

# GUIDE TO API 10D 7<sup>TH</sup> EDITION

API Specification 10D 7<sup>th</sup> Edition (Casing Bow-spring Centralizers) was released on 1<sup>st</sup> March after 7 years of consultation with manufacturers

Testing specifications are clearer and better defined, enabling more consistent testing across all centralizer manufacturers

This guide covers:

- The background to the new edition
- An overview of the update
- The key changes included in the update with a comparison to the previous API testing standard
- An explanation of the testing protocols
- Full reporting requirements for manufacturers
- The roadmap to meet the standard
- The impacts for procurement and drilling engineers

# OVERVIEW

01

Centralizer manufacturers need to provide more stringent data across a wider range of products and sizes

02

All bow spring centralizers need to be tested or retested

03

Existing API specifications in tenders will need to be replaced with new specification

04

There are new reporting requirements so expect to see forthcoming changes to datasheets

05

There is no monogram. Operators need to be vigilant about companies claiming to comply

06

Tighter tolerances are required on test equipment



American  
Petroleum  
Institute

We are a member of the API committee designated the task of supporting the update to testing requirements



**Centek**  
group



## KEY CHANGES

- The specification now covers all bow spring centralizers, including under-reamed products
- All casing sizes between 3 1/2" & 20" are contained
- Pass or fail is based around standoff (rather than restoring force) and starting force - which must be less than the weight of the casing
- The minimum standoff ratio (SOR) cannot be less than 67% when the bow-spring centralizer is subjected to the API test load values
- Standoff must be measured on and between every bow after flexing
- Outer pipe tolerances of the pipe ID and bevel have been tightened to improve accuracy of test data between test facilities and manufacturers
- Load deflection chart considers OD/ID clearances so plotting from 100% standoff is no longer allowed



## KEY CHANGES

- Flexing on each bow has been reduced from 12 times to 3 times
- To establish initial API performance, 3 products need to be tested (previously it was 6). All 3 need to be within the requirements. The average standoff is taken as the benchmark for future tests
- Restoring force is no longer used in determining whether a centralizer meets the requirements
- The standoff at API test load for all bow-spring centralizers must have a coefficient of variation (CV) of 15% or less
- Running force is the mean value in (at least) the last 2 inches of travel
- Different and additional data must be provided on datasheets
- The API monogram is no longer used to validate compliance



# API TESTING STANDARD COMPARISON

## 7<sup>TH</sup> EDITION

## 6<sup>TH</sup> EDITION

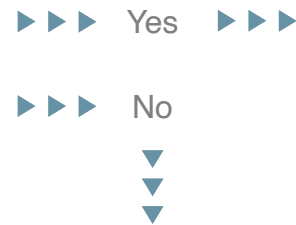
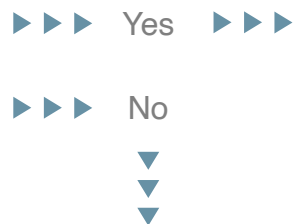
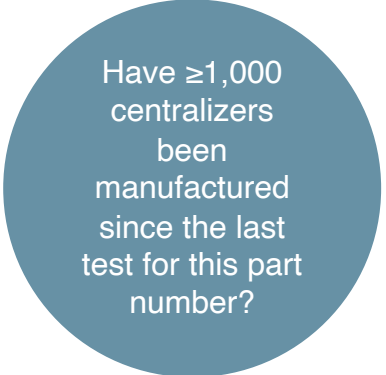
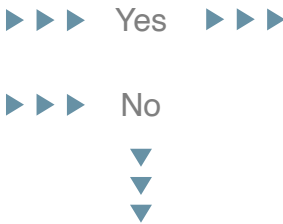
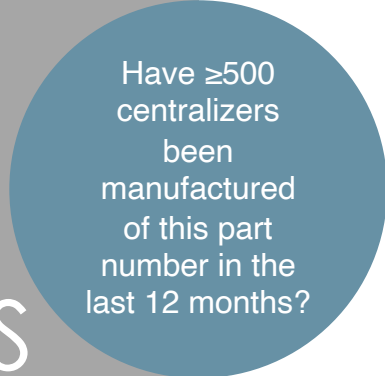
	7 <sup>TH</sup> EDITION	6 <sup>TH</sup> EDITION
Covers	All bow spring centralizers	Standard bow spring centralizers
	Covers casing sizes between 3 1/2" & 20"	Covers casing sizes between 3 1/2" & 20"
Standoff must be measured	On and between every bow after flexing	Not specified
Number of flexes on each bow	3 times	12 times
Number of products needed to establish initial API performance	3 (all 3 must be within requirements)	6
Minimum number of tests for design and process verification	1 but with additional criteria	1 annually if manufactured in quantities <500
Standoff at API test load for all bow-spring centralizers	Coefficient of variation (CV) of $\leq 15\%$ *	Only needs to meet minimum requirements
Initial performance and benchmark for future tests	Average of standoff values at API test load	Restoring force at 67% standoff
Pass Fail based on	Minimum standoff and maximum starting force	Minimum standoff and maximum starting force
Test inner pipe	Based on nominal diameter +/- 0.76mm.	Specific to API 5CT.
Pipe bevel for starting force test	30-35° x 3.2mm	45° maximum
Instrumentation of the test stand allow displacement readings	1.6 mm maximum	1.6 mm minimum
Verification tests	Must all within 15% coefficient of variance	Not applicable

