HI-TECH ELASTOMERS LTD.

OFFSHORE PRODUCTS

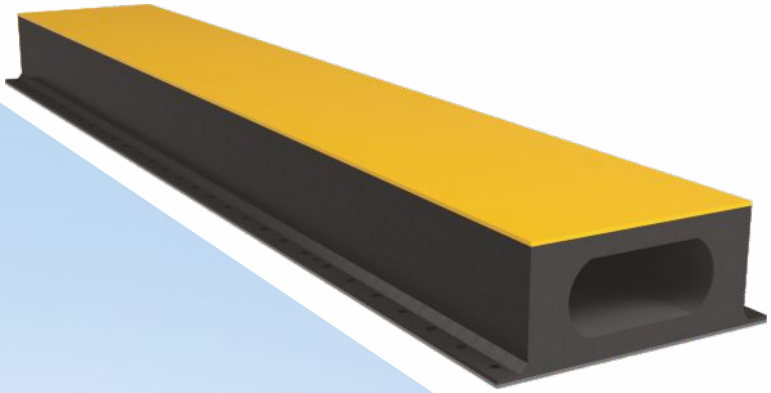
FLOATOVER SOLUTIONS

Where Innovation is Tradition

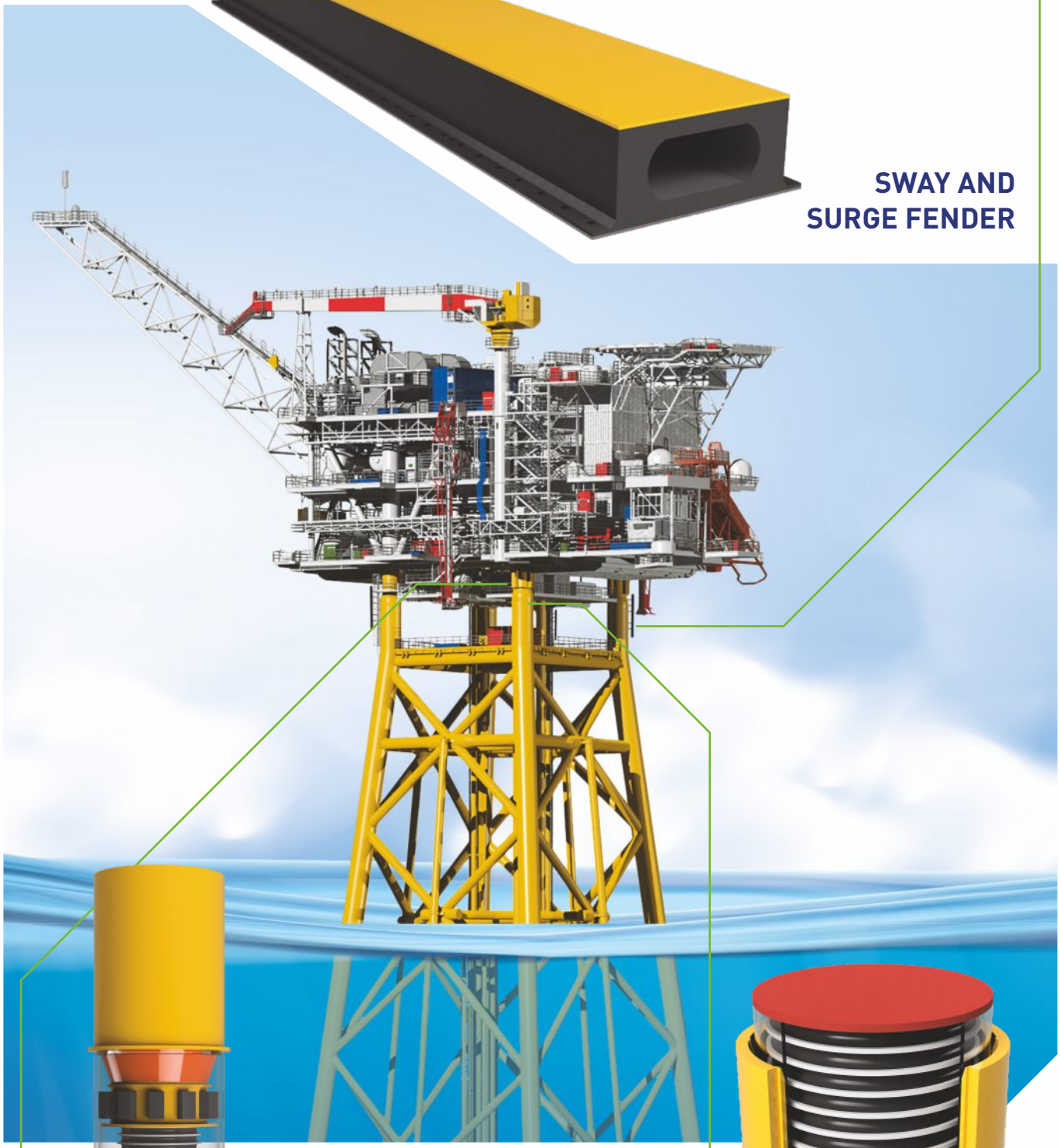
FIXED PLATFORM INSTALLATION PROCESS

Hi-Tech products and services designed for every stage of the fixed platform installation process

Our comprehensive polymer solutions for the FLOATOVER installation process are utilized for energy absorption, vibration reduction and movement tolerance. The critical nature of a FLOATOVER process demands only the highest performing solutions, and we spare no expense in pinpoint engineering and stringently testing our technology.



SWAY AND SURGE FENDER



LEG MATING UNIT

DECK SUPPORT UNIT

SWAY AND SURGE FENDERS (SSF)

Barge fendering systems are used during the floatover operation, and protect against damage arising from potential impact between the barge and the substructure legs during the entrance, mating and exit phases. The fenders also assist in ensuring the design clearances during this operation.

