

**CPC ENGINEERING SPECIFICATION**

SECTION SOP	Doc. No. CES-26-103
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FLUSHING AND CLEANING OF HYDRAULIC SYSTEMS

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
0	INITIAL RELEASE	01-02-2024	PK	USR	JG	Released





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Flushing Procedure for BOP Control Unit

Standard References:

- API 16D – Specification for Control Systems for Drilling Well Control Equipment

1. Objective

To ensure the Blowout Preventer (BOP) control unit is properly flushed to remove manufacturing debris, assembly contamination, or degradation byproducts, ensuring operational reliability and conformance to cleanliness requirements.

2. Scope

Applicable to new, repaired, or overhauled BOP control units (surface or subsea), including the reservoir, manifold, piping, and associated actuators prior to commissioning.

3. Equipment and Materials

- High GPM triplex pump module (On existing unit) or External flushing unit (pump, filters, hoses)
- High-efficiency filter elements (20 micron or better)
- Clean flushing fluid (same grade as final hydraulic fluid)
- Pressure gauges
- Lint-free cloths and visual inspection tools (white wipes)
- Clean, dry compressed air for drying

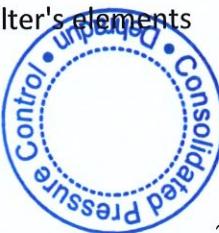
4. Safety Precautions

- Ensure the system is de-energized and depressurized.
- Use appropriate PPE: gloves, goggles, flame-retardant clothing.
- Confirm area is well-ventilated during flushing and drying.
- Tag and lock out power sources and pressure lines.

5. Flushing Procedure

5.1 Pre-Flushing Preparation

- Verify all components (reservoir, manifold, piping, accumulators) are installed and accessible.
- Remove all inline filter's elements and replace with temporary flushing filter's elements





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5.2 Flushing Loop Setup

- Keep all manifold valves in centre position except one and make its loop by connecting its leg pipes
- Connect the electrical supply to the starter
- Configure return line back to reservoir or external flushing tank.

5.3 Flushing Operation (Lines and reservoir)

- Close all isolation valve of accumulator module
- Fill the oil in the reservoir to required level.
- Start the Triplex pump module and run the system for 30 mins for single loop
- Continue the above process to all manifold valve's outlets.

5.4 Filters and Elements

- Open and clean all elements of filter's elements
- Continue flushing until elements of filters are found clean
- If residual not found stop the above process

6. Cleaning of hydraulic lines and manifolds or outlets

- Open the outlets of leg pipes
- Connect the compressed air to the alternate hydraulic supply end.
- Put all the manifold valves in center position
- Now start each leg pipe cleaning one by one by keeping the valve in open and close position for at least 5 mins each
- Put all the valves in center position
- Open the bleeder valve and allow the air flushing through manifold into the reservoir for 15 mins
- Stop the air supply

7. Cleaning of the reservoir

- Take out the oil and put it in drum for disposal
- Open the manway both side and use the compressed air to clean
- Use the clean cloth with extension to clean the reservoir

8. Cleanliness Acceptance criteria for reservoir

Verification:

- Conduct white wipe test for visible debris (no residual acceptable).

9. Post-Flushing Actions

- Change the elements of filters
- Refill reservoir with new hydraulic fluid or should have cleanliness level of at least NACE # 10
- Document filter change-outs or particle count readings.



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10. Documentation Requirements**Include the following in the flushing report:**

- Flushing start/end dates and times
- Equipment used (pump specs, filter ratings)
- Number of filter changes
- Total flushing fluid circulated
- Visual inspection results
- Sign-off by responsible engineer or technician

