

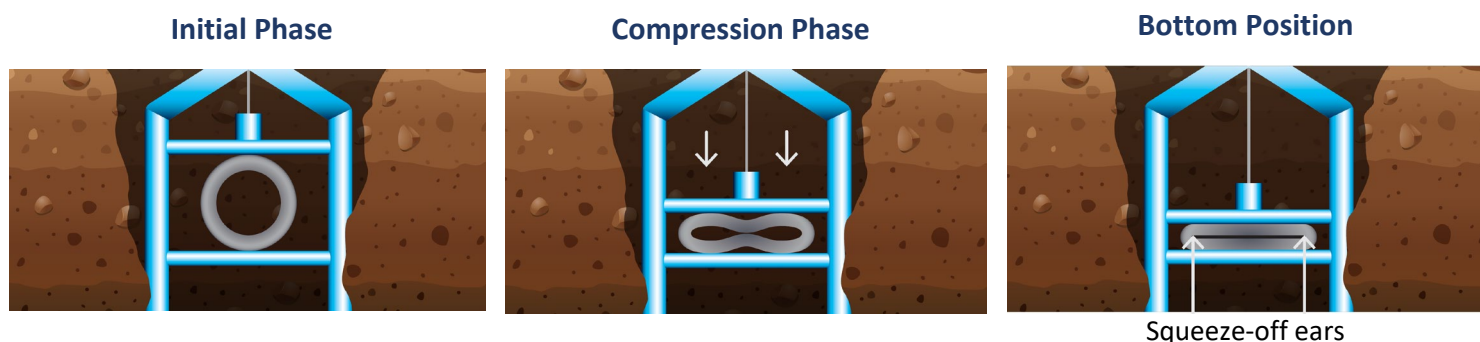
Squeezing-off polyethylene pipe

1. INTRODUCTION

Squeezing-off is a technique that can be applied to PE pipe to temporarily limit or stop the flow of fluid through the pipe. The technique involves compressing the pipe between parallel bars. The bars are forced together by either mechanical or hydraulic means resulting in the inside surfaces of the pipe making contact.

Squeezing-off flattens the PE pipe and in doing so places high compressive stress on the pipe wall – particularly at the “pinch points” or so called “ears”. These high stresses have the potential to damage the pipe and hence there are significant constraints associated with the technique.

SQUEEZE-OFF TECHNIQUE



2. FACTORS THAT INFLUENCE SQUEEZE-OFF

There are many variables that impact the outcome of the squeeze-off process including:

- The diameter and wall thickness of the pipe (DN and SDR).
- Pipe temperature (both high and low temperatures can be problematic).
- The rate at which the pipe is squeezed-off – **This is a critical aspect see note below.**
- The rate at which the squeeze off is released – **This is a critical aspect see note below.**
- Damage to the pipe at the point of squeeze-off.
- Pipe material.
- Fluid in the pipe.

- Proximity to previous squeeze off locations, welds, and fittings.
- The amount of pipe wall compression achieved during the process - **This is a critical aspect see note below.**
- Re-rounding of the pipe after squeezing-off.
- Total time taken by the process.

Note:

The rate of compression to achieve the squeeze off is critical and ASTM F1041 and AS/NZS 4645 recommend the compression rate not exceed 50mm/min. The release rate is arguably even more critical with ASTM F1041 recommending this rate not exceed 13mm/min and AS/NZS 4645 recommending the rate not exceed 10mm/min. The amount of pipe wall compression is another critical aspect with AS/NZS 4645 and other industry guidelines recommending the use of stops to prevent crushing the pipe at the point of squeeze-off.

3. WHEN IS SQUEEZE-OFF USED?

Squeeze-off is primarily used as an emergency response technique to temporarily stop or nearly stop the flow of fluid through a PE pipe where valves or other flow control devices are not available.

Note:

- It is not suitable for repeated flow control at the same location nor is it suitable as a means of throttling flow.
- It should only be applied for a short time.
- Squeeze off must never be repeated at the same location.

4. STANDARD PROCEDURES

The commonly referenced Standards covering squeeze off are the US ASTM Standards:

- **ASTM F1041** *Standard guide for squeeze-off of Polyolefin Gas Pressure Pipe and Tubing*
- **ASTM F1563** *Standard Specification for Tools to squeeze-off Polyethylene (PE) Gas Pipe or Tubing*
- **ASTM F1734** *Standard Practice for Qualification of a Combination of Squeeze Tool, Pipe, and squeeze-off Procedures to Avoid Long-Term Damage in Polyethylene (PE) Gas Pipe*

These standards provide guidance on the procedure, equipment and tools used to achieve the squeeze off and the process to follow when qualifying the procedure.

Australian Standard *AS4645 Gas Distribution Network Management* includes guidance for the use of squeeze off in gas infrastructure installations.

5. INDUSTRY GUIDELINES AND POLICES

In Australia squeeze-off is covered by Water Services Association of Australia (WSAA) guidelines for the water industry and The Australian Pipelines and Gas Associations (APGA) Code of Practice Upstream Polyethylene Gathering Networks – CSG Industry. Numerous individual asset owners also have procedures and policies for gas and water infrastructure networks. A similar approach has been taken internationally with multiple differing recommendations and policies from industry and individual asset owners.

One common element to these guidelines and policies is they all recognise this technique can damage the pipe and hence:

- Many require the squeeze-off location to be marked so that the location is not used for another squeeze off.
- Many require the pipe to be inspected for damage after the squeeze-off has been released.
- Many require prequalification of the procedure prior to application.
- Some require all squeezed-off sections to be reinforced using clamps.
- Some require all squeezed-off areas to be removed at a convenient time after the process is complete.
- Some permit the squeezed-off section to be returned to service without reinforcement provided no damage to the pipe is evident.

6. PIPA RECOMMENDATIONS

- The squeeze-off procedure should be prequalified based on the three ASTM standards as a guide.
- Avoid squeezing-off at locations where damage to the pipe surface is evident.
- Location of any squeeze-off should be marked and never attempt to squeeze-off at the same location more than once.
- All squeezed-off sections should either be removed at some convenient time shortly after the process is complete or the squeezed-off section should be reinforced with a suitable clamp or electrofusion repair fitting.

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