

VAN-TEC

TECHNICAL TROUBLESHOOTING & FIELD SOLUTIONS

Common Field Problems • Root Cause Analysis • Corrective Actions • Prevention

This guide presents typical field scenarios for engineering reference. Each case should be investigated against the actual installation, operating conditions and product-specific VAN-TEC documentation before a final root-cause conclusion is made.

FIELD CASE 01 - THREADED BRONZE / BRASS VALVE BODY CRACKING

Problem / Symptoms	Crack appears in a new threaded valve body during or shortly after installation.
Probable Causes	• Excessive tightening torque • Wrench applied at the opposite end of the valve • Pipe misalignment or external bending load • Incompatible or damaged threads • Excessive sealing material increasing thread stress
Technical Analysis	Cracking near a threaded connection does not automatically indicate a material defect. Installation marks, thread engagement, wrench position, pipe alignment and fracture location should be reviewed before determining root cause.
Corrective Action	• Isolate and depressurise the system • Replace the damaged valve • Verify mating thread type and condition • Correct pipe alignment and supports • Reinstall using the wrench at the valve end nearest the joint and controlled tightening
Prevention	• Train installers on two-wrench / counter-hold practice • Do not tighten solely to achieve preferred valve orientation • Use compatible thread sealant in controlled quantity • Follow product-specific torque limits where issued

ENGINEERING TAKEAWAY: A cracked valve body should be assessed for installation torque, thread compatibility and external loading before being classified as a manufacturing defect.

FIELD CASE 02 - FLANGED VALVE JOINT LEAKAGE

Problem / Symptoms	Leakage is observed at the flange/gasket connection after installation or pressurisation.
Probable Causes	• Misaligned or non-parallel flanges • Incorrect or damaged gasket • Uneven bolt tightening • Incorrect bolt grade/condition or lubrication assumptions • Pipe loads transferred into the valve
Technical Analysis	Uneven gasket compression can create local leakage paths. Flange bolts should not be used to pull misaligned pipework into position.
Corrective Action	• Depressurise safely • Inspect flange alignment and faces • Inspect/replace gasket as required • Confirm correct bolting • Retighten using an approved cross/star sequence and specified torque
Prevention	• Support and align pipework before valve installation • Use correct gasket and bolting • Tighten progressively and uniformly • Apply project/product-specific final torque

ENGINEERING TAKEAWAY: Flange leakage is frequently a joint-system issue involving alignment, gasket condition and bolt loading, not the valve body itself.

FIELD CASE 03 - BUTTERFLY VALVE DIFFICULT TO OPEN OR CLOSE

Problem / Symptoms	High operating torque, sticking, incomplete travel or disc interference is reported after installation.
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Probable Causes	• Valve not centred between flanges • Disc interference with pipe/flange bore • Pipe misalignment • Incorrect actuator stops or mounting • Debris or damaged liner/seat
Technical Analysis	Butterfly valves require adequate disc clearance and correct centring. External pipe stress or incorrect actuator adjustment can significantly increase operating torque.
Corrective Action	• Inspect centring and disc clearance • Check pipeline alignment • Cycle valve manually where safe • Inspect seat/liner and remove debris • Verify actuator mounting, travel and end stops
Prevention	• Check disc clearance before final bolt tightening • Do not use valve to correct pipe misalignment • Commission actuator after mechanical installation is verified

ENGINEERING TAKEAWAY: High operating torque should trigger checks of centring, clearance, pipe stress and actuator setup before assuming an internal valve defect.

FIELD CASE 04 - CHECK VALVE NOISE / SLAMMING

Problem / Symptoms	Repeated banging, impact noise or severe closing shock occurs during flow reduction or pump shutdown.
Probable Causes	• Valve oversized for actual flow • Rapid flow reversal • Installation near turbulent fittings or pump discharge • Unsuitable check-valve design for system dynamics • Pump/control sequence causing transient events
Technical Analysis	Check-valve slam is a dynamic system problem. Closing behaviour depends on velocity, deceleration, valve design and installation location.
Corrective Action	• Review actual flow and velocity • Inspect valve orientation and free movement • Review pump start/stop sequence • Evaluate alternative non-slam/dual-plate design where appropriate • Perform surge analysis for severe systems
Prevention	• Size for operating conditions, not only line size • Avoid highly disturbed locations where practical • Coordinate check-valve selection with pump and transient behaviour

ENGINEERING TAKEAWAY: Noise or slam should be investigated as a hydraulic transient and valve-selection issue, not only as a mechanical fault.

