



Our fleet of load measuring equipment is available to measure tension or compression and our dedicated team of applied force and measurement engineers have developed a self contained instrument display system for pile testing applications. They also offer a range of on-site services including load weighing, testing and monitoring and statutory examinations of lifting equipment.

The team are fully trained to calibrate and proof test all equipment via our in-house repair, calibration and certification facility and our equipment and certification is traceable to National Physical Laboratory and UKAS standards.

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Load Measurement: Tension

Tension Load Links and Cells

Our large fleet of tension load cells and load links range from 2 tonne capacity through to 250 tonnes capacity and are ideal for weighing and safe load indication during lifting or pulling operations.

Readouts are available in three options:

- Built in display
- Hand held display
- Radio remote display



i Our Applied Force and Measurement department are able to provide a complete repair and recalibration service

▶ For full details of our range of Tension Load Cells for sale, please refer to our 60 page Slings & Lifting Accessories Brochure

For further information on the shackles required for your Tension Load Cells please refer to page 33

Fleet Code	Cap (t)	Readout Type	Reading Increments (Kg)	Test Load (t)	Height of Digits (mm)	Bearing to Bearing (mm)	Weight (Kg)	Shackle to suit (t)
LLC 02	2	Hand Held	1	4	14	166	2.5	6.5
LLB 02	2	Built In	1	4	14	166	2.5	6.5
LLC 05	5	Hand Held	10	10	14	166	2.5	6.5
LLB 05	5	Built In	10	10	14	166	2.5	6.5
LLR 05	5	Radio Remote	10	10	18	166	2.5	6.5
LLC 10	10	Hand Held	10	20	14	176	3	12
LLB 10	10	Built In	10	20	14	176	3	12
LLR 10	10	Radio Remote	10	20	18	176	3	12
LLC 20	20	Hand Held	10	20	14	220	6	25
LLR 20	20	Radio Remote	10	40	18	220	6	25
LLC 35	35	Hand Held	100	70	14	254	11.5	55
LLB 35	35	Built In	100	80	25	230	11.5	55
LLR 35	35	Radio Remote	100	70	18	254	11.5	55
LLC 50	50	Hand Held	100	100	14	254	14	55
LLR 50	50	Radio Remote	100	100	18	254	14	55



Load Measurement: Compression

Compression Load Cells

Our comprehensive range of high specification compression load cells can be used singularly, for testing or calibration services, or in groups for weighing operations.

The load data can be viewed on our digital display systems for either single or multiple cells.

These display systems, which are available with single-way hand held or four-way desktop readout, are either mains or battery powered, and are suitable for both site and workshop use.

All of the compression load cells within our range have the capability of an accuracy of $\pm 0.5\%$. However, to guarantee this accuracy, calibration prior to use is required which is a chargeable extra.



Load Plattens

For on-site use, or where a level surface cannot be guaranteed, it is recommended that plattens are used to ensure that greater accuracy is achieved.

Each platten has a slightly domed head which has contact with the load and a precision machined saddle that sits within the load cell. This arrangement ensures that the load cannot slip, thus increasing safety and further improving the accuracy of data.

Fleet Code	Capacity		Height (mm)	Height with Plattens (mm)	Dia (mm)	Load Area Dia (mm)
	(t)	kN				
CLC 10	10	100	-	120	180	65
CLC 12	12	120	-	210	-	100 x 200
CLC 25S	25	250	50	75	90	40
CLC 25	25	250	100	125	90	40
CLC 50S	50	500	50	75	90	40
CLC 50	50	500	100	125	90	40
CLC 100	100	1000	100	150	120	80
CLC 150	150	1500	150	190	125	60
CLC 200	200	2000	150	190	125	60
CLC 300A	300	3000	200	240	200	170
CLC 300B	300	3000	115	185	300	160
CLC 500	500	5000	115	185	320	180
CLC 750	750	7500	115	185	320	210
CLC 850	850	8500	115	185	320	210
CLC 1000	1000	10000	115	215	350	220



Compression Weigh Pads

These battery, or mains operated "drive-on" "drive-off" load pads, are a simple method of check weighing the weight of your vehicle.

Each pad has a capacity of 10 tonne and it is recommended they be used in pairs, weighing each axle of the vehicle in turn. The readout which can be illuminated is available in either kgs or lbs and has a load holding facility.

