

AERO
NAV



LABORATORIES, INC.



FULL SERVICE TESTING

- *Environmental*
- *Functional*
- *Developmental*

AERO NAV

RELIABILITY THROUGH TESTING

- **MILITARY**
- **COMMERCIAL**
- **AUTOMOTIVE**
- **TRANSPORTATION**
- **MARINE**
- **AEROSPACE**
- **MEDICAL**

ENVIRONMENTAL/FUNCTIONAL/DEVELOPMENTAL TESTING

- Lightweight high impact shock
- Mediumweight high impact shock
- Heavyweight high impact shock
- Enclosure (dripproof, watertight, immersion, etc.)
- Explosive atmosphere
- Explosive decompression
- High & low temperature with vibration
- Humidity
- Icing
- Highly accelerated stress screening (HASS)
- Sand & dust
- Structureborne, airborne and acoustic noise
- Temperature altitude
- Temperature shock
- Acceleration
- Blowing rain
- Solar radiation
- Fungus
- Inclination
- Shaker shock (classical and shock response spectrum)
- Spike voltage
- High & low temperature
- Seismic loading
- Wind tunnel
- Strain gage
- Fire resistance
- Hydraulic burst
- Altitude
- Highly accelerated life test (HALT)
- Vibration (sine, random, seismic, gunfire, etc.)
- Salt spray
- Accelerated weathering
- EMI / RFI
- Voltage & frequency transients & variations
- Insulation resistance & dielectric withstanding voltage
- DC magnetic field
- Package (bounce, drop, impact, etc.)
- Magnetic permeability
- Pneumatic & hydraulic pressure
- Solderability
- Underwriters Lab & National Sanitation Foundation

CUSTOMER SUPPORT SERVICES

- Test plan preparation
- Engineering analysis
- Complete formal test reports with digital color photographs in electronic and hard copy
- Flexible scheduling to meet customers program needs
- On-site DCMAO representative for military programs.
- Field testing
- Customer area with computer highspeed internet access
- Fixture design and fabrication
- Technical support
- Facilities are readily modified for extended range testing to meet customer's unique requirements
- Establish environmental test specifications

AERO NAV LABORATORIES, INC.

INSTRUMENTATION

- Pressure & temperature transducers
- Wind velocity meters
- Sound level meters
- Computer data analyzers
- Microprocessor controlled high voltage ac/dc dielectric strength tester
- Dynamometers
- Flow meters, air & liquid
- Power measurement meters (3 phase)
- High speed vibration/shock data acquisition
- Strain gages
- Light spectrum measurement
- Digital multi-channel storage oscilloscopes
- Digital scales

PHOTOGRAPHS

Filtration system on mediumweight shock machine



Underground centrifuge



COMPANY DESCRIPTION

AERO NAV LABORATORIES has served the military, commercial, automotive, transportation, marine, medical and aerospace communities with a complete range of environmental test services, facilities, and engineering support since 1974. Conveniently located at the crossroads of the world, just 10 minutes from New York's LaGuardia Airport, AERO NAV'S 22,000 square foot facility provides a readily accessible and convenient focus for all of our customer's test needs.

Our facilities and support capabilities allow for the testing of equipment from large shipboard systems down to small electronic chassis and components.

SPECIFICATIONS AND STANDARDS

- Military specifications and standards
- SAE, ASTM, ISO, IEC, UL, NSF, RTCADO-160, ABS, etc...
- Various automotive and medical specifications

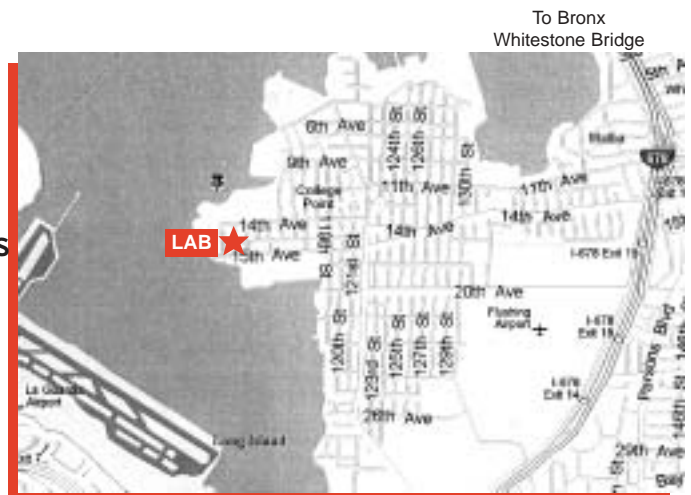
CERTIFICATIONS

- Conformity European (CE) certification
- Defense Electronics Supply Center (DESC)
- MIL-Q-9858, Quality System Certification by Defense Contract Management Agency
- Approved HI shock test facilities, lightweight and mediumweight equipment, Dept. of Navy, Naval Sea Systems Command

