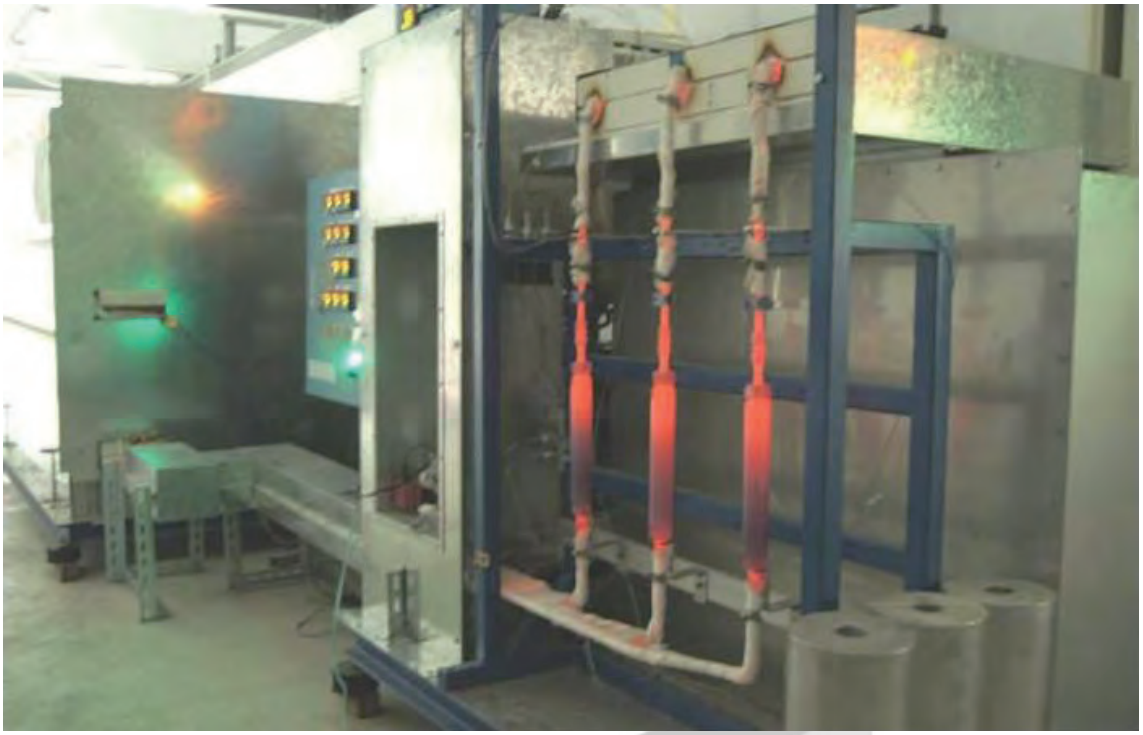
Ultra-Supercritical Steam Materials Test Systems



Features & Applications:

Features:

- Supercritical Steam test system
- High Pressure 360 Bar
- Up to 650° C
- Mass Flow 400kg/Hr
- Water chemistry sensors
- Recirculation loop
- Water purification instrument
- Chemical agent injection system

