1.0 SCOPE

This specification establishes the design, performance, environmental, manufacturing, inspection, test, acceptance, packaging and delivery for a Power Supply consisting of a 11.55 KW, 440 Vac to 350 Vdc converter.

2.0 APPLICABLE DOCUMENTS

2.1 **Government Documents**. The following documents, of the exact issue shown or current issue if not specified, form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considereda superseding requirement.

Military Specifications

MIL-I-45208A	Inspection System Requirements
MIL-S-901D	Shock Tests, H.I. (High Impact) Shipboard Machinery, Equipment and Systems, Requirements for
MIL-DTL-2036E	Enclosures for Electric and Electronic Equipment, Naval Shipboard

Military Standards

MIL-STD-108E	Definitions of and Basic Requirements for Enclosures for Electric and Electronic Equipment
MIL-STD-461G	Electromagnetic Emissions and Susceptibility Requirements forthe Control of Electromagnetic Interference
MIL-STD-1399-300 Type 1	Interface Standard, Low Voltage Electric Power, Alternating Current

Military Handbooks

MIL-HDBK-217	Reliability Prediction of Electronic Equipment
MIL-HDBK-454	Standard General Requirements for Electronic Equipment

Other Publications

NAVSEA TE-000-AB-GTP-010	Parts Derating Requirements and Application Manual for Navy Electronic Equipment
NAVSEA S9510-AB-ATM-010	Submarine Atmosphere Control Manual

2.2 **Non-Government Documents**. The following documents, of the exact issue shown or current issue if not shown, form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

Specifications

ASTM D 1868	Standard Method for Detection and Measurement of Partial Discharge (Corona) Pulses in Evaluation of Insulation System
ANSI-IPC-A610	Acceptability of Printed Board Assemblies

Standards

IEEE Standard 754
ISO9001

Federal Standards

FED-STD-H28A Screw Threads

Drawings

None

Other Publications

UL 1012	Power Units Other Than Class 2
IEC-801	Electromagnetic Transient and Radiation Standards

3.0 REQUIREMENTS

3.1 **Item Definition.** The Power Supply described herein consists of the following functional blocks in a single envelope:

a. A three phase power conditioner.
b. A 11.55 KW threshold (17.50 KW objective) converter that converts the output of the power conditioner to 11.55 KW threshold (17.50 KW objective), 350 Vdc (maximum) output.
c. A digital interface for external control and output of status (voltage, current, fault status).

3.1.1 **Interface Description**

3.1.1.1 **Connectors.** The Power Supply shall have separate input power, output power, and communications connectors. All connectors shall be mounted on the rear of the Power Supply.

3.2 **Characteristics**

3.2.1 **Performance Requirements**

3.2.1.1 **Input Voltage and Frequency.** The Power Supply input voltage and frequency shall be in accordance with (IAW) MIL-STD-1399-300 Type 1 440Vac 3-phase 60 Hertz (Hz) power.

3.2.1.2 **Output Power.** The Power Supply output voltage shall be 150 to 350 Vdc per the front panel setting (see paragraph 3.2.1.11.2) with a maximum rated current of 33 amps (threshold), 50 amps (objective).

3.2.1.3 **Overload.** The Charger shall be capable of sustaining an overload condition that drives its output into the constant current mode operation (per the output current adjustment of paragraph 3.2.1.13.2) for an unlimited duration. In order to protect the system is case of short circuit, an over load that drives the output voltage 70 Vdc below the Voltage Set Point, will cause the Charger to shut down after a delay of 1+/-0.25 seconds. Recovery will be done by manually resetting the Charger.

3.2.1.4 **Input Current Waveform.** Operation of the Power Supply shall have minimum harmonic distortion effect on the power source electrical system. Operation of the Power Supply

shall have no single harmonic line current or current of any frequency above the fundamental frequency at 60 Hz to 2000 Hz that exceeds the limit line set at 3 percent of the user equipment's fundamental frequency current. Additionally, single harmonic line current or current of any frequency above 2000 Hz through 20 kHz shall not exceed the limit line set at 6000/f percent of the user equipment's fundamental frequency current, where "f" is the variable frequency. Acceptable/unacceptable criteria can be found in Figure 23 of MIL-STD-1399-300-1.

