

Generator initial acceptance test

This document is a step-by-step execution procedure and an NFPA compliant EPSS test form.



Summary of sequence of actions

Stage	Action	Minimum duration or decision
Prepare	Approve criteria, inspect installation and arrange witnesses	All readiness items must be completed
Test A	Simulate normal supply failure and carry the intended emergency loads	At least 90 minutes
Restore	Restore normal supply and check ATS retransfer	At least 5 minutes retransfer setting
Cool	Allow engine cooldown before the next test	At least 5 minutes
Test B	Apply 30%, 50% and 100% of the applicable kW rating	30 + 30 + 60 minutes
Prove controls	Cycle-crank, battery recovery, alarms and shutdowns	Complete applicable functions
Close	Restore AUTO, resolve defects and submit signed evidence	Accept only when all criteria are met

EPS means the generator and its energy source. EPSS means the complete emergency power supply system. ATS means automatic transfer switch. Test A checks automatic supply to the intended loads; Test B checks sustained generator output at the prescribed load stages.

Table of Contents

This document is a step-by-step execution procedure and an NFPA compliant EPSS test form.....	1
Summary of sequence of actions.....	1
1. Agree the test basis before switching	2
2. Initial acceptance test flowchart.....	3
3. Execute the preparation and cold start	4
4. Execute the full load tests.....	5
5. Execute controls and restore readiness.....	5
6. Apply the correct criteria and form entries	6
7. Completed EPSS form page 1 of 4.....	7
8. Completed EPSS form page 2 of 4.....	8
9. Completed EPSS form page 3 of 4.....	9
10. Completed EPSS form page 4 of 4.....	10
11. Supplemental timing and load basis	11
12. Test A complete building load record.....	12
Engine and environmental readings at the same times.....	12
13. Test B complete staged load record	13
14. Cycle crank and battery recovery record	14
15. Safety function and alarm register	14
16. Test report findings and acceptance decision	15
17. References	16
18. Appendix A – Initial acceptance test form	17

1. Agree the test basis before switching

People and equipment

Assign sufficient trained personnel complete with valid calibrated test instruments.

Readiness checks

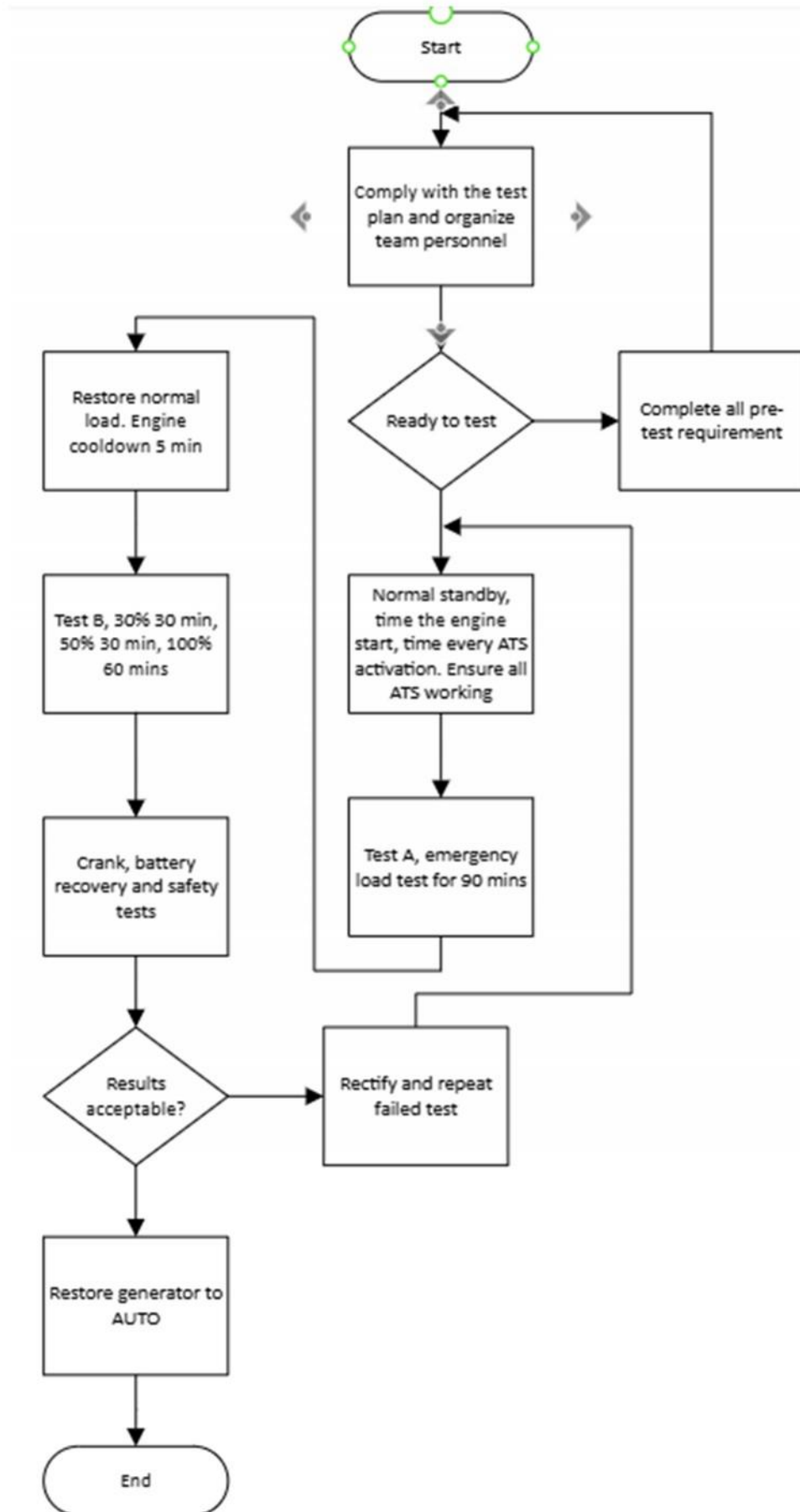
Confirm fuel quantity and quality; oil and coolant levels; batteries and charger; heaters; ventilation and radiator air path; exhaust; earthing and bonding; circuit protection; phase sequence; ATS wiring and interlocks; remote alarms; and completed installation inspections. Keep installed doors, louvers and ventilation in their normal operating configuration.

