TEC

Materials Testing Laboratory

## Residual Stress Analysis

- ASTM E915
- ASTM E1426
- SAE J784a
- Metals & Ceramics
- Depth profiling
- Multiple exposure technique

## Retained Austenite Analysis

- ASTM E975
- SAE SP-453
- Bearings, gears, and other close tolerance components
- 4-peak analysis
- Correction for carbides

## Component Quality

- Prolong fatigue life
- Increase component strength
- Decrease component weight
- Reduce component failures

## Process Control

- Eliminate needless manufacturing steps
- Analyze effects of manufacturing steps
- Fine tune process parameters

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A2LA ACCREDITED

ISO REGISTERED 9002

# X-Ray Diffraction Laboratory and Field Services

## Quality Service

When you use TEC's accredited laboratory, you can be sure that you will receive superior analysis and technical support. We meet today's strictest quality standards by meeting A2LA (ISO/IEC Guide 25) and ISO-9002 requirements. Scheduled turnaround of analysis results is always rapid; however, our materials testing group can also adapt to meet critical deadlines when you need immediate results.

## Residual Stress

By managing residual stresses during the manufacturing process, you and your customers can prevent failures caused by phenomena such as fatigue and stress corrosion cracking. In TEC's Materials Testing Laboratory, special instrumentation is dedicated to improving your products through process and quality control.

Residual stresses, if not controlled, can weaken materials, causing product defects and failures. Common applications involve measuring residual stresses created by heat treating, welding, rolling, forming, shot peening, machining, etc.

## Retained Austenite

TEC has also developed superior techniques for measuring the amount of retained austenite in steels. The retained austenite content in steel components is critical for high tolerance parts such as bearings and gears. We calculate retained austenite content by measuring two austenite and two martensite peaks, allowing for carbide interference corrections. This four peak method is recommended by both ASTM and SAE for obtaining accurate results.

# Applications

Residual stress and retained austenite measurements have been performed by TEC for a wide variety of processes, parts, and materials. Here are just a few examples:

### Processes

welding
rolling
machining
grinding
extruding
forging
shot peening
casting
cold working
heat treating

### Parts

automotive and aerospace engine and transmission components

armaments & missiles

electric motor components

biomedical components

wheels

springs

pipes & structures

tools & dies

test coupons

pumps

drills & fasteners

### Materials

Alumina
Alpha iron
Brass
Case iron
Chromium
Copper
Tin
Nickel
Alloy steels
Carbon steels
Aluminum alloys
Silicon carbide
Silicon nitride
Titanium alloys
Tungsten carbide
Cobalt alloys
Uranium alloys
Nickel alloys
Zirconium alloys

Austenitic, ferritic and martensitic stainless steels

*Measuring stresses on welds on the International Space Station*

## In-House or Field Services

Other laboratories often require large or irregularly shaped components to be sectioned before measurements can be performed. Our lab uses stress analyzers manufactured by TEC, featuring portable diffractometers that operate up to 25 feet away from the unit.

Because of this portability, our lab personnel can perform measurements on complete parts ranging in size from a fraction of an inch to several hundred feet. And, TEC is able to perform the measurements you need, either in our lab in Knoxville or at your site. At either location, we guarantee rapid, precise results.

## Customer Commitment

Our capabilities are well-known and widely used by a variety of industries world-wide. These include aerospace, automotive, defense, medical, transportation and many more. Other applications include research and development, manufacturing and supplying our capabilities to other testing laboratories.

At TEC, our customers are partners. Our expert lab staff, customer service and materials engineers are dedicated to helping you meet your own quality control demands.