



Test Lab Capabilities

- Vertical Shaker Table
- Environmental Chamber
- Linear Shake Table (Horizontal)
- 1Mip (1000kip) Test Frame
- 44kip (20 tonnes) Test Frame
- Rock point load test frame

Vertical Shaker Table

In Weir-Jones Engineering Consultants' arsenal of test equipment is the Ling Dynamic Systems V722 shaker table. This table is capable of producing sine wave forces up to 4100N (922lbf) instantaneous or up to 2600N (587lbf) continuous. Both sinusoidal waveforms and random signals can be used as an input for this shaker table. Typical vibration frequencies range from 5 to 4000Hz. Weir-Jones has an integrated computer system this is used to program and monitor the waveforms to and from the table. We have a collection of mounting and adapter plates that allow for three-axis testing of components. Additionally, we offer custom adapter plate manufacturing for any hole pattern. Our shaker can be used to test any part up to a maximum of 100kg (220lbs).



Table Manufacturer:	Ling Dynamic Systems (LDS)
Table Model:	V722
Controller Manufacturer:	Ling Dynamic Systems (LDS)
Controller Model:	DVC 4000 Mk 5A
Maximum Acceleration:	97 g peak (Sinusoidal), 50 g rms (Random)
Rated Force:	922 lbs _f peak (Sinusoidal), 750 lbs _f rms (Random)
Frequency Range:	DC-4000 Hz
Maximum Displacement:	1 inch peak-peak
Maximum Velocity:	40 inches/sec peak
Maximum Payload:	220 lbs (including shaker table/adapter plates)
Resonant frequency:	3150Hz +/- 5% (bare table) nominal
Driven by LDS PA2000:	(2kW) power amplifier
Control Feedback:	1 to 4 PCB J357B01 Piezoelectric Accelerometers.

Control Modes:

- 1) **Random:** Multiple stored profiles, each with up to 120 breakpoints and 8 test levels/durations definable from 24 dB to 0 dB in 1 dB increments. Demand profiles programmed as required from 1×10^{-5} to 100 g²/Hz with 40 dB dynamic range. Includes Mil Standard 810-E.
- 2) **Swept Sine:** Multiple stored fixed point and sweep profiles. Amplitudes from 0.02 to 199 g peak. Logarithmic (to 9.99 oct/min) or linear (to 99.9 Hz/sec). Bi-or Uni-directional sweep rates defined by rate or time per sweep
- 3) **Shock:** Shock pulse profile can be any of the following: half-sine, saw-tooth, triangular, trapezoidal, rectangular or user-defined in terms of acceleration versus time. Pulse duration could be set from 2 msec up to 999 msec. Peak acceleration will depend on pulse duration. Profile includes UL458-SA20.
- 4) **External Input Signal:** Literal time signal reproduction of acceleration data stored in ASCII format on disk. Suitable for small loads. Effective range 0-2000 Hz.



Environmental Chamber

The environmental chamber at Weir-Jones Engineering Consultants Ltd. is an Envirotronics EVH33-2705. Equipped with a Micristar 828 Digital Process Controller, our chamber can maintain temperatures between -73°C and 177°C with +/- 0.4°C accuracy. The Micristar allows for manual temperature inputs as well as programmed temperature profiles for a variety of testing needs. We maintain a yearly temperature calibration schedule, so our chamber is always calibrated and ready for testing. Installed with the chamber is a humidity mode, which can regulate the internal humidity between 20% and 95% RH. The chamber accommodates small to medium sized components or assemblies, with an internal volume of 33 cubic feet.

Note that it is possible to operate the vertical shaker table below the environmental chamber and perform “Shake and Bake” testing (as shown in unit photo). Full operational range of all equipment is possible during simultaneous operation.



Manufacturer:	Envirotronics
Model:	EVH33-2-705
Refrigeration:	Mechanical
Temperature Range:	-73 °C to + 177 °C ± 1.1 °C at sensor
Maximum Transition Rate:	9 °C/min (empty) 7 °C/min (100 lb aluminium load)
Humidity Range:	10% to 95% ± 5 % RH
Controller:	Micristar 828 or external computer control; can be used to trigger shaker system.
Interior Dimensions:	44" wide x 40" deep x 36" high
Includes:	20" x 20" window and cable access ports.

Linear Shake Table

The Linear Shake Table is a high-powered planar earthquake simulator ideal for more advanced dynamics and multidynamics analysis and research relating to earthquake loss reduction. It is capable of moving high loads of up to 25 kg at various accelerations and velocities.

Picture not available

Manufacturer:	Terrascience Systems Ltd.
Maximum Acceleration:	1mg to 1g sinusoidal
Frequency Range:	0.1Hz to 40Hz
Maximum Displacement:	75mm peak-peak
Maximum Payload:	1kg to 25 kg
Test Duration Limits:	30 seconds to 30 minutes



1Mip (1000kip) Test Frame

The large compressive hydraulic press (test frame) at Weir-Jones is capable of loads up to 1Mip (1000kip or 450 tonne). This press uses an 11” double acting cylinder and sturdy steel plate that allows for testing samples up to 22 inches wide and 36 inches high. We can use either the manual hand pump or a motorized pump for faster extension. Additionally, we can perform destructive compressive testing using this frame on soil samples, rock samples, or other components. Compressive load data can be read against the internal jack pressure or against a calibrated 1000kN (224kips) proving ring.



Cylinder Capacity:	1000kip (500 tons)
Stroke:	150mm (5.91in)
Cylinder effective area:	855.29cm ³ (132.57in ³)
Inside frame dimensions:	22” W x 24” D x 36” H
Proving ring capacity:	225kip (1000kN)
Load Type:	Compressive only

44kip (20 tonnes) Test Frame

The medium test frame utilizes an Eagle Pro ESH-202 hollow single acting cylinder, which is rated for a maximum of 20 metric tons (tonnes). Because we use a hollow cylinder, it can be flipped around to test both compressive load cells and tension link load cells with the same frame. The frame is also easily adjustable, so any size of load cell or component can be calibrated or tested up to a maximum of 40 inches. We use a hand pump with pressure gauge to extend the cylinder. Our calibrated load cells can be used in this test frame connected to a datalogger, or we can use a 20 kip proving ring depending on your testing needs..



Cylinder Capacity:	44kip (20 tonnes)
Stroke:	49mm (1.93in)
Cylinder effective area:	32.8cm ³ (5.08in ³)
Inside frame dimensions:	30” W x 40” H
Proving ring capacity:	20kip (9000kg)
Load Type:	Compressive and Tensile

ROCK POINT LOAD TEST FRAME

The rock point load test frame is a small hydraulic test frame which has been specifically modified to perform a rock point load test for geotechnical testing. The test setup employs a 4-ton bottle jack, test frame instrumented with a full bridge strain gauge, and two conical platens for crushing the rock sample. The frame is such that it can be clamped in a vice to provide stability. Depending on sample size, our rock crusher can test samples up to about 50MPa ultimate compressive strength.



Jack Capacity:	8kip (3.6 tonne)
Max sample size:	6” W x 6” D x 3” H