

This is a preview of "ISO 22825:2012". [Click here to purchase the full version from the ANSI store.](#)

Second edition  
2012-05-15

---

---

## **Non-destructive testing of welds — Ultrasonic testing — Testing of welds in austenitic steels and nickel-based alloys**

*Contrôle non destructif des assemblages soudés — Contrôle par  
ultrasons — Contrôle des soudures en aciers austénitiques et en  
alliages à base nickel*



Reference number  
ISO 22825:2012(E)

© ISO 2012

This is a preview of "ISO 22825:2012". [Click here to purchase the full version from the ANSI store.](#)



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

This is a preview of "ISO 22825:2012". [Click here to purchase the full version from the ANSI store.](#)

## Contents

Page

Foreword .....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	2
4 Information required prior to testing .....	2
4.1 Items to be defined by specification .....	2
4.2 Specific information required by the operator prior to testing .....	2
5 Personnel .....	3
6 Equipment .....	3
7 Range setting for compression waves .....	3
8 Sensitivity setting .....	4
8.1 General .....	4
8.2 Use of side-drilled holes .....	4
8.3 Use of other reference reflectors .....	5
9 Test procedure and ultrasonic techniques .....	5
9.1 Development of the test procedure .....	5
9.2 Content of the procedure .....	5
9.3 Selection of ultrasonic technique(s) .....	6
9.4 Optimization of technique and draft of procedure .....	7
9.5 Practical implications of the use of refracted compression waves .....	7
10 Classification and sizing of indications .....	8
11 Testing of welds .....	8
11.1 General .....	8
11.2 Surface condition and couplant fluid .....	8
11.3 Parent metal testing .....	8
11.4 Scanning .....	8
11.5 Evaluation of indications .....	9
12 Test report .....	9
12.1 General data .....	9
12.2 Information related to equipment .....	9
12.3 Information related to testing technique .....	9
12.4 Results of testing .....	10
Annex A (informative) Compression wave angle beam techniques .....	11
Annex B (informative) Stainless steel calibration blocks for range setting .....	17
Annex C (informative) Reference blocks for sensitivity setting .....	19
Bibliography .....	22

This is a preview of "ISO 22825:2012". [Click here to purchase the full version from the ANSI store.](#)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22825 was prepared by the European Committee for Standardization (CEN) Technical Committee TC 121, *Welding*, Sub-committee SC 5, *Testing of welds*, in collaboration with Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 22825:2006), which has been technically revised.

The main changes are the addition of annexes on:

- compression wave angle beam techniques;
- stainless steel calibration blocks for range setting;
- examples of reference blocks.

Requests for official interpretations of any aspect of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 5 via your national standards body. A complete listing of these bodies can be found at [www.iso.org](http://www.iso.org).

This is a preview of "ISO 22825:2012". [Click here to purchase the full version from the ANSI store.](#)

## Introduction

Welds in austenitic steel components and dissimilar metal welds are widely regarded as very difficult to inspect by ultrasound. The problems are mainly associated with unfavourable structure and grain size, as well as with different material properties which result in inhomogeneous and anisotropic mechanical and acoustic properties that contrast with the relatively homogeneous and isotropic behaviour in low-alloy steel welds.

Austenitic weld metal and other coarse-grained, anisotropic materials can significantly affect ultrasound propagation. In addition, beam distortion, unexpected reflections and wave mode conversions on the fusion line and/or columnar grains can occur. Therefore it can be difficult and sometimes impossible for ultrasonic waves to penetrate the weld metal.

Ultrasonic testing of these metals may require techniques that differ from conventional techniques. These special techniques often include the use of dual-element probes designed for refracted compression (longitudinal) waves or creeping waves rather than for conventional shear waves.

In addition, it is necessary to produce representative reference blocks with welds in order to develop a testing procedure, set a preliminary sensitivity level, assess the procedure and demonstrate effectiveness before a definitive procedure is written. Material, weld preparation and welding procedure, as well as the geometry and surface condition of reference blocks are the same as for the component being tested.