MEMBERSHIPS

- Long Island Association
- Long Island Forum for Technology
- Institute of Environmental Sciences and Technology
- Hauppauge Industrial Association
- American Society of Naval Engineers
- American Society of Mechanical Engineers
- Navy League of the United States

*This map shows where we are located.
You are welcome to visit us.*



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AERO NAV LABORATORIES

FLUID SYSTEM COMPONENTS SHOWN ON LIGHT & MEDIUM - WEIGHT SHOCK MACHINES

MEDIUM WEIGHT SHOCK
8 INCH 3 WAY BALL VALVE
W/ ACTUATOR,
BNL INDUSTRIES , INC.



MEDIUM WEIGHT SHOCK
8 INCH
MOTORIZED STRAINER,
THE HELLAN STRAINER CO.



LIGHT WEIGHT SHOCK
2 INCH BALL VALVE
BNL INDUSTRIES , INC.



LIGHT WEIGHT SHOCK
1 1/2 INCH BALL VALVE
W/ ACTUATOR
THE HELLAN STRAINER CO.



MEDIUM WEIGHT SHOCK
6 INCH GATE VALVE,
WILLIAM E. WILLIAMS VALVE
CORP.



MEDIUM WEIGHT SHOCK
6 INCH SIMPLEX STRAINER
TATE ANDALE, INC.



LIGHT WEIGHT SHOCK
2 INCH GLOBE VALVE,
WILLIAM E. WILLIAMS VALVE
CORP.



LIGHT WEIGHT SHOCK
4 INCH VENT
TATE ANDALE, INC.



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Reliability Through Testing

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ENVIRONMENTAL TESTING

Commercial and Military

- Environmental Stress Screening (ESS)
- Vibration Testing
 - Sine, Random, Gunfire
- Simulated Environmental Testing
 - Temperature, Humidity, Altitude
 - Acceleration, Salt Spray, Sand & Dust
 - Explosive Atmosphere, Rain, Sunshine, Fungus, Noise, Shock
- Navy High Impact Shock Testing (MIL-S-901), Light Weight Shock Testing, Medium Weight Shock Testing
- Electrical Characteristics
 - Supply Line Voltage and Frequency, Transient Voltage and Frequency, Emergency Voltage and Frequency, Spike Voltage.
- EMI/EMC
- Gauge Calibration
- On-Site Resident DCMAO Reps
- Shock Testing
- Package Testing
 - Vibration (Bounce/Repetitive Shock), Compression Testing, Drop Testing, Pendulum Impact
- Specifications
 - MIL-STD-108, 167, 202, 331, 461/462, 740, 798, 810, 1399, 2036, MIL-S-901, MIL-I-983, MIL-E-5272, MIL-E-16400, MIL-T-5422, MIL-T-28800.
 - RTCA/DO-160, NAVMAT-P-4855-1, NAVMAT-P-9492, U.L. 471, NSF 2, NSF 7, FCC Part 15, NSTA, ASTM
- Defense Electronics Supply Center Certified

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RELIABILITY THROUGH TESTING

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FUNCTIONAL/DEVELOPMENT TESTING

Commercial and Military

- Engineering Support
- Wide Range Of Instrumentation Including:
 - Pressure & Temperature Transducers
 - Flow Meters
 - Power Supplies
 - Power Measurement
 - Wind Speed Measurement
 - Vibration/Shock Measurement
 - Sound Level Meters
 - Strain Gages
 - Structure-borne Noise Measurement
 - Computer Data Acquisition & Analysis
 - Light Spectrum Measurement
 - EMI Measurement
- Dedicated Laboratory Space
- Field Testing
- Strain Gage Testing
- Forensic Analysis & Testing
- Fire Resistance Testing
- Hydrostatic Burst Testing (Upto 10,000 psi)

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AERO NAV LABORATORIES NEWSLETTER

THIS NEWSLETTER IS PUBLISHED PERIODICALLY TO INFORM
OUR CUSTOMERS OF ITEMS OF INTEREST



HASS / HALT TEST CHAMBER

THE LAB'S NEW HASS/HALT CHAMBER HAS A 500 LB. CAPABILITY & CAN PROVIDE UP TO 65 G'S 3 AXIS VIBRATION, WITH A TEMPERATURE CHANGE UP TO 60°C PER MINUTE.

HASS/HALT TESTING REDUCES DESIGN & DEVELOPMENT COSTS OF NEW PRODUCTS, THEY ALSO SERVE TO IMPROVE EQUIPMENT RELIABILITY RESULTING IN REDUCED FAILURES IN THE FIELD AND SUBSEQUENT RETURNS TO THE FACTORY FOR REWORK. THE ECONOMIC ADVANTAGES ARE EVIDENT.