Conduct acceptance testing with all required EPSS accessory and support equipment installed and operating¹.

¹ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), paras 7.13.2.2–7.13.3.

2. Initial acceptance test flowchart

Follow the applicable normal power-failure route, then complete both loaded tests and the control tests. A failed or incomplete requirement remains open until resolved.



The 30%, 50% and 100% stages refer to generator kW, with documented site derating where applicable. The first two stages are minimum load percentages.

3. Execute the preparation and cold start

Step 1 Briefing

Brief all participants on the switching sequence, communication method, stop command and recovery plan. Only authorised personnel may operate electrical switching equipment.

Record: Obtain work permit, switching schedule, participants and start conditions.

Step 2 Inspect and connect equipment

Complete Sections A to I of the form. Connect the load bank and measuring equipment only. Confirm cable protection, earthing, phase rotation and separation of hot discharge exhaust from generator supply air intake.

Record: Inspection findings, load bank connection arrangement, instrument identifications and unresolved defects.

Step 3 Establish normal standby condition

Set the generator and ATSS to AUTO. The engine must be in its normal standby state, with its normal coolant heater and battery charger operating. Do not warm the engine with a preliminary run immediately before the cold start test. Complete any manual run on a prior occasion and allow normal standby conditions to be restored².

Record: Ambient temperature, coolant temperature, battery voltage, heater status and time of last engine run.

Step 4 Initiate loss of normal power

Bring the emergency loads to the intended operating condition. Open all normal supply switches or circuit breakers under the approved switching plan. Start the time record at the defined loss simulation event³.

Record: Exact test method, operated switch tags and time zero.

Step 5 Observe automatic start and transfer

Without manually assisting the sequence, record start delay, crank duration, attainment of operating speed, acceptable generator output and power restoration at every ATS load terminal. Check actual load operation. Prove the start initiating circuit of each ATS. Note that a single successful ATS test does not prove the others⁴.

Record: Individual ATS transfer times, total interruption at each load, first stable readings and event traces.

² National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), paras 7.13.4.3.1–7.13.4.3.2 and annex A.7.13.4.3.1–A.7.13.4.3.2. Annex text explains cold start as typical standby condition with normal heater operation.

³ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), paras 7.13.4.3.1–7.13.4.3.2.

⁴ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), para 7.13.4.3.4(3)–(9) and annex A.7.13.4.3.4(6).

4. Execute the full load tests

Step 6 Run Test A for at least 90 minutes

Start the 90 minute loaded period. Exercise all loads served by the EPSS, or an agreed simulation of the intended load characteristics. Record first readings and then at 15 minute intervals⁵.

Record: Start/end time, connected loads, all phase currents/voltages, kW, kVA, power factor, Hz, oil pressure and coolant temperature.

Step 7 Restore normal power and verify retransfer

After the complete Test A duration, restore normal power. Confirm that each ATS recognises stable normal supply and observes its approved retransfer delay, with a minimum setting of 5 minutes. Time each ATS separately. Check that the connected loads are operating normally after retransfer⁶.

Record: Normal supply restoration, each ATS retransfer time and any interruption.

Step 8 Complete engine cooldown

Once the emergency load is removed, observe the programmed unloaded cooldown and shutdown. Allow at least 5 minutes of cooldown after Test A⁷.

Record: Time last load left the generator, cooldown duration and engine stop time.

Step 9 Run Test B

Start the generator and, at rated speed, apply the first prescribed load. Maintain at least 30% kW for 30 minutes, at least 50% for the next 30 minutes, then 100% for the next 60 minutes, using the OEM-approved site rating. Building load may contribute; adjust the load bank so that the measured total meets the target. Time the actual load stages⁸.

