

## Bend Stiffener

# Bend protection in dynamic environments

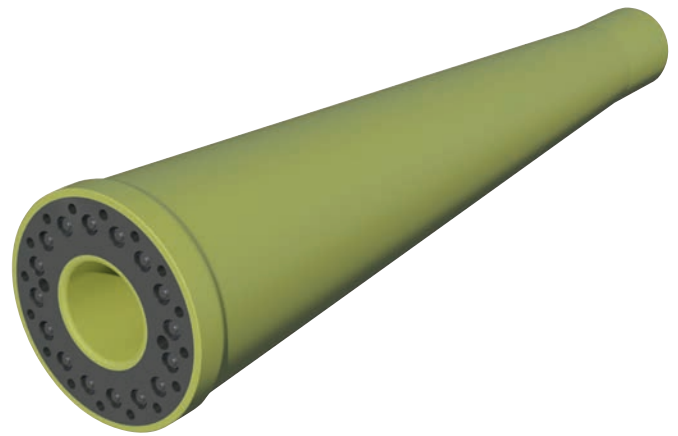
Where any flexible tubular connects to a structure, normal movement during operation (dynamic loading) or forces incurred during installation and retrieval (static loading) can cause catastrophic failure of the tubular at the termination point. The failure mode can be through collapse, rupture of internal lines or even rupture of the external layers leading to escape of the contents to the environment. This can happen as a result of a single event or be caused through fatigue damage over time.

Bend limiting devices are provided to protect the tubular from these situations and perform the following functions:

- Maintain the manufacturers recommended minimum bend radius (MBR) during the life of the project
- Provide a suitable load path from tubular to fixed structure
- Reduce point loading at the termination to an acceptable level

### **Bend Stiffeners**

Bend stiffeners acquired their name because the conical shape gradually increases the overall stiffness of the tubular in order to prevent over bending at the termination point. Manufactured from elastomeric material, a bend stiffener is suited to the constant wave and current induced motion of dynamic installations but can also be used for static applications.



Bend stiffeners are project specific and to provide you with the performance at every level, Trelleborg Offshore will fully engineer the product to accommodate the defined tension and angle combinations.

Trelleborg Offshore's track record in the supply of bend stiffeners, specifically for dynamic applications, is extensive.

### **Diverless Bend Stiffener Connectors**

For applications where termination of the tubular and bend stiffener is an issue or a retrofit solution is needed, Trelleborg Offshore has a range of diverless connectors available.

**Benefits:**

- Added local stiffness to the umbilical or flowline
- Limits bending stresses and curvature
- Prevents structure damage from overbending
- Reduces structure fatigue

**Achievements:**

- First dynamic bend stiffener supplied for service in 1994
- Over 1,000 dynamic bend stiffeners currently in service
- Bend stiffeners operating in locations around the world in ambient temperatures ranging from -20°C/-4°F to 50°C/122°F
- 100% track record with no failures in service
- Lloyd's Register Type Approval

**Contact Us**

Trelleborg Offshore delivers innovative and reliable offshore solutions that maximize business performance to meet your needs.

Our dedicated and highly skilled staff are always on hand to provide seamless process support from initial idea, through to delivery and beyond.

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