3.2.1.5 **Transient Input Voltages and Frequencies.** The Power Supply shall withstand transient input voltages and transient input frequencies as described in Table II of MIL-STD-1399-300-1.

3.2.1.6 **Emergency Conditions.** The Power Supply shall not suffer any damage or degradation of components due to emergency conditions as described in Table II of MIL-STD-1399-300-1.

3.2.1.7 **Voltage Spike.** The Power Supply shall tolerate a voltage spike as described in Table II and when applied as shown in Figure 30 of MIL-STD-1399-300-1.

3.2.1.8 **Duty.** The Power Supply shall be rated for continuous operation over the full load range in the environment specified in paragraph 3.2.5.2.

3.2.1.9 **Regulation.** The static voltage regulation shall be 1% maximum over the load range for the input voltage range specified in 3.2.1.1. The dynamic voltage regulation shall be ±5% with recovery within 100 milliseconds for a 50% step load change.

3.2.1.10 **Ripple and Noise.** The maximum output ripple and noise spiking of the Power Supply shall not exceed 1 volt peak to peak.

3.2.1.11 **Efficiency.** The minimum efficiency of the Power Supply shall be 81%.

3.2.1.12 **Controls**

3.2.1.12.1 **Fault Reset.** The Power Supply shall automatically reset after a shutdown caused by overtemperature failure.

3.2.1.12.2 **Input/Output Controls.** The Power Supply shall have external input control and status/data output, both shall be compliant with Standard Commands for Programmable Instruments protocol. In addition, the Power Supply shall be able to operate in constant voltage and constant current control mode.

3.2.1.12.3 **On/Off Switch.** The Power Supply shall have a main two-position On/Off switch located on the front of the unit. All power to the unit will be isolated when the switch is open/off.

3.2.1.13 **Status and Fault Indicators**

3.2.1.13.1 **Status Indicators.** The Power Supply shall have the front panel status indicator lights (LEDS) and digital displays listed below.

1. Voltage Output Display. A digital readout, minimum of 4 digits, that displays the output voltage
2. Current Output Display. A digital readout, minimum of 4 digits, that displays the output current.
3. Voltage Limited Operation. An LED indicating that the Power Supply operates in the constant voltage mode.
4. Current Limited Operation. An LED indicating that the Power Supply operates in the constant current mode.

5. Overtemperature An LED will indicate over temperature condition
6. Remote. An LED indicating that the Power Supply is presently controlled by the remote digital interface

3.2.1.13.2 **Status.** The Power Supply shall monitor and report via the digital output interface the following status condition listed below at a minimum:

1. Output Voltage/Current. A message reporting actual voltage/current output.
2. Phase Loss. A message indicating that one of the input phases is missing.
3. Over Temperature. A message indicating that the Power Supply shutdown was caused by overheating.
4. Over Voltage. A message indicating the Power Supply shutdown was caused by an Overvoltage failure per Paragraph 3.2.1.3.
5. Overload. A message indicating the Power Supply shutdown was causedby an overload failure per paragraph 3.2.1.3.

3.2.1.14 **Grounding**

3.2.1.14.1 **Chassis Grounding.** The Power Supply chassis shall be grounded as shown in Figure 1. The design and construction shall be such that all exposed metal parts are at ground potential. Both input and output circuits shall be ungrounded. A stainless steel threaded ¼ inch diameter grounding stud extending ½ inch nominal from the rear panel with associated nuts and lock washers shall be provided as a safety ground connection. The 4th pin on the Power Supply AC input power connector shall be connected to the unit chassis.

3.2.1.14.2 **Ground Fault Detection Voltage.** The Power Supply shall tolerate a nominal 500 ± 50 VDC ground fault detection (G.F.D.) voltage superimposed on one leg of the input circuit continuously when the Power Supply is connected. The maximum current supplied from the G.F.D system will be 10 milliamp. Thesuperimposed voltage duration will be 10 ± 2 seconds.

3.2.1.15 **Insulation Resistance.** The insulation resistance for both the input and output circuits shall not be less than 10 megohms at the environmental service conditions specified in 3.2.5.2, measured at 500 VDC.

