

■ Centrifugal Compressor - Surge Recognition & Response

Indicator	What You See
Flow	Rapid oscillation / flow reversal; check valve chatter
Pressure	Discharge pressure swings; cyclic "breathing" of the machine
Sound	Deep booming or honking every 1-3 seconds
Vibration	Axial vibration spikes; thrust position shifts
Temperature	Rising discharge temp from re-compressed gas

■ Immediate Response

1) **Open recycle/anti-surge valve** - move operating point right, away from surge line. 2) Reduce head demand (lower discharge resistance) if process allows. 3) If surge continues - **controlled shutdown**; repeated surge cycles destroy thrust bearings, seals, and impellers. 4) After event: inspect thrust bearing metal temps, axial probe data, and seal condition before restart.

■ Performance Map Zones

Zone	Meaning	Action
Surge line (left limit)	Minimum stable flow at given head	Anti-surge control line set 5-10% flow margin right of it
Stonewall / choke (right limit)	Max flow, sonic velocity at impeller	Rising power, falling efficiency; back off flow
Design point	Best efficiency region	Operate here; watch for process drift

■ Anti-Surge System Checks

Valve stroke test results current | Transmitter calibration (flow dP, P, T) | Controller margin line position | Recycle cooler capacity | Valve opening speed (<2 s full stroke typical for trip action)