- SEE INFORMATION SHEET 106 FOR ADDITIONAL TECHNICAL DESCRIPTIONS OF HASS / HALT



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AERO NAV LABORATORIES NEWSLETTER

THIS NEWSLETTER IS PUBLISHED PERIODICALLY TO INFORM OUR CUSTOMERS OF ITEMS WHICH MAY BE OF INTEREST.



WILL YOUR ENCLOSURE WITHSTAND WATER SPRAY, SPLASH, OR RAIN? OUR LABORATORY EQUIPMENT WILL VALIDATE THE CAPABILITY OF YOUR EQUIPMENT TO MEET ITS ENCLOSURE REQUIREMENTS. THE PHOTOGRAPH SHOWS AN ELECTRONIC CABINET BEING SUBJECTED TO DRIP TESTING. AN INTERNAL CAMERA IS INSTALLED WITHIN THE UNIT TO PROVIDE VISUAL INDICATION OF ANY POSSIBLE LEAKAGE.



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AERO NAV LABORATORIES NEWSLETTER

THIS NEWSLETTER IS PUBLISHED PERIODICALLY TO INFORM OUR CUSTOMERS OF ITEMS WHICH MAY BE OF INTEREST.



NEED TO KNOW THAT YOUR EQUIPMENT CAN OPERATE IN AN EXPLOSIVE ATMOSPHERE, OR WHETHER THE EQUIPMENT CAN WITHSTAND RAPID CHANGES OF PRESSURE?

THE EXPLOSIVE CHAMBER CAN VERIFY THE ABILITY OF YOUR EQUIPMENT TO MEET THESE REQUIREMENTS.



WHAT ABOUT THE EFFECTS OF SAND&DUST ON THE OPERATION OF YOUR EQUIPMENT?

THE SAND&DUST CHAMBER USES CALIBRATED MEDIA TO DEMONSTRATE THE TIGHTNESS OF EQUIPMENT ENCLOSURES AND SEALS.



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LABORATORY EQUIPMENT CAPABILITY

- LABORATORY RECEIVING DOOR: 12 FT. X 12 FT.
- RECEIVING CAPABILITY: 6 TON FORK LIFT.
35 TON CRANE AVAILABLE UPON NEED
- VIBRATION EQUIPMENT: 20,000 LB. WEIGHT WITH A 10 FT. X 10 FT. TABLE TOP
- ELECTRODYNAMIC SHAKER (FOR PERFORMING VIBRATION & SHOCK TESTING):
18,000 FORCE POUNDS
- HALT/HASS CHAMBER WITH 500 LB. CAPABILITY, 65 G'S 3 AXIS VIBRATION,
TEMPERATURE CHANGE UP TO 60° C/MIN
- LIGHTWEIGHT & MEDIUMWEIGHT HIGH IMPACT SHOCK MACHINES
- CENTRIFUGE WITH 500 LB. WEIGHT CAPABILITY UP TO 80 G'S ACCELERATION
LOAD
- TEMPERATURE CHAMBERS WITH RANGES FROM -100° C TO + 1200° C &
CAPABILITY TO MODIFY THESE RANGES TO SUIT CUSTOMERS SPECIAL NEEDS

NOTE

FOR DESCRIPTION OF OTHER LAB EQUIPMENT SUCH AS HUMIDITY, EXPLOSION,
SAND & DUST, ETC. CONTACT THE LABORATORY

- DIGITAL SCALE: 10,000 LB. CAPABILITY
- DYNAMOMETER: 50,000 LB. CAPABILITY
- TORQUE WRENCH: 2,000 FT-LB CAPABILITY
- LIQUID FLOWMETER: 1500 GPM
- AIR FLOWMETER: 1060 SCFM
- RESERVOIR: 1,800 GALLON CAPABILITY

Information Sheet 101



LABORATORIES, INC.

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TEST SPECIFICATIONS

THE DOCUMENTS BELOW PRESENT AN ABBREVIATED LIST OF TESTS PERFORMED BY AERO NAV LABORATORIES. FOR INFORMATION ON DOCUMENTS NOT LISTED AND FOR ASSISTANCE IN DESIGNING A TEST PROGRAM CONTACT THE LABORATORY.

