

# 166 Helpsheet



*World Leaders in Computer Controlled Testing  
Systems for Geotechnical Engineers and Geologists*

## Transducers

### Explanation of Submersible load cells

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#### 1. Introduction

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GDS uses a wide range of load cells, however one of the most commonly used due to its versatile nature is the submersible load cell. They are available in several different makes and models, enabling a suitable load cell for all types of testing.

The main submersible load cell type used by GDS Instruments is the STALC9 load cell, these are mainly used within triaxial cells to measure the direct axial compression load applied directly to the sample.

#### 2. Technical

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As the load cell is subjected to cell pressure a diaphragm within the load cell is subjected to the same pressure via two external ports, these allow water to pass into the load cell at the external pressure, this in turn subjects the interior of the load cell (which is filled with oil and completely de-aired) to that same pressure.

As the outside pressure of the load cell and the internal pressure are the same, there is no deformation, thus the strain gauges within the load cell are not subjected to any movement, therefore they do not record any load applied.

As the load is applied to the load cell, it is effectively forcing the two sections (top and bottom separated by the diaphragm mentioned above) together; this causes the load cell to increase in diameter which causes the strain gauges to move, thus creating a voltage. This voltage is then measured and (using the calibration data within GDSLab) converted into load (kN).