

260800-H: SUPPLEMENTAL ELECTRICAL ACCEPTANCE TEST

Related Sections

Basis Guideline: [260800](#) - "Electrical Acceptance Test"
[260913-H](#) – "Electrical Power Monitoring"

References:

Special Instructions to Designers, see [Codes and Regulations](#)
[Standard Details: Isolation Power System E-IP-1 and E-IP-2](#)

NEC 517, "National Electrical Code"; Section 160: Isolated Power Systems

NFPA 99, "Health Care Facilities Code"; Sections 6.3.3.1.6, 6.3.3.2, 6.3.3.3.2, 10.3.6

For an explanation of the use of these guidelines, see ["Design Guidelines for UMHC Facilities"](#)

Isolated Power Systems (IPS)

A certification test report shall be submitted to the Owner for each IPS that is modified or installed within any given scope of work. Refer to the Special Instructions to Designers for the year of adoption of each mentioned Codes and Regulation. The Certification Report which documents the Isolated Power System (IPS) has met all qualifications and include the following:

1. All fixed equipment tested and not one circuit shall exceed 5.0mA.
2. Portable equipment shall not have the leakage current exceed 100µA with the ground wire closed and shall not exceed 500µA with ground wire disconnected.
3. All circuits shall have the current readings with equipment on and off. Provide identification of each circuit as it is shown on panel schedule.
4. Confirm that each new or modified Line Isolation Monitor (LIM) will actually create audible and visual alarms as described by the manufacturer. Test each circuit through a resistor whose value is $200 * V$ (ohms), where V equals measured line voltage. Record the LIM alarm milliampere value indicated. Confirm that the LIM alarms can be acknowledged/muted.
5. Each Hospital Grade receptacle covered by the IPS shall have a pull test that exceeds 4 ounces (115 gram).
6. Test and report any reverse polarity receptacle wiring.
7. Test all conductive surfaces for the voltage potential 20 millivolt limit and report any non-bonded metal storage cabinets.
8. Confirm that all isolated power panels in each room are bonded together with a minimum #6 AWG green THHN cable and not to be bonded to other Isolation Panels outside of the room.
9. Identify any incorrect panel schedule circuit labels.
10. Identify any existing non-code compliant wiring (ANSI type and/or color).
11. Test all branch circuit wiring for leakage currents to ground (wiring shall be isolated from panel boards, wiring devices and hard wired equipment). Recommend replacing the wiring on any circuit exceeding IPS manufacturer's recommendations.
12. Test that the resistance between the ground point of each receptacle and the reference point is less than 0.2 ohms.
13. Test that the system impedance of the isolated system must exceed 200,000 ohms, including receptacles but not light fixtures or components of fixtures.
14. New isolated power systems shall be commissioned and certified by a qualified agency.
15. Existing isolated power systems shall be re-certified by a qualified agency.
16. All conductors distributed from the IPS shall have dielectric constant of 3.5 or less, type XHHW-2 meets this requirement and is type that is recommended by the IPS Manufacturers.
17. Simulate an alarm condition to confirm audio and visual alarms.

The results of all tests performed by the qualified agency shall be documented in a report that contains all of the above and also contains the following:

1. Michigan Medicine project title including RTN number and AEC project number or Work Order number.
2. Date of test and date of report submission.
3. Indicate if the report is a resubmission based on retesting after originally identified issues were later remediated. Include the original test report submission date if that is the case.
4. Qualified agency certifier's name and contact information.
5. Each qualifier mentioned above shall be clearly identified as a pass/fail status.
6. A description of any other code violations observed in the room by the certifier. For example; non GFCI or isolated power receptacles providing power to booms or other portable equipment capable of extending into the patient vicinity

Engine-Generators, Automatic Transfer Switches and Paralleling Gear

The following additional tests, to engine generator, and automatic transfer switches shall be performed beyond what is in 16950. These are especially important on any installation with more than one generator installed.

1. Affirm that all generators start and synchronize upon loss of power.
2. That all priority one loads (Life Safety and Critical) are powered within 10-seconds.
3. That loads are added in priority order as more capacity becomes available.
4. That the loss of a generator or an increase in a higher priority load shall automatically shed sufficient lower priority loads to insure remaining generators do not become overloaded.
5. That all Life Safety and Critical transfer switches can transfer during tests and on restoration of power so the loads are not disturbed (closed transition or STS). Do like tests on any other ATS's having closed transitioning.
6. On ATS's not having closed-transition switches, affirm that 'in-phase' controls only transfer when the two sources are within specified phase angle.
7. Provide documentation that includes all the settings for each ATS.
8. Test for smooth operation of maintenance bypasses, to affirm loads are not interrupted during operation in 'either direction'.
9. Confirm communication with power monitoring systems, including monitored points and associated alarm.
10. Confirm that fuel delivery systems meet drawings and specifications, including sequence of operations, controller response to alarms and loss of communication to components, and manual backup systems.
11. Replacement of an existing ATS, Generator, or Paralleling Gear should include load bank test when it is in its final location and power sources terminated, prior to supporting load that is related to patient care.

Security Systems

1. Proper operation of all electronic access control (EAC) doors are tested, both in non-secured, and secured states, under the following conditions. [If 50% of the doors (minimum of one), of each configuration, pass then the testing of the remaining doors in that grouping may be waived by the commissioner]. These tests, when appropriate, are done in concert with auto door operators and electrified door hardware contractors.
 - a. Normal power available, no fire alarm.
 - b. Normal power available, with fire alarm
 - c. Normal power not available, no fire alarm.
 - d. Normal power not available, with fire alarm.
 - e. Affirm that all interfaces to other doors, and/or other devices are working properly.
 - f. Affirm that sequence of operation for each location is followed by installed systems.
2. Proper operation of CCTV cameras, switchers, monitors and recorders.
 - a. Test for proper operation of all cameras, and PTZ controls from Facilities Control Center.

- b. On fixed cameras affirm proper targeting of camera
 - c. Test cameras under normal lighting and emergency level lighting to affirm clear images
 - d. Test that programmed initiating events (alarms) brings camera up on alarm monitor, and that real time recording begins on DVR.
 - e. Affirm other operational sequences noted in contract documents.
3. Other security systems such as Infant Monitoring, Equipment tracking, and other 'special' systems are tested in normal and abnormal circumstances (as noted under EAC above), to affirm noted operational sequences given in contract documents are met.

Audio Visual Systems

Test all components of audio visual systems to affirm design criteria is being met for all modes of operation – standard audio/visual presentation, video conferencing, interaction with 'other end of line' for OR integration projects, etc. Also test operator interface, with user to affirm they can understand and use the system properly

Project Commissioning

The below noted systems shall be commissioned, following all of the requirements, procedures, submittal, training and other activities as defined on Campus web-page

Systems to be Commissioned

The systems and equipment will be commissioned include, but are not limited to the following:

<i>Electrical Systems</i>	<i>Mechanical Systems</i>
Alarm System	Air Handling Unit
A/V System	Alarm System
Clock	Building Automation System
Fire Alarm	Chiller
Generator	Chemical Treatment System
Heat Tracing	Fan Coil Unit
Intercom	Fire Pump
Nurse Call	Jockey Pump
Security System	Pneumatic Tube
Substations	Pump Controller
Transformer	RO/DI Water
480V UPS	Room Pressurization
	Smoke Evacuation
	Sterilizer
	Temperature Controls