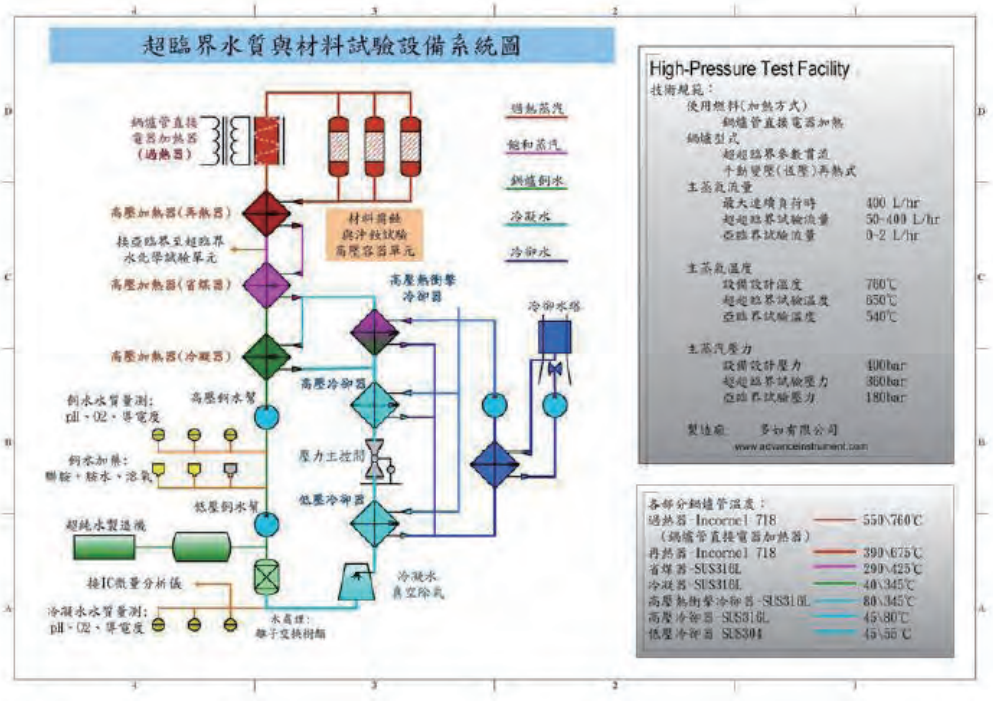
Applications:

- Oxidation/Reduction
- Heat Transfer
- Heat Flux
- Soil Erosion
- Quantitative
- Thermal Stability
- Estimated lifetime
- Oxidative stability
- Corrosion

Ultra-Supercritical Steam Materials Test Systems

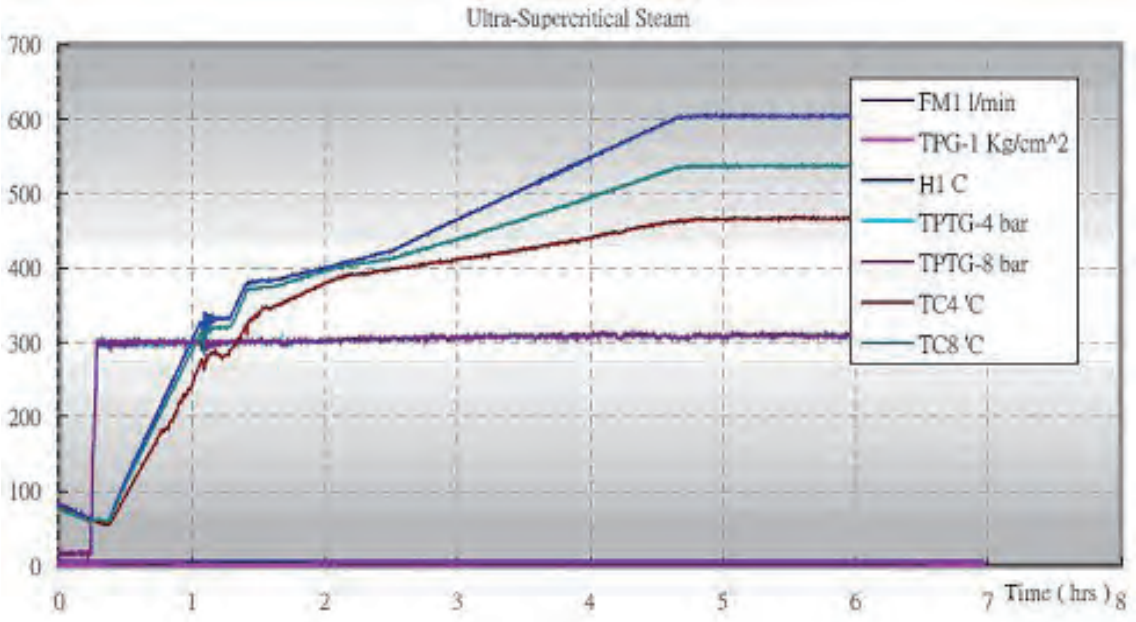
Description:

This test mainly comprises water supply system, the object to be tested, a pressurizer and a cooling system. In the water supply system, demineralized and deaerated water or boiler feedwater to which chemicals have been added to obtain the required water chemistry is provided in a feedwater tank. This water is injected into the test loop by a piston pump. To minimize flow oscillations caused by the pump's six pistons, a damping vessel is installed in the pump discharge line.