Our fendering systems are custom designed to comply with the client's specified stiffness requirements in both compression and shear. We can offer a cost-effective system for attaching the fenders to the barge structure, if required.

FEATURES

- Protect substructure and transport barge during floatover operation
- Efficiently and safely absorb impact loads
- Mitigates forward and sideways movement during the mating phase
- Limit the movement of the transportation barge during ballasting operation
- Protect against damage arising from the potential impact
- Easy to install and removal after floatover operation

APPLICATIONS

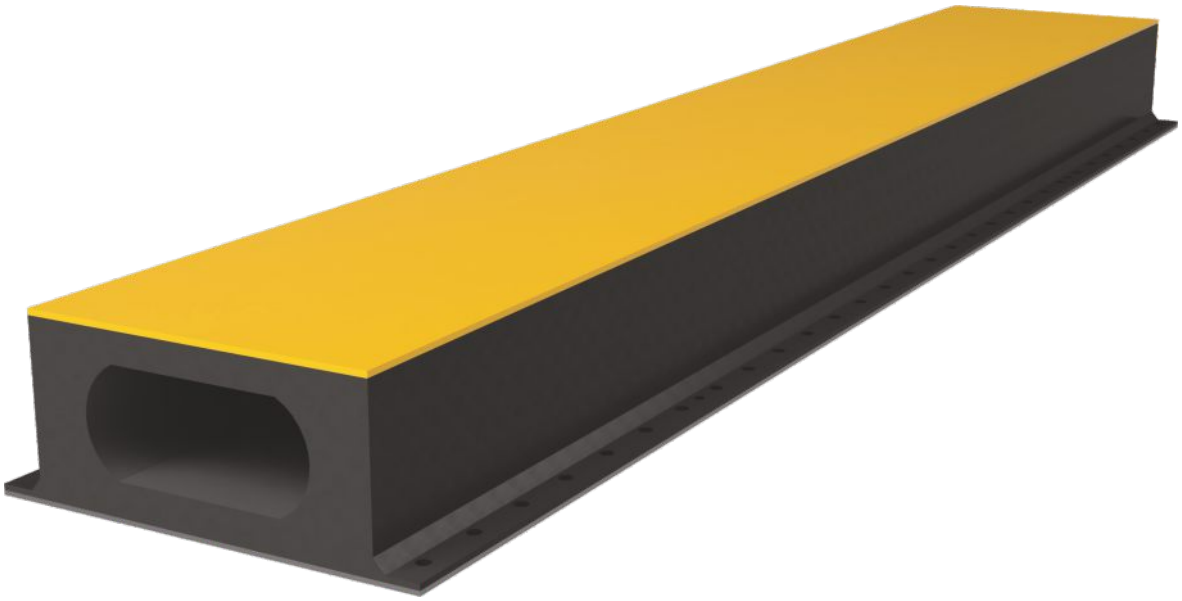
- Offshore platform jacket structure
- Transportation barge
- Offshore Wind High Voltage Direct Current (HVDC)
- Decommissioning topside

