

2015 BSEE International and Domestic Standards Workshop



API RP 5C5: Procedures for Testing Casing and Tubing Connections



David Coe
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Revising API RP 5C5: 2003-2015

1. Technical Objectives of Connection Test Protocols
2. Historical Context of API RP 5C5 Development
3. API RP 5C5 3rd Ed. - Current 2003 Connection Test Protocol
4. API RP 5C5 - Revised 2015 Connection Test Protocol
5. API RP 5C5: Addressing HPHT Well Engineering
6. Conclusion and Path Forward for API RP 5C5
7. Acknowledgements

- API RP 5C5 : Recommended Practice for Testing Casing and Tubing Connections, 3rd Ed.
 - Recommends testing procedures and test acceptance criteria
 - Addresses fluid pressure, axial force, bending and make-up torsion
 - Recommends tests to determine the galling tendency, sealing performance and structural integrity

API Casing and Tubing Connection Test Protocols 1958-2015

- 1958 - API RP 37 1st Ed.
- 1980 - API RP 37 2nd Ed.
- 1990 - API RP 5C5 1st Ed.
- 1996 - API RP 5C5 2nd Ed.
- 2003 - API RP 5C5 3rd Ed.; ISO 13679:2002

Revising API RP 5C5 2003-2015

- API RP 5C5 3rd Ed.
 - Revisions of the connection test protocol began in 2004
 - Initial revisions failed the ISO country vote in 2011
 - Working on current “API only” document since 2012

Recommended Practice on Procedures for Testing Casing and Tubing Connections

ANSI/API RECOMMENDED PRACTICE 5C5
THIRD EDITION, JULY 2003

REAFFIRMED, AUGUST 2010

**ISO 13679:2002 (Identical), Petroleum and natural
gas industries—Procedures for testing casing and
tubing connections**