MILITARY STANDARDS

MIL-STD-108, MIL-STD-167, MIL-STD-202,
MIL-STD-331, MIL-STD-461/462, MIL-STD-740,
MIL-STD-798, MIL-STD-810, MIL-STD-1399,
MIL-STD-2036

MILITARY SPECIFICATIONS

MIL-S-901, MIL-I-983, MIL-E-5272, MIL-E-16400,
MIL-T-5422, MIL-T-28800, MIL-V-24509, MIL-V-
17547, MIL-F-24755, MIL-T-27, MIL-M-17059, MIL-
L-23886, MIL-I-22023

MISC. MILITARY

NAVMAT P-4855-1, NAVMAT P-9492, PPD-802-6335704, MIL-HDBK-705, MIL-HDBK-781, MIL-HDBK-454, MIL-PRF-13830

NATIONAL SANITATION FOUNDATION

NSF #1, NSF #52

UNDERWRITERS LAB

UL 471, UL 50, UL 606, UL 681, UL 698, UL 427

COMMERCIAL

RTCA/DO-160 (COMMERCIAL EQUIVALENT
TO MIL-STD-810)

FEDERAL COMMUNICATIONS COMMISSION PART 15

OTHERS

- AMERICAN BUREAU OF SHIPPING (ABS)
- SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)
- INTERNATIONAL STANDARDS ORGANIZATION (ISO)
- AMERICAN SOCIETY FOR TESTING & MATERIALS (ASTM)
- INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

Information Sheet 102



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ENGINEERING TECHNICAL SUPPORT SERVICES

AERO NAV LABORATORIES HAS SERVED THE MILITARY, COMMERCIAL, AUTOMOTIVE, TRANSPORTATION, MARINE, MEDICAL AND AEROSPACE COMMUNITIES IN THE AREA OF ENVIRONMENTAL TESTING SINCE 1974. DURING THIS TIMEFRAME THE LABORATORY HAS ACCUMULATED A SIGNIFICANT BASE OF TESTING EXPERIENCE AND CAPABILITY.

THE PROVISION OF ENGINEERING SUPPORT SERVICES ALLOWS THE APPLICATION OF THIS TEST EXPERIENCE AND CAPABILITY TO ASSIST CLIENTS IN SUPPLYING RELIABLE EQUIPMENT, ABLE TO OPERATE SATISFACTORILY IN THEIR RESPECTIVE ENVIRONMENTS.

ENGINEERING SUPPORT SERVICES ARE AVAILABLE TO CLIENTS AS REQUIRED, IN THE AREAS OF:

- PERFORMING OF ANALYSES AND DESIGN REVIEWS OF CUSTOMER EQUIPMENT
- ESTABLISHING DESIGN AND ENVIRONMENTAL TESTING SPECIFICATIONS
- PREPARING ENVIRONMENTAL TESTING PROCEDURES AND REVIEW TEST RESULTS
- TEST FIXTURE DESIGN AND FABRICATION

Information Sheet 103



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SHOCK

SHOCK TESTING IN THE LABORATORY CAN TAKE TWO APPROACHES. SIMULATION OF EITHER THE SPECIFIED SHOCK CONDITIONS OR THE RESPONSE OF THE SYSTEM, KNOWN AS A SHOCK RESPONSE SPECTRUM (SRS), CAN BE PERFORMED.

SPECIFIED SHOCK TESTING

THE MOST COMMON TYPE OF SPECIFIED INPUT SIMULATION IS KNOWN AS CLASSICAL SHOCK TESTING. IT CONSISTS OF INPUTTING VARIOUS RELATIVELY NON-COMPLEX WAVEFORMS. THE THREE MOST COMMON ARE SHOWN BELOW.

COMMON SHOCK PULSES

(A) RECTANGULAR PULSE

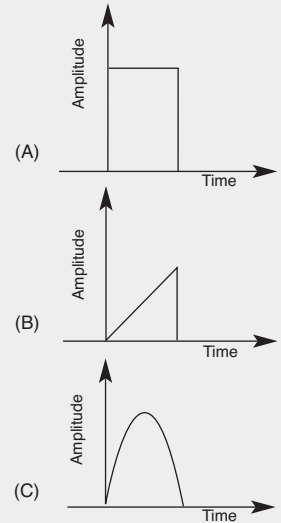
THE AMPLITUDE IS CONSTANT OVER THE TIMEFRAME

(B) SAWTOOTH PULSE

THE AMPLITUDE PEAKS AT THE END OF THE TIMEFRAME

(C) HALF- SINE PULSE

THE AMPLITUDE VARIES SINUSOIDALLY OVER THE TIMEFRAME



THESE SHOCK PULSES ARE IDEALIZED VERSIONS OF THE MOST COMMON PULSES THAT ARE ENCOUNTERED IN SERVICE. EQUIPMENT IS AVAILABLE IN THE LABORATORY TO SIMULATE THE DIFFERENT PULSES SHOWN ABOVE. THE SELECTED TEST PULSE IS DEPENDENT UPON THE ACTUAL SERVICE ENVIRONMENT.