FLOATOVER SOLUTIONS

SWAY AND SURGE FENDERS (SSF)

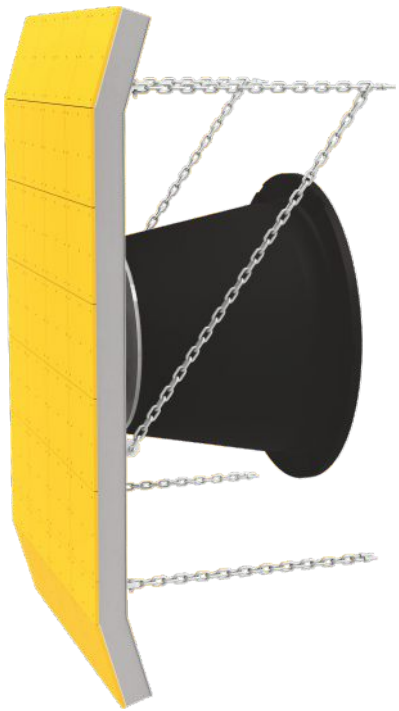
TYPES OF SURGE FENDERS

1. SURGE AND SWAY FENDER



2. ARCH FENDER (HXAT)

3. CONE FENDERS (HNC)



DECK SUPPORT UNITS (DSU)

When a topside of an offshore oil and gas platform or an offshore wind structure has been constructed, it needs to be loaded onto a barge and be transported to the offshore installation site.

The application of an Deck Support Unit (DSU) is to reduce the direct impact between the underneath of the topside and the heavy transport barge.

FEATURES

- Supports topside placed on an integrated deck frame
- Allows horizontal movement between deck support frame and deck
- Mitigates adverse weather and sea conditions during transport
- Allow horizontal movement between the topside and deck support frame during and after the mating process
- Customized for each individual projects requirements
- Full-scale testing compression load up to 18,300MT

APPLICATIONS

- Oil & Gas topside
- Mining and LNG terminal construction
- Offshore wind high voltage direct current (HVDC) topside

FLOATOVER SOLUTIONS

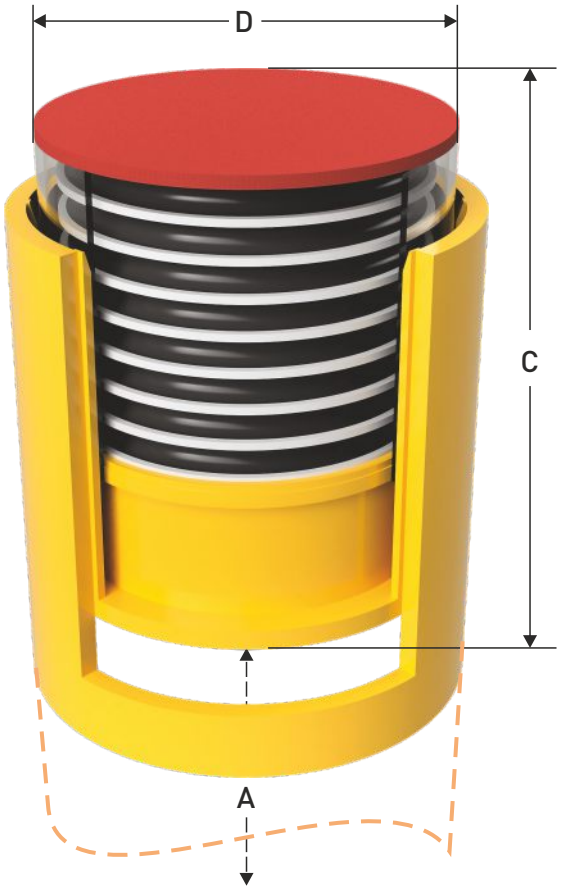
DECK SUPPORT UNITS (DSU)