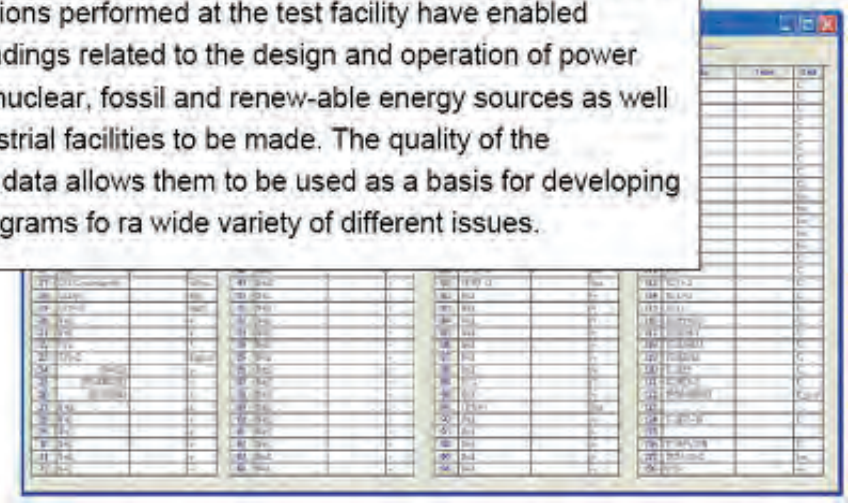
Equipment:

- Feed water instrument
- Feed water purification
- Chemical agent injection system
- High Pressure Recirculation loop
- High Pressure Heat Exchanger
- High Pressure Direction Boiler Tube Heating System
- High Pressure Test Vessel
- High Pressure Cooler
- Condenser instrument
- Data acquisition System



Impressive:

The broad and impressive range of applications for which the high-pressure test facility (360 bar, 650°C, 400 kg/min,400 KW) installed in an accredited laboratory can be used underlines the flexibility of this test rig which, at the start of the new millennium, had been in operation for 6 years and will continue to be available for new research and development work in the future. There sults of the investigations performed at the test facility have enabled pioneering findings related to the design and operation of power plants using nuclear, fossil and renew-able energy sources as well as other industrial facilities to be made. The quality of the experimental data allows them to be used as a basis for developing computer programs fo ra wide variety of different issues.



800 Series Advanced Universal Electromechanical Materials Testing Machines

Features:

- Position Measurement Accuracy ± 0.02mm
- Position resolution 0.15 μ m
- 30,000 data sampling
- 100 Hz selectable data capture
- Automatic recognition and calibration
- Digitized technology

Description:

800 Series universal testing machines are capable of tensile and compression testing modes within a single frame. In addition, select frames are capable of reverse stress testing.

Test types include tensile, compression, shear, flexure, peel, tear, cyclic and bend tests.

800 Series Advanced Universal Electromechanical Materials Testing Machines

Specification:

- Control Electronics and User Interface

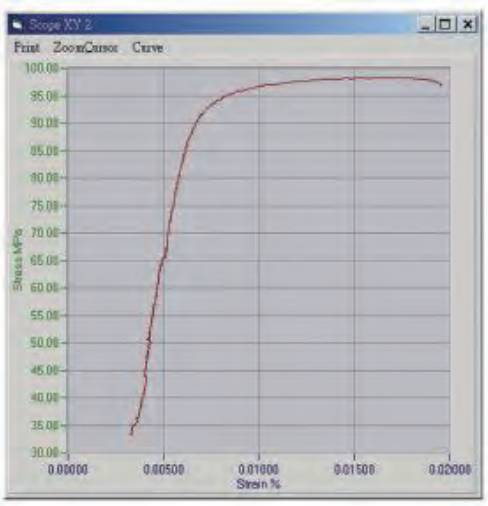
- With 100 Hz data collection and control rates, AI's 880 electronics feature unparalleled accuracy and advanced real-time control. These electronics can control the frame using any combination of load, strain, or speed rates-often a requirement for today's testing standards.
  Automatic recognition and calibration of transducers ensure safe and proper testing