SHOCK RESPONSE SPECTRUM

WHEN TESTING IS REQUIRED TO PRODUCE A LABORATORY SHOCK PULSE HAVING A SPECTRUM TAILORED TO THAT OF THE ACTUAL ENVIRONMENT, SHOCK RESPONSE SPECTRUM SIMULATION IS PERFORMED. A TYPICAL SHOCK RESPONSE SPECTRUM, AS SHOWN, IS A PLOT OF ACCELERATION VERSUS FREQUENCY.



Information Sheet 104



LABORATORIES, INC.

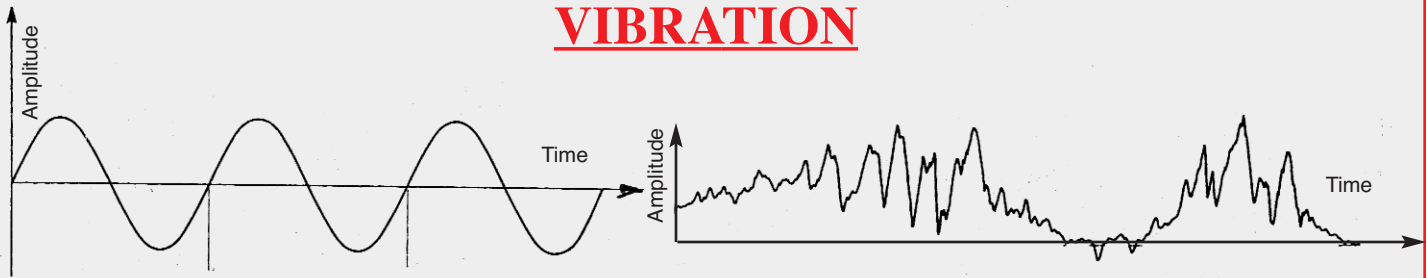
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VIBRATION



SINUSOIDAL VIBRATION

RANDOM VIBRATION

VIBRATION TESTING IS PERFORMED TO DEMONSTRATE THE ABILITY OF EQUIPMENT TO WITHSTAND THE EXPECTED DYNAMIC VIBRATIONAL STRESSES ENCOUNTERED IN SERVICE.

BASIC VIBRATION MODES

SINUSOIDAL

VIBRATION CHARACTERIZED BY AMPLITUDES WHICH VARY SINUSOIDALLY WITH TIME.

RANDOM

VIBRATION CHARACTERIZED BY IRREGULAR NON-REPEATING PATTERNS AND AMPLITUDE, VERSUS TIME. RANDOM VIBRATION MORE CLOSELY SIMULATES THE REAL WORLD.

MIXED VIBRATION MODES

SINE ON RANDOM

SINE AND RANDOM VIBRATION ARE PRODUCED SIMULTANEOUSLY TO SIMULATE SOURCES WHERE BOTH SINUSOIDAL AND RANDOM VIBRATION ARE GENERATED IN SERVICE.

RANDOM ON RANDOM

TWO DIFFERENT RANDOM VIBRATION PATTERNS ARE PRODUCED SIMULTANEOUSLY TO SIMULATE SOURCES WHERE TWO SEPARATE RANDOM INPUTS ARE GENERATED IN SERVICE.

MIXED MODE VIBRATION ATTEMPTS TO MORE CLOSELY SIMULATE THE REAL WORLD ENVIRONMENT THAN EITHER SINE OR RANDOM SEPARATELY.

GUNFIRE

TEST PULSES ARE ALSO AVAILABLE WHICH SIMULATE THE VIBRATION CAUSED BY OVERPRESSURE PULSES PRODUCED IN THE VICINITY OF ARMAMENTS.

Information Sheet 105



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HIGHLY ACCELERATED STRESS SCREENING (HASS) / HIGHLY ACCELERATED LIFE TEST (HALT)

HASS & HALT CONSISTS OF HIGH & LOW TEMPERATURE & 3 AXIS
VIBRATION TESTING PERFORMED EITHER INDIVIDUALLY OR IN
COMBINATION.

HIGHLY ACCELERATED STRESS SCREENING (HASS)

HIGHLY ACCELERATED STRESS SCREENING IS A TECHNIQUE FOR
IDENTIFYING PROCESS FLAWS IN EQUIPMENT DURING PRODUCTION. HASS
SUBJECTS EQUIPMENT TO OVERSTRESS CONDITIONS BUT AT A LEVEL
WHICH DOES NOT EFFECT DESIGN LIFE.

HIGHLY ACCELERATED LIFE TEST (HALT)

HIGHLY ACCELERATED LIFE TESTING IS PERFORMED TO IDENTIFY
DESIGN WEAKNESSES AND PROBLEMS. HALT SUBJECTS EQUIPMENT
TO OVERSTRESS CONDITIONS AT A LEVEL WHICH DOES EFFECT LIFE,
BUT OFFERS AN ADVANTAGE BY REDUCING THE DESIGN &
DEVELOPMENT PHASES OF A PROGRAM.