Our DSUs are engineered and specially customized for every individual project, consisting of a stack of elastomeric pads installed between two steel casings. DSUs are installed onto the deck support frame of a barge. The topside is then loaded onto this deck support frame and our DSUs act to absorb the weight of the topside; these DSUs support the integrated deck structure and allow relative horizontal movement between the topside and the deck support frame during the transportation and mating process.

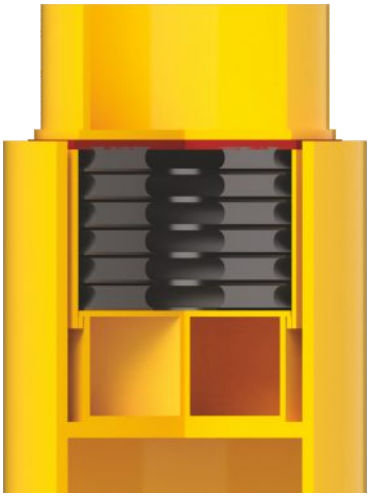
RFQ Requirements for a DSU

A. DSF Leg and Deck Leg diameter and wall thickness
B. Required Stroke
C. Overall height restriction in Jacket or Deck Leg
D. Lateral Offset of Sliding Surface

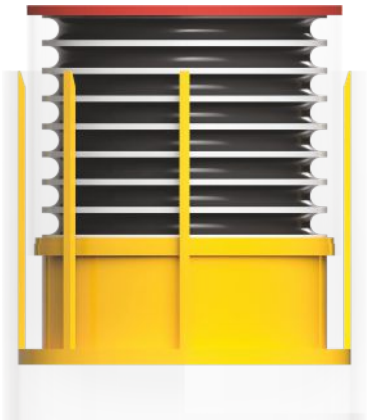
- Number of Units
- Scope Definition
- Relevant Standards
- Functional Requirements
  - Min and Max Vertical Loads
  - Lateral Load
  - Deflection Tolerance
  - DAF and Test Factor
- Steel and Fabrication Requirements
- Delivery Terms
- Loose vs. Tight Slot



DSU Installation



Before Load Transfer



After Load Transfer

LEG MATING UNITS (LMU)

Float-over is a proven installation method for the heavy topside of an offshore oil & gas platform or for offshore wind substation structures out at sea.

The float-over process involves the heavy barge transporting the topside structure to the installation site where the mating process begins; the barge manoeuvers into position between the jacket legs and aligns the topside structure with the substructure before it ballasts, slowly connecting the topside onto the jacket substructure.

FEATURES

- Capable of absorbing immense topside loads
- More efficient than conventional platform installation methods
- Reliable even in adverse weather conditions
- Assist in the transfer of static & dynamic load from the barge transporting the topside to the substructure during float-over operation
- Install large platform topside without the use of a heavy lift crane vessel
- Full-scale testing compression loads up to 18,300 MT
- More cost-effective and reduces installation lead time

APPLICATIONS

- Oil & gas topside
- Mining and LNG terminal construction
- Offshore Wind High Voltage Direct Current (HVDC)
- Decommissioning topside

FLOATOVER SOLUTIONS

LEG MATING UNITS (LMU)

As the weather and sea conditions can be harsh in an offshore environment, our float-over solutions help to ensure the transportation and installation goes flawlessly, including keeping the topside and substructure safe during the mating process.

LMU (Leg Mating Unit) experience vertical and horizontal compression during the ballasting operation, until the topside deckleg cans are in contact with the jacket leg. To stabilize the mating process and limit the barge sway movement, SSF (Sway and Surge Fenders) will be in action as well. Finally, decompression will occur on our DSU (Deck Support Unit), and effectively transfer the topside's weight from the barge to the substructure. Odin float-over hardware plays a key role during the mating process for the float-over the operation.