- Controller
  - The controller includes these high performance features
  - 30,000 data sampling
  - 100 Hz selectable data capture
  - Digitized technology
  - 24-bit resolution, converting time 17 usec
  - Load measurement accuracy:
    ± 0.4% of reading
    down to 1/100 of load cell capacity and ± 0.5% down to 1/250 of load cell capacity

- Position Measurement Accuracy: ± 0.02mm or 0.05% of displacement

- Position resolution up to 0.15 μ m

- Crosshead Speed Accuracy
  (Zero or constant load):
  ± 0.1% of set speed



- Strain Measurement Accuracy:
  ± 0.5% of reading down to 1/50 of full range with extensometer
  - Intelligent datum logging responds automatically to change material properties during the test
  - Dedicated electronics provide advanced real-time control, error detection, and limit checking which are independent of the PC
  - Automatic recognition and calibration of load cells and strain transducers
  - Designed to work with Greendale materials testing software

800 Series Advanced Universal Electromechanical Materials Testing Machines

800 Series Advanced Materials Testing System									
Models		Single Column Tabletop Models			Twin Column Tabletop Models				
		842	843	844	864	865	866	867	869
Load Capacity:	kN	0.5	1	2		5	10	30	50
	kgf	50	100	200		500	1000	3000	5000
Maxumum Speed:	mm/min	1000			2500	1000	500		
Minimum Speed:	mm/min	0.05			0.005	0.001			
Maximum Force at Full Speed:	kN	0.5	1	2	1	5	10	30	25
Maximum Speed at Full Load:	mm/min	1000					500		250
Return Speed:	mm/min	1500			2500	1200	600		500
Position Control Resolution:	µn	0.156		0.208	0.236	0.118	0.057	0.054	0.063
Total Crosshead Travel:	mm	500	917		1135				
Total Vertical Test Space:	mm	659	1076		1249			1205	
Height:	mm	875	1275		1597				
Width:	mm	375			909				
Depth:	mm	500			700				
Weight:	kg	32	37		136			182	240
Maximum Power Requirement:	VA	225		400	300			600	700

GreenDale Materials Testing Software

- Simple and Powerful for Any Materials Testing Application

  Greendale is a fully integrated modular software package that provides with easy, tailored application solutions for today's laboratory managers and test technicians. Greendale offers a truly innovative, intuitive interface while providing the most powerful and flexible materials testing package.

- Features

  Greendale provides the most powerful and flexible material testing package along with an intuitive web-like design that users at all levels are easy to use and learn. From the simplicity of a basic peak load test to the power required for a complex cyclic test, users shall appreciate the minimum learning and training required.

800 Series Advanced Universal Electromechanical Materials Testing Machines

Specification:

DL Split Furnaces

- Internal bore 38 (mm)

  1200 ℃

  - Single or triple zone versions
  - Horizontal mounting
  - Wide range of sizes

- Application

  High temperature sintering, specimen or material heat treatment, preconditioning and suitable for various materials testing applications. DL tube furnaces are available in a range of bore inner diameter from 38 to 105 mm together with three heating length options of 300, 450 and 750 mm. Each furnace can be supplied with either single or three zone capability. The standard configuration is with a free standing PID controller, Eurotherm model 2216.

- Three Zone Option

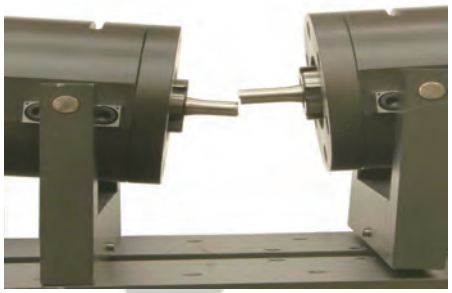
  The three zone option should be selected when a superior temperature gradient along the work tube is required.

Model RRM : Rotating Beam Fatigue Testing System

Advance Instrument Inc. (AI), recognized as a pioneer in the field of material testing Instrumentation and system developer and manufacturer in Taiwan, has been serving industry faithfully for more than two decades. Over that time, AI has demonstrated an unsurpassed quality of machine design and performance. Today, the use of the aluminum alloys as machine frame and heavy-duty bearing housings are key components making a system built to last for many years of usage.