Record: First-load timing, stage start/end times and readings at least every 15 minutes; take extra readings around each load change.

Step 10 Confirm temperature stability

At full load, compare coolant temperature with outdoor ambient temperature. It must have stabilised relative to ambient at least 30 minutes before the test finishes. Agree the OEM method for assessing stability. Extend the full-load period if necessary; 60 minutes alone does not establish stability⁹.

Record: Coolant and ambient readings, temperature difference, stability period and any extension.

5. Execute controls and restore readiness

Step 11 Prove the starting cycle and battery recovery

Unload and cool the generator. With the normal supply secure, initiate the crank test. Observe the complete specified crank - rest sequence and failure-to-start response. Restore the starting system, clear the test condition and confirm restart capability¹⁰.

⁵ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), para 7.13.4.3.4(1)–(10). This procedure uses 15-minute records during both loaded tests to retain a complete, consistent record; see para 7.13.4.5.8.

⁶ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), para 7.13.4.3.4(11).

⁷ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), paras 7.13.4.3.4(12) and 7.13.4.4.

⁸ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), paras 7.13.4.5.1–7.13.4.5.2, 7.13.4.5.4 and 7.13.4.5.7–7.13.4.5.8.

⁹ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), para 7.13.4.5.3.

Record: Each crank/rest period, lockout, local/remote indication and charger current at 0, 5, 10 and 15 minutes, or until stabilised.

Step 12 Prove alarms and protective functions

Test applicable indicators, remote alarms, shutdowns and emergency stops. Record the expected and actual response separately. Do not create a real low-oil, overheating or overspeed condition.

Record: Completed safety matrix, setpoint schedule, simulation method, event log and any permitted manufacturer evidence.

Step 13 Restore the installation

Remove the load bank through the approved isolation sequence. Restore the normal switching arrangement, protective settings, fuel valves, alarm circuits and remote connections. Reset emergency stops. Leave all relevant generator and ATS controls in AUTO, with the charger and heaters operating and no unresolved alarm. Replenish fuel as needed.

Record: Final switch positions, settings, AUTO status, fuel level, alarm status and operator handover.

Step 14 Review and submit the result

Compare each record with the pre-agreed criteria. Close defects and repeat the affected test scope where required. Attach signed logs, event traces, manufacturer evidence and instrument records. The contractor and consultant sign only verified results; submit the completed package for the required AHJ acceptance.

Record: Pass/fail/hold decision, defects, retests, full names, professional registration, dates and signatures.

6. Apply the correct criteria and form entries

Supplied form entry	How to complete it correctly
Start and operating time within 30 seconds	Enter the approved Type and load-specific limit. For Type 10, assess acceptable supply at the ATS load terminals within 10 seconds. Record engine start separately.
Number of cranking at least 3 times	Record normal successful-start attempts separately from the deliberately inhibited cycle-crank test. Do not require three attempts to start a healthy engine.
L1–L2, L2–L3, L3–L2 readings	The last pair repeats the second. Record L3–L1 for the third distinct phase-to-phase measurement and identify the correction.
Insulation tester reading	Record insulation resistance in MΩ with test voltage, duration and temperature, under the OEM isolation method. This is different from winding resistance in Ω.
Yes and N/A columns only	Use Yes only with evidence. N/A requires a reason. Write HOLD or FAIL in remarks for untested or unacceptable items; never disguise them as N/A.
Brushes, commutator, heat exchanger and synchronisation	Determine applicability from the equipment. A brushless, single set, open transition installation does not need invented results for absent components.
Latest NFPA and SBC certification	State the editions and approved drawing revisions in the signed record.
Only three load-reading rows	Attach the complete 15 minute logs. The three rows in the original form are a summary and cannot evidence all required durations.

¹⁰ National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn), paras 7.13.4.6–7.13.4.6.3; para 5.6.4.2 and table 5.6.4.2.

Check kW rather than amperes alone

For the 500 kVA / 400 kW example, a resistive 400 kW load at 400 V draws about 577 A. The generator's 500 kVA nameplate current is about 722 A. Therefore, 577 A can represent full engine kW at unity power factor; it is not evidence that the generator is only 80% loaded.

For a balanced three-phase load: $\text{kW} = \sqrt{3} \times \text{line voltage} \times \text{line current} \times \text{power factor} \div 1000$. Use the power analyser's measured total kW for acceptance.

7. Completed EPSS form page 1 of 4

WORKED EXAMPLE ONLY

This example assumes one diesel, brushless generator, radiator cooling, two open-transition ATSs and Type 10 performance.