3.2.1.16 **Dielectric Withstanding Voltage.** The Power Supply shall be capable of withstanding a 1500 V rms dielectric test voltage lasting 1 minute at 60Hz. The equipment shall prevent electrical breakdown such as corona (defined in ASTM D 1868), flash over (surface discharge), spark over (air discharge) or insulation breakdown (puncture discharge) when subjected to the dielectric test voltage for periods up to one minute when the test voltage is applied between any single input or output pin and chassis ground.

3.2.1.17 **Power Factor.** The Power Supply shall operate within the voltage and frequency envelopes specified in 3.2.1.1 and 3.2.1.9 with an overall power factor within the range 0.8 lagging to 0.95 leading.

3.2.2 **Physical Characteristics**

3.2.2.1 **Dimensions and Configuration.** The Power Supply shall have an enclosure thatis rack mountable in a standard 19 inch rack. The Power Supply shall incorporate handles on the front to assist with installation or extraction of the unit from the rack. The Power Supply shall incorporate four PennEngineering Model PEM CLSS-032-3 self-clinching nuts on each side to facilitate attachment of a slide rail.

3.2.2.2 **Weight.** The weight of the Power Supply shall not exceed 75 pounds.

3.2.2.3 **Cooling Method and Clearances.** The Power Supply shall both be forced air cooled with the fan(s) located in the rear and/or front of the unit that require a clearance no greater than 3 inches from the face of the fan grill. The air flow direction shall be from front to back. The Power Supply top, bottom and sidecooling clearance requirements shall not extend beyond the front panel.

3.2.3 **Reliability**

3.2.3.1 **MTBF.** The Mean-Time-Between-Failure (MTBF) of the equipment defined by this specification shall be at least 30,000 hours. A NSB environment as specified in MIL-HDBK-217 and an operating temperature of 40 degrees C shall be used to calculate the equipment MTBF. Failure rate sources other than MIL-HDBK-217 shall be identified for each application with rational for its use.

3.2.3.2 **Reliability Tests.** Each unit shall accumulate 24 hours of power on operation (burn-in) at full load in a 50 degree C environment.

3.2.3.3 **Equipment Life.** The life of the equipment shall be 15 years minimum with an operating life expectancy of 50,000 hours minimum.

3.2.4 **Maintainability.** The equipment specified herein shall not require scheduled preventive maintenance such as lubrication and screwdriver adjustments more frequently than every ninety days. A modular design concept shall be used to the maximum extent practicable. Repair shall be limited to the replacement of assemblies, preferably of a plug-in type and shall not require the use of a soldering iron. Mean-Time-To-Repair (MTTR) of the equipment shall not exceed 2-1/2 hours.

3.2.5 **Environmental Conditions.** The equipment shall meet the functional,performance, reliability and service life requirements specified herein when subjected to the environmental conditions specified in the following paragraphs, both operating and non-operating. For environmental condition specifications, operating is defined as being used or operated in an active or powered state. Non- operating is defined as being in a dormant or non-powered state.

3.2.5.1 **Non-Operating Conditions**

3.2.5.1.1 **Non-Operating Temperature.** The Power Supply shall not be damaged nor shall subsequent operational performance be degraded as a result of being subjected to temperatures over a range of -17.8 degrees C to +70.0 degrees C (0 degrees F to 158 degrees F).

3.2.5.1.2 **Non-Operating Pressure.** The Power Supply shall not be damaged nor shall subsequent operational performance be degraded as a result of being subjected to an atmospheric pressure range of 57 kPa to 101 kPa (8.26 psi to 14.64 psi).

3.2.5.1.3 **Transport Shock Load Limit.** The Power Supply shall not be damaged nor shall subsequent operational performance be degraded as a result of being subjected to the following forces applied statically and independently when properly configured or packaged for transport. This shall be accomplished by installing an accelerometer on the package and dropping the package one time on each of its 6 sides on a flat, hard surface. The peak force on each face of the package shall be calculated using the peak accelerometer reading on each face. The force calculated shall be equal the g-levels shown below. After this test, the unit shall be removed from the package and tested to verify that it meets all performancerequirements of this specification."

a. Horizontal (fore, aft and lateral) 3.0 g

b. Up 2.0 g
c. Down 4.5 g

3.2.5.1.4 **Transport Vibration.** When properly configured or packaged for transport, the Power Supply shall be designed to withstand vibrations up to 2g at 10 to 150 Hz frequency for a period of at least 2 hours.