- Capacity: 10 tonne
- Accuracy: $\pm 10\text{kgs}/22\text{lbs}$

Fleet Code
PW 10



On-Site Services

Our Applied Force and Measurement team provide a number of on-site services:

- Load Weighing and Monitoring
- Load Testing
- Calibration of Tensile and Compression Test Equipment
- Statutory Examinations

Load Weighing and Monitoring

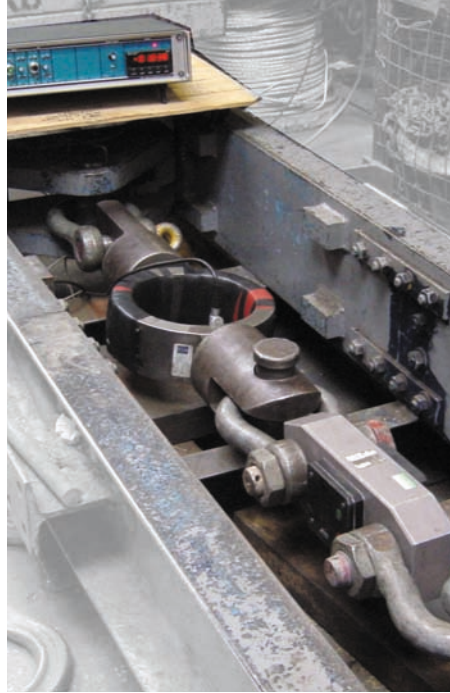
The weighing and monitoring of larger structures is often more easily achieved by jacking the load from below rather than lifting from above, particularly when considering not only the availability but moreover the costs of crane hire and the additional load measuring equipment that is required.

Hydraulic cylinders, compression load cells and computerised monitoring equipment enables complex weighing jobs to be performed cost effectively.

It may also be necessary to monitor movement as well as load where again, our large range, of dial gauges and potentiometers allows us to provide accurate data as required by the customer.

The precise monitoring of load *and* movement is a major pre-requisite when jacking heavy structures, especially bridge decks. The ability to transfer deck loading onto temporary supports while the deck remains open to traffic has tremendous financial advantages and is always a primary consideration when considering the viability of a project. Arbil makes this possible with the marrying of two disciplines: precision control of hydraulic pumps; and computerised monitoring of jack loading and movement, both vertically and horizontally.

The on-screen graphical display is customised to provide whatever information is required during the jacking process, all in instantly recognisable form with the option of hard copy printout of each phase of the operation.



Load Testing

Depending upon the nature of the required test, the necessary load or force can be applied either hydraulically via calibrated jacking sets or with test weights via calibrated tensile load cells. Hundreds of tons of test weights are available including hand weights, slab weights and concrete blocks. We can also provide beams and carrying cradles, if required, to assist with handling.

Our fleet also includes water bags which are a versatile means of testing where the use of normal solid weights is difficult.

(Speak to our Hire Team for further information.)

Calibration of Tensile and Compression Test Equipment

Proving rings and load cells which are traceable to NPL standards, are utilised when our engineers attend site to calibrate our customers' testing machines and tensile test equipment.

Statutory Examinations of Lifting Equipment

Provided as an additional service to back up our extensive sales of loose lifting tackle and lifting machines, our engineers are available to carry out your 6 monthly and annual inspections.

This service which is available either on-site or in-house complies with the requirements of L.O.L.E.R. (Lifting Operations and Lifting Equipment Regulations) where a "Record of Thorough Examination" is issued.



In addition to our on-site services, our Applied Force and Measurement team provide a number of specialist services in-house.

Repair/Calibration Services

A comprehensive in-house repair, calibration and certification facility is available for a wide range of items including:

- Pressure gauges and dial gauges
- Load links and load cells (compression and tension)
- Load cell read out systems
- Load columns and hydraulic jacking systems

The Equipment

To support this wide range of testing and calibration services, Arbil possess a comprehensive range of equipment as detailed below;

- Horizontal tensile test rigs up to 50 tonnes capacity
- Vertical tensile test rigs up to 20 tonnes capacity
- Hydraulic jack testers up to 1000 tonnes capacity
- Dynamic jack testers up to 750 tonnes capacity
- Drive-in trolley jack testers up to 50 tonnes capacity
- Pump and hose tester up to 20,000psi
- Torque test and re-calibration to 1500Nm
- P.A.T. Testing of electrical equipment

Traceability

All our testing and calibration equipment is maintained in first class working order and is traceable to National Physical Laboratory standards, UKAS Standards.