Identification field	Completed entry
Pin number / application number	H — not provided / H — not provided
Location / project / owner	H — actual location, project name and owner not provided
Date / approved drawing reference	Site test date not assigned / H — drawing number and revision required
Test status	ILLUSTRATIVE ONLY — actual acceptance withheld
Generator capacity / set serial number	E: 500 kVA / 400 kW; 400 V, 3 phase, 60 Hz, rated PF 0.8 / H: serial required
Alternator manufacturer / serial	H — enter both from the installed nameplate
Engine manufacturer / serial	H — enter both from the installed nameplate
Control panel manufacturer / serial	H — enter both from the installed nameplate
Emergency loads connected	E: ATS-01 emergency lighting and controls; ATS-02 emergency ventilation and associated pumps; aggregate Test A load 200 kW at PF 0.80
Start delay / transfer delay	E: start delay 0 min 1.0 sec; after acceptable generator output, transfer 1.2 sec at ATS-01 and 1.8 sec at ATS-02
Mains return delay / cooling time	E: retransfer 5 min 0.0 sec / 5 min 0.2 sec; engine cooldown 5 min 0 sec

A Fuel system

Item	Entry	Example observation
1 Main supply tank level	E	80%; separate check of required fuel autonomy remains H
2 Day tank level	E	75% before Test A
3 Day tank float switch	E	Low/high level simulation controls refill correctly
4 Supply or transfer pump	E	Starts and stops on simulated demand; no leakage
5 Solenoid valve operation	E	OEM functional sequence verified in example
6 Water in system	E	No water observed in sample/separator

Item	Entry	Example observation
7 Flexible hoses and connectors	E	Secure, undamaged and free of visible leaks
8 Vents and overflow unobstructed	E	Routing and termination inspected; no obstruction
9 Piping	E	Supported, identified and free of visible leaks

8. Completed EPSS form page 2 of 4

WORKED EXAMPLE ONLY

Ref	Supplied form item	Entry	Completed observation
B1	Oil level	E	Within dipstick range before start
B2	Oil filters	E	Correct installation; no leakage
B3	Lube oil heater	E-NA	Not fitted in assumed OEM arrangement
B4	Crankcase breather	E	Unobstructed; connection sound
C1	Coolant fluid level	E	At specified cold level
C2	Cooling water to heat exchanger	E-NA	Unit-mounted radiator; no heat exchanger
C3	Rod out heat exchanger	E-NA	No heat exchanger; no dismantling for this test
C4	Fresh air through radiator	E	Normal air path open; no recirculation observed
C5	Radiator external cleanliness	E	Fins clean and undamaged
C6	Fan and alternator belts	E	Condition and tension checked to OEM method
C7	Water pumps	E	Circulation normal; no leakage
C8	Flexible hoses and connections	E	Secure; no rubbing, swelling or leakage
C9	Jacket water heater	E	Operating in normal standby; coolant 40°C
C10	Louver motors and controls	E	Open on demand; normal running configuration
D1	Exhaust leakage	E	No leakage observed at joints
D2	Condensate drain trap	E	Drain arrangement clear and secure
D3	Valve clearance	H	OEM inspection/startup record required; do not adjust without OEM procedure
D4	Exhaust bolt torque	H	OEM torque record and specified values required
E1	Intake prevents water and exhaust entry	E	Weather protection and separation checked
E2	Intake clear of heat sources	E	No nearby hot-air recirculation observed

Ref	Supplied form item	Entry	Completed observation
F1	Battery	E	Terminals secure; bank in serviceable condition
F2	Operating voltage	E	24 V dc nominal; example float reading 27.2 V
F3	Battery brand and model	H	Enter actual manufacturer, model and capacity
F4	Battery type	E	Two 12 V lead-acid batteries in series
F5	Battery connected to engine block	E	Negative return matches assumed OEM drawing; verify actual return/bonding arrangement

B = lubrication; C = cooling; D = exhaust; E = intake; F = electrical starting system. H entries must be resolved before actual acceptance. N/A entries apply only to the stated example configuration.

9. Completed EPSS form page 3 of 4

WORKED EXAMPLE ONLY

Ref	Item	Completed entry
G1	Genset control model and brand	H — actual details required
G2	Synchronisation	E-NA — one set; open-transition ATSS
G3	Control panel location and distance	E — set-mounted; integral to generator
G4	Output breaker make/model/amps	H — record actual make, model, poles, frame and trip settings
G5	Breaker distance from alternator	E — integral set-mounted assembly; actual arrangement to verify
H1	Brush length and free movement	E-NA — brushless alternator
H2	Commutator and slip rings	E-NA — no service brushes or slip rings in example
H3	Rotor and stator	E — external condition normal; OEM inspection record required
H4	Bearings	E — no abnormal noise or temperature observed
H5	Exciter	E — voltage builds and remains stable
H6	Voltage regulator	E — response observed during load steps
H7	Winding insulation test	H — actual MΩ, test voltage/time/temperature and OEM limits required
H8	General EPSS condition	E — no abnormal vibration, leakage, noise or deterioration
H9	Automatic operation	E — AUTO and restart readiness restored
I1	Fluid leakage	E — no visible fuel, oil or coolant leak
I2	Grounding	H — earth/bond continuity and approved arrangement test record required