LMUs consists of a steel structure incorporating engineered elastomeric pads, it can be installed either in the topside, or in the substructure. They can absorb immense loads and minimizes the risk of damage created when the topside's load is transferred to the jacket. The elastomeric pads in LMUs are designed to absorb the static and dynamic forces of the topside structure and relieve the horizontal forces generated by the sea surface movements during the float-over mating operation. After the installation is completed, the topside leg cans are welded to the substructure.

LMUs are tailored to each individual project, with the highest engineering levels, and subjected to rigorous testing to provide performance guarantees. Designed and built to the highest standards, LMUs have been applied to many projects around the world, demonstrating their safety, reliability and quality.

TYPES OF LEG MATING UNITS

1. WITHOUT SAND CAN

2. WITH SAND CAN

3. WITH SHOCKCELL

Note: Dimensions and specifications are provided by Hi-Tech office as these are special polymer solutions and every project is bespoke and unique.

FLOATOVER SOLUTIONS
LEG MATING UNITS (LMU)

RFQ Requirements for a LMU

A. Jacket Leg (Deck Leg) diameter and wall thickness

B. Required Upstand & Stroke (No Sand Can: Upstand = Stroke) and whether Sand Can is required or preferred

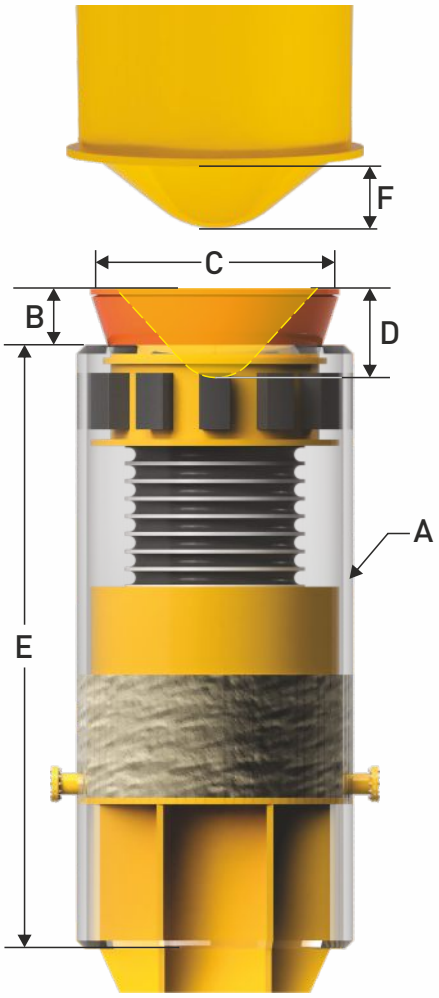
C. Watch Circle or Capture Radius

D. Receptor Depth and intended contact location

E. Overall height restriction in Jacket or Deck Leg

F. Stabbing Cone height

- Number of Units
- Scope Definition
- Relevant Standards
- Functional Requirements
  - Min and Max Vertical Loads
  - Lateral Load
  - Deflection Tolerance
  - DAF and Test Factor
- Steel and Fabrication Requirements
- Delivery Terms
- Sample Float-Over Hardware Specification

