Formwork Pressure Monitoring Quality Control Checklist

Sensor-supported checklist for concrete formwork pressure monitoring operations · Designed for use in conjunction with the vemaventuri PREMO for Hub & Node, LINK sensor platform

Project information

Project		**Pour date**	
Element		**Mix design**	
Contractor		**Concrete grade**	

All sensor measurements must be logged in the vemaventuri IoT platform and exported as part of the project QA record. Stripping and formwork actions must be based on sensor data, not time-based schedules alone. Any deviation from this checklist must be documented with the responsible person's name and time stamp.

	Checklist item	Measured value / remarks
	1 Pre-pour: formwork design and pressure calculation	
	1.1 Geometry and element classification	
☐	Wall height and element geometry defined and confirmed on working drawing *Record: height ___ m | width ___ m | element type: wall / column / pier / other*	
☐	Element classified: conventional vibrated concrete OR Self-Compacting Concrete (SCC) *SCC → design for full hydrostatic head over full pour height (DIN 18218:2010-01)*	
☐	Single-sided formwork identified — anchor loads reviewed and confirmed against sensor alert plan	
☐	Bottom-up pumping scenario identified — additional pressure surge margin applied	
	1.2 Design pressure calculation	
☐	Applicable standard selected: DIN 18218:2010-01 (Europe) or ACI 347R-14 (USA / international)	
☐	Fresh concrete consistency class confirmed: F1–F6 per EN 206:2013+A2:2021 or slump class per ACI *Consistency class: ___ | Slump / flow value: ___ mm*	
☐	Maximum lateral pressure p_max calculated and documented *Calculated p_max: _____ kN/m² | Formula reference: _____*	
☐	Formwork rated capacity confirmed — exceeds p_max with documented safety margin *Formwork capacity: _____ kN/m² | Safety margin: _____ %*	
☐	Maximum allowable pour rate (m/h) derived from design pressure and communicated to pour supervisor *Max pour rate: _____ m/h*	
	1.3 Concrete mix review	
☐	Mix design reviewed — w/c ratio, cement type, admixture type and dose confirmed *Mix reference: _____*	

☐	Retarding or plasticising admixtures flagged — extended open time factored into pressure model	
☐	Concrete temperature at delivery anticipated — adjust assumptions if below 10 °C or above 25 °C *Expected delivery temperature: _____ °C*	
☐	Ambient temperature at time of pour assessed *Ambient forecast: _____ °C*	

2 Pre-pour: formwork inspection and sensor setup

2.1 Formwork inspection

☐	Formwork designed for full hydrostatic head at specified pour rate *Design pressure: _____ kN/m² (ACI 347R / DIN 18218)*	
☐	Formwork inspected — no damage, deformation, or inadequate bracing	
☐	All ties, wedges, walers, and clamps tightened to specification	
☐	Substrate joints and form-face connections sealed against grout loss	
☐	Bracing and lateral restraint confirmed adequate for full p_max plus wind loads	

2.2 Sensor installation — vemaventuri PREMO system

☐	Pressure sensor positions planned: minimum 2 sensors per pour section, staggered vertically *Walls > 4 m: 3 sensors minimum | Lower sensor at approx. 0.3 m above base*	
☐	PREMO sensors mounted flush with formwork face at planned positions *Sensor IDs: _____ | Heights above base: _____*	
☐	Wireless connectivity to Hub / data logger verified — signal strength confirmed *System status: ☐ Online Hub ID: _____*	
☐	Sensor IDs labelled in monitoring web app — match physical sensor positions	
☐	Zero-reference measurement performed before concrete placement begins *Baseline reading: _____ kN/m² (should be 0 ± tolerance)*	
☐	Warning threshold configured in web app: 75–80 % of formwork rated capacity *Warning threshold set at: _____ kN/m²*	
☐	Critical threshold configured in web app: 85–90 % of formwork rated capacity *Critical threshold set at: _____ kN/m²*	
☐	Alert notification delivery tested — responsible engineer and pour supervisor receive alerts *Test alert confirmed: ☐ Yes*	

