

Our Ref: DJC: L.N20094.001.02

29 April 2013

On Water Marine Services  
desmond@seagrassmooring.com.au

Attention: Des Maslen

**RE: "SEA GRASS FRIENDLY MOORING TACKLE"**

Hello Des,

The letter is in response to your request for us to provide certification on your "Sea Grass Friendly" mooring tackle system.

## 1 Introduction

BMT WBM Pty Ltd was engaged by On Water Marine Services (OWMS) to provide certification for a mooring tackle system. The tackle assembly incorporates items that are either commercially available lifting equipment with published working load limits (WLLs) or are custom items with existing certification by a third party, however the system as a whole has no defined working load limit.

## 2 Methodology

The assembly was described to us by OWMS with the aid of a diagram. A sketch of the arrangement was constructed by BMT WBM based on this information and is shown in our drawing D.N20094.001 Rev 1. Drawings of custom components incorporated in the tackle system were provided to us along with their statement of certification. OWMS's supplier of the commercial lifting components, IWR Lifting, supplied the catalogue specifications for the commercially available components.

The 'Aquatec' rope manufactured by Donaghys was the only item without a published working load limit. Table A1 of *AS4142.1-1993 Fibre ropes, Part 1: Car and safe usage* was referenced in order to determine a working load limit for the mooring rope. On Water Marine Services provided assistance with categorising the condition under which the rope is to be used. We were informed "*The rope is not subject to 'flexing' at all under normal exposure. Under normal conditions the mooring will only be subjected to between 100 and 150 kgs of load. The only time it will encounter loading is during wind or storm events, so it is very much an occasional exposure.*" Under these conditions, Table A1 requires a safety factor of 6 to be applied to the mooring rope.

This application differs from lifting equipment due to the presence of a corrosive environment. Despite our best efforts, no Standard or other guidance on the design of mooring tackle was discovered that would assist us determine an appropriate working load limit of the metal components. Further to this, On Water Marine Services have requested BMT WBM to determine the working load limit in the 'new' (non-corroded) condition

and stated that normal industry practice is to make allowances for the effects of corrosion on a case by case basis. The working load limit (rating) provided in this letter of certification applies to new equipment with no corrosion.

### 3 Results

Table 1 and Table 2 list the individual components used in the mooring tackle, the certified WLL (which does not consider corrosion). In the case of a tackle assembly using 24mm Aquatec rope the overall tackle system WLL is 1650 kg-force (16.1kN). When the 32mm Aquatec rope is used, the WLL is increased to 1800 kg-force (17.6kN).

Note that this assessment cannot guarantee the long-term strength of the connection between the sea bed and the screw pile; such an assessment should be based on empirical data (observation).

**Table 1: Tabulated WLL of components, 24mm rope**

Item Description	WLL* kg	WLL Notes
"Sea Grass Friendly" mooring small screw pile <sup>#</sup>	2,500	Certified by 3D Engineering Solutions
M24 Lifting eye	1,800	Commercial equipment, rating supplied by MVR Lifting
20mm Dee type grade 'S' shackle	4,700	Commercial equipment, rating supplied by MVR Lifting
Swivel type eye & bow	3,270	Commercial equipment, rating supplied by MVR Lifting
<b>24mm Donaghys 'Aquatec' rope</b>	<b>1,650</b>	Donaghys product brochure, 9900 kgf / 6 = 1650 kgf
Shock absorber	2,500	Certified by 3D Engineering Solutions

**Table 2: Tabulated WLL of components, 32mm rope**

Item Description	WLL* kg	WLL* Notes
"Sea Grass Friendly" mooring small screw pile <sup>#</sup>	2,500	Certified by 3D Engineering Solutions
M24 Lifting eye	<b>1,800</b>	Commercial equipment, rating supplied by MVR Lifting
20mm Dee type grade 'S' shackle	4,700	Commercial equipment, rating supplied by MVR Lifting
Swivel type eye & bow	3,270	Commercial equipment, rating supplied by MVR Lifting
<b>32mm Donaghys 'Aquatec' rope</b>	<b>2,800</b>	Donaghys product brochure, 16800 kgf / 6 = 2800 kgf
Shock absorber	2,500	Certified by 3D Engineering Solutions

## 4 Closure

If you have any questions regarding the above, please do not hesitate to call us at our Newcastle office.

Regards



**Daniel Carpenter**  
**Mechanical Engineer**  
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