Compliance checklists

Project	Client	Location	Revision	Date
Sample 230/34.5 kV pooling substation	Sample client	Sample site	0	4 Nov 2026

Document no.	Prepared	Checked	Approved
SSL-C-CMP-001	Sample engineer	Sample engineer	Sample engineer

Rev	Date	Description	By
0	4 Nov 2026	Issued	Sample engineer

230/34.5 kV pooling substation, 250 MW. 38 comply (1 met by design) · 0 do not comply · 0 need your answer · 0 need your review · 3 not applicable. Automatic items are evaluated from the design run. Manual items record your answer.

NESC and NFPA

No.	Requirement	Standard and clause	Design value	Status
NESC-01	Clearance of live parts at 230 kV above the surfaces where people stand	ANSI C2-2007 (NESC), Rule 124A1, Table 124-1	16.40 ft provided, 13.75 ft minimum	Complies
NESC-02	Fence around the substation and the safety clearance zone of its live parts	ANSI C2-2007 (NESC), Rule 110A	Fence 8.00 ft high, 6.99 ft minimum; hv live parts to the fence 22.97 ft, R 15.40 ft	Complies
NESC-03	Safety signs at each entrance and on each side of the fenced enclosure, gates kept locked	ANSI C2-2007 (NESC), Rule 110A1	Sample answer.	Complies
NESC-04	Grounding of the substation's equipment, structures and fence	ANSI C2-2007 (NESC)	Sample answer.	Complies
NESC-05	Wiring of the control building where the NEC applies	NFPA 70 (NEC)	Sample answer.	Complies
NESC-06	Lightning protection of the control building	NFPA 780	Sample answer.	Complies
NESC-07	Fire protection of the transformers and the control building	NFPA 850	Sample answer.	Complies

IEEE and ANSI

No.	Requirement	Standard and clause	Design value	Status
IEEE-01	Mesh voltage Em within the 70 kg tolerable touch voltage	IEEE 80-2013, Eq. 33, Eq. 80	Mesh voltage 820.5 V ≤ tolerable touch 926.6 V (70 kg)	Complies
IEEE-02	Step voltage Es within the 70 kg tolerable step voltage	IEEE 80-2013, Eq. 30, Eq. 92	Step voltage 1426.6 V ≤ tolerable step 3040.3 V (70 kg)	Complies
IEEE-03	Grid conductor sized for the fault current and time	IEEE 80-2013, Eq. 37	400 kcmil bare copper, 202.7 mm² ≥ 179.5 mm²	Complies
IEEE-04	Mesh and step voltage equations within their stated range	IEEE 80-2013, §16.5, §16.7	40 × 41 meshes of 13.93 ft, outside the 40 per side or 8.21–73.8 ft of §16.7 · Sample answer.	Complies
IEEE-05	Surface layer (gravel) and its derating factor Cs in the tolerable voltages	IEEE 80-2013, Eq. 27	3000 Ω·m × 0.33 ft, Cs 0.705	Complies
IEEE-06	Soil resistivity measured on site (Wenner) and seasonal variation allowed	IEEE 80-2013, §13.3, §13.4	Entered value 100 Ω·m · Sample answer.	Complies
IEEE-07	GIS enclosures bonded at each bay, transient enclosure voltage within limits	IEEE 80-2013, §10		Not applicable

