

# The Importance and Current Status of a Neutron Diffraction Residual Stress Standard

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## Importance-summary

- Absolutely essential in some cases
- Always useful for
  - giving customer confidence in the measurements
  - saving explanation time
- Provides a good-practice guide for all measurement “providers”

# Development of the ISO/CEN Neutron RS Standard

- 1) The Versailles Project on Advanced Materials and Standards (VAMAS) TWA 20: “MEASUREMENT OF RESIDUAL STRESS” [Jan. 1996]
- 2) EC supported project: “Residual Stress Standard Using Neutron Diffraction” (RE STAND) [Dec. 1997]
- 3) European Comm. for Standardization: CEN TC 138 AHG7: “Test Method for Measurement of Residual Stress by Neutron Diffraction” [Oct. 2000] → ISO/CEN [Apr. 2001]

# VAMAS TWA 20: “MEASUREMENT OF RESIDUAL STRESS”

- VAMAS created by a MOA between Canada, France, Germany, Italy, Japan, UK, USA and the EC (1982)
- One goal of VAMAS is to promote development of materials technology, test methods, design methods and materials databases that are required as a precursor to the drafting of standards.
- TWA 20 organized by George Webster (Imperial College, UK)
- With RESTAND produced ISO/Tech. Trends Assessment:  
“Polycrystalline materials – Determination of residual stresses by neutron diffraction” (ISO/TTA 3)

# EC-funded project: “Residual Stress Standard Using Neutron Diffraction” (RESTAND)

## GOALS:

-To assemble the necessary technical information for the preparation of a suitable European standard for the non-destructive measurement of residual stress by neutron diffraction.

-To assist European industry (auto and aerospace) to acquire access to residual stress measurements by neutron diffraction.

-To improve industrial confidence in this technique, through standardization of the measurement method in Europe.

- Organized by Tassos Youtsos, JRC, Petten, The Netherlands
- With TWA 20 produced ISO/Tech. Trends Assessment: “Polycrystalline materials – Determination of residual stresses by neutron diffraction” (ISO/TTA 3)

# CEN TC 138 AHG7: “Test Method for Measurement of Residual Stress by Neutron Diffraction”

- Established under CEN/TC 138 (European Committee for Standardization – NDT Tech. Comm.)
- Scope: To prepare the ENV (preliminary standard) “*Non-destructive testing - Test method for measurement of residual stress by neutron diffraction*” using ISO/TTA 3 as a starting point
- Became a joint CEN/ISO project approved in April 2001
- Convenor: Dr. Tassos Youtsos, EU-JRC-Petten.
- Produced “Standard Test Method For Determining Residual Stresses By Neutron Diffraction” a draft proposal for a joint CEN/ISO International Technical Specification (CEN/TC 138/AHG7 N47)

# Summarize Meetings

VAMAS		RESTAND		ISO/CEN
Jan.'96 - Jul. '00		Dec. '97 - Feb. '01		Apr. '01 - Sep. '03
8 meetings		7 meetings		8 meetings
41 participants		29 participants (20)		11 total (6)
1 industrial		7 industrial		0 industrial
23 institutions		18 institutions		10 institutions
12 countries (4)		8 countries (1)		9 countries (2)

## Current Status of the Tech. Spec/Standard (now pr CEN ISO/TS 21432)

- CEN/TC 138/AHG7 N47 submitted to CEN in Oct. 2003
- Reviewed by 26 of 28 European member countries; 24 approved, 2 abstained.
- Final draft accepted May 2005.
- Three year probationary period ends May 2008: No objections and it becomes an ISO/CEN Standard.
- Currently working with the Residual Stress subcommittee of ASTM (E28.13) to review 21432 for acceptance as an ISO/ASTM standard.