



Challenges of Pipe and Tube Testing

Presented by Instron®
A World Leader in Materials Testing

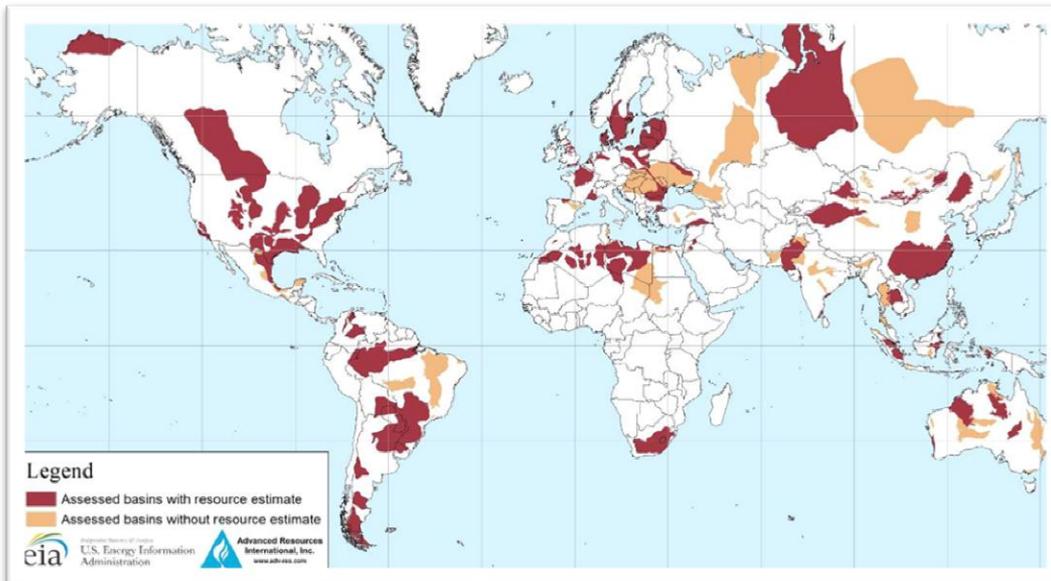
*An overview of recent changes and challenges facing Pipe and Tube
manufacturers and suppliers*



The difference is measurable®

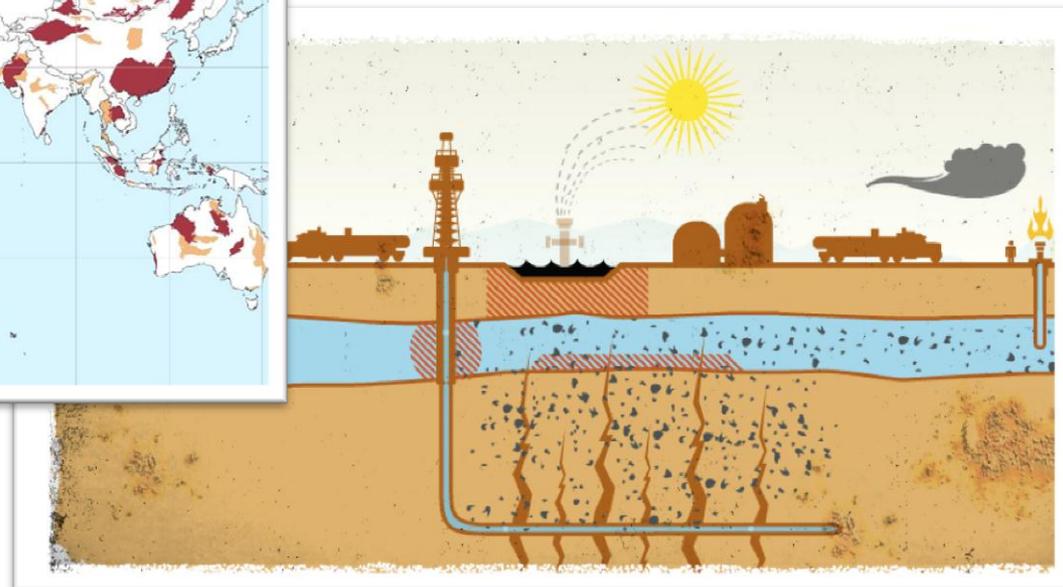
Why Now?