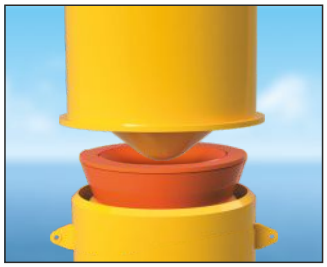


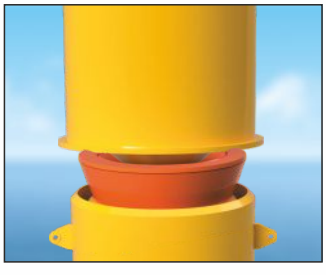
LMU Installation

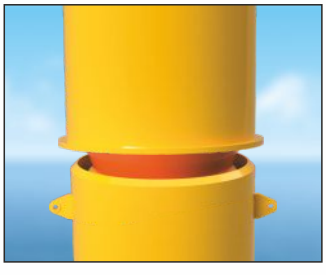
1. Initial Alignment

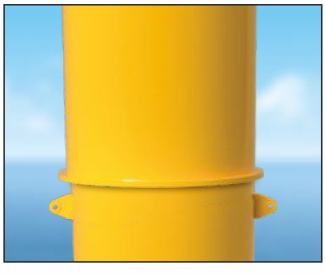
2. Begin Ballasting

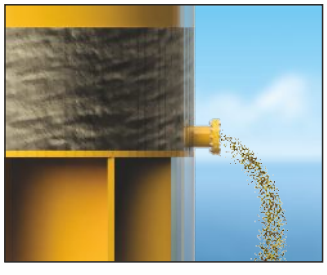