FIELD CASE 05 - BALANCING VALVE - DESIGN FLOW CANNOT BE ACHIEVED

Problem / Symptoms	Commissioning engineer cannot reach the required design flow.
Probable Causes	• Insufficient available differential pressure • Blocked strainer or dirty system • Air trapped in circuit • Incorrect valve preset • Incorrect valve sizing or pump condition
Technical Analysis	Balancing performance depends on the complete circuit. A correctly functioning valve cannot create flow when the system lacks available differential pressure.
Corrective Action	• Flush and vent system • Clean strainers • Confirm valve flow direction and preset • Measure differential pressure • Check pump duty and circuit resistance • Reassess valve size if necessary
Prevention	• Commission only after flushing • Record design flow and final setting • Maintain clean strainers and adequate pump head

ENGINEERING TAKEAWAY: Always measure differential pressure and verify system conditions before changing the valve or blaming valve performance.

FIELD CASE 06 - PICV / BICV LOW OR UNSTABLE FLOW

Problem / Symptoms	Flow remains below target or varies despite control commands.
Probable Causes	• Debris in regulating mechanism • Insufficient differential pressure • Incorrect preset • Wrong flow direction • Actuator/control issue • Valve selected outside its flow range
Technical Analysis	Pressure-independent control requires the valve to operate within its specified flow and differential-pressure range.
Corrective Action	• Flush and clean the system • Clean upstream strainer • Verify arrow direction • Check preset and design flow • Measure available differential pressure • Verify actuator signal, stroke and mounting
Prevention	• Protect control valves from construction debris • Select using design flow and ΔP range • Commission and record settings

ENGINEERING TAKEAWAY: PICV/BICV troubleshooting should combine hydraulic measurements with actuator/control checks.

FIELD CASE 07 - ACTUATOR DOES NOT FULLY OPEN OR CLOSE VALVE

Problem / Symptoms	Actuator stops early, runs in the wrong direction or does not drive the valve through full travel.
Probable Causes	• Wrong supply voltage • Incorrect control signal or wiring • Incorrect actuator/valve compatibility • Improper mounting • Incorrect end-stop or stroke setting • Valve mechanically obstructed
Technical Analysis	Electrical and mechanical causes must be separated. Verify free valve movement before diagnosing the actuator.
Corrective Action	• Check supply voltage and signal • Verify wiring • Confirm actuator model and torque suitability • Inspect mounting and coupling • Set travel/end stops correctly • Check valve for mechanical obstruction
Prevention	• Verify actuator specification before installation • Commission full stroke after mounting • Protect electrical components from water ingress

ENGINEERING TAKEAWAY: Confirm the valve moves freely first, then verify actuator power, signal, mounting and travel.

FIELD CASE 08 - FCU - POOR COOLING DESPITE INSTALLED CONTROL VALVE

Problem / Symptoms	FCU provides insufficient cooling even though the valve appears installed and operational.
Probable Causes	• Air trapped in coil • Dirty strainer • Insufficient chilled-water flow • Incorrect PICV/BICV preset • Insufficient ΔP • Kinked/twisted flexible hose • Control or actuator problem
Technical Analysis	Poor cooling is a system symptom. Valve replacement should not be the first action without confirming flow, air removal, strainers and controls.

Corrective Action	• Vent coil • Clean strainer • Inspect flexible hoses • Measure flow/ΔP • Verify valve preset and actuator operation • Check water temperatures and control sequence
Prevention	• Flush and vent before commissioning • Avoid hose kinking/torsion • Record design flow and commissioning values

ENGINEERING TAKEAWAY: FCU performance must be diagnosed as a complete hydronic circuit, not as a valve-only problem.

FIELD CASE 09 - RUBBER EXPANSION JOINT BULGING / DEFORMATION / FAILURE

Problem / Symptoms	Joint shows abnormal bulging, offset, twisting, leakage or premature deterioration.
Probable Causes	• Missing/incorrect anchors or guides • Excessive axial/lateral movement • Torsion • Pipe weight supported by joint • Misalignment • Pressure/temperature or chemical incompatibility
Technical Analysis	Rubber expansion joints accommodate specified movements; they are not pipe supports and should not be used to correct major misalignment.
Corrective Action	• Depressurise and inspect joint • Check anchors, guides and supports • Measure installed geometry/movement • Verify elastomer and service conditions • Replace damaged joint and correct system restraint
Prevention	• Design anchors/guides correctly • Install without torsion • Do not exceed rated movement • Select elastomer for actual medium and temperature

ENGINEERING TAKEAWAY: Expansion-joint failures often originate from piping-system restraint, alignment or service compatibility.

FIELD CASE 10 - FLEXIBLE HOSE PREMATURE FAILURE

Problem / Symptoms	Hose leaks, braid distorts or connection fails earlier than expected.
Probable Causes	• Twisting during installation • Kinking or bend radius too small • Excessive tension • Hose too short • Used to compensate for major misalignment • External abrasion
Technical Analysis	Flexible hoses require natural curvature and should not carry torsional or excessive tensile loads.
Corrective Action	• Replace damaged hose • Correct pipe alignment • Use suitable hose length • Route with adequate bend radius • Eliminate rubbing/contact points
Prevention	• Do not twist during tightening • Counter-hold fittings • Allow natural bend • Do not stretch hose between fixed points

ENGINEERING TAKEAWAY: Correct routing and freedom from torsion are critical to flexible-hose life.