3.2.5.1.5 **Humidity.** The Power Supply shall not be damaged nor shall subsequent operational performance be degraded as a result of exposure to non-condensing humidity conditions in the 6% to 95% range.

3.2.5.2 **Operating Conditions**

3.2.5.2.1 **Operating Temperature.** The Power Supply shall meet specified performance requirements when operating in an ambient temperature environment range of 10 degrees C to 50 degrees C (50 degrees F to 122 degrees F).

3.2.5.2.2 **Shock.** The Power Supply shall meet MIL-S-901D, Grade B shock requirements.

3.2.5.2.3 **Humidity.** The Power Supply shall meet specified performance requirements when exposed to non-condensing humidity conditions in the 6% to 95% range.

3.2.5.2.4 **Drip.** The Power Supply shall meet the drip proof requirements in MIL-STD-108Efor equipment when not inclined in any direction.

3.2.5.2.5 **Inclination.** The Power Supply shall be capable of operating at any inclination angle up to 60 degrees from its normal operating position.

3.3 **Design and Construction**

3.3.1 **Materials, Processes, and Parts**

3.3.1.1 **Printed Circuit Boards.** All printed circuit boards shall be conformal coated using good commercial practices to protect against moisture induced corrosion and breakdown.

3.3.1.2 **Threaded Fasteners.** All threaded fasteners, including bolts, studs and nuts must meet the requirements of FED-STD-H28A for Screw Threads. All cap screws, nuts, bolts, washers, set-screws, keys and other fasteners shall be English-unit type; no metric fasteners shall be used. Studs and bolts must be of sufficient length so that nuts, when tightened, expose at least one full thread. All nuts shall be torqued in accordance with published torque values. Torque Stripe or safety wiring will beused to insure retention of proper tightening.

3.3.1.3 **Electrical Cables, Connectors and Penetrators**

3.3.1.3.1 **Electrical Cables.** Insulation on all internal wiring and cables shall be non-toxic and non-flammable in oxygen enriched environment and meet the requirements of Submarine Atmospheric Control Manual S9510-AB-ATM-010. Teflon coated wire or Kaptan polymide film over FEP insulation is preferred.

3.3.1.3.2 **Electrical Connectors.** Connectors shall be designed so that they may be readily connected or disconnected by the operator without risk of electrical shock. Connector housings shall be suitable to the application environment. Pins and sockets shall be constructed of corrosion resistant material or plated to prevent corrosion and electrical discontinuities.

3.3.1.4 **Part Derating.** For new designs, derating of electronic and electromechanical partsshall

be in accordance with NAVSEA TE-000-AB-GTP-010. For existing equipment designs (includes modified commercial off the shelf (COTS) equipment), it shall be assured that none of the parts are stressed beyond their specified ratings when the equipment is operating in its intended application.

3.3.1.5 **Electrostatic Discharge (ESD).** ANSI IPC A-610 or equivalent shall be used for guidance in the handling and control of hardware containing components susceptible to damage due to ESD. Warning labels shall be affixed to the protectivepackaging and to the equipment. Warnings shall be provided in all relevant areas ofthe system technical manual. Identification markings shall be affixed on all ESD sensitive subassemblies and shall be visible to the maintenance personnel prior to maintenance handling in the equipment. Enclosures, assemblies and subassemblies containing class 1 or class 2 ESD sensitive components shall be appropriately marked. Spare parts, modules, printed circuit board subassemblies, and so forth shall be protected from ESD damage.

3.3.1.6 **Parts Availability.** The vendor shall warrant that fit, form, and function equivalents of all components and subassemblies manufactured by them shall be available tothe Procuring Activity for a period of ten (10) years from date of equipment purchase order.