Functional and load test

No	Supplied form check	Completed entry
1	Manual operation without load	E — demonstrated previously; standby restored before cold start
2	Emergency stop button	E — controlled no-load test; reset verified
3	Start or operation problem	E — none in example
4	Coolant temperature	E — Test A 40–85°C; Test B maximum 90°C
5	Frequency	E — steady readings 60.0 Hz
6	Abnormal vibration or knocking	E — none observed
7	Oil, fuel, coolant or air leakage	E — none observed
8	Start and operation within limit	E — engine running 4.0 s; all ATS loads restored 8.8 s; Type 10 basis
9	Load transfer duration	E — ATS-01 8.2 s; ATS-02 8.8 s from time zero
10	Panel load-transfer problem	E — none in example
11	Phase sequence	E — L1–L2–L3 verified
12	Automatic mains failure test	E — Test A complete; see timing and 90-minute log
13	High coolant-temperature trip	E — OEM simulation; correct trip and alarms
14	Low lube-oil pressure trip	E — OEM simulation; correct trip and alarms
15	Emergency stop	E — local and remote devices checked; see safety register

10. Completed EPSS form page 4 of 4

WORKED EXAMPLE ONLY

The readings below are illustrative stable measurements at the end of Test A. Test B and complete time histories follow on the supplemental sheets.

Reading	Completed value	Reading	Completed value
1 L1–N	230.9 V	2 L2–N	230.9 V
3 L3–N	230.9 V	4 L1–L2	400.0 V
5 L2–L3	400.0 V	6 L3–L1	400.0 V; corrected pair
7 Oil pressure	4.0 bar	8 Temperature before start	40°C coolant; 25°C ambient
9 Temperature after start	40°C at first loaded reading; 85°C at Test A end	10 Cranking	Normal start: 1 attempt; inhibited cycle test: 3 attempts

Three row summary from the original form

Stage	Time	R / Y / B A	kVA	PF	R / Y / B V L-N	Hz	Coolant °C	Oil bar	Battery V
30%	11:15:07-	173/173/173	120	1.00	231/231/231	60.0	83	4.3	27.6
50%	11:45:07-	289/289/289	200	1.00	231/231/231	60.0	86	4.1	27.6
100%	12:45:07	577/577/577	400	1.00	231/231/231	60.0	90	4.0	27.6

The minus sign means immediately before increasing the load. R/Y/B correspond to L1/L2/L3. Phase-to-phase voltages are 400 V in this example. kW is separately recorded in the full logs; kVA and kW are equal here only because PF = 1.00.

Contractor certification

Required certification field	Entry
Contractor company and full printed name	H — to be entered by the responsible contractor
Signature, stamp and date	NOT SIGNED — actual witnessed test required
Saudi Council of Engineers registration and mobile	H — actual registration details and contact required
NFPA / SBC editions and drawing revisions	H — enter exact adopted requirements and approved references

Consultant acceptance

The consultant must review the actual results, resolve all H/FAIL entries and verify restoration of automatic operation before signing.

Required acceptance field	Entry
Consultant company and full printed name	H — to be entered by the responsible consultant
Signature, stamp and date	NOT SIGNED — actual review and witnessing required
Saudi Council of Engineers registration and mobile	H — actual registration details and contact required
AHJ witness or acceptance reference	H — to be completed under the applicable approval process

11. Supplemental timing and load basis

WORKED EXAMPLE ONLY

Example parameter	Assumption
Generator and controls	500 kVA / 400 kW standby, 400 V, 60 Hz, 1800 rpm, PF 0.80; 24 V dc start; single set
Classification	Level 1, Type 10 assumed; actual Class and fuel autonomy remain H
Test route	New and unoccupied example; all normal supplies opened under the approved switching plan
Site rating	400 kW with zero derating assumed for arithmetic only; actual altitude/ambient derating requires OEM confirmation
Test A loading	200 kW at PF 0.80 = 250 kVA; approximately 361 A per phase at 400 V
Test B loading	120 / 200 / 400 kW at PF 1.00; approximately 173 / 289 / 577 A per phase
Rated power factor evidence	H — actual factory test certificate at rated PF required before using unity-PF site test

Cold start event record

Event	Example time	Elapsed from normal supply loss
Normal supply loss / time zero	09:00:00.0	0.0 s

Event	Example time	Elapsed from normal supply loss
Start delay expires and cranking begins	09:00:01.0	1.0 s
Engine fires and runs	09:00:04.0	4.0 s; cranking duration 3.0 s
Operating speed reached	09:00:06.0	6.0 s
Generator output acceptable	09:00:07.0	7.0 s
ATS-01 load supply restored	09:00:08.2	8.2 s
ATS-02 load supply restored and all loads stable	09:00:08.8	8.8 s; Test A loaded timer starts

Transfer and restoration by ATS

ATS	Start circuit	Supply restored	Normal returns	Retransfer	Delay
ATS-01	E — individually proved	09:00:08.2	10:30:08.8	10:35:08.8	5:00.0
ATS-02	E — individually proved	09:00:08.8	10:30:08.8	10:35:09.0	5:00.2

Record how each ATS start circuit was individually proved, for example a controlled start demand or manufacturer circuit test. The common cold start timing record alone cannot show that both initiating circuits work.