3 During pour: placement and real-time pressure monitoring

3.1 Placement execution

☐	Pour rate controlled within design maximum — monitored against concrete volume and time records *Actual pour rate: _____ m/h | Design maximum: _____ m/h*	
☐	Concrete placed in layers consistent with vibration depth and formwork pressure design *Max layer height: _____ mm*	
☐	Drop height controlled — no segregation risk at form entry point	

☐	Time between successive layers within initial set time for current concrete temperature *Max allowed interval at current temperature: _____ min*	
☐	Pour sequence and direction consistent with formwork pressure design assumptions	

3.2 Vibration and compaction

☐	Vibrator insertion spacing ≤ 1.5× effective radius of action for current mix *Effective radius: _____ mm | Max spacing: _____ mm*	
☐	Re-vibration of partially stiffened layers avoided *Re-vibrating stiffened concrete re-liquefies it and re-establishes full hydrostatic head at that depth*	
☐	Withdrawal rate controlled — ≤ 80 mm/s to avoid air entrainment	

3.3 Formwork pressure — real-time monitoring

☐	Pressure sensor readings monitored continuously throughout pour — dedicated responsibility assigned *Peak reading: _____ kN/m²*	
☐	Pressure remains below design threshold at all times — no alert triggered *☐ Confirmed ☐ Pour paused (reason: _____)*	
☐	At Warning threshold (75–80 %): pour rate reduced — pressure allowed to stabilise before resuming *☐ Warning triggered Time: _____ Action taken: _____*	
☐	At Critical threshold (85–90 %): pour STOPPED — no resumption without responsible engineer sign-off *☐ Critical triggered Time: _____ Authorised by: _____*	
☐	For SCC: continuous monitoring maintained — full hydrostatic head assumed; no vibration-based relief	
☐	Any mix deviation (temperature, slump, admixture) logged with time stamp and correlated to pressure data *Log reference: _____*	

4 Post-pour: monitoring, inspection and stripping

4.1 Continued pressure monitoring

☐	Pressure monitoring continued after pour completion — minimum 4 hours post-completion *Pour completion time: _____ Monitoring end time: _____*	
☐	Consistent pressure decay confirmed on all sensor channels	
☐	Pressure confirmed below 10 % of p_max before loosening tie rods or striking props *Pressure at decision point: _____ kN/m²*	

4.2 Physical inspection after pour

☐	Formwork inspected for bulging, joint displacement, or tie rod deformation — photographed *Inspection result: ☐ No defects found ☐ Defects documented (see attached)*	
☐	Finished element dimensions checked — bow, out-of-plumb, or stepped joint documented if present	
☐	Stripping authorised by responsible engineer based on sensor data — not time alone *Authorised by: _____ Time: _____*	

4.3 Data analysis and calibration for next section

☐	Actual maximum pressure compared against theoretical design value — deviation calculated *Actual p_max: _____ kN/m² | Design p_max: _____ kN/m² | Deviation: _____ %*	
☐	If deviation > 15 %: root cause identified — mix, temperature, pour rate, re-vibration — documented	
☐	Calibrated pour rate limits for next section updated based on actual pressure data *Updated pour rate limit: _____ m/h*	
☐	Lessons learned communicated to pour supervisor and site team before next section	
	5 Documentation and traceability	
☐	Formwork pressure profile archived — peak pressure confirmed within design limit	
☐	Temperature and ambient condition records attached *Temperature range across deliveries: _____ °C to _____ °C*	
☐	Concrete delivery note numbers, measured slump / flow, truck temperatures — archived	
☐	Full sensor pressure log exported from web app and stored in project documentation system *File reference: _____*	
☐	Pour start time, end time, and total volume placed recorded *Start: _____ End: _____ Volume: _____ m³*	
☐	All deviations, threshold exceedances, and corrective actions documented with time stamp	
☐	Complete sensor data package handed over to structural engineer / client QA *Date: _____ Recipient: _____*	

Sign-off

Site engineer / responsible person	QA / structural engineer of record
Name: _____	Name: _____
Signature: _____	Signature: _____
Date / Time: _____	Date / Time: _____

This checklist is part of the vemaventuri knowledge series. For sensor setup support and QA documentation visit vemaventuri.io or contact info@vemaventuri.io