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No.	Requirement	Standard and clause	Design value	Status
IEEE-08	230 kV bus shielded (rolling sphere, Mousa)	IEEE 998-2012, §6.5, §6.6	186 of 186 points, least margin +27.95 ft, sphere 86.11 ft	Complies
IEEE-09	230 kV equipment shielded	IEEE 998-2012, §6.5, §6.6	93 of 93 points, least margin +39.49 ft, sphere 86.79 ft	Complies
IEEE-10	Transformers shielded	IEEE 998-2012, §6.5, §6.6	80 of 80 points, least margin +32.90 ft, sphere 81.96 ft	Complies
IEEE-11	Breaker interrupting duty (E/Z with the X/R adjustment) within the rated short-circuit current	IEEE C37.010-2016, §5.2.2, §5.2.3	230 kV three-phase 22.52 kA ≤ 50.00 kA · 230 kV line to ground 20.41 kA ≤ 50.00 kA · 34.5 kV three-phase 26.02 kA ≤ 40.00 kA · 34.5 kV line to ground 1.06 kA ≤ 40.00 kA	Complies
IEEE-12	dc time constant within the derating method (X/R 45 at 60 Hz)	IEEE C37.010-2016, §4.11.3.6	230 kV 40 ms ≤ 120 ms · 34.5 kV 82 ms ≤ 120 ms	Complies
IEEE-13	Closing and latching current within the breaker's rating	IEEE C37.04-2018, §5.6.2.3	230 kV 57.60 kA ≤ 130.00 kA · 34.5 kV 58.79 kA ≤ 104.00 kA	Complies
IEEE-14	Short-time current within the rated short-circuit current for the rated duration	IEEE C37.04-2018, Table 12, Table 16	230 kV 22.52 kA ≤ 50.00 kA · 34.5 kV 23.10 kA ≤ 40.00 kA	Complies
IEEE-15	Battery voltage within the 125 V DC control range of the breakers	IEEE C37.04-2018, Table 23	60 cells: 105.0 V at the end of discharge to 139.8 V on equalize, within 100 V to 140 V	Complies
IEEE-16	Battery capacity covers the duty cycle with aging and design margins	IEEE 485-2020, §6.4, §6.3.3, §6.3.4	300 Ah ≥ 241 Ah for 8 h	Complies
IEEE-17	Charger recharges the battery while carrying the continuous load	IEEE 946-2020, §7.3	63 A ≥ 52.8 A	Complies
IEEE-18	Low-voltage power circuit breakers in the preferred frame sizes	IEEE C37.13-2015, §5.4	STATION SERVICE TR-1 800 A · STATION SERVICE TR-2 800 A · STANDBY GENERATOR 800 A · BUS COUPLER 800 A	Complies
IEEE-19	Two station service sources and a standby generator	IEEE 1818-2017	2 × 225 kVA station service transformers from two 34.5 kV sections and a 250 kVA standby generator	Met by design
IEEE-20	System voltages and their ranges at 230 kV	ANSI C84.1	Sample answer.	Complies
IEEE-21	Power transformers' ratings, tests and impedance	IEEE C57.12.00	Sample answer.	Complies
IEEE-22	Current and voltage transformers' accuracy classes and burdens	IEEE C57.13	Sample answer.	Complies
IEEE-23	Surge arresters' ratings and their application at 230 kV	IEEE C62.11, IEEE C62.22	Sample answer.	Complies
IEEE-24	Seismic qualification of the substation equipment	IEEE 693	Moderate seismic qualification level · Sample answer.	Complies
IEEE-25	Oil containment for the transformers	IEEE 980	2 transformers over oil containment pits draining to a common oil collection pit · Sample answer.	Complies
IEEE-26	Fire protection of the substation	IEEE 979	Sample answer.	Complies
IEEE-27	Environmental and community considerations of the substation	IEEE 1127	Sample answer.	Complies

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Interconnection

No.	Requirement	Standard and clause	Design value	Status
GRID-01	Power factor 0.95 leading to 0.95 lagging at rated output, dynamic, at the high side of the substation	FERC Order No. 827 (pro forma LGIA), §9.6.1.2	STATCOM ±83 Mvar; ±82.2 Mvar at 250 MW and power factor 0.95 · Sample answer.	Complies
GRID-02	Power factor 0.95 leading to 0.95 lagging at rated output at the Point of Interconnection	FERC Order No. 827 (pro forma LGIA), §9.6.1.1		Not applicable
GRID-03	Reactive power capability and voltage control of the inverter-based plant	IEEE 2800-2022, §5.1, §5.2	Sample answer.	Complies
GRID-04	Voltage and frequency ride-through of the inverter-based plant	IEEE 2800-2022, §7.2, §7.3	Sample answer.	Complies
GRID-05	Generator frequency and voltage protective relay settings	NERC PRC-024-4		Not applicable
GRID-06	Frequency and voltage ride-through of the inverter-based resources	NERC PRC-029-1	Sample answer.	Complies
GRID-07	Voltage and current harmonic distortion at the point of common coupling within the limits of IEEE 519	IEEE 519-2022	Sample answer.	Complies

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