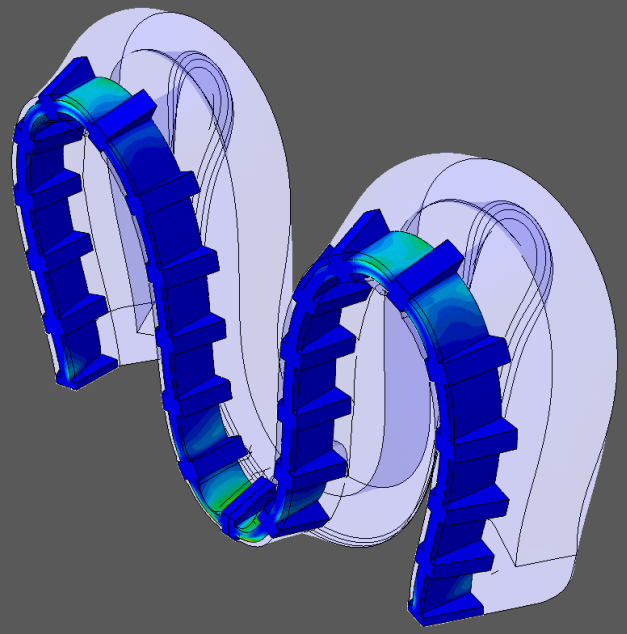
Turner Seal



Technical Product Information

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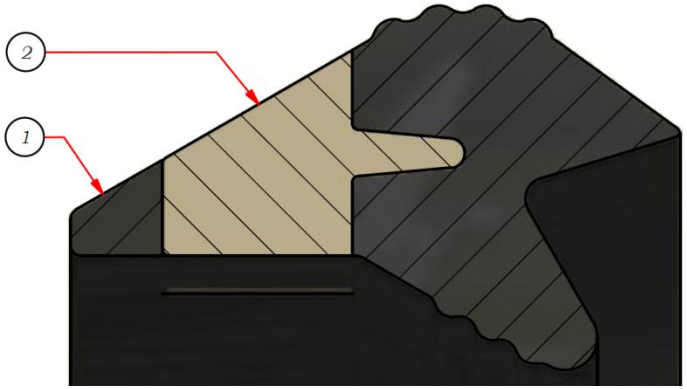
HULTEC Product Development

The main concern

- Ease of installation vs. risk of seal extrusion
  - A relatively flexible seal may also be weak enough to extrude through the gap between spigot and socket mouth
- Turner seal addresses this by structurally decoupling bending flexibility from radial stiffness
  - Flexible in bending for ease of installation
  - Stiff in radial compression to resist fluid pressure
- This presentation explains how this works

Radial stiffness

- Provided by strong plastic segments ② embedded in the rubber ①
- Continuous through the thickness of the seal so they act as blocks against seal extrusion
- Away from the lips so they don't interfere with sealing



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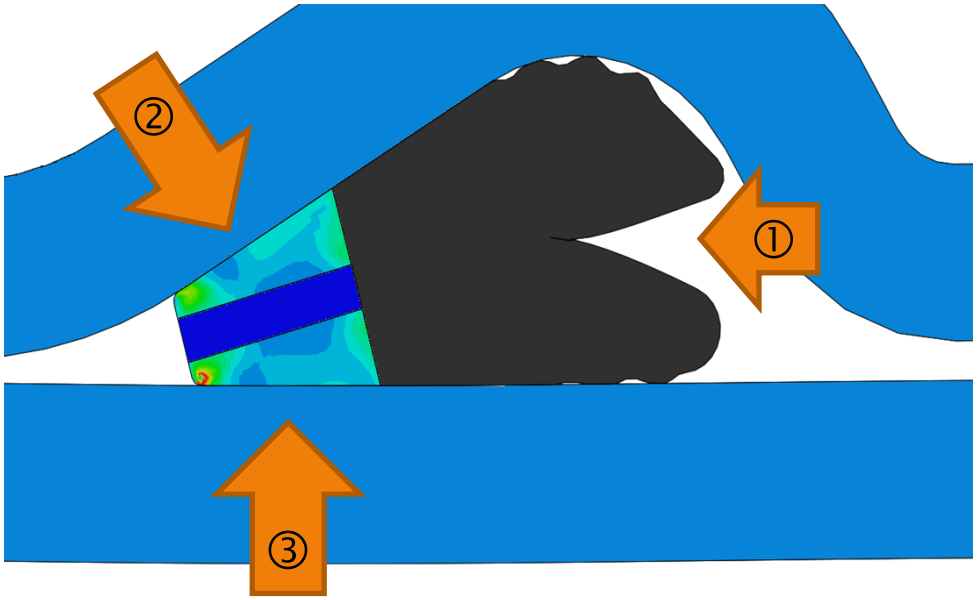
How radial stiffness works against seal extrusion