3. Initial Capture


4. Continue Ballasting


5. Impact Loading

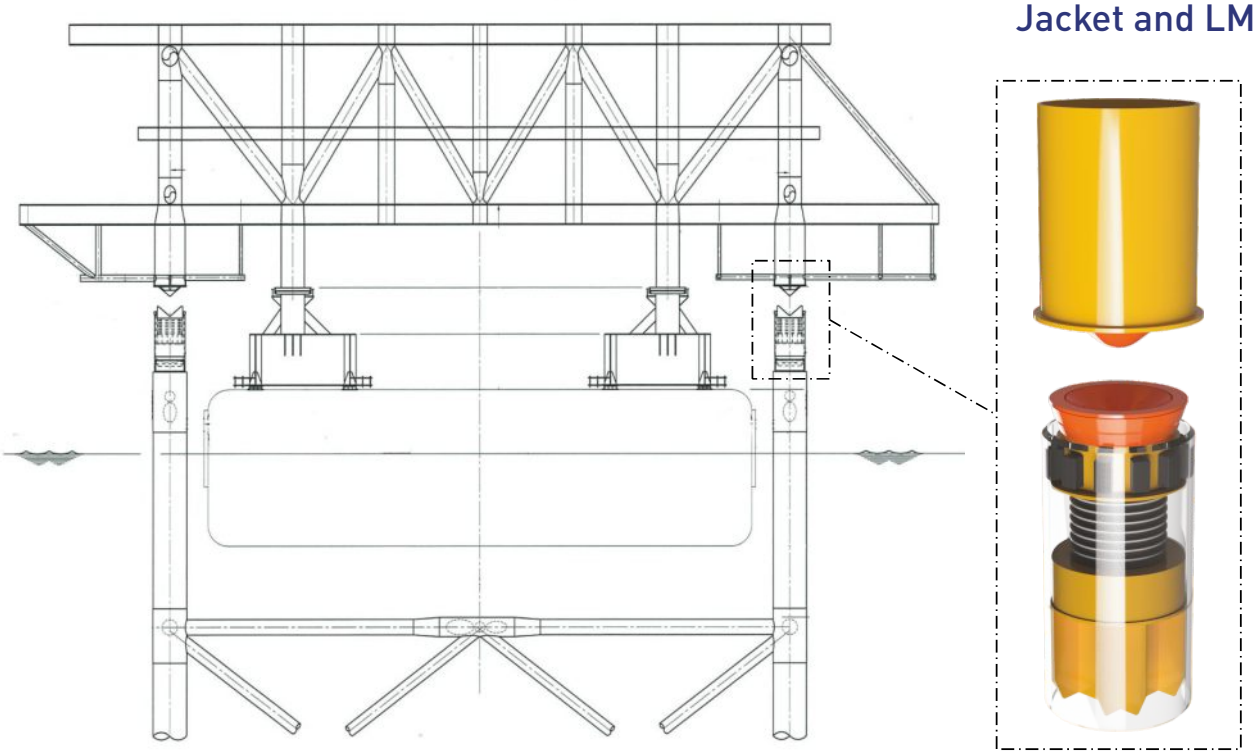

6. Begin Load Transfer


7. Full Load Transfer


8. Sand Release for Final Closure

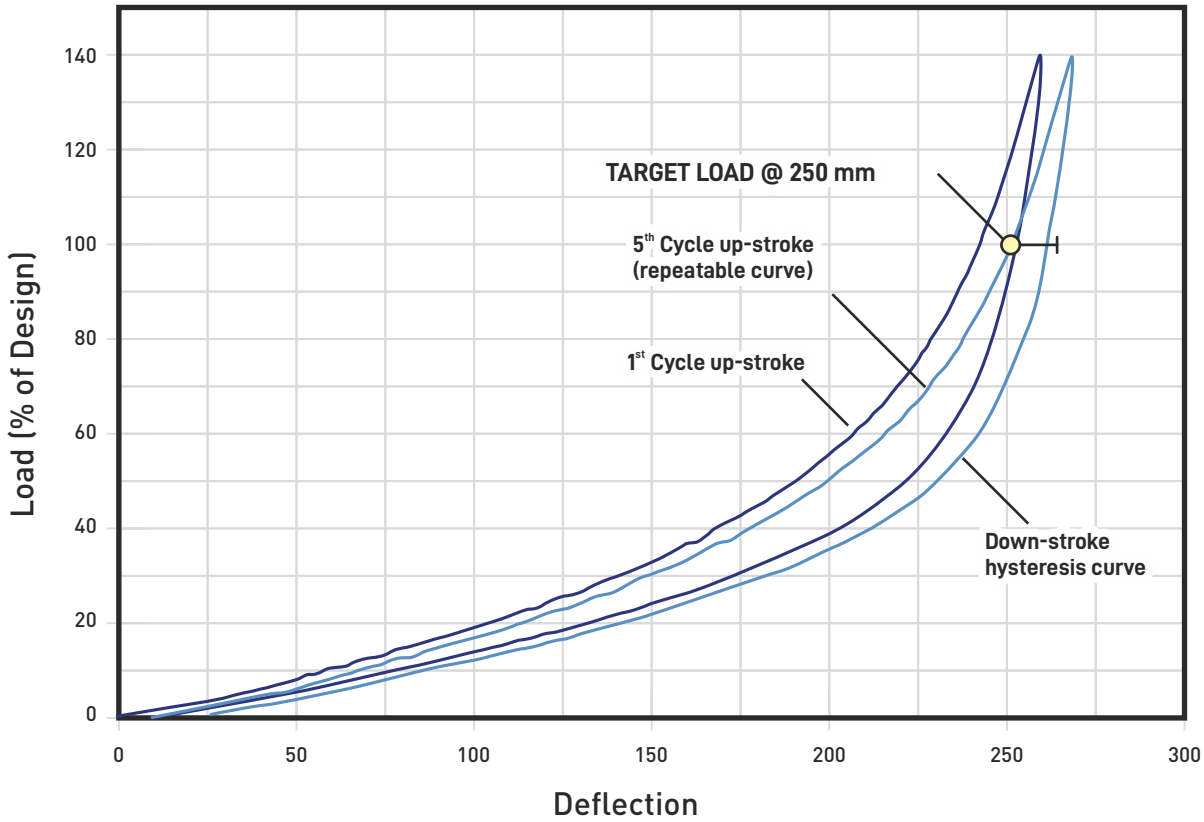
FLOATOVER SOLUTIONS
LEG MATING UNITS (LMU)