- Growth in Oil country tubular goods (OCTG)
- Shale gas horizontal drilling/fracking globally
- Multiple new pipelines planned in the US



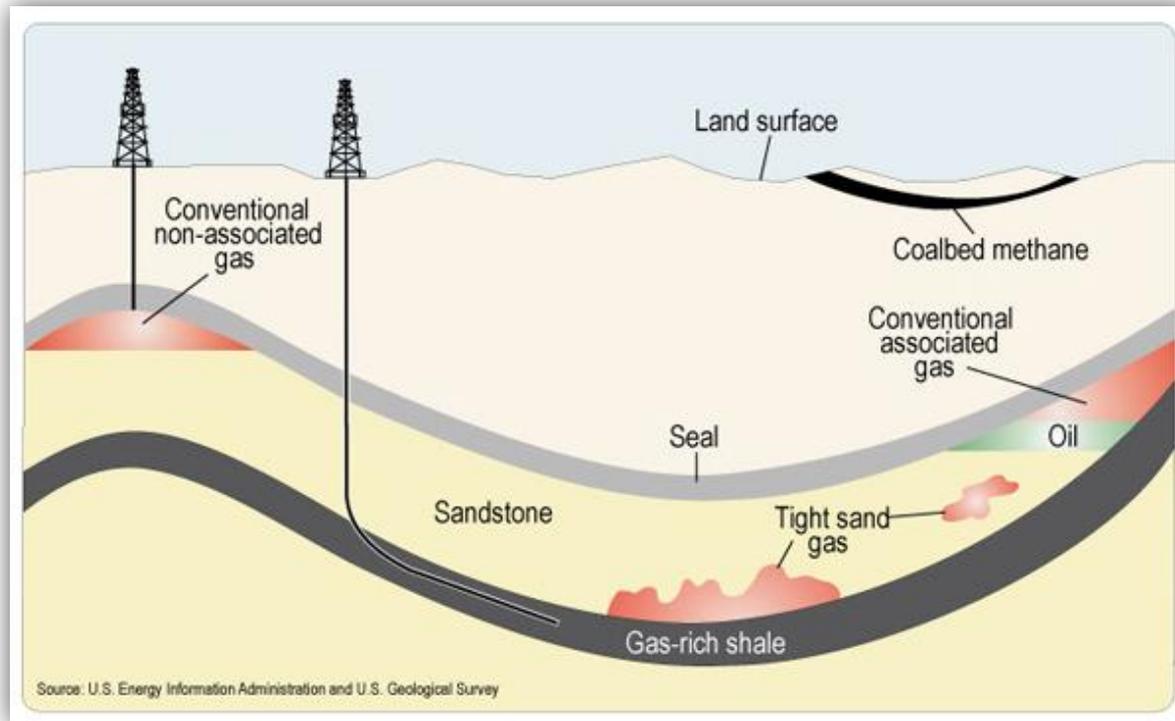
Source: U.S. Energy Information Administration, [Today in Energy](#), January 2, 2014.

Source: GreenCupboards, [Fracking Debate](#), August 25, 2011.



Why is This Important?

- Horizontal drilling and fracking implications
 - Increased length of pipe
 - Increased strength
 - Added multiple wells on a single site
- How does this affect your testing requirements?
 - Increased load capacity and volume of testing
 - Is your system ready for the changes heading your way?



Pipe & Tube Applications

- Are pipe & tube the same thing?
 - Pipe = Nominal, ID (Inside Diameter)
 - Tube = Nominal, OD (Outside Diameter)