Applications:

- Fatigue Test
- Fatigue Limit Test
- Fatigue Fracture Test
- Endurance Limit Test
- Machine Test and Laboratory
- Perform Testing ISO 1143 and ASTM F1160
- Test the Properties of Surface Treatments or Coatings



Description:

- Theory of Operation

Advance Instrument's rotating beam fatigue testing system (RRM) design is based on the rotating beam principle. The specimen functions as a simple beam symmetrically loaded at two points. When rotated one half revolution, the stresses in the fibers originally below the neutral axis are reversed from tension to compression and vice versa. Upon completing the revolution, the stresses are again reversed so that during one revolution the test specimen passes through a complete cycle of flexural stress (tension and compression).

- Specimen Loading

The AI RRM can be equipped to test simple straight shank specimens. The standard specimen length is 78mm. The specimen shape can be rod or tube. Specimens approximately 25mm (1 in) longer or 25mm (1 in) shorter can be used without affecting the calibration of the machine. Straight shank specimens are held in place using precision specimen collets. Stress is applied to the specimen by direct application of deadweights to ensure precise loading. Maximum fiber stress in a specimen having a 4.3 mm diameter is 3200 MPa. While minimum fiber stress in a specimen having a 11 mm diameter is 20 MPa. The system is equipped with a 7" LCD controller that provides easy-to-use in determination of the load weights needed to produce a particular stress at a simple calculation.

- Load Frame Features

The standard machine operates at an adjustable integrated variable servo speed of 10 RPM to 6,000 RPM. Speed control is important in testing certain alloys that heat up when highly stressed, and it also allows certain correlations of results between high-speed tests and previous lower speed tests. If speed stability is at ± 0.2% of set point assuming a constant line voltage. At the nominal rate of 6,000 RPM, the machine can complete 360,000 cycles per hour; 8,640,000 cycles per day.

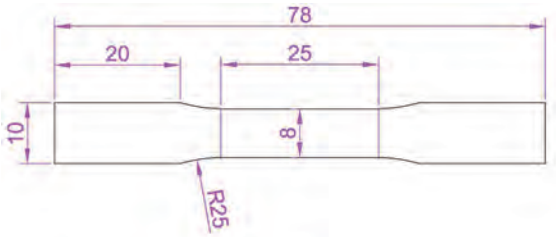
- 7" LCD HMI Controller

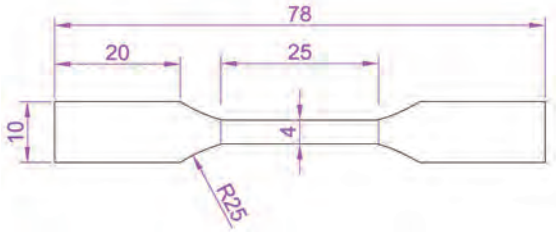
An easy-to-read digital cycle counter with pickup device provides an accurate display of completed cycles in display increments of one cycle per count up to 99,999,999 counts. Control buttons are provided to reset the display count at the start of a test. The display is equipped with a memory back up so that count data is not lost in the event of a power loss. Setting the test stress, specimen diameter and type (Rod / Tube) on controller, will automatically calculate out how many load weights is needed. The test can be unlimited cycle or limited cycle, and it can also show how long the test duration have passed.

Model RRM : Rotating Beam Fatigue Testing System

Specification:

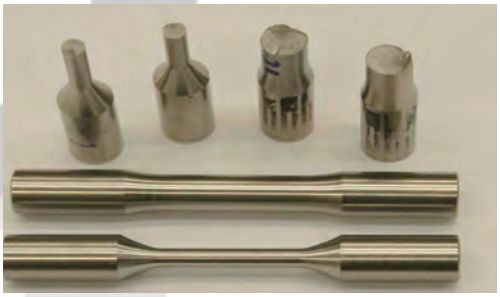
- Model : RRM
  - Rotational Speed: 10 to 6,000 RPM
  - Speed Regulation Accuracy: ± 0.1%
  - Test Bending Stress Range: 20 ~ 3,200 MPa
  - Recommended Specimen Diameter: 4.3 ~ 11.0 mm
  - Specimen Shape: Straight Shank Rod or Tube
  - Bending Moment Capacity: 25 kg-cm ~ 250 kg-cm
  - Capacity Increments: 0.25 kg-cm





