



Product Link

Strut Ancillaries - Section 5.4

MP500 - Section 6.1



The MP250 is a modular format high load capacity hydraulic strut combining the compressive strength of steel tube with the convenience of hydraulic actuation for length adjustment and pre-loading potential. Swivel end bearing units allow for various strutting alignments within an excavation, with or without waling beams.

MP250 struts use 610mm diameter tubular sections as the main structural member. At shorter spans, the hydraulic capacity limits the axial load and at longer spans, the potential for flexural buckling of the extension sections dictates overall axial capacity.

The MP250 has an practical operating range of 3.1m to 25.0m without intermediate support and can withstand working loads up to 250 tonnes at shorter spans. For higher load / longer span applications, it is possible to combine the MP250 hydraulic unit with 1220mm (super tube) diameter extension pieces, using appropriate adaptor pieces,

Typical Applications

- The MP250 is designed to provide direct support between concrete capping beams in basement type excavations. However it can be used to span steel section waler beams with appropriate bearing checks.

Features and benefits

- MP250 struts combines the strength of steel tubes with the convenience of hydraulic adjustment.
- Hydraulic units can be used with super tube extensions to achieve clear spans up to 48.0m, depending on loading conditions.
- Swivel end bearing plates provide a zero moment end connection and can articulate laterally up to 45° for knee brace and raking applications.
- Two alternative swivel pin holes are provided to ensure the "line of action" is carried through the back face of the end bearing plate at all strut angles (see photo opposite).
- Provides 1m of double acting hydraulic adjustment with integral lock-off valve for simple zero fluid loss installation and removal techniques.
- Individual struts can be fitted with the Groundforce wireless, fully automated, load monitoring system.*
- The MP250 hydraulic units can be fitted with a mechanical lock-off system. - special order only.*

* please contact Groundforce Technical Services Department for more details if required.



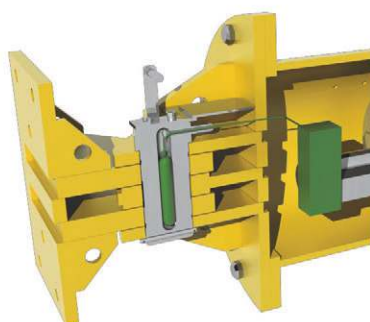
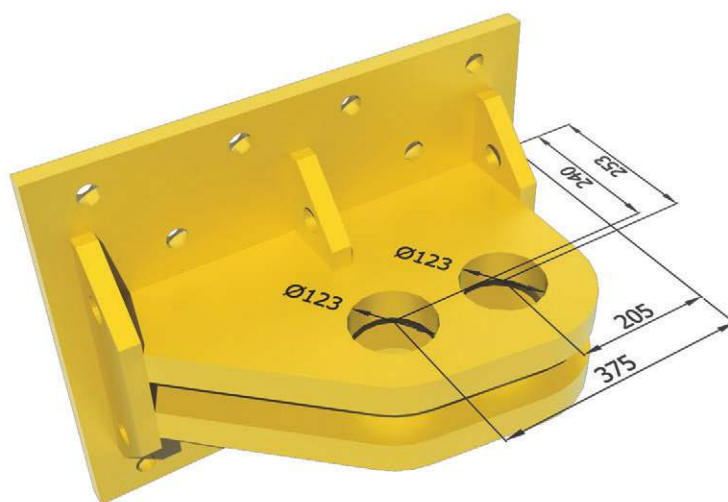
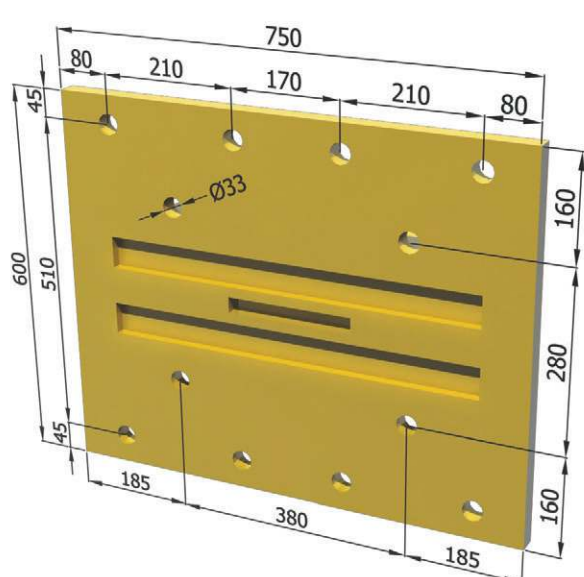
Technical Specification