Test A ends at 10:30:08.8 after exactly 90 minutes. The last load leaves the generator at 10:35:09.0; the engine stops at 10:40:09.0 after 5 minutes unloaded cooldown. Test B begins with a new start command at 10:45:00.0.

12. Test A complete building load record

WORKED EXAMPLE ONLY

Elapsed min	Clock time	kW	kVA	PF	I1 / I2 / I3 A	V12 / V23 / V31 V	Hz
0	09:00:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0
15	09:15:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0
30	09:30:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0
45	09:45:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0
60	10:00:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0
75	10:15:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0
90	10:30:08.8	200	250	0.80	361 / 361 / 361	400 / 400 / 400	60.0

Engine and environmental readings at the same times

Elapsed min	Coolant °C	Ambient °C	Coolant minus ambient °C	Oil bar	Battery V	Observation
0	40	25	15	4.5	27.6	Stable output; no alarms
15	80	25	55	4.4	27.6	Stable output; no alarms
30	82	25	57	4.3	27.6	Stable output; no alarms
45	84	25	59	4.2	27.6	Stable output; no alarms
60	85	25	60	4.1	27.6	Stable output; no alarms
75	85	25	60	4.0	27.6	Stable output; no alarms
90	85	25	60	4.0	27.6	Stable output; no alarms

What the witness must confirm

Observe that the required equipment operates on generator supply. A live generator display alone does not prove that emergency lighting, fans, pumps or their controls have received power and operated correctly. Confirm motor rotation, sequencing and load priorities against the approved schedule.

WORKED EXAMPLE ONLY

Check	Worked result	Actual site decision
Automatic supply	Both example ATSS restore within 10 s	H — actual timed records required
Duration	90 minutes of intended load	H — actual full duration required
Operating readings	Illustrative steady readings as above	H — compare with actual OEM/design limits
Load operation	Example equipment operated correctly	H — actual equipment schedule and witnessing required

13. Test B complete staged load record

WORKED EXAMPLE ONLY

Elapsed min	Clock time	kW / kVA	PF	I1 / I2 / I3 A	V12 / V23 / V31 V	Hz
0	10:45:07	120 / 120	1.00	173 / 173 / 173	400 / 400 / 400	60.0
15	11:00:07	120 / 120	1.00	173 / 173 / 173	400 / 400 / 400	60.0
30	11:15:07–	120 / 120	1.00	173 / 173 / 173	400 / 400 / 400	60.0
30	11:15:07+	200 / 200	1.00	289 / 289 / 289	400 / 400 / 400	60.0
45	11:30:07	200 / 200	1.00	289 / 289 / 289	400 / 400 / 400	60.0
60	11:45:07–	200 / 200	1.00	289 / 289 / 289	400 / 400 / 400	60.0
60	11:45:07+	400 / 400	1.00	577 / 577 / 577	400 / 400 / 400	60.0
75	12:00:07	400 / 400	1.00	577 / 577 / 577	400 / 400 / 400	60.0
90	12:15:07	400 / 400	1.00	577 / 577 / 577	400 / 400 / 400	60.0
105	12:30:07	400 / 400	1.00	577 / 577 / 577	400 / 400 / 400	60.0
120	12:45:07	400 / 400	1.00	577 / 577 / 577	400 / 400 / 400	60.0

– = just before a load increase; + = first stable reading after it.

Elapsed min	Coolant °C	Ambient °C	Difference °C	Oil bar	Battery V
0	80	25	55	4.5	27.6
15	82	25	57	4.4	27.6
30–	83	25	58	4.3	27.6
30+	84	25	59	4.3	27.6
45	86	25	61	4.2	27.6
60–	86	25	61	4.1	27.6
60+	87	25	62	4.1	27.6
75	89	25	64	4.0	27.6

Elapsed min	Coolant °C	Ambient °C	Difference °C	Oil bar	Battery V
90	90	25	65	4.0	27.6
105	90	25	65	4.0	27.6
120	90	25	65	4.0	27.6

Duration check: 120 kW from 10:45:07 to 11:15:07 = 30 min; 200 kW to 11:45:07 = 30 min; 400 kW to 12:45:07 = 60 min. Total = 120 min.

Stability check: coolant 90°C and ambient 25°C give a constant 65°C difference for the final 30 minutes. This illustrates the record required; an actual 90°C reading is acceptable only if it meets the applicable OEM limit. Example unload at 12:45:07 and stop after OEM cooldown at 12:50:07.

14. Cycle crank and battery recovery record

WORKED EXAMPLE ONLY

The example engine is deliberately prevented from firing by the manufacturer test mode. Normal power remains available to the building. The technician confirms the starting circuit will be restored immediately after the test.

