

## Grayloc® Clamp Connectors Provide Benefits Over Standard Flange Connections

### Grayloc® Clamp Connector technology enables customer to optimize its testing and validation regime