- Operating range 3.1m - 28.0m; unsupported.
- Ram Construction: Steel, double acting incorporating a mechanical lock-off valve on the full bore side.
- Ram specification: Bore - 250mm, Piston rod diameter 180mm, stroke 1050mm, full bore area 491cm², annulus area 236cm², fluid volume required to achieve 50% stroke = 14 litres.
Pressure/load ratio - 33.8 tonnes per 1000psi (69 bar) induced pressure.
Max working axial load capacity - 2500kN.
- Standard Extensions Fabricated from 610 x 12.7 grade S355 CHS; available in 0.5m, 1.0m, 2.0m, 4.0m, 8.0m, 9.0m & 12.0m long. Standard lengths - see weight chart on 5.3.3. - also compatible with 1220 x 16 super tube extensions.
- Connection Flanges 810mm Ø / 30mm thick; connected with 8No. M30grade 8.8 bolts - min tightening torque 1085Nm.
Working bending moment capacity of flange under zero axial load = 336kNm.
- Swivel Pin 120mm Ø (EN19T) - optional load pin can be used in lieu.
- Bearing Plate Articulation: +/- 45° from the normal.

Ancillary Components

End Bearing Plate: The bearing plate has been designed to efficiently distribute load internally into the waling beam or structure over a stiff bearing length of 750mm up to a maximum inclined thrust angle of 45° to the normal. Up to 25°, the central pinhole can be used (depending on direction of the angle) from 25° up to 45° the offset pinhole is used to ensure that the line of action of the thrust remains through the bearing plate.

The effective strength of the strut is also dependant on the local bearing and buckling strength of the waling member and/or the shear capacity of the web if a UC section waling beam is used for example. This should be checked as a matter of course. The 750 mm wide end bearing plate includes several 33mm diameter holes to enable bolted connections to waling members or to attach a cleat attachment plate.



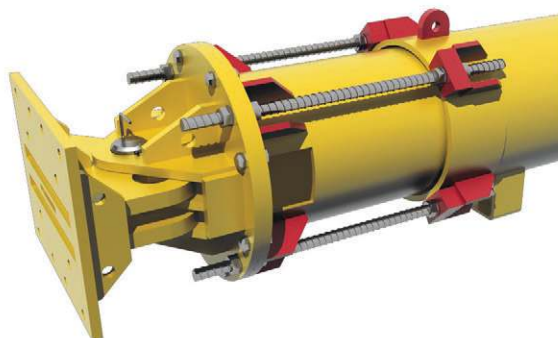
Load Pin: Can be used in lieu of the standard swivel pin to monitor real time loads in individual struts. See 5.4.3 or contact the Technical Services Department for more information.