- Notes:
  1. Includes open-end wrench and Allen wrenches for machine operation
  2. Of yoke and weight pan
  3. Inclusive of one set each C6 (6mm) and C10 (10mm) collets
  4. Standard Power Requirement: 220Vac, 2kva
  5. Approximate System Weights: 76kgs
  6. Approximate Shipping Dimensions and Weights: 990 x 540 x 350mm / 168kgs and includes leveling feet with vibration isolators.

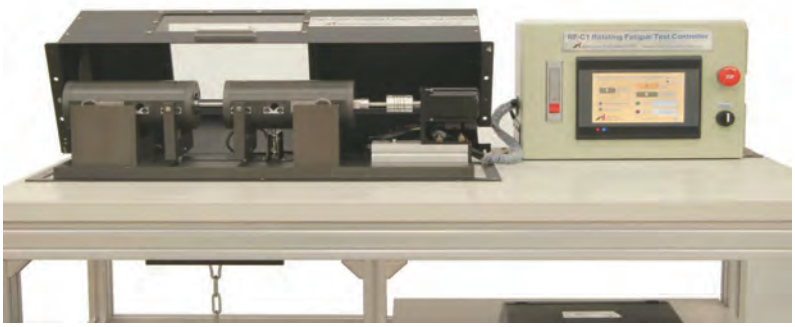
- Optional Accessories:
  - RRM-W Standard load weight set
  - RRM-T1 Power source. 100~125 Volts, 50/60 Hz.
  - RRM-CAA Complete Eight sets of two precision collets (6 to 13 mm diameter) for use on straight shank specimens
  - RRM-Cxx : Specific dimension set of two pieces precision collets
  - RRM-FUR. Furnace system for use on RRM.



- Optional RRM-W Standard Load Weight Sets Include :
  - 10kg x4 pieces
  - 5kg x1 piece
  - 2kg x2 pieces
  - 1kg x1 piece
  - 0.5kg x2 pieces
  - 0.2kg x2 pieces
  - 0.1kg x1 piece
  - 0.05kg x1 piece

How-to-Order : RRM - B1 - CAA - FUR

- RRM - Model
- B1 : 100~125 Volts, 50/60 Hz
  B2 : 220 Vac, 2kva (Standard)
- CAA : Complete 8 sets of precision collets from 6 to 13mm
  Collets reference for additional order:
  C6 : 6mm C7 : 7mm C8 : 8mm C9 : 9mm
  C10 : 10mm C11 : 11mm C12 : 12mm C13 : 13mm
- FUR : Option : High temperature furnace



TGA-A1200 Thermogravimetry Analysis (Obsolescence)

Features:

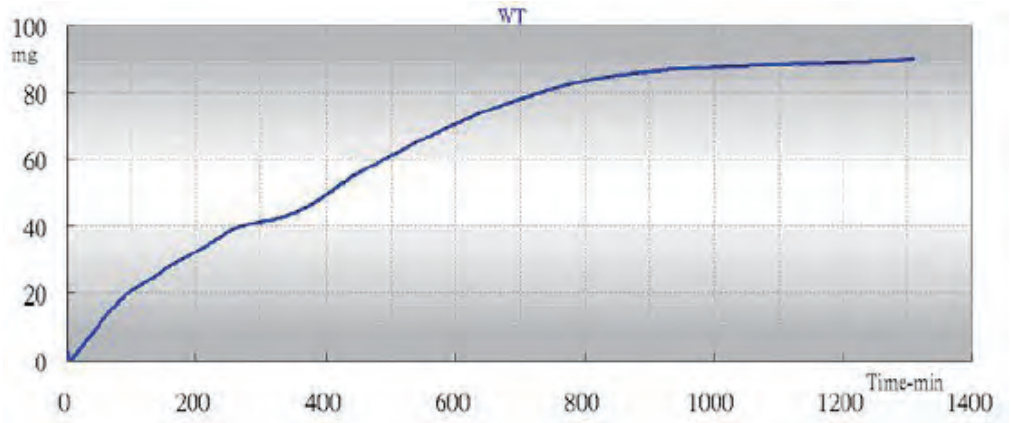
- Pressure, 4 Bar
- High Vacuum, 1 x 10-3 torr
- Up to 800° C
- Samples up to 20 g in mass
- corrosive gas atmospheres
- 5 gas inlets

