

## More about technical concept of M-Reels

The purpose of the modularity of the M-reels are threefold;

- Ensure a more rapid transportation of reels
- Reduce the cost of transportation of the reels
- Allow configuration of a reel according to Customers needs with dividers etc. installed at the Customers specified positions.

### 1. Container transportation

The use of 40' (and 20' if necessary for added equipment) Open Top Containers (OTC) for transportation of the reels allows us to ship even 14.4m reel as general containerized cargo or on standard flatbed trucks.



The result is a much quicker transportation than when a regular freighter is used. OTCs can be booked in most ports in the world one to four days before they are needed and shipped on the next available container vessel as soon as they are filled.

### 2. The reduced cost of transportation of M-Reels

The cost of shipping three containers containing all the parts for a 9.2m M-Reel will beat the cost of shipping a standard reel on an ocean-going freighter by far. Even when the cost of assembling or dismantling the M-Reel is added, the savings are considerable.

For customers who need the reel delivered to their own base or factory and who already has crane, manlifts and/or compressed air for the tools, the savings may be even higher.

### **3. Configuration of the reels.**

The M-reels of various ODs and core ODs may be configured with the one or more dividers installed in one of the 5 or 7 predefined positions on the core. The dividers all come with gate sections to allow opening up crossover from one compartment to the other.

The cradles and the reels come with D-rings suitable both for seafastening purposes when the reel shall be shipped full of product. The D-rings on the cradle and the reel may also be connected with a suitable rigging to enable combined lifting of both these.

### **4. Bolted connections**

The M-Reels are bolted together from parts weighing up to 2.6t each. In all 570 bolts of size M30 and grade 8.8 are necessary to assemble a 9.2m M-reel. The load transfer from one section to the other is partly done by the bolts taking up the tension and shear loads and partly by the friction between the section in the bolting area.

As each bolt is torqued to 1000Nm the bolts will, in most cases experience non or very little fatigue loads.

The bolts are all locked by means of thread lock "glue" such as Loctite 262 or similar which gives a very sturdy nut-to-bolt locking.

### **5. Certification**

All M-Reels rented out or sold have had the design and calculations reviewed and checked by DNV as part of their Type Approval for Offshore Installation use and for transportation aboard commercial vessels.

The basis for the certification is today DNV ST-0378 latest edition, while previously the DNV Standard for Certification No. 2.22 now included in the ST-0378 was used.

The design temperature used is -10°C while the DAF is 1.1.

Allowable Backtension from the product onto the drum is normally 25tonm at the centre while a 10° static side lead is used in the calculations.

The design also meets the requirements of a 1.27g vertical acceleration (gravitation

included) and a 0.48g transversal acceleration (load case III) when stored in a Dolly Base (on 4 rollers) or in the cradle.

The manufacturers are certified to ISO 9001 latest edition, and all materials are of grade S355 J2G3 carries a 3.2 Certificate and bolts a 2.2 certificate. All materials substitutions to locally recognised steel grades are approved by M-Reel AS and by DNV before use.