

June 17, 2021

Notification

API Specification 6A Large Diameter (BX-164) Ring Gaskets

Issue: It has been reported that blowout preventer (BOP) 10K/15K flange connections from multiple offshore rigs have developed leaks after the BOPs were reassembled and pressure tested as part of the 5-year inspection cycle, resulting in delayed return-to-service of the equipment and significant nonproductive time (NPT). Specifically, one operator has reported an NPT of greater than 40 days because of this one instance alone. In response to these leaks, the original equipment manufacturer (OEM) and drilling contractors opened an investigation to attempt to determine the cause, which included a review of the parts and materials used for the maintenance of the BOPs.

One drilling contractor participating in the investigation reported performing a comprehensive review of the API monogrammed BX-164 gaskets used in the BOP's maintenance that were considered a possible contributing factor to the leaks. While the specific BX-164 gaskets associated with the leaking BOP connections were not measured prior to installation, similar gaskets from inventory measured as out of tolerance for several of the specified manufacturing dimensions of the gaskets when compared to the published values in API Specification 6A, 21st Edition, according to the drilling contractor. Additional new BX-164 gaskets were reportedly obtained from stock and measured with similar out of tolerance results. The gasket manufacturer was made aware of the nonconforming values of the applicable gaskets.

Discussions between the investigating contractor and other contractors revealed similar incidents of leaks occurring around newly replaced gaskets. Sample lots of new BX-164 gaskets were provided to two independent inspection companies to verify conformance to three API 6A specified ring dimensions: ring width, ring height and outer diameter. Both independent inspection companies reportedly identified numerous gaskets that each were out of tolerance for at least one of these values. According to the contractors, nonconforming measurements have been obtained from the analysis of new BX-164 ring gaskets only; it is not known if this potential issue extends to other API 6A ring gasket sizes as well.

Discussion: API Specification 6A includes material and dimension requirements for ring gaskets but does not specify the methods or processes required to achieve conformance. Furthermore, the product specification permits sampling. As a result, not all monogrammed gaskets may individually be measured. The sampling could be limited to a single gasket per lot or batch in accordance with the manufacturer's procedures. The API Subcommittee on Wellhead and Valve Equipment, which has oversight of Specification 6A, has formed a work group to review current ring gasket manufacturing requirements and to recommend any needed changes to the 6A Specification, including those necessary for improved quality control for ring gaskets in general and for the BX-164 gaskets, specifically.

Nonconformance Reporting: As a result of this initial investigation, API has received a report of nonconforming API Specification 6A Ring Gaskets through API's online Nonconformance Reporting (NCR) website. Consequently, API has opened an investigation of the facilities identified in the NCR to review product conformance to API Specification 6A and review actions taken by facilities in response to customer notification of nonconforming product. Applicable manufacturers of monogrammed products that do not meet specification requirements should be notified directly by the users of that product. Additionally, API should be notified of nonconforming product through use of the [Nonconformance Reporting](#) system on the API website so API can continue to track this issue.

Recommendations: To date, the only flange connections found by drilling contractors to be leaking are those using BX-164 gaskets. While the root cause of the leaks remains undetermined, until additional guidance or information is available, API recommends that users inspect the large diameter gaskets upon receipt and gaskets currently in inventory to ensure critical dimensions fall within tolerance prior to use. As further information becomes available from the investigations related to the NCRs and the proceedings of the API Specification 6A work group, these recommendations will be revisited and revised as needed. Relying on the application of the monogram alone on these gaskets may not be sufficient; it is the responsibility of the user to determine suitability of the equipment for its intended use. For equipment in service with BX-164 Ring Gaskets, equipment users should continue to perform standard wellbore pressure tests. Additionally, equipment users should continue to check that closure bolting torques at end connections are at required values to ensure sealing integrity of the BX-164 Ring Gasket.

Stakeholder Involvement: The API Specification 6A work group has asked for input from stakeholders on their experiences with the BX-164 and other large diameter gaskets. This outreach is expected to include a survey of manufacturers and users of these API monogrammed gaskets. API is supporting the work group in its effort to develop and distribute the survey to manufacturers and users. All stakeholders are encouraged to participate in the API Specification 6A work group. To join the group, please email Ivan Pinto at pintoi@api.org.

The API will issue updated notifications on this matter as appropriate.