

LIBERTYCES FIELD GUIDE

STOP REPLACING THE SAME HYPOCHLORITE VALVE

A pre-order field check for catching an incomplete sodium hypochlorite valve specification — before the next purchase order goes out, and before the same valve fails again.

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30+ years, 100+ municipal & industrial projects, zero specification failures

THE REPEAT-FAILURE PATTERN

The most common sodium hypochlorite valve failure isn't a bad valve — it's the same incomplete spec, repeated. A valve fails, gets replaced with the identical part number, and fails again on roughly the same timeline. The pattern repeats because the original specification error was never identified — only the symptom (the failed valve) was addressed.

Sodium hypochlorite failures typically trace to one of four unaddressed variables in the original spec:

- **Off-gassing and trapped cavity pressure** — decomposing hypochlorite inside a closed ball valve cavity builds internal pressure with no path to relieve it.
- **Elastomer/seat mismatch** — the body material was verified for hypochlorite compatibility, but the seat, seal, or O-ring material was not checked independently.
- **Concentration and temperature drift** — the valve was specified for the concentration at time of purchase, not the concentration and temperature it actually sees in service.
- **Diaphragm construction** — a single-layer diaphragm was used where composite (PTFE/PVDF/EPDM) construction was needed for off-gassing resistance.

Replacing a failed valve with the same part number does not change any of these four variables. The clock simply restarts on the same failure.

SECTION 02

THE 30-SECOND SPEC RISK TEST

Run this against any hypochlorite valve spec sitting on your desk right now. Score each line red / amber / green.

Check	Red Flag	Green Flag
Concentration documented	Not specified or "standard bleach"	Exact % + temperature range documented
Venting on ball valves	No vent hole mentioned	Upstream vent hole specified (typ. 1/8")
Seat/seal material	Only body material listed	Seat, seal, and O-ring materials called out separately
Diaphragm construction (if applicable)	"PTFE diaphragm" only	Full layer construction specified (wetted/barrier/backing)
Prior failure history	Not reviewed before reorder	Failure location documented and addressed

Three or more red flags means the spec is likely to repeat its prior failure — regardless of how many times the same valve has already been reordered.

SECTION 03

THE DETAIL MOST SPECS MISS: VENTING

Sodium hypochlorite decomposes over time, releasing oxygen and chlorine gas. Inside a closed ball valve cavity — the trapped volume between the two seats when the valve is in the closed position — that decomposition has nowhere to go. Pressure builds inside the cavity until it exceeds the seat's ability to hold, at which point the valve either weeps, cracks, or blows a seat.

This failure mode is invisible on a standard compatibility chart, because the chart evaluates chemical resistance of the material — not the mechanical consequence of trapped, decomposing chemical inside a sealed cavity. It is a design detail, not a material detail, and it is the single most commonly missed line item in hypochlorite valve specs LibertyCES reviews.

The fix: specify an upstream vent hole (commonly 1/8" or larger, sized to the cavity volume and expected off-gassing rate) on any ball valve used in continuous or semi-continuous hypochlorite service. Diaphragm valves avoid this specific failure mode by design but introduce their own construction requirements (see Section 04).

SECTION 04

MATERIAL REFERENCE, DONE RIGHT

A hypochlorite-compatible body material does not guarantee a working valve. Every wetted component needs independent verification:

Component	Common Spec Shortcut	What to Verify Instead
Body	"PVC is hypochlorite compatible"	PVC vs. CPVC by temperature and concentration
Seat	Assumed to match body material	PTFE seat, independently rated, backed with FKM where cycling load requires it
Seal/O-ring	"Standard elastomer"	FKM specifically verified — not EPDM, which degrades faster in oxidizer service
Diaphragm (if used)	"PTFE diaphragm"	Full construction: PTFE wetted face + PVDF gas-barrier layer + EPDM backing cushion

Cross-check every line against the specific manufacturer's published hypochlorite documentation for that model — not a generic industry chemical-resistance chart, which is a screening tool, not a final approval.

SECTION 05

COPY/PASTE PURCHASE-ORDER LANGUAGE

Add the following language block to any hypochlorite valve purchase order to close the four gaps identified in this guide before the order is placed:

Valve shall be rated for sodium hypochlorite service at [X]% concentration and [X]°F maximum operating temperature.

Ball valve configurations shall include an upstream vent hole (min. 1/8") to relieve trapped-cavity pressure from off-gassing.

Seat material: PTFE, backed with FKM. Seal/O-ring material: FKM (not EPDM).

If diaphragm valve: diaphragm construction shall be submitted in writing, specifying wetted-layer, gas-barrier, and backing-layer materials independently.

Vendor shall confirm in writing that the submitted configuration is rated by the manufacturer for the exact concentration and temperature specified above — not a generic hypochlorite compatibility rating.

PRE-ORDER CHECKLIST

- ☐ Exact hypochlorite concentration (%) documented
- ☐ Maximum and continuous operating temperature documented
- ☐ Operating and surge pressure documented
- ☐ Valve type selected (ball vs. diaphragm) with rationale
- ☐ Body material confirmed against concentration/temperature (PVC vs. CPVC)
- ☐ Seat material independently specified (not assumed from body)
- ☐ Seal/O-ring material confirmed as FKM
- ☐ Vent hole specified on ball valve configurations
- ☐ Diaphragm construction fully specified, if applicable
- ☐ Prior failure history reviewed and root cause addressed
- ☐ Vendor written confirmation of exact-service rating obtained

Free Spec Review

Send this completed checklist to James Riggins at LibertyCES for a free review before you place the order — (559) 395-5500 or james@libertyces.com.