3.3.1.7 **Hazardous Materials.** Materials used in fabrication or required for maintenance shall not adversely affect the health or safety of personnel or introduce atmosphericcontaminants that could have deleterious effects on machinery or equipment. Solvents, cleaning agents, oil and materials which could be classified as flammable, or subject to rapid evaporation or have distinctive odors must be carefully selected. Typical prohibited materials are mercury, asbestos, aerosol spray can products, acetone, methyl ethyl ketone, methyl alcohol, toluene and vinylchloride. Materials used shall not produce toxic or noxious fumes over the operating temperature range specified or at any temperature below 95 degrees C while non-operating and shall meet the requirements of Submarine Atmospheric Control Manual S9510-AB-ATM-010.

3.3.2 **Electromagnetic Radiation.** The Power Supply shall be designed to comply with requirements CE101, CE102, CS101, RE101, RE102, RS101, and RS103 of MIL- STD-461, Requirements for Control of Electromagnetic Interference Emissions and Susceptibility. Testing is not required if it can be shown by analysis, previous application data or other means, that the Power Supply complies with the requirements specified or that the design is consistent with written guidelines intended to minimize conducted and radiated emissions and susceptibility

3.3.3 **Identification and Marking.** Each unit shall be marked with the following information as a minimum:

a. Manufacturer's name, registered trademark, or Commercial and Government Entity (CAGE) Code
b. Manufacturer's part number and revision number
c. Manufacturer's serial number
d. ESD marking as called out in Paragraph 3.3.1.5

3.3.4 **Workmanship.** Workmanship standards shall conform to Requirement 9 of MIL- STD-454.

3.3.5 **Safety.** Safety precautions shall be taken in equipment design per MIL-STD-454, Requirement 1. Commercial off the shelf (COTS) equipment that has been tested in accordance with UL1012 shall be considered as having met the provisions of MIL- STD-454, Requirement 1. Modified COTS equipment which has any modification tothe primary voltage (above 42.4 volts) areas requires recertification. Hazardous materials requirements of 3.3.1.7 shall be adhered to.

3.3.6 **Human Performance/Human Engineering.** The Power Supply shall each be designed for ease of operation of the man-machine interface for all equipment functions. The equipment shall exhibit modular design architecture which provides for replacement of assemblies.

3.4 **Documentation.** The contractor shall furnish technical data documentation asspecified in the associated Statement of Work. This documentation may include, but is not limited to, the following items:

Top Level Assembly Drawing Contractor's
Quality Assurance ManualOperating and
Maintenance Manual Qualification Test
Plan
Qualification Test Results
Acceptance Test Procedure (including ESS)
Acceptance Test Results
MTBF Prediction
Configuration Control Plan
Recommended Spares List
Failure Summary Report
Humidity Analysis (by similarity)
Drip Proof Analysis

3.5 **Logistics**

3.5.1 **Maintenance.** The technical manuals shall provide detailed maintenance instruction on the equipment.

3.5.2 **Supply.** The vendor shall warrant that a continued source of supply of additional items be available to the procuring activity. Warranty shall include availability of parts, components and services which shall be required to ensure continued use of items purchased.

3.6 **Precedence.** When the requirements of this specification or applicable subsidiary documents are in conflict, the following precedence shall apply:

a. Contract purchase order which references this specification
b. This specification
c. Applicable subsidiary documents

The contractor shall notify the procuring activity of each instance of conflicting, orapparently conflicting, requirements.

3.7 **Measurements.** Measurements shall be rounded off to significant digits IAW IEEE Standard 754.

4.0 **QUALITY ASSURANCE PROVISIONS**

4.1 **Qualification.** The equipment shall satisfy the qualification requirements of this specification. Qualification testing shall be applicable as noted on the purchase order. Qualification methods shall be as defined in Table 4.1-1, Qualification Cross Reference. The methods indicated in the table are described as follows:

a. Analysis. Qualification by analysis shall include auditable documentation which shall be subject to procuring activity review and approval.
b. Simulation. Qualification by simulation shall be through use of a physical mock-up or a computer model whose characteristics can be shown to provide an accurate

simulation of the item.

c. Demonstration. Qualification by demonstration shall be through the exercise ofthe item(s) to assure that the specified qualitative functions can be performed. Instrumentation or data recording beyond that inherently provided in the item(s) being qualified shall generally not be required.

d. Inspection or Test. Qualification by inspection or test shall provide quantitative measurements of specified parameters to verify compliance with requirements. These shall be performed by the contractor and/or his suppliers and shall be subject to procuring activity verification. Procurement activity verification shall consist of the following:

    1. Surveillance of the operations to determine that practices, methods, and procedures of the Quality Assurance System are being properly applied.
    2. Procuring activity product inspection to measure the quality of the productto be offered for acceptance.