- Pipe Applications

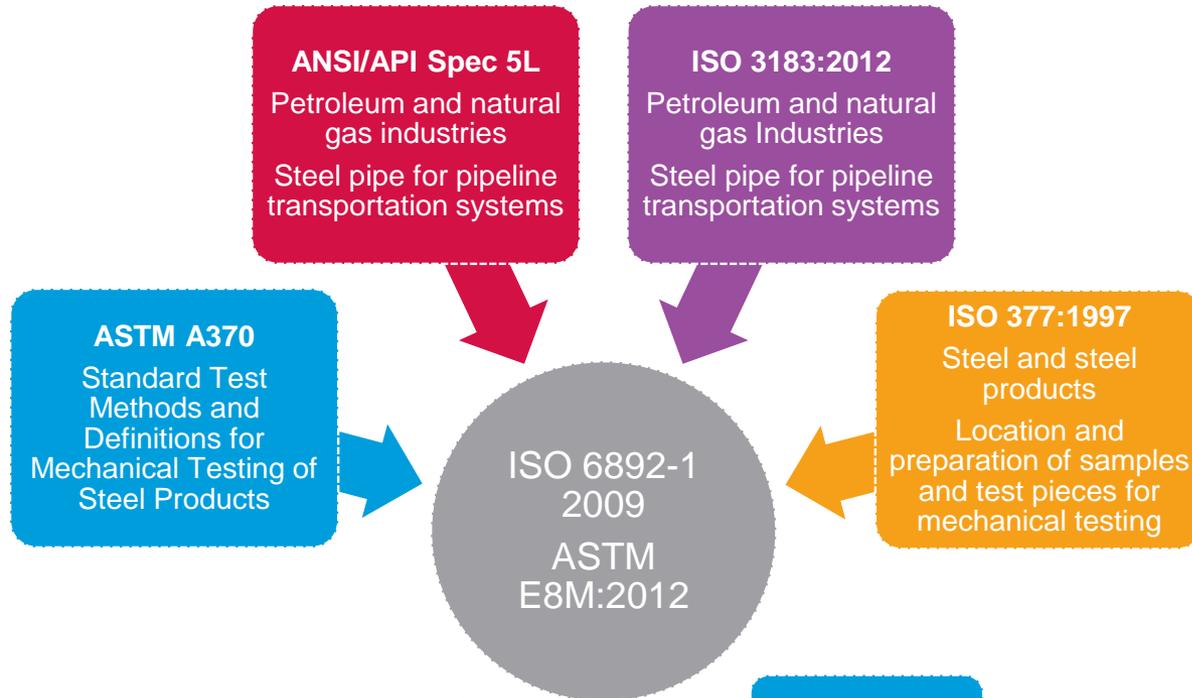


- Tube Applications

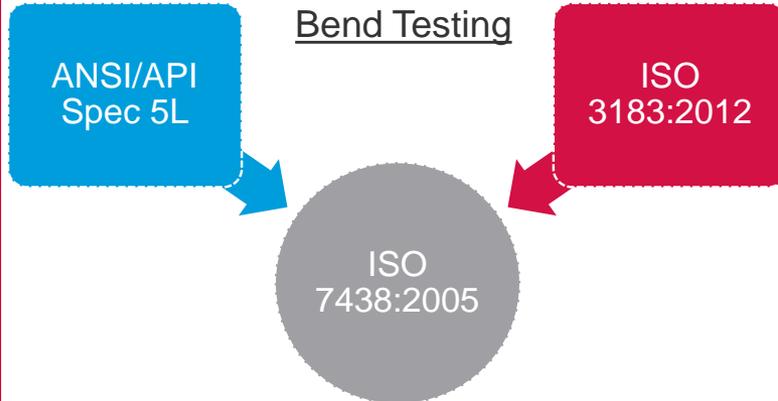


Product Standards Link to Testing Standards

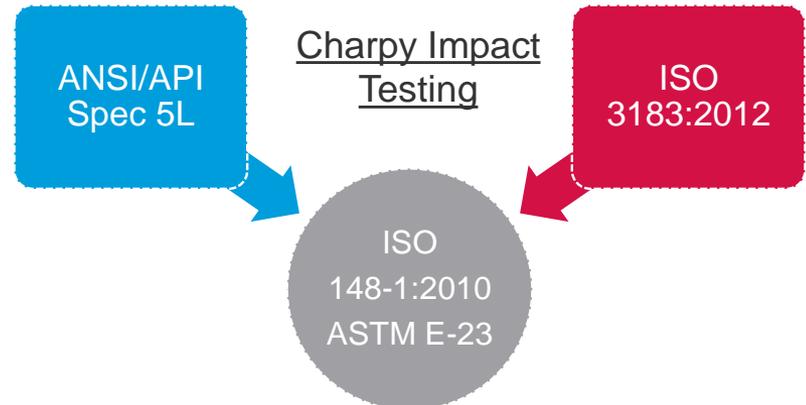
Tensile Testing



Bend Testing



Charpy Impact Testing



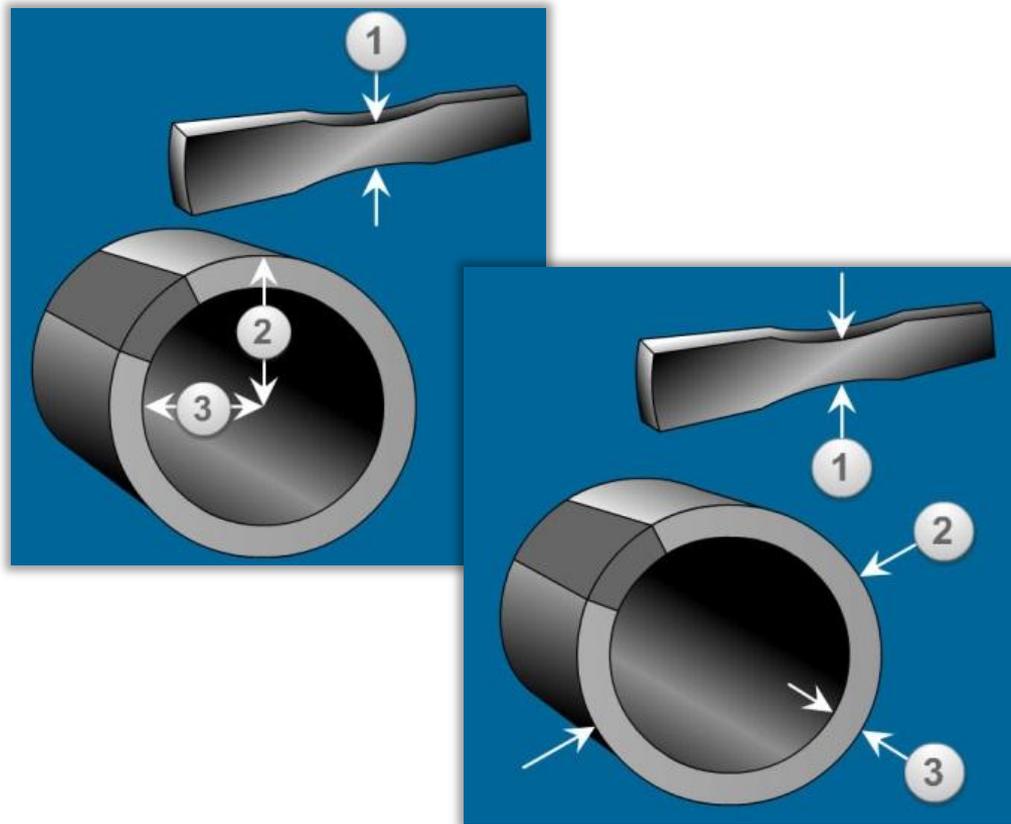
Your Testing Challenges



- Specimen geometry/curvature
- Testing full section pipe and tube
- Suitable strain measurement
- Impact testing high-strength materials

Challenge – Specimen Geometry

- The curved shape of pipe and tubing presents a number of gripping challenges.



Gripping Longitudinal Strips

- Application-specific jaw faces allow you to quickly grip longitudinal strip curved cut out specimens, without flattening the tab ends.



Challenge – Testing Full Section Pipe/Tube

- Specimen preparation is time consuming; lab operators generally want to test the largest full section of pipe possible on a given testing system.



Testing Full Section Product

- End plugs are used to prevent crushing
 - Allows the testing of full product sections
 - Removes the need to machine specimens from full product, saving time and money



Challenge – Suitable Strain Measurement

- Pipe and Tube specimen geometries make attachment of extensometers challenging.



Suitable Strain Measurement

- An extensometer securely clamps the inner diameter of strip specimen, preventing strain measurement errors due to slippage or undesired movement on the curved specimen surface.
- A single instrument accommodates a wide range of specimen diameters, reducing changes in test setup.



Challenge – Impact Testing High Strength Pipe & Tube Materials

- Higher strength materials are being used in the pipe and tube industry in a drive for deeper and more complex well production
 - Increased impact energy
 - Continual focus on improved safety
 - Tractability of results
 - Greater volume of tests



High-Energy Impact for Pipe & Tube

- Appropriate hammer weight, which fully fractures specimen at impact, produces accurate and reproducible results
- Interlocked safety screen prevents harm to your operator
- Automatic recording of test results linked directly into your business system removes operator steps and opportunity for errors
- Minimal number of steps required to run a test allow increasing test volume per shift



Does this sound familiar?

Do you see the same challenges in your
business?

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