- When fluid pressure pushes the seal axially ①, the segments pick up a reaction ② from the socket to hold the seal in place
- In order to develop this reaction ②, the segments must also sustain a radial reaction ③ from the spigot
- Solid contact with spigot and socket and large radial stiffness are essential



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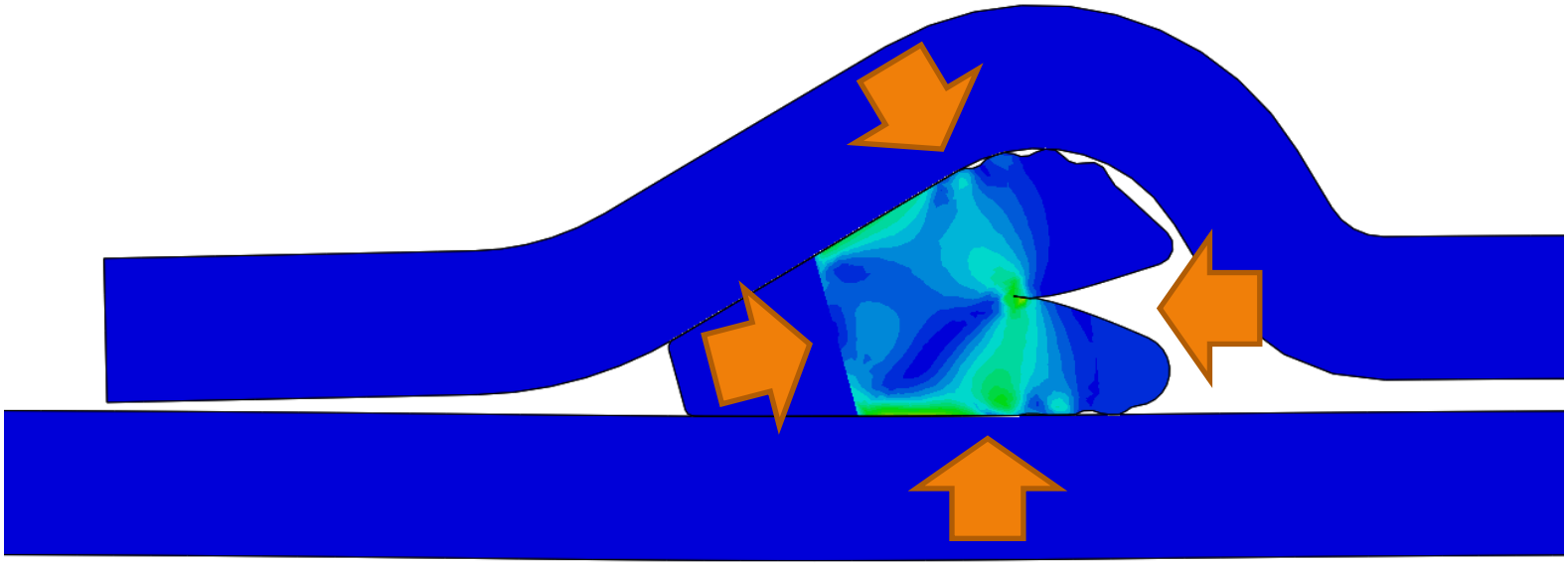
How sealing is ensured

- While the blocks take the axial load from fluid pressure and support the seal
- Rubber integrity is preserved at the sealing regions
- Adequate seal compression ensures optimal sealing performance