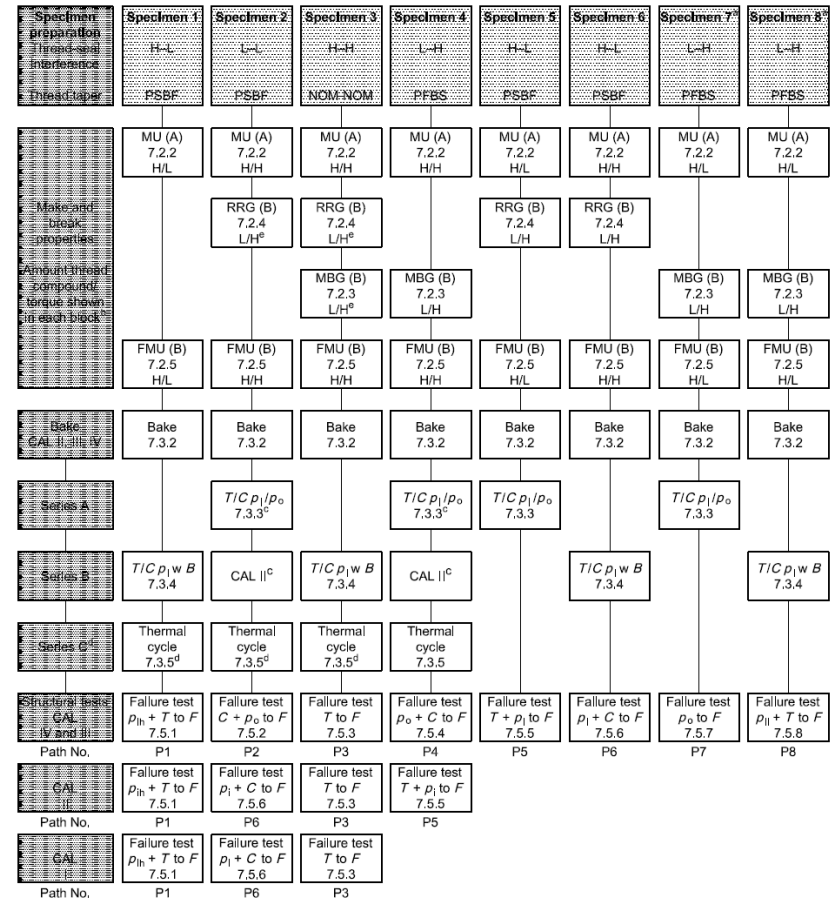
AMERICAN PETROLEUM INSTITUTE



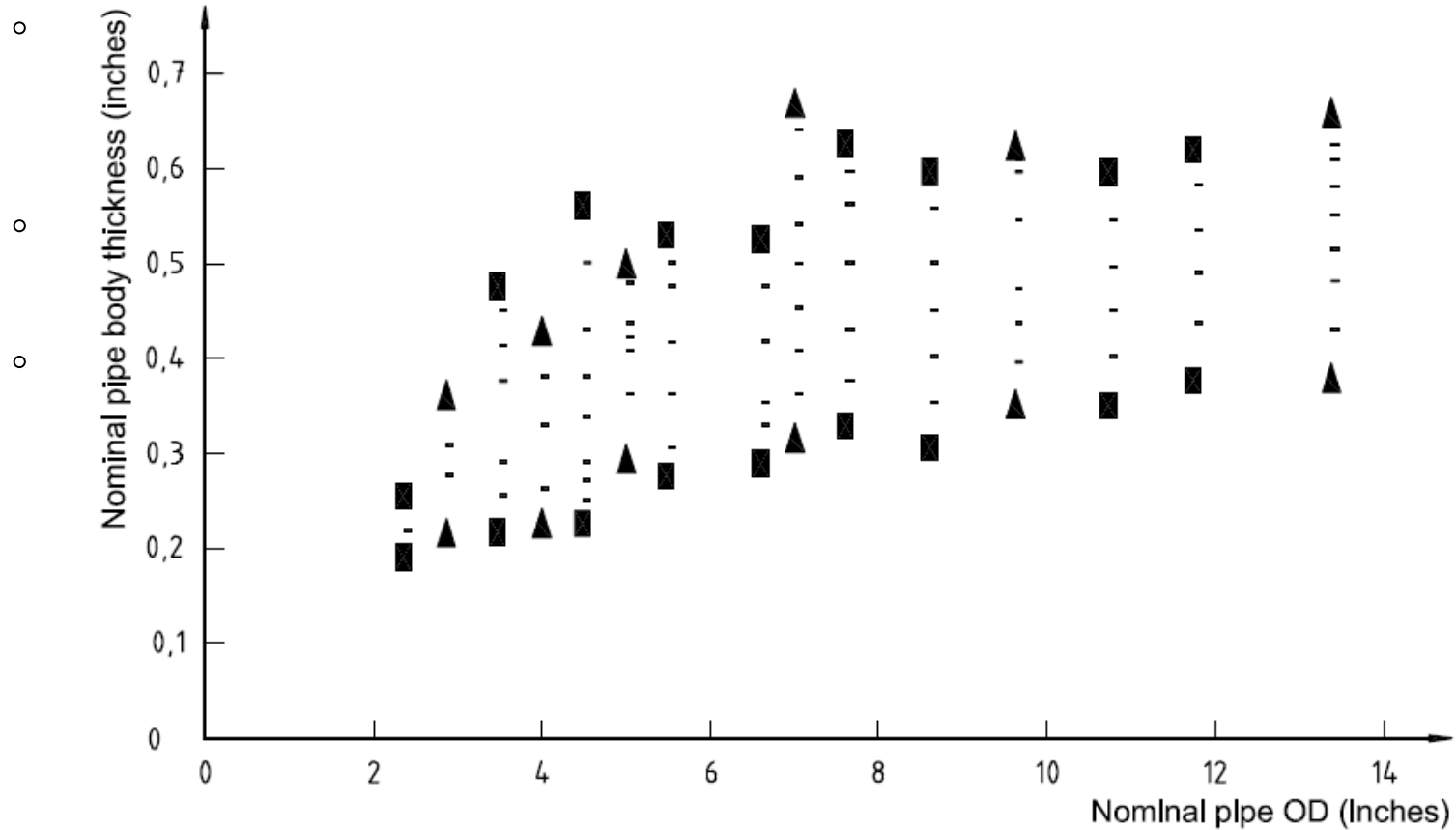
Current API RP 5C5 2003

- API RP 5C5 3rd Ed.; ISO 13679

- Eight test specimens
- Varying geometries and make-up conditions
- Series B & C or Series A & C testing
- Elevated temperature
- Four CAL levels