Event	Example period	Duration	Example outcome
Crank attempt 1	13:00:00–13:00:15	15 s	Engine prevented from firing
Rest period 1	13:00:15–13:00:30	15 s	Starter disengaged
Crank attempt 2	13:00:30–13:00:45	15 s	Engine prevented from firing
Rest period 2	13:00:45–13:01:00	15 s	Starter disengaged
Crank attempt 3	13:01:00–13:01:15	15 s	Engine prevented from firing
Failure-to-start timeout	13:01:15	75 s total	Cranking stopped; overcrank alarm/lockout indicated

Battery charger recovery after the crank test

Minutes after test	Clock time	Charge current A	Battery bank V	Example observation
0	13:01:15	10.0	25.4	Recovery charging
5	13:06:15	6.0	26.4	Current reducing
10	13:11:15	2.0	27.1	Approaching float
15	13:16:15	1.0	27.2	Approaching steady float condition

15. Safety function and alarm register

WORKED EXAMPLE ONLY

The E result below illustrates a satisfactory response; it does not certify a test. Enter the actual setpoint, method, local indication, remote response, shutdown result and reset confirmation in the field record.

Function	Example observed response	Entry
Overcrank	Timeout and lockout; local visual and required remote alarm	E
Low coolant temperature	Indication and required remote alarm; no shutdown	E

Function	Example observed response	Entry
High engine temperature prealarm	Indication and required remote alarm; no premature shutdown	E
High engine temperature shutdown	OEM simulation causes shutdown and required alarms	E
Low lube-oil pressure	OEM simulation causes shutdown and required alarms	E
Overspeed	OEM simulated input; shutdown, lockout and required alarms	E
Low main-tank fuel	Simulated low level; indication and required remote alarm	E
Low coolant level	Indication and required remote alarm; shutdown follows approved configuration	E
EPS supplying load	Load indication / ammeter confirms output	E
Control not in AUTO	Local indication and required remote alarm	E
High battery voltage	OEM simulated input; required visual indication	E
Low cranking voltage	OEM simulated input; indication and required remote alarm	E
Low battery voltage	OEM simulated input; required visual indication	E
Battery charger ac failure	Controlled input loss; required visual indication	E
Lamp test	All applicable indicators operate	E
Local and remote common alarm	Applicable alarms reach required attended/remote location	E
Audible alarm silence and reset	Silence operates; a subsequent alarm is not inhibited	E
Air or hydraulic starting pressure	Electrical starting only; neither arrangement fitted	E-NA
Air shutdown damper	Not fitted in assumed OEM arrangement	E-NA
Local and remote emergency stops	Each fitted device stops engine under controlled conditions; reset verified	E
Overload and load shedding	Optional-load shedding not fitted in example; actual applicability to be checked	H
2025 Level 1 start-signal monitoring	Broken / disconnected / short-circuit simulations initiate EPS under OEM method	E; if 2025 applies

16. Test report findings and acceptance decision

Actual acceptance decision

The worked results illustrate a Type 10 automatic supply restoration, a 90-minute intended-load test, the 120-minute staged load test, 30 minutes of stable full-load temperature difference, a complete cycle-crank sequence and a battery recovery record. These observations are fictional and cannot establish actual compliance.

Outstanding information for the real report

Open item	Required closeout	Responsible party
Project identity and requirements	Project/location, drawing revisions, NFPA/SBC editions and EPSS Level/Type/Class	Designer / consultant
Equipment identity and settings	Actual nameplates, serials, breaker settings, ATS settings and OEM operating limits	Contractor / OEM
Site output and fuel autonomy	OEM derating at site altitude/ambient; required fuel duration and usable fuel calculation	Designer / OEM
Installation evidence	Earthing/bonding, insulation tests, torque/startup records and complete inspections	Contractor / OEM

Open item	Required closeout	Responsible party
Test results	Genuine timing traces, all load readings, temperature trend, crank and safety test records	Commissioning team
Exceptions and non-applicable items	Document justification; consultant agreement and AHJ review where required	Contractor / consultant
Defects and retests	Close every fail/hold item; repeat affected functions or duration as agreed	Contractor / consultant
Certification and handover	Full names, registration details, signatures, restored AUTO and operator handover	Contractor / consultant

Defect and retest record

Defect ID	Description / failed criterion	Action and retest	Closeout
H-01	No actual site readings supplied	Execute and witness this procedure	OPEN
H-02	Project/OEM documents and certificates pending	Submit and review before acceptance	OPEN

17. References

Subject	NFPA 110 clause
EPSS Class, Type and Level	4.2–4.4; tables 4.1(a) and 4.1(b)
Installation completion and AHJ notification	7.13.1–7.13.3
Normal-power failure and cold-start route	7.13.4.3.1–7.13.4.3.2; associated annex notes
Parallel system functions	7.13.4.3.3–7.13.4.3.4(1)
Timing and building-load duration	7.13.4.3.4(2)–(10)
Retransfer and cooldown	7.13.4.3.4(11)–(12); 7.13.4.4
Full-load stages and site derating	7.13.4.5.1–7.13.4.5.4
Coolant stability relative to ambient	7.13.4.5.3
Unity power factor and factory certificate	7.13.4.5.5
First and recurring readings	7.13.4.5.7–7.13.4.5.8
Cycle-crank and battery charge-rate observations	7.13.4.6–7.13.4.6.3; 5.6.4.2; table 5.6.4.2
Safeties, alarms and permitted evidence	7.13.4.7–7.13.4.7.2; 5.6.5–5.6.6; table 5.6.5.4
Documents for the AHJ	7.13.4.8
Additional 2025 Level 1 start-signal monitoring	5.6.5.9 in the 2025 edition