MP250 Hydraulic Strut

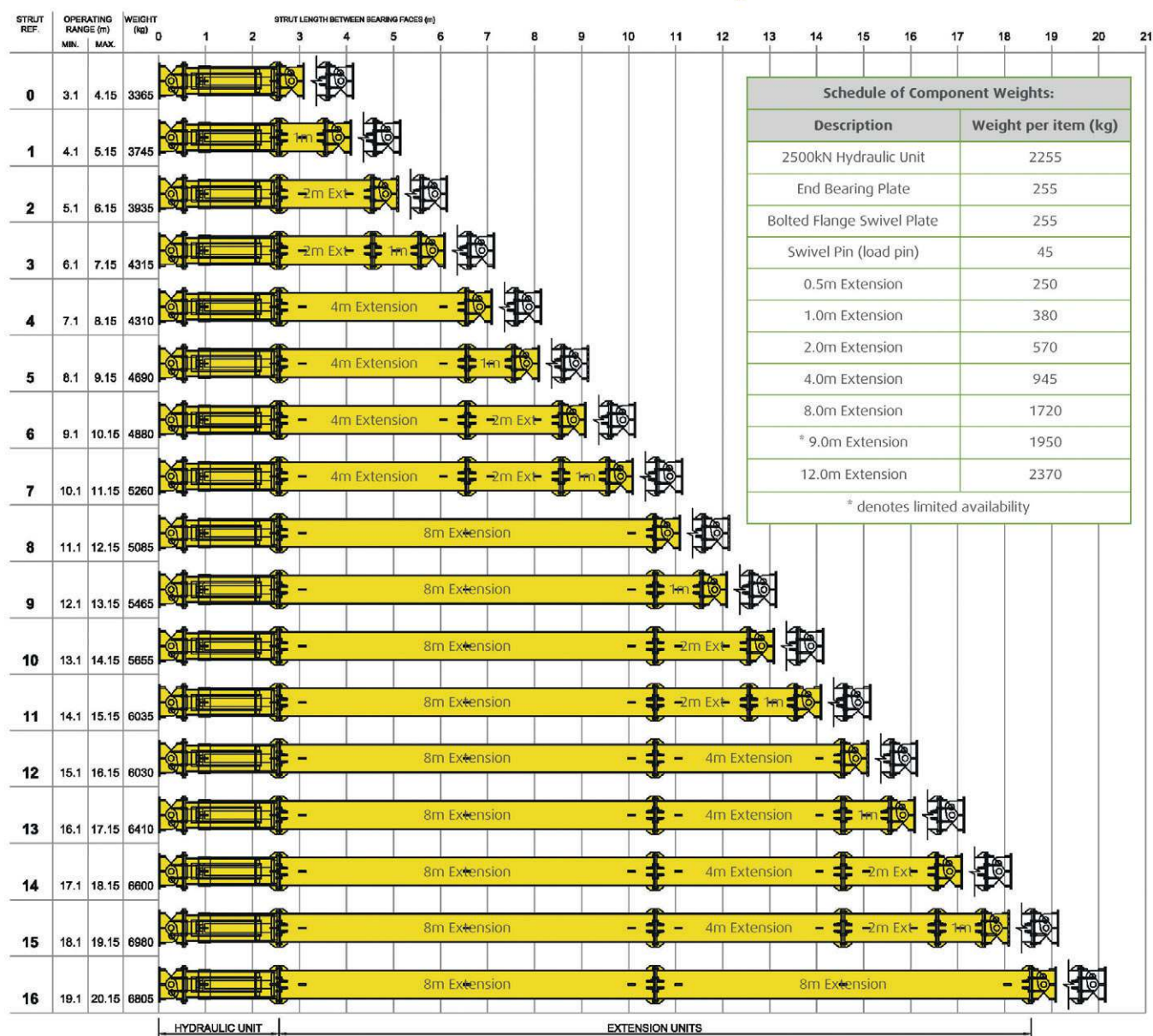
5.3.3

Ancillary Components continued...

Mechanical isolation (special order only). It is possible to equip certain ram units with locking rods to provide full hydraulic isolation. Contact the Technical Services department for more information.



MP250 Operating Range/Weight Chart - Standard Extensions



The strut has a modular format comprising a hydraulic ram unit and a series of bolt together fixed length extension units to obtain the desired length. The table below shows standard configurations of the strut. The list is not exhaustive as other permutations are possible and valid, however the strut should not use more than four extension pieces in a single assembly.

