Preview

Normcommissie 342 092 "Niet-des(ter) Nef onderzoek"

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Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 473	NEN-EN 473	Niet-destructief onderzoek - Kwalificatie en certificatie van personeel voor niet-destructief onderzoek - Algemene principes (en,nl)
EN 1330-1:1998	NEN-EN 1330-1:1998	Niet-destructief onderzoek - Termen en definities - Deel 1: Lijst van algemene termen (en,nl)
EN 1330-2:1998	NEN-EN 1330-2:1998	Niet-destructief onderzoek - Termen en definities - Deel 2: Termen die voor niet-destructieve onderzoeksmethoden worden toegepast (en,fr,de,nl)
EN 1330-9:2000	NEN-EN 1330-9:2000	Niet-destructief onderzoek - Termen en definities - Deel 9: Termen gebruikt bij onderzoek met akoestische emissie (en,fr,de,nl)
EN 13477-1	NEN-EN 13477-1	Niet-destructief onderzoek - Akoestische emissie - Karakterisering van apparatuur - Deel 1: Beschrijving van apparatuur (en)
EN 13477-2	NEN-EN 13477-2	Niet-destructief onderzoek - Akoestische emissie - Karakterisering van apparatuur - Deel 2: Verificatie van bedieningseigenschappen (en)

Preview



ICS 17.140.20; 77.040.20

English Version

Non-destructive testing - Acoustic emission - Examination of  
metallic pressure equipment during proof testing - Planar  
location of AE sources

Essais non destructifs - Emission acoustique - Vérification  
des équipements métalliques sous pression pendant  
l'épreuve - Localisation planaire des sources d'EA

Zerstörungsfreie Prüfung - Schallemissionsprüfung -  
Prüfung von metallischen Druckgeräten während der  
Abnahmeprüfung - Planare Ortung von  
Schallemissionsquellen

This European Standard was approved by CEN on 8 July 2005.

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## Foreword

This European Standard (EN 14584:2005) has been prepared by Technical Committee CEN/TC 138 "Non-destructive testing", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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Orb  
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EEN

## 1 Scope

This European Standard specifies the method for conducting acoustic emission (AE) + testing of metallic pressure equipment during acceptance pressure testing using a planar location method. General principles of acoustic emissions are described in EN 13554.

The objectives of the AE testing are to provide 100 % volumetric testing to define regions of the structure, which are acoustically active with burst type AE e.g. as a result of sub-critical flaw evolution; thus increasing the reliability of the acceptance test. The test provides a reference map for comparison with results of future tests.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 473, *Non-destructive testing – Qualification and certification of NDT personnel – General principles*

EN 1330-1:1998, *Non-destructive testing – Terminology – Part 1: List of general terms*

EN 1330-2:1998, *Non-destructive testing – Terminology – Part 2: Terms common to the non-destructive testing methods*

EN 1330-9:2000, *Non-destructive testing – Terminology – Part 9: Terms used in acoustic emission testing*

EN 13477-1, *Non-destructive testing – Acoustic emission – Equipment characterisation – Part 1: Equipment description*

EN 13477-2, *Non-destructive testing – Acoustic emission – Equipment characterisation – Part 2: Verification of operating characteristic*

## 3 Terms and definitions

For the purpose of this European Standard, the terms and definitions given in EN 1330-1:1998, EN 1330-2:1998 and EN 1330-9:2000 apply.

## 4 Personnel qualification

It is assumed that acoustic emission testing is performed by qualified and capable personnel. In order to prove this qualification, it is recommended to certify the personnel in accordance with EN 473.

NOTE For pressure equipment see directive 97/23/EC, Annex 3.1.3: "For pressure equipment in categories III and IV, the personnel must be approved by a third party organization recognized by a Member State".

## 5 Test method

### 5.1 General

The main target of the AE test is to locate and monitor acoustic emission sources caused by phenomena e.g. crack growth and yielding generated by the applied load to the equipment.

The properties and structural state of the material, the type and magnitude of the applied stress and stress rate are significant factors affecting the emission.



All the relevant located AE sources shall be evaluated by other NDT methods.

## 5.2 Application of load

The application of the stress to the equipment shall be made using internal pressure following the procedure specified in the relevant product standard. The rate of the application of pressure shall be established so as to avoid burst signal overlap. The pressurising system shall permit pressurisation at a steady controllable rate and shall allow the pressure to be held constant at the hold points. The pressurisation rate would not normally exceed 1 % for pneumatic and 5 % for hydraulic test pressure per minute. The intermediate hold periods, if necessary according to the AE activity or the pre-defined pressure schedule, will normally be 5 min to 10 min. The final hold period at the test pressure shall have a minimum duration of 15 min.

NOTE Intermediate hold periods are strongly recommended, especially if pressurisation rates exceed 0,5 %/min for pneumatic or 2 %/min for hydraulic tests.

Prior to starting the test, all the necessary actions shall be taken to identify and to reduce potential sources of extraneous noise.

Dependent upon the results of the initial loading, a reduction of the load to working pressure or lower, followed by re-pressurisation, may be required.

## 5.3 Sensors

The most commonly used frequency range is 100 kHz to 300 kHz. Lower frequency monitoring allows detection at greater distances and high frequency monitoring provides improved rejection of external noise. Selection of frequency range may optimise location accuracy by avoiding the detection of multiple wave modes.

The equipment surface below the sensors shall be cleaned to ensure the maximum coupling efficiency. The sensor couplant shall be as specified in the written test instruction. The sensors may be directly attached to the structure using magnetic devices or an adhesive.

The effectiveness and reliability of the acoustic couplant shall be verified. The characteristics of the type of the acoustic couplant used shall not affect the structure adversely.

## 5.4 Location

The location of AE sources is performed using delta t measurement.

The accuracy is normally within  $\pm 5\%$  of the sensor spacing and shall be measured and verified using an artificial source. If the accuracy is not within  $\pm 5\%$ , appropriate action shall be taken.

For difficult geometry e.g. nozzles, manholes, reference measurements shall be made.

## 5.5 Preliminary information

Prior to the test, the AE Test Organisation shall collect the following information, as relevant:

- a) relevant product standard;
- b) type of equipment or structure and material characteristics and specifications;
- c) assembly and/or layout drawings with sufficient details of the structure;
- d) material specifications, including heat treatment, if applicable;
- e) proposed pressure/stress application sequence;
- f) potential acoustic noise interference sources and the isolating mechanism applied;

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# NEN

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