Information Sheet 106



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ENCLOSURE

AN ENCLOSURE IS A MECHANICAL ITEM WHICH EITHER PARTLY OR WHOLLY SURROUNDS A COMPONENT OR ASSEMBLY. THE ENCLOSURES ARE DESIGNED TO PROVIDE VARYING DEGREES OF ENVIRONMENTAL PROTECTION AS LISTED BELOW:

- AIRTIGHT
- DUSTTIGHT
- SPLASHPROOF
- SUBMERSIBLE
- EXPLOSIONPROOF
- DRIPPROOF
- DUSTPROOF
- SPRAYTIGHT
- WATERTIGHT
- HERMETIC

THE LABORATORY IS EQUIPPED TO PERFORM TESTING TO VERIFY THE CUSTOMER SELECTED DEGREE OF PROTECTION.

Information Sheet 107



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HUMIDITY/ ICING

HUMIDITY

HUMIDITY TESTING IS PERFORMED TO DETERMINE THE EFFECTS OF EQUIPMENT EXPOSURE TO A WARM, HUMID ATMOSPHERE. TEMPERATURE AND HUMIDITY CHANGES CAN CAUSE INTERNAL & EXTERNAL CONDENSATION LEADING TO MATERIAL DEGRADATION.

ICING

ICING TESTING IS PERFORMED TO DETERMINE THE EFFECT OF FREEZING RAIN, MIST, OR SEA SPRAY ON THE EQUIPMENT AND ITS PERFORMANCE. IT IS ALSO EFFECTIVE FOR EVALUATING THE EFFICIENCY OF DE-ICING TECHNIQUES.

Information Sheet 108



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SAND & DUST / SALT SPRAY

SAND & DUST

THIS TEST IS DIVIDED INTO TWO PROCEDURES. A DUST TEST IS PERFORMED TO DEMONSTRATE THE ABILITY OF THE EQUIPMENT TO RESIST THE EFFECTS OF FINE PARTICLES WHICH MAY PENETRATE INTO CRACKS, CREVICES, BEARINGS, ETC. A BLOWING SAND TEST DEMONSTRATES THE ABILITY TO WITHSTAND LARGER SIZE PARTICLES, WITHOUT DEGRADATION IN PERFORMANCE OR APPEARANCE.

SALT SPRAY

SALT SPRAY TESTING DEMONSTRATES THE RESISTANCE OF EQUIPMENT TO THE DELETERIOUS EFFECTS OF EXPOSURE TO AN AQUEOUS SALT ATMOSPHERE. OTHER GASES SUCH AS SULFUR DIOXIDE (SO₂) CAN BE COMBINED WITH THE SALT SPRAY.

Information Sheet 109



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STRUCTUREBORNE NOISE / AIRBORNE NOISE / ACOUSTIC NOISE

STRUCTUREBORNE NOISE

STRUCTUREBORNE NOISE IS SELF-INDUCED VIBRATION WHICH IS TRANSMITTED THROUGH EQUIPMENT AND ULTIMATELY INTO FOUNDATIONS.

AIRBORNE NOISE

AIRBORNE NOISE TESTS MEASURE THE NOISE GENERATED BY THE TEST ITEM.

ACOUSTIC NOISE

ACOUSTIC NOISE TESTS SIMULATE THE ENVIRONMENT OF AN ACOUSTIC NOISE FIELD AND OBSERVES FOR THE EFFECTS OF THIS EXTERNAL NOISE ON THE TEST ITEM. THIS TEST IS OF PARTICULAR IMPORTANCE FOR EQUIPMENT OPERATING IN OR NEAR AIRCRAFT OR LARGE INDUSTRIAL MACHINERY, ENGINES, ETC.

Information Sheet 110



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EXPLOSIVE ATMOSPHERE / EXPLOSIVE DECOMPRESSION / ALTITUDE

EXPLOSIVE ATMOSPHERE

EXPLOSIVE ATMOSPHERE TESTING VERIFIES THE ABILITY OF EQUIPMENT TO OPERATE IN AN EXPLOSIVE ATMOSPHERE WITHOUT CAUSING AN EXPLOSION. IT ALSO PROVES THAT AN EXPLOSION OCCURRING WITHIN THE EQUIPMENT WILL BE CONTAINED WITHIN AND WILL NOT PROPAGATE TO THE EXTERIOR.

EXPLOSIVE DECOMPRESSION

THIS TEST DEMONSTRATES THE ABILITY OF EQUIPMENT TO WITHSTAND RAPID CHANGES OF EXTERNAL PRESSURE, E.G., THE LOSS OF CABIN PRESSURE ABOARD AN AIRCRAFT.

ALTITUDE

ALTITUDE, OR LOW PRESSURE TESTS ARE PERFORMED TO VERIFY THAT EQUIPMENT CAN OPERATE IN A LOW PRESSURE ENVIRONMENT WITHOUT DEGRADATION.

Information Sheet 111



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BLOWING RAIN / SOLAR RADIATION / FUNGUS / ACCELERATED WEATHERING

BLOWING RAIN

THIS TEST IS PERFORMED TO VERIFY THE ABILITY OF EQUIPMENT TO OPERATE WITHOUT DEGRADATION IN A BLOWING RAIN ENVIRONMENT. IT MEASURES THE EFFECTIVENESS OF PROTECTIVE COVERS AND SEALING FEATURES.

SOLAR RADIATION

RADIATION TESTING IS PERFORMED TO DETERMINE THE EFFECTS OF SOLAR RADIATION ON EQUIPMENT EXPOSED TO SUNSHINE, IN OPERATION OR IN UNPROTECTED STORAGE.

FUNGUS

THE FUNGUS TESTS DETERMINE THE EXTENT TO WHICH THE EQUIPMENT WILL SUPPORT FUNGAL GROWTH. IT ALSO DEMONSTRATES HOW THE FUNGUS MAY EFFECT THE EQUIPMENT OPERATION.

ACCELERATED WEATHERING

ACCELERATED WEATHERING CONSISTS OF RELATIVELY LONG TERM EXPOSURE OF ITEMS TO SPECIFIED ENVIRONMENTS. THIS TEST IS DESIGNED TO OBSERVE FOR MATERIAL DEGRADATION.

Information Sheet 112



LABORATORIES, INC.

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FIRE RESISTANCE / MAGNETIC PERMEABILITY

FIRE RESISTANCE

FIRE RESISTANCE TESTING CONSISTS OF TWO METHODS. (1) FLAMMABILITY

TESTING APPLIES A DIRECT FLAME ONTO THE ITEM FOR A

SPECIFIED PERIOD, TO DETERMINE THE DEGREE THAT THE ITEM WILL

SUPPORT COMBUSTION. (2) DEMONSTRATES THAT THE UNIT

CONTINUES TO FUNCTION DURING & AFTER EXPOSURE TO FLAMES.

MAGNETIC PERMEABILITY

THIS TEST MEASURES THE MAGNETIC PERMEABILITY OF MATERIALS AND

EQUIPMENT. IT DEMONSTRATES THAT THE TEST ITEM DOES NOT EXCEED

MAGNETIC SIGNATURE LIMITATIONS.

Information Sheet 113



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INCLINATION / ACCELERATION / STRAIN GAGE / PACKAGE

INCLINATION

THIS TEST SIMULATES, FOR SHIP AND SUBMARINE APPLICATIONS,
THE VESSELS CYCLICAL PITCH AND ROLL MOTIONS.

ACCELERATION

ACCELERATION TESTING IS PERFORMED TO VERIFY THE ABILITY
OF EQUIPMENT TO WITHSTAND THE "G" FORCES THAT WILL BE EXPERIENCED
IN SERVICE. THIS TEST IS ACCOMPLISHED USING A CENTRIFUGE.

STRAIN GAGE

STRAIN GAGE TESTING IS PERFORMED TO OBSERVE THE STRUCTURAL
STRESSES INDUCED IN EQUIPMENT WHEN SUBJECTED TO VARIOUS
ENVIRONMENTAL AND OPERATIONAL LOADS.

PACKAGE

THESE TESTS SUBJECT PACKAGED ITEMS TO THE HANDLING STRESSES
ENCOUNTERED DURING TRANSPORTATION & STORAGE. THE TESTS CONSIST OF DROP
TESTS, STORAGE TESTS SUCH AS STACKING & COMPRESSION, TEMPERATURE, TESTS
AND TRANSPORTATION VIBRATION SIMULATIONS.

Information Sheet 114



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HYDRAULIC BURST / PNEUMATIC & HYDRAULIC PRESSURE

HYDRAULIC BURST

HYDRAULIC BURST TESTS ARE PERFORMED ON FLUID SYSTEM
COMPONENTS SUCH AS CYLINDERS, VALVES, HOSES, ETC.
TO VERIFY PROOF AND BURST PRESSURE CAPABILITIES.

PNEUMATIC & HYDRAULIC FLOW & PRESSURE

PNEUMATIC AND HYDRAULIC TESTING IS PERFORMED TO
DEMONSTRATE PRESSURE, VOLUME AND FLOW
PARAMETERS, AS WELL AS PERFORMANCE
CHARACTERISTICS, OF FLUID SYSTEM COMPONENTS AND
ASSEMBLIES.

Information Sheet 115



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HIGH & LOW TEMPERATURE/ TEMPERATURE ALTITUDE/ TEMPERATURE SHOCK/ TEMPERATURE WITH VIBRATION

HIGH& LOW TEMPERATURE

HIGH & LOW TEMPERATURE TESTS ARE PERFORMED TO VERIFY THAT EQUIPMENT CAN OPERATE WITHOUT DEGRADATION WHEN EXPOSED TO EXTREME CLIMATIC CONDITIONS.

TEMPERATURE ALTITUDE

THIS TEST VERIFIES THE ABILITY OF EQUIPMENT TO WITHSTAND A COMBINATION OF TEMPERATURE AND ALTITUDE EFFECTS. INCLUDED ARE HIGH OR LOW TEMPERATURES AND PRESSURES BELOW OR ABOVE NORMAL ATMOSPHERE.

TEMPERATURE SHOCK

TEMPERATURE SHOCK TESTS ARE PERFORMED TO VERIFY THAT EQUIPMENT CAN WITHSTAND SUDDEN CHANGES OF EXTREME TEMPERATURE WITHOUT DEGRADATION.

TEMPERATURE WITH VIBRATION

THIS TEST SERVES TO DEMONSTRATE THE ABILITY OF EQUIPMENT TO WITHSTAND THE STRESSES INDUCED BY A COMBINATION OF TEMPERATURE AND VIBRATION EFFECTS.

Information Sheet 116



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EMI/ RFI / INSULATION RESISTANCE & DIELECTRIC WITHSTANDING VOLTAGE / DC MAGNETIC FIELD / SOLDERABILITY

EMI / RFI

ELECTROMAGNETIC OR RADIO FREQUENCY INTERFERENCE, BOTH RADIATED OR CONDUCTED, CAN EFFECT THE PERFORMANCE OF EQUIPMENT. THE EFFECTS OF EMI/RFI CAN BE MEASURED BY THE LABORATORY.

INSULATION RESISTANCE & DIELECTRIC WITHSTANDING VOLTAGE

THE LABORATORY PERFORMS MEASUREMENTS OF INSULATION RESISTANCE TO DETERMINE THE ISOLATION OF ELECTRICAL CIRCUITS. THE DIELECTRIC WITHSTANDING VOLTAGE TESTS ELECTRICAL CIRCUITS FOR BREAKDOWN OR FLASHOVER DUE TO HIGH VOLTAGE.

DC MAGNETIC FIELD

THIS TEST SIMULATES A HIGH MAGNETIC FIELD. THE TEST DEMONSTRATES THAT EQUIPMENT WILL OPERATE SATISFACTORILY WHILE EXPOSED TO THE FIELD.

SOLDERABILITY

THIS TEST DETERMINES THE SOLDERABILITY OF WIRES, LUGS, TABS, LEADS, ETC. WHICH ARE TYPICALLY JOINED BY SOLDERING.

Information Sheet 117



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SPIKE VOLTAGE / VOLTAGE & FREQUENCY TRANSIENTS & VARIATIONS

SPIKE VOLTAGE

SPIKE VOLTAGES ARE ABRUPT SHORT DURATION TRANSIENTS, WHERE THE MAXIMUM VALUE SIGNIFICANTLY EXCEEDS ITS AVERAGE AMPLITUDE. SPIKE VOLTAGES CAN BE INDUCED, MEASURED & RECORDED BY LABORATORY INSTRUMENTATION DURING EQUIPMENT OPERATION.

VOLTAGE & FREQUENCY TRANSIENTS & VARIATIONS

RELATIVELY LONG TERM VOLTAGE AND FREQUENCY TRANSIENTS, WITH VARIATIONS IN AMPLITUDE AND DURATION, ARE APPLIED TO EQUIPMENT TO DETERMINE THE EFFECT ON OPERATION.

Information Sheet 118



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WIND TUNNEL / SEISMIC LOADING

WIND TUNNEL

WIND TUNNEL TESTING IS PERFORMED TO DEMONSTRATE THE ABILITY OF EQUIPMENT TO WITHSTAND WINDS OF UP TO 200 MPH AND TEMPERATURES DOWN TO -22° F. THE WIND TUNNEL ALSO SIMULATES ICING CONDITIONS BY USING A WATER SPRAY SYSTEM. IT CAN ACCOMMODATE ITEMS UP TO 2 FT. X 4 FT. IN CROSS-SECTION. THE TESTING IS PERFORMED AT AN ASSOCIATED TEST FACILITY IN CONJUNCTION WITH AERO NAV LABORATORIES.

SEISMIC LOADING

SEISMIC LOADING CONSISTS OF THE APPLICATION OF STEADY STATE AND DYNAMIC STRUCTURAL LOADS TO SIMULATE THE CONDITIONS WHICH OCCUR DURING SEISMIC ACTIVITY, SUCH AS EARTHQUAKES.

Information Sheet 119



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