



ANALYTICAL INSTRUMENTS GROUP

AREX D

DESKTOP RETAINED AUSTENITE ANALYZER



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Phase transformation in critical and structural steel component is a very sensitive and important parameter to be evaluated since mechanical and physical properties of steels depends on phase composition.

In many industrial processes, determination of Retained Austenite is requested at very low concentration and with a great accuracy.

Traditional metallographic investigation by chemical etching and optical determination of Retained Austenite is in many case ineffective due to the low accuracy and sensibility of this method.

Accurate measurements of Retained Austenite content is essential during the set up and control of many heat treatment processes as well as plays a great role in Additive Manufacturing processes.

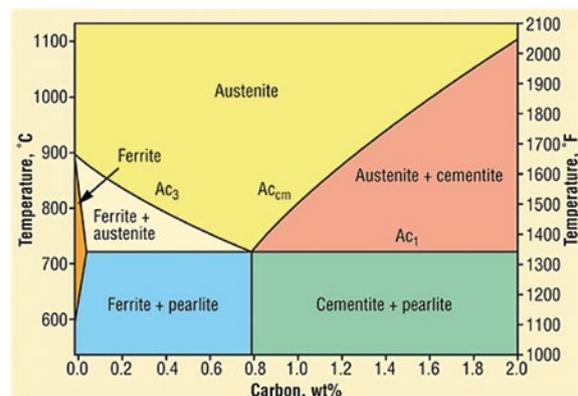
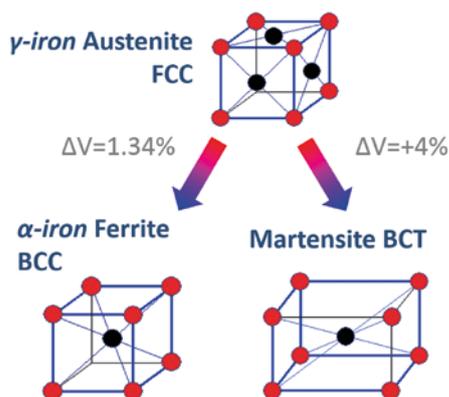
AreX D is the first bench top X-Ray diffractometer designed for the fast, accurate and easy determination of Retained Austenite in compliance with ASTM E 975-13 Standard practice for X-ray determination of Retained Austenite in steel with near random crystallographic orientation.

AreX D is capable to determine Retained Austenite volume percentage down to 1% in few minutes.



R.A %	S.D.
30	0.8
15	0.6
10	0.4
3	0.2

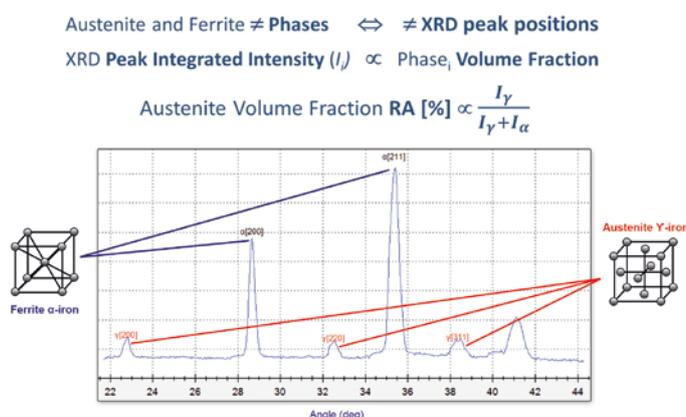
Granted Standard Deviation vs Concentration.
120 seconds measuring time



Austenite is a face centered cubic (FCC) phase present in steel at high temperature. Upon cooling, most of the steel is transformed into ferrite - a body centered cubic (BCC) phase – or into martensite – a body central tetragonal (BCT) phase. Depending on the rate of the cooling, some percentage of the steel (typically 0-40%) remains as Austenite. Hence the term “Retained Austenite”.

Features

- Mo Anode X-Ray source
- Power 50 W
- Air cooled X-Ray tube
- Zr filter
- Angular range 21.5° - 44.5° 2 Theta
- DECTRIS MYTHEN2 R 1D microstrip detector
- Video camera for easy and precise sample alignment
- Sample holder dimension 200W x 150D x 70H mm
- Austenite software in a user-friendly interface
- Door interlock, thick steel frame and lead shield for x-ray safety protection
- Power supply: 110/220 V, 50/60 Hz
- Dimension: 490 W x 550 D x 360 H mm
- Weight: 37 Kg
- Typical measuring time 180 seconds



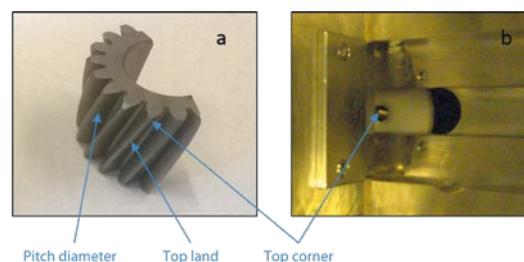
AreX D

Applications AreX D – Retained austenite in gear manufacturing

In this specific case, Retained Austenite amount has been determined by using the dedicated diffractometer **GNR AreX D** compliant with the standard practice **ASTM E 975-13**.

Retained Austenite (RA %) has been evaluated in three different points in two different samples (“Big Gear” and “Small Gear”).

1. Pitch Diameter – 2. Top Land – 3. Top Corner



Powertrain samples and measured points (a) and pinion sample mounted on teflon support to measure top corner region (b) taken by inner USB camera.

Safety Assurance

AreX D complies with the statutory requirements regarding X-Ray, machine and electrical safety. Maximum X-Ray safety with radiation level significantly below the annual dose limit for general public (1 mSv/year) following ANSI N43.3 - 1993 and other industry standards for open beam X-Ray operation.

The radiation enclosure door cannot be opened when X-Rays are on and the system immediately switch off if shutter is forced to open. This function completely protects user from radiation exposure.



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