Except as otherwise noted, the contractor may use its own or any other facility suitable for the performance of the tests and inspections. It shall be the responsibility of the contractor to identify, in a timely manner, the need for use of Government facilities for testing.

4.1.1 **Responsibility for Inspection.** Unless otherwise specified in this specification orin the purchase order, the vendor is responsible for providing all test and inspectionequipment, facilities, fixtures and personnel required for conducting and monitoring tests and inspections, unless otherwise specified in this specification or purchase order. The procuring activity reserves the right to witness tests or inspectionsspecified herein and to reinspect or retest items to assure compliance with the requirements.

4.1.2 **Special Tests and Examinations.** Formal tests shall include the following types:

a. Qualification tests to verify that the unit meets all requirements.
b. Factory Acceptance Tests (FAT) performed on each deliverable unit.

4.1.2.1 **Qualification Tests.** A one-time qualification test shall be performed to ensure that the unit meets the requirements of this specification.

4.1.2.1.1 **General.** The qualification test shall be performed on models, prototypes, or first deliverable equipment and may be used to support engineering analysis to demonstrate that specified requirements will be met. When the tests are planned in order to satisfy requirements of this specification, the contractor shall provide aplan describing the testing to be performed.

4.1.2.1.2 **Environmental Testing.** It is anticipated that the contractor's test program will include a significant amount of engineering evaluation and/or analysis (in lieu of full scale testing to military standards) in order to demonstrate compliance with the environmental requirements specified in 3.2.5. The design analyses shall be submitted to the procuring activity for review and approval. As a minimum, the contractor shall:

a. Submit design analyses to verify conformance with the specified shock and vibration requirements.

    1. Shock analysis - In lieu of testing, a static analysis may be performed to verify that stress levels in the main structural members resulting from shock loading specified do not exceed the material yield strength.
    2. Vibration analysis - In lieu of testing, a dynamic analysis may be performed to verify that the unit(s) furnished are capable of meeting vibration requirements.

b. Submit design analyses to verify performance over the specified operating temperature ranges.
c. Submit design analyses and/or supporting rational used to verify compliance with all other environmental requirements.

4.1.2.2 Factory Acceptance Tests

4.1.2.2.1 Primary Equipment Acceptance Testing. Primary equipment provided under this specification shall be tested / demonstrated / inspected (as defined in Table 4.1-1) to verify compliance with the requirements of Section 3. For non-developmental items the contractor shall submit a copy of his existing factory test procedures for the item(s) for review by the procuring activity. The test procedures shall be submitted to the procuring agency 60 days prior to scheduled start of testing. The contractor shall notify the procuring activity of the actual start of test no later than10 days prior to that date. Completed test data sheets shall be delivered to the Procuring Activity with the equipment or as otherwise specified in the purchase order.

4.2 Quality Conformance Inspections. The contractor shall provide a Quality Inspection System conforming to the requirements of ISO9001 or equivalent. It shall be acceptable to the Procuring Activity for supplies and services herein. The Quality Assurance Program Plan shall be submitted to the Procuring Activity for approval and shall include workmanship and ESD control criteria. In addition, the contractor shall be responsible for performing or having performed tests and/or inspections that are required to verify compliance to all requirements specified in Section 3 in accordance with the methods indicated in Table 4.1-1. All equipment used toinspect and test must be calibrated.

4.2.1 Nonconforming Material. The contractor is not given the authority for MaterialReview Board (MRB) activity relating to any nonconformance (Major or Critical) which affects dimensional or functional performance as defined by the contract or specification. All nonconformances of this nature must bedocumented and submitted to the Procuring Activity, in addition to the cause and corrective action, for disposition and approval by the customer. Under no circumstances, may work continue prior to customer approval. All other nonconforming items (Minor), relative to productfeatures not defined by the contract or this specification which do not affect form, fit, function, reliability, maintainability, safety, and/or weight, may be dispositionedby the contractor's internal MRB. The contractors must maintain a file of all records associated with the end item and submit minor MRB actions to the Procuring Activity for information and review. The Procuring Activity reserves the right toreject disposition decisions of minor nonconformances. The contractor will be notified within three (3) working days if disagreement occurs. The notification requirement for minor defects does not prohibit contractor's continuation of work, athis own risk, towards completion of the end item.