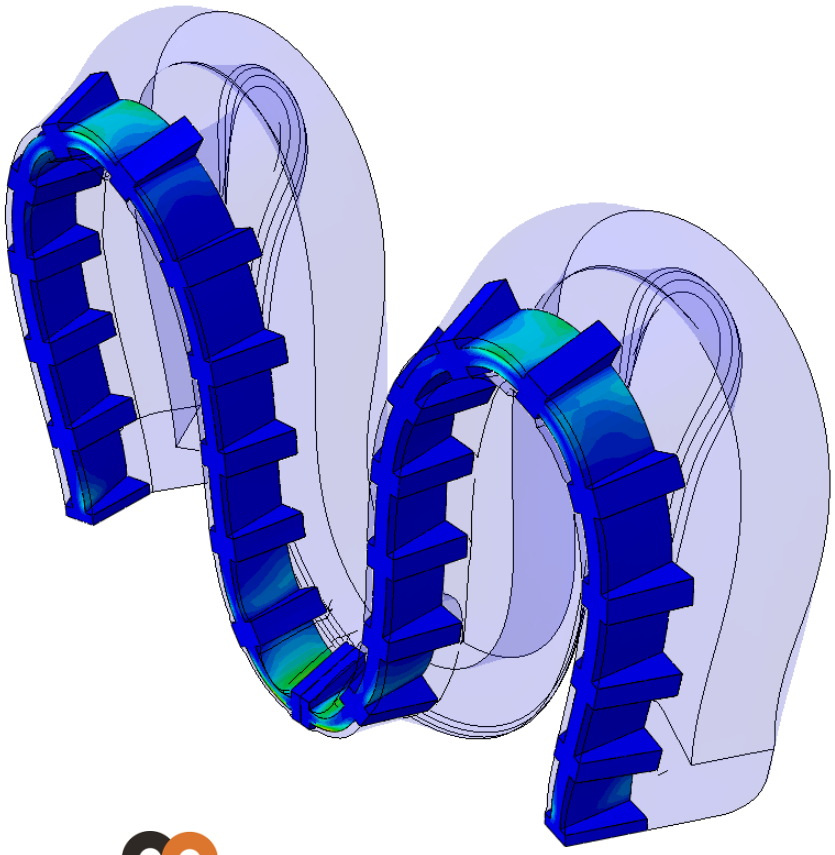


And it really works!

- Validated with nonlinear FEA and physical testing
- Test of pipes with integral socket using the Turner Seal.
- The test protocol from AS/NZS 4441
  - 140 degrees F
  - 261 psi
  - 1000 hours

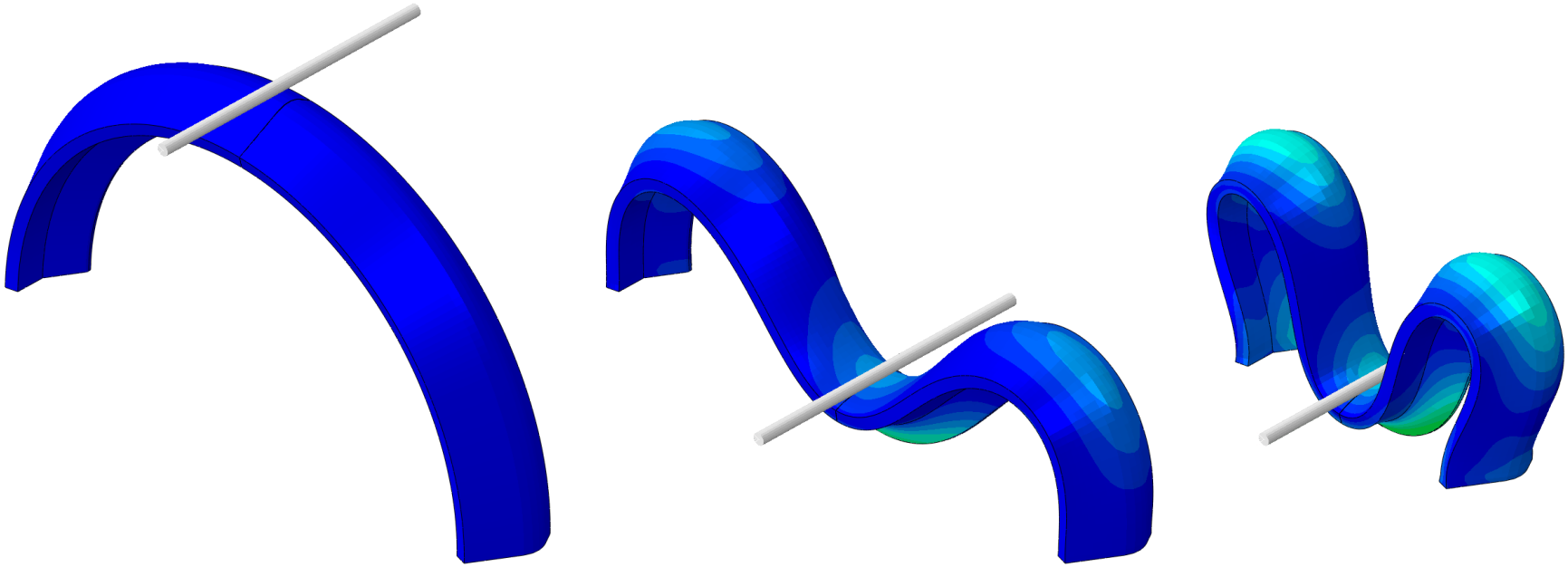
Bending flexibility

- Continuous blocks to hold the seal axially would be too stiff in bending
- This would make installation extremely difficult
- Radial stiffness is decoupled from bending stiffness by using discontinuous blocks
- Joined by a relatively thin band



Bending flexibility

- So the seal can bend easily for installation
- Thanks to the bending flexibility of the band and the rubber
- While radial stiffness of the blocks is preserved



In conclusion

- By effectively decoupling radial stiffness from bending stiffness
- The Turner seal is able to provide both ease of installation and maximum sealing performance