

# Bend protection in dynamic environments

## Njord BS (Bend Stiffener)

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

Njord BS 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 Njord BS is suited to the constant wave and current induced motion of dynamic installations but can also be used for static applications.

Njord BS are project specific and to provide you with the performance at every level, Trelleborg Applied Technologies will fully engineer the product to accommodate the defined tension and angle combinations.

Trelleborg Applied Technologies track record in the supply of Njord BS, specifically for dynamic applications, is extensive.

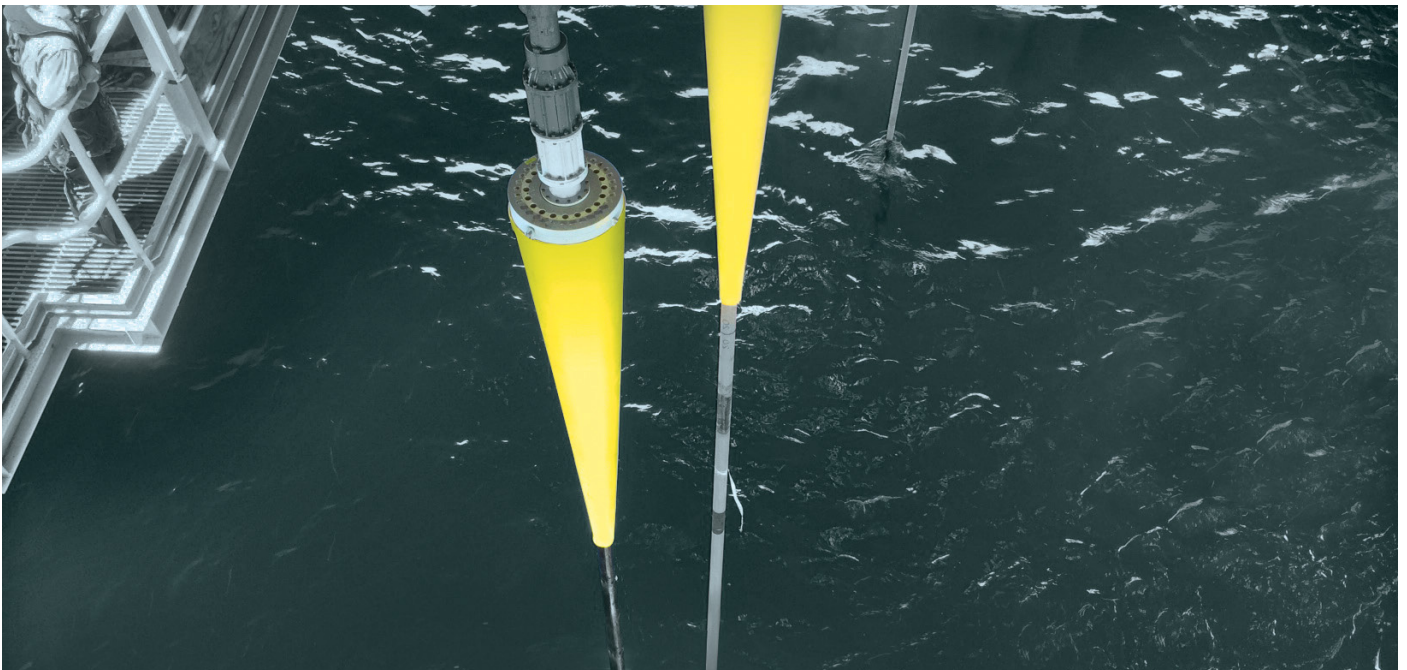
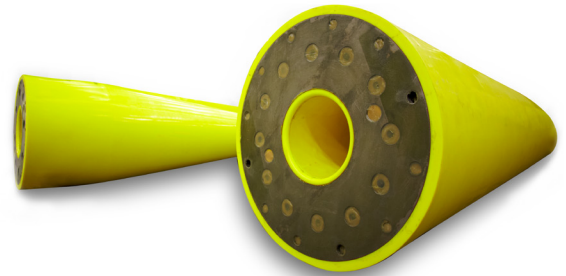


## Benefits :

- 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
- Njord BS operates 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 Applied Technologies division is an industry expert in delivering innovative and reliable solutions that maximize performance for our customers. Our vast range of specialized, customizable materials ensure peace of mind at every stage of your project. With reliable and efficient project management and manufacturing we endeavour to take performance to new levels by achieving your goals safely, on time and within scope.



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