Annex G - API RP 5C5 2003 – Product Line Qualification



Key

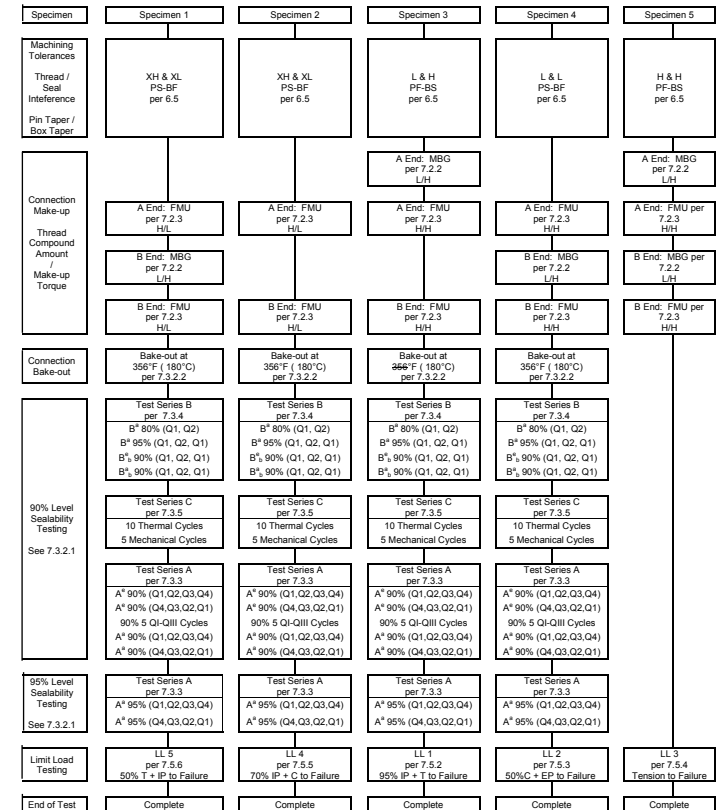
- no test, no analysis
- analysis only
- ▲ test and analysis

Revising API RP 5C5 2003-2015

- API RP 5C5, 2015 revision

- Four sealability test specimens
- Varying extreme geometries
- Series A, B & C testing on all four specimens (CAL IV)
- Elevated temperature, series A & B testing for all four specimens
- Six to nine months to execute test program for one size/weight/grade

Figure 7 – CAL IV Test Requirements and Sequence



Revising API RP 5C5 2003-2015

- Technical Challenges of API RP 5C5: 2015 revision
 - Elevated temperature performance properties not defined in API 5C3
 - 1st and 2nd quadrants are straightforward
 - 3rd and 4th quadrants are more difficult
 - Standard, high collapse performance properties not currently defined in the standards although a number of candidate rating approaches such as Klever-Tamano are presented in API TR 5C3.

Revising API RP 5C5 2003-2015

- HPHT Well Engineering in the API RP 5C5: 2015 revision
 - The minimum elevated temperature for CAL IV testing is 356 °F
 - Test protocol
 - Revised connection test protocol

Revising API RP 5C5 2003-2015

- HPHT Well Engineering and Connection Test Protocols
 - Current and previous protocols
 - API 5C5: 2015, CAL I – III
 - Other protocols can be suitable for validation

Revising API RP 5C5 2003-2015

- API RP 5C5 - Standards in Action!
 - Provides testing procedures and test acceptance criteria
 - Provides objective physical test evidence
 - Addresses fluid pressure, axial force and bending
 - Specifies tests to determine:
 - Galling tendency
 - Sealing performance
 - Structural integrity

Revising API RP 5C5 2003-2015

- API RP 5C5: RP on Procedures for Testing Casing and Tubing Connections, 2015 revision
 - API staff are formatting the final draft
 - Anticipate a recommendation for ballot vote at the API 2015 E&P Standards meeting
 - The target publication timeframe is by December 2015

Acknowledgements

- All my industry colleagues who have been working to revise the connection test protocol over the past years
- The operators, manufacturers and test labs providing support for this revision process
- BSEE for the opportunity to present the current work in revising the connection test protocol

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