Reference

National Fire Protection Association, *NFPA 110 Standard for Emergency and Standby Power Systems* (2022 edn)

18. Appendix A – Initial acceptance test form



EMERGENCY POWER SUPPLY SYSTEM (EPSS) TEST CD FORM

Pin No.		Date	
Location		Application Number	
Project Name			
Owner			

CD Approved Drawing Ref. No.			
	Test Status	☐	Passed

Generator Set Capacity	KVA		Alternator Manufacturer					
	KW							
Serial Number			Serial Number					
Control Panel Manufacturer			Engine Manufacturer					
Serial Number			Serial Number					
Type of emergency loads connected. (i.e. fire lift, fans, pumps, etc...)			Start delay time	min	sec	Transfer delay time	min	sec
			Mains return delay time	min	sec	Generator cooling time	min	sec

ITEMS (as applicable)	Accepted		Remarks
	Yes	N/A	
A. Fuel System			
1. Main supply tank level			
2. Day tank level			
3. Day tank float switch			
4. Supply or transfer pump operation			
5. Solenoid valve operation			
6. Water in system			
7. Flexible hose and connectors			
8. Tank vents and overflow piping unobstructed			
9. Piping			

Contractor Signature

Consultant Signature

*Note: All Fields are Mandatory

B. Lubrication System			
1. Oil level			
2. Oil filters			
3. Lube oil heater			
4. Crankcase breather			
C. Cooling System			
1. Fluid level			
2. Adequate cooling water to heat exchanger			
3. Rod out heat exchanger			
4. Adequate fresh air through radiator			
5. Clean exterior of radiator			
6. Fan and alternator belts			
7. Water pump(s)			
8. Condition of flexible hoses and connections			
9. Jacket water heater			
10. Louver motors and controls			

ITEMS (as applicable)	Accepted		Remarks
D. Exhaust System	Yes	N/A	
1. Leakage			
2. Drain condensate trap			
3. Valve clearance			
4. Torque bolts			
E. Intake System			
1. Air intake system designed to prevent injection of water or other exhaust gases			
2. Intake pipe routed well away from heat sources			
F. Electrical System			
1. Battery			
2. Operating voltage			
3. Brand/Model			
4. Battery type			
5. Is battery connected to engine block?			

Contractor Signature

Consultant Signature

***Note:** All Fields are Mandatory

G. Control Panel			
1. Genset control model brand			
2. Is there synchronization property?			
3. Installation place, distance to the Genset			
4. Alternator output circuit breaker brand/model/AMPS			
5. Circuit breaker distance from alternator			
H. Generator			
1. Brush length, appearance, free to move in holder.			
2. Commutator and slip rings			
3. Rotor and stator			
4. Bearings			
5. Exciter			
6. Voltage regulator			
7. Measure and record resistance readings of windings with insulation tester.			
8. General condition of EPSS, any unusual condition of vibration, leakage, noise, temperature or deterioration.			
9. System in automatic operation condition.			
I. Safety Precaution			
1. Fluid leakage			
2. Grounding			

Functional and Load Test	
1. Is genset operated manually without load?	
2. Is emergency stop button tested?	
3. Is there any problem at start and operation?	
4. Coolant temperature value	
5. Frequency value	
6. Is there any abnormal vibration and knocking?	
7. Is there any oil – fuel – coolant air leakage?	
8. Is start and operating time inside the requested limit of 30 seconds?	
9. Is load transfer duration inside the limits?	
10. Is there any problem in load transfer or panel?	
11. Is phase sequence correct?	
12. Auto mains failure test?	
13. High water temperature trip?	
14. Low lube oil pressure trip?	
15. Emergency stop?	

Contractor Signature

Consultant Signature

***Note:** All Fields are Mandatory

Readings	
1. L1 – N	
2. L2 – N	
3. L3 – N	
4. L1 – L 2	
5. L2 – L3	
6. L3 – L2	
7. Oil pressure (bar)	
8. Temperature before starting	
9. Temperature after starting	
10. Number of Cranking at least 3 times	

SL No	Time	Load (AMPS)			KV A	PF	Voltage			Hz	Temp	Oil Pres	Batt Volt
		R	Y	B			R	Y	B				

CERTIFICATION

The system as specified above has been installed and tested, in accordance with latest edition of NFPA, SBC and CD approved drawings

Contractor

(Signature over Printed Name with Stamp)

(Saudi Engineering Council License No. / Mobile No.)

CERTIFICATION

The undersigned accepted the testing report for the system as specified herein.

Consultant

(Signature over Printed Name with Stamp)

(Saudi Engineering Council License No. / Mobile No.)