LMU & DSU Functionality



Installation
Vessel aligned over Jacket and LMUs

Load Vs. Deflection Curve Determination



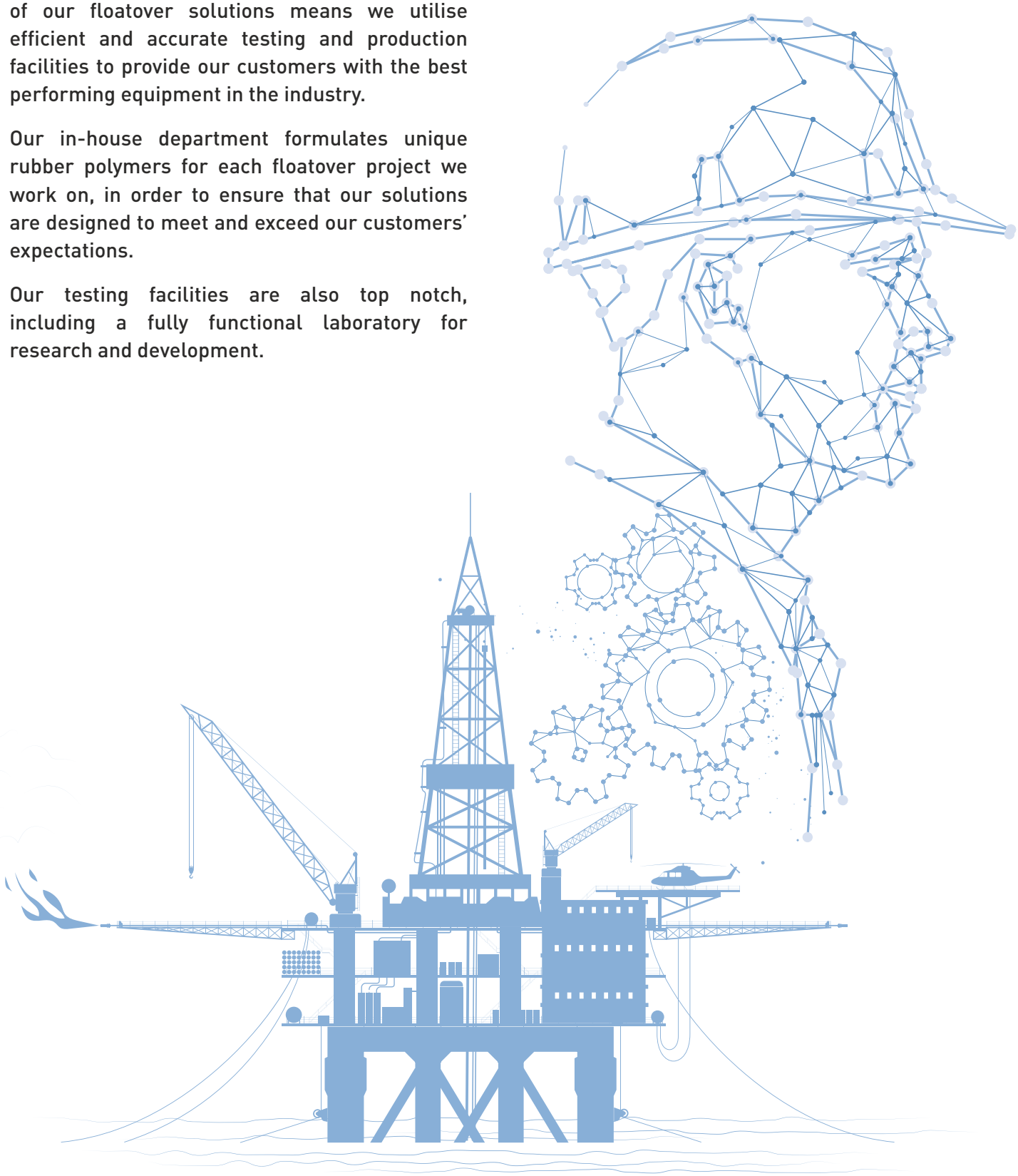
FLOATOVER SOLUTIONS

TESTING, RESEARCH & DEVELOPMENT

At Hi-Tech Engineered Products, our continued investment towards improving the performance of our floatover solutions means we utilise efficient and accurate testing and production facilities to provide our customers with the best performing equipment in the industry.

Our in-house department formulates unique rubber polymers for each floatover project we work on, in order to ensure that our solutions are designed to meet and exceed our customers' expectations.

Our testing facilities are also top notch, including a fully functional laboratory for research and development.



NOTES

PRODUCT INSTALLATION PICTURES

A1
A2

HI-TECH ELASTOMERS LTD.

WHERE INNOVATION IS A TRADITION

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