Additional mid-span vertical support via say king piles, or plunge columns, can extend the range of maximum performance. This and requests for non-standard configurations other than those shown below must be verified by the Groundforce Technical Services Department.

Using standard 610mm diameter extensions the MP250 can maintain its full capacity of 250 tonnes using its standard extensions up to a maximum span of 16.0m. After which it would require intermediate support in order to maintain full capacity at longer spans.

As intermediate support isn't always possible or convenient, the MP250 strut can be adapted to incorporate larger diameter "Super Tube" extensions. These are 1220mm diameter tubes, rather than the standard 610mm diameter. These "Super" Extensions allow the MP250 strut to span further whilst maintaining its full 250t working axial capacity.



To connect the standard extensions and the hydraulic ram (all 610mm dia) to the larger "Super" Extensions (1220mm), a 1.0m long tapered adapter piece is utilised. For each strut assembly, two adapter pieces are required.

Note:

- Struts incorporating super tubes are very heavy, it is therefore essential to have a detailed lifting and installation / removal plan in place prior to commencing work. It is essential that the on-site assembly and installation of these struts is supervised by a Groundforce Engineer.
- Due to the many variables and checks involved in designing using super tubes, it is strongly recommended that any such design work is carried out by a Groundforce Engineer, Please contact the Technical Department for advice.

Brief Technical Specification - refer to section 6 for more detail

- Super Tube: 1220 x 16mm wall thickness grade S355 CHS.
- Flange connection: 8/16 No. M30 grade 10.9 bolts on 730/1340mm PCD.
- Flange diameter: 810mm / 1420mm.



Schedule of Component Weights:		
Description		Weight per item (kg)
0.5m "Super" Extension (610 Ø)		275
1.0m "Super" Extension		650
2.0m "Super" Extension		1100
4.0m "Super" Extension		2100
8.0m "Super" Extension		4100
10.0m "Super" Extension		5050
12.0m "Super" Extension		6000
Std to "Super" Ext' Adapter		1100
Note: Standard Extension:		610 x 12.7mm CHS
Super Extension:		1220 x 16.0mm CHS

MP250 Hydraulic Strut - Working Load Chart - refer to section 'i' for more information

The lines on the chart below indicate the maximum **working** axial strut loading at various spans and includes an allowance for either 0kN, 10kN or 20kN accidental load applied at mid-span (see load effect diagram below). The area under the lines indicate the envelope for a safe solution. It is not considered necessary to account for **thermal effects** in MP250 struts when used in the UK and therefore this is not included in this chart. Please refer to section 'i' for more information on load effects on struts.

Explanation: The horizontal **Green** portion of the lines on the chart indicates the **working** axial capacity of the strut assembly as limited by the capacity of the hydraulic unit i.e. 2500kN. The sloping lines indicate a load reduction from this value due to the potential for buckling of the steel tubular extension members. The sloping **Green Line** represents the working load after taking into account a 20kN mid-span accidental load. The **Red Line** represents the working load after taking into account a 10kN accidental load. The **Blue Line** represents the working load without allowing for any accidental loading effects. The blue line must be used with caution and after a full risk analysis. The **Black Line** represents the working load with super tube extensions used in lieu of the standard 610mm diameter items. It is strongly recommended that strut configured with super tube extensions are verified by a Groundforce Engineer

Notes on applied factors of safety:

The lines on the graph below are expressed in terms of working load limit. These values represent the remaining structural capacity or resistance once allowances have been made for the bending effects induced by self weight, accidental loading, eccentricity and secondary moments (see diagram below and also notes in section 'i'). A minimum global factor of safety of 2.0 has been applied to all hydraulic components in order to determine the overall working axial capacity of the hydraulic ram. Regarding steelwork, structural resistances have been calculated in accordance with BS5950: 2000. A global factor of 1.6 has been applied to ULS values to reduce them to working values.