Repair and Test Facilities

In addition to our comprehensive repair and calibration service of load



measurement equipment, we also repair and test the complete range of mechanical, hydraulic and electrically operated lifting, winching and jacking equipment.

Certification

All equipment that has been repaired, tested and calibrated by Arbil is issued with either a "Report of a Thorough Examination of Lifting Equipment" or a "Certificate of Calibration".



Sample Report of a Thorough Examination of Lifting Equipment

Potentiometers, Transducers and Dial Gauges

Potentiometers

Potentiometers combined with our digital readout systems allow safe, remote measurement of movement.

Several units can be linked to a single display to enable continuous monitoring of different positions.

Fleet Code	Type	Range (mm)	Resolution (mm)
SRP 01	Spring Return	0 - 50	0.01
SRP 02	Spring Return	0 - 75	0.01
SRP 03	Spring Return	0 - 150	0.01
DWP 01	Draw Wire	0 - 2000	1.00
RP 01	Rotary	0 - 30000	10.00




Pressure Transducers

Pressure transducers allow remote monitoring of hydraulic pressure when the use of a standard pressure gauge would be difficult or hazardous. By using our calibration facilities, we can combine hydraulic cylinders with transducers and digital readouts to give accurate load monitoring during lifting or testing operations.

Fleet Code	Range (psi)	Increments (psi)	Accuracy (%)
PT 01	0 - 10,000	10	±0.5



 240v power supply required



Dial Gauges

Dial gauges allow accurate monitoring of movement during operations such as bridge deck jacking and proof testing.

The dial gauges are available with an optional magnetised base.

Fleet Code	Type	Range (mm)	Resolution (mm)
DG 01	Spring Return	0 - 50	0.01



Pile Testing Equipment

With the continuing requirement to build large structures on poor ground, the need for Civil Engineering companies to improve pile testing techniques has become even more necessary.

To compliment these techniques and improve site safety, Arbil's "Applied Force and Measurement" department has developed a lightweight, self contained instrument display system.

This system utilises strain gauged, high integrity, low profile load cells (either single or multiple units) for accurate load measurement and a range of low voltage linear displacement transducers to measure vertical and/or horizontal movement at the pile head.

Operator Safety

One of the many benefits that the system provides is operator safety, as it eliminates the need for an operator to take readings from analogue dial gauges or load columns from under temporary Kentledge® or highly stressed reaction frames during the test cycle.

Readings can also be taken remotely from the dedicated readout unit which can be run from its own internal rechargeable batteries from any 12v DC power supply or via its 240v AC recharging unit.

Data Display

The three digital displays are energised via a single on/off switch. These displays give information on the following:

- Each individual transducer in turn
- Total load (usually given in kN)
- Automatic average displacement (usually given in 0.01mm)

While the system is ideal for maintained and cyclic tests and has auto-off battery saving features, this can be disabled to give a constant display when carrying out constant rate penetration or uplift tests.



Conventional load column units and analogue dial gauges are also available where load measurement can be carried out in a safe manner.

Applied Force

Utilising hydraulic cylinders from Arbil's extensive range, heavy duty rubber protected hoses and the choice of hand and powered pumps; loads can easily be applied and maintained from a remote monitoring position.

Of particular use are the compressed air driven pumps which incorporate an auto-hold facility to ensure accurate load maintenance during lengthy "hold" periods within a given loading cycle.

Monitoring Devices

A complete range of load application and monitoring devices are available from 10kN load pressure plate bearing testing to 10,000kN per cylinder pile tests.

Test and Calibration

Arbil's "Applied Force and Measurement" engineers are fully trained to calibrate and proof test all equipment before shipment to site, with all certificates traceable to the National Physical Laboratory and UKAS.



A self-contained Tangye® hydraulic jack complete with calibrated gauge for small plate bearing or mini pile tests.

Test Weights and Cradles

Hand Test Weights (20Kg)

A system of portable 20kg test weights suitable for a wide variety of applications

Ideal for:-

- Floor Loading in Lift Testing
- Hanging Load Testing
- Suspension Beam Testing



Fleet Code
HTW 20

Test Weight Cradle

Provides a secure container for test weights when lifting.



i Available in a variety of sizes/capacities to meet your specific requirements



Fleet Code
TWC 01

Slab Test Weights

A series of test weights for higher capacity testing. These cast steel weights are available in 0.5, 1, 2 and 4 tonne capacities.



Fleet Code
ATPT 1

Kentledge® Weights

A system of large weights used for load testing piled foundations.



Fleet Code
KW 01