\*If the CV is more than 15%, 2 centralizers may be tested to achieve the 15% CV

# RE-TESTING REQUIREMENTS

Verification tests are required for products after specified quantities have been manufactured or after a defined period of time. In addition:

- All products to benchmark initial performance
- Products within three months of evaluation period
- Products which fail to meet the criteria to re-establish the performance benchmark
- Starting force of under-reamed centralizer in open hole after running through restriction



No test required at this time





# REPORTING REQUIREMENTS

# CONVENTIONAL APPLICATIONS

- Centralizer part number
- Casing nominal diameter
- Open hole diameter (ID)
- Starting force of centralizer in open hole
- Restarting force of centralizer in open hole
- Running force of centralizer in open hole
- Centralizer installation method
- Description of centralizer coating, if present.
- Centralizer starting force test orientation (pull-in or push-in configuration)
- The mean of standoff ( $\mu$ ) at the following percentages of API test load; 50%, 100%, 150%, 200%, 250%, and 300%.



# UNDER-REAMED APPLICATIONS

- Centralizer part number
- Casing nominal diameter
- Restriction diameter
- Starting force of new centralizer in restriction and in the open hole after running through restriction
- Restarting force of new centralizer in restriction and in the open hole after running through restriction
- Running force of new centralizer in restriction and in the open hole after running through restriction
- Open hole diameter (ID), or open hole diameter (ID) range
- Centralizer installation method
- Centralizer starting force test orientation
- Description of centralizer coating, if present
- The mean of standoff ( $\mu$ ) at the following percentages of API test load; 50%, 100%, 150%, 200%, 250%, and 300%.

# REPORTING REQUIREMENTS





# OUR ROADMAP

Centek has been key to the development of the new standard and the new specification adheres to many of Centek's existing testing protocols. As the leader in centralization, Centek is uniquely placed to support distributors and operators through this change



# IMPACTS FOR PROCUREMENT

- If standoff ratio is less than 67%, it's not API 10D compliant
- Everyone is non-compliant – at the moment
- Datasheets will change for all centralizer manufacturers and will be closer to real world performance
- Under-reamed products are now included so specification change on tenders may be required
- Compliance is likely to be piecemeal
- Direct comparison is more difficult as timings are not defined on when compliance is required
- No API audit / monogram makes it challenging to qualify each manufacturer. The onus is on the operator to review this
- Some test criteria is still not clear and subject to interpretation



# PROCUREMENT CHECK LIST

Use this list to ensure your suppliers are either already compliant or in the process of rolling out the new standard to their products

01



Review tender specification for new and existing contracts

02



Check if current suppliers are aware of the update and are planning to update their test procedures accordingly. Confirm timings with suppliers for full compliance

03



Request updated datasheets as testing is rolled out

# IMPACTS FOR DRILLING ENGINEERS

- More accurate, real world standardized data
- New metrics will be provided on datasheets. These are likely to change more frequently
- There is likely to be some variation in performance as products are tested - they are likely to be less favorable for many manufacturers
- Manufacturers can no longer plot 100% standoff on load deflection chart - it starts at the weight of the casing
- Chart must account for ID clearances and loss in OD
- Simulations will need to be adjusted to reflect the new data points provided
- Starting forces are likely to be reported as higher and standoff will be lower
- Potential for more numerous changes to datasheets as products are tested more frequently
- No API audit / monogram makes it challenging to differentiate between suppliers
- Some products might not be API compliant
- Some test criteria is still not clear and subject to interpretation





# DRILLING ENGINEER CHECK LIST

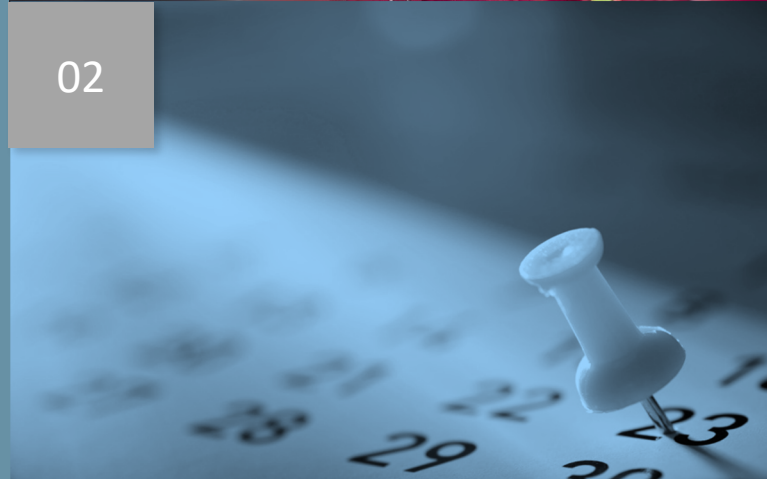
Use this list to ensure your centralizer supplier's updated product performance data meets the requirements of your well designs

01



Review well specification for new and existing contracts

02



Check that current suppliers are aware of the update and are planning to update their test procedures accordingly

03



Request updated datasheets and run test simulations to check how predicted performance measures are impacted by the new data



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