FIELD CASE 11 - WATER HAMMER / BANGING NOISE

Problem / Symptoms	Sharp pressure noise or vibration occurs when valves operate or pumps start/stop.
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Probable Causes	• Rapid valve closure • High fluid velocity • Pump trip/start • Check-valve slam • Incorrect arrestor selection/location • Insufficient surge-control measures
Technical Analysis	Water hammer is a transient system phenomenon and may require more than one mitigation method.
Corrective Action	• Identify triggering event • Measure/estimate velocity and pressure conditions • Review valve closing time and pump sequence • Check check-valve behaviour • Review arrestor location/sizing • Perform surge analysis where severity warrants
Prevention	• Control velocities • Use suitable valve closing characteristics • Coordinate pump/check-valve operation • Apply properly selected surge-control devices

ENGINEERING TAKEAWAY: Treat water hammer as a system transient; an arrestor is one possible component of a complete solution.

FIELD CASE 12 - AIR ACCUMULATION / NOISE / REDUCED FLOW

Problem / Symptoms	Gurgling, unstable flow, loss of performance or recurring air pockets occur.
Probable Causes	• Air vent located incorrectly • Insufficient high-point venting • Poor filling procedure • Air ingress • System geometry traps air • Air separator required
Technical Analysis	Air follows system high points and low-pressure regions. Effective air management depends on system layout and filling/venting strategy.
Corrective Action	• Vent high points • Verify automatic air vents operate correctly • Review filling procedure • Inspect for air ingress • Consider central air separation where appropriate
Prevention	• Provide vents at designed air collection points • Fill and vent system in a controlled manner • Maintain air-management devices

ENGINEERING TAKEAWAY: Persistent air problems require system-level review of high points, filling, pressure and air-separation strategy.

FIELD CASE 13 - Y-STRAINER EXCESSIVE PRESSURE DROP

Problem / Symptoms	Downstream flow falls or differential pressure across the strainer becomes excessive.
Probable Causes	• Screen blocked by debris • Screen mesh too fine for application • Strainer undersized • Not cleaned after construction flushing
Technical Analysis	A strainer protects downstream equipment but becomes a hydraulic restriction when contaminated.
Corrective Action	• Isolate safely and clean screen • Inspect for damage • Verify screen specification • Check pressure drop after cleaning • Reassess size if pressure loss remains high
Prevention	• Clean after initial flushing • Provide maintenance access • Monitor differential pressure where critical

ENGINEERING TAKEAWAY: A dirty strainer can mimic a valve or pump problem; always check it during low-flow troubleshooting.

FIELD CASE 14 - GATE VALVE DOES NOT FULLY CLOSE / PASSES

Problem / Symptoms	Valve reaches apparent closed position but flow continues.
Probable Causes	• Debris on seat/wedge • Seat or wedge damage • Improper throttling use causing wear • Stem/operating mechanism issue • External pipe stress
Technical Analysis	Isolation valves can pass if debris prevents full seating or if sealing surfaces have been damaged.
Corrective Action	• Cycle valve carefully where appropriate • Flush line • Inspect operating mechanism • Inspect seat/wedge if problem persists • Repair/replace damaged parts
Prevention	• Keep pipelines clean • Use gate valves primarily for isolation unless specifically designed otherwise • Operate periodically in suitable services

ENGINEERING TAKEAWAY: Before declaring seat failure, check for debris and confirm the valve has reached true mechanical closure.

FIELD CASE 15 - EXTERNAL CORROSION / COATING DAMAGE

Problem / Symptoms	Rust, coating chips or local corrosion appear on coated iron/steel valve surfaces.
Probable Causes	• Impact during transport/installation • Coating mechanically damaged • Aggressive/coastal environment • Inadequate repair of damaged coating • Service exceeds coating specification
Technical Analysis	FBE/epoxy performance depends on coating continuity and environment. Local mechanical damage can expose the substrate.
Corrective Action	• Clean and assess damaged area • Repair using approved compatible coating procedure • Check surrounding coating adhesion/integrity • Review environmental exposure
Prevention	• Protect coated surfaces during handling • Use suitable lifting methods • Specify enhanced coating thickness/system for severe environments where required

ENGINEERING TAKEAWAY: Coating damage should be repaired promptly; environmental severity and handling practices are part of corrosion-control performance.

GENERAL FIELD INVESTIGATION PRINCIPLE

Do not classify a field failure solely from the visible symptom. A structured investigation should review product identification, installation method, pipe alignment/support, operating pressure and temperature, medium, flow direction, commissioning records, photographs, fracture/leak location, maintenance history and any abnormal hydraulic or mechanical events. Product-specific VANTEC documentation and approved project requirements take precedence.