5 PREPARATION FOR DELIVERY

5.1 **Packaging and Packing Requirements.** All items shall be packed and packaged, using good commercial practices, to ensure parts will arrive at destination without damage.

5.2 Prohibited Packing Materials. The use of asbestos, excelsior, newspaper, or shredded paper (all types including waxed paper, computer paper and similar hygroscopic or non-neutral material) for packing material is prohibited. In addition, loose polystyrene is prohibited for shipboard use.

6 NOTES

6.1 Suggested Source(s). Identification of the suggested source(s) of supply is not to be

construed as a guarantee of present or continued availability as a source of supply for the item described in this drawing.

REQUIREMENTS PARAGRAPH		QUAL METHOD					TEST TYPE				QUAL LEVEL				NOTES
		ANALYSIS	SIMULATION	DEMONSTRATION	INSPECTION	TEST	ENGRG EVALUATION	FACTORY ACCEPTANCE	QUALIFICATION	CERTIFICATION	PARTS/COMPONENTS	SUBASSEMBLY	ASSEMBLY	CONFIGURATION ITEM	
3.2.1.1	Input Voltage and Frequency					X		X	X					X	1
3.2.1.2	Output Power					X		X	X					X	
3.2.1.3	Overload					X		X	X					X	
3.2.1.4	Input Current Waveform					X			X					X	
3.2.1.5	Transient Voltages and					X		X	X					X	
	Frequencies					X			X					X	1
3.2.1.6	Emergency Conditions					X			X					X	1
3.2.1.7	Voltage Spike	X							X					X	
3.2.1.9	Regulation					X		X	X					X	
3.2.1.10	Ripple and Noise					X		X	X					X	
3.2.1.11	Efficiency					X		X	X					X	
3.2.1.12.1	Fault Reset			X	X			X	X					X	
3.2.1.12.2	Output Controls			X	X			X	X					X	
3.2.1.13.1	Status Indicators			X	X			X	X					X	
3.2.1.13.2	Fault Indicator			X	X			X	X					X	
3.2.1.14.1	Chassis Grounding				X			X	X					X	
3.2.1.14.2	GFD Voltage					X			X					X	
3.2.1.15	Insulation Resistance					X		X	X					X	
3.2.1.16	Dielectric Withstanding Voltage					X		X	X					X	
3.2.1.17	Power Factor					X			X					X	
3.2.2.1	Dimensions & Configuration				X			X	X					X	
3.2.2.2	Weight				X				X					X	
3.2.2.3	Connectors				X			X	X					X	
3.2.2.4	Cooling Method/Clearances				X				X					X	

Table 4.1-1 1 Qualification Cross Reference

REQUIREMENTS PARAGRAPH		QUAL METHOD					TEST TYPE				QUAL LEVEL				
		ANALYSIS	SIMULATION	DEMONSTRATION	INSPECTION	TEST	ENGRG EVALUATION	FACTORY ACCEPTANCE	QUALIFICATION	CERTIFICATION	PARTS/COMPONENTS	SUBASSEMBLY	ASSEMBLY	CONFIGURATION ITEM	NOTES
3.2.5.1.1	Non-Operating Temperature	X							X					X	
3.2.5.1.2	Non-Operating Pressure	X							X					X	2
3.2.5.1.3	Transport Shock Load Limit			X					X					X	
3.2.5.1.4	Transport Vibration			X					X					X	
3.2.5.1.5	Humidity	X							X					X	
3.2.5.2.1	Operating Temperature					X			X					X	
3.2.5.2.3	Shock	X							X					X	
3.2.5.2.4	Humidity	X							X					X	
3.2.5.2.5	Drip				X				X					X	
3.2.5.2.6	Inclination			X					X					X	