Applications:

- Thermal stability
- Quantitative
- Pyrolysis
- Oxidation/Reduction
- Water and Volatiles
- Adsorption/Desorption
- Additive and Filler
- Kinetics
- Composition
- Estimated lifetime
- Oxidative stability

Description:

Thermogravimetric Analysis measures the amount and rate of change in the weight of a material as a function of temperature or time in a controlled atmosphere.



TGA-A1200 Thermogravimetry Analysis (Obsolescence)

Specification:

- Advance Instrument Inc. TGA-A Series are special gravimetric analyzers designed to provide with unique capabilities for Pressure, High Vacuum, and High-Temperature under static or dynamic reactive atmospheres.

- The TGA-A1200 is our standard system, employing a high-sensitivity balance in a robust design. The TGA-A1200 can accommodate samples up to 20 g in mass, with a sensitivity of 10 microgram. The TGA-A1200 is the instrument of good choice for pressure studies (up to 4 Bar) at measurement temperatures up to 800° C, and can accommodate a variety of gas compositions under high-pressure static or optional dynamic flow. The standard vacuum accessory provides for measurement at reduced pressures down to 1 x 10-3 torr.

- The TGA-A1200 is recommended for pressures or corrosive gas atmospheres are required. This top-of-the line model provides with static pressures up to 4 Bar, and utilizes an advanced balance with a 20 g capacity. This allows the reaction chamber to be completely sealed and also allows for aggressive gas chemistry while isolating the microbalance assembly. The TGA-A1200 can be operated up to 750° C at the maximum pressure, or equipped with the standard vacuum accessory for low-vacuum studies.

- The TGA-A1200 is a specialized instrument designed for both high temperature and pressure at the same time. The maximum temperature 1200° C is achieved safely in a unique double-wall reactor. The TGA-A1200 is equipped with a steam generator which makes it ideal for coal gasification studies, and 5 gas inlets for the maximum flexibility in dynamic reactive atmospheres.

- The rugged, reliable, TGA-A offers exceptional value as a compact, general-purpose thermogravimetric analyzer that typically outperforms a competitive research-grade model. Its integral mass flow control, gas switching capability, superb software, and ease-of-use make the TGA-A ideal in basic research, teaching, or in industrial laboratories that need qualified results.

- Compensated Temperature Thermo balance Included:
  - Maximum Sample Weight: 20 g
  - Sensitivity: 10 µg
  - Furnace Heating Resistance Wound
  - Temperature Range: Ambient to 900 C
  - Isothermal Temp Accuracy: +/- 2 C
  - Isothermal Temp Precision: +/- 0.5 C
  - Controlled Heating Rate: 0.1 to 20 C/min
  - Furnace Cooling (forced Cooler Water): 900 to 50 C <30 min
  - Temperature Calibration Curie Point
  - Software Included

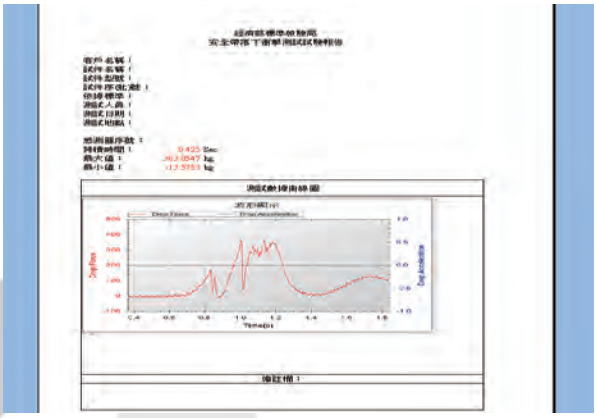
HDT-2 Dynamic performance tester of personal fall arrest systems

Features:

- Dynamic performance testing of full body harnesses (Safety harness)
- Dynamic performance testing of self-retracting lifelines
- Dynamic performance testing of safety belt
- Dynamic performance testing of safety strap

Applications:

- Industrial safety belts, harnesses and safety lanyards test
- Full-Body Harness, EN 361:2002), ANSI A10.14, ANSI Z359.1, AS/NZ 1891.1, CSA Z259.10, OSHA 1926.502, ISO 10333-1
- Body Belts, ANSI A10.14, JIS M7624
- BS 1397



Description:

The HDT-2 apparatus of Advance Instrument (AI) are computer controlled, electromechanically operated dynamic load measuring devices. The dynamic load measuring unit can perform drop tests. It is for the investigation of various forms of harness, self-retracting lifelines or textile.

The system consists of the dynamic load measuring units, datum acquisition unit, testing software, control system and the test frame. The facility is designed for dynamic load testing.

The electromagnet device that is release the dummy torso with trigger the acquisition board to acquire load data.

The date acquisition rate is specified by the operator's computer software. The measured value from the load cell will be displayed on the computer screen by means of the software. The computer saves both the load data automatically. The data will be available for further management in ASCII (*.csv) format with test graphic.

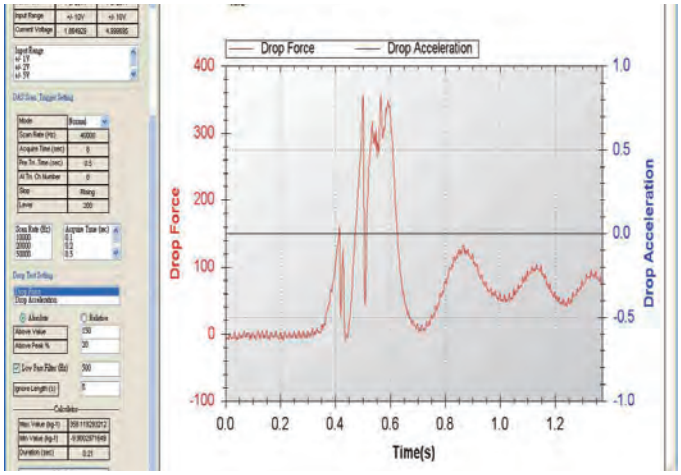
The basic design of the unit includes a dynamic load, with signal conditioner with data acquire device. The computer controls the data acquire device and saves the measured data.

The HDT-2 instrument is capable to perform dynamic load tests. Operational parameters are set up through the user-friendly software that allows generator of report with Excel format .

HDT-2 Dynamic performance tester of personal fall arrest systems

Specification:

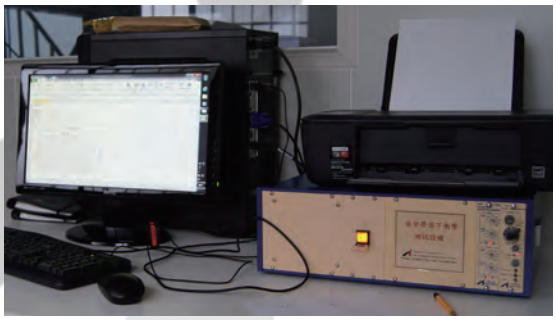
- HDT-M1 Personal fall arrest systems dynamic performance test units
  - Dynamic Load Cell : range 20 \ 30 \ 50 kN
  - Load Cell Fixture
  - 7011 Strain Gage Amplifier, 7012C-HDT Control Enclosure with power supply
  - Dynamic Data acquire board
  - Personal Computer with printer
  - HDT-AP2 Harness Dynamic load measuring software



- HDT-RDD dummy torso electromagnet release device
  - Force >500 kgf

- HDT-HB1 Torso Test Mass
  - 75Kg\ 100Kg \160Kg

- HDT-ACM1 Accelerometers with Signal Conditioning Amplifier
  - HDT-ACC-120 Accelerometers IEPE voltage output 50g
  - 7611 IEPE Voltage Signal Conditioning Amplifier



- Fall protection test tower Testing Frame (Fall protection test tower)
  - Custom frame widths, column space, and frame high to suit any test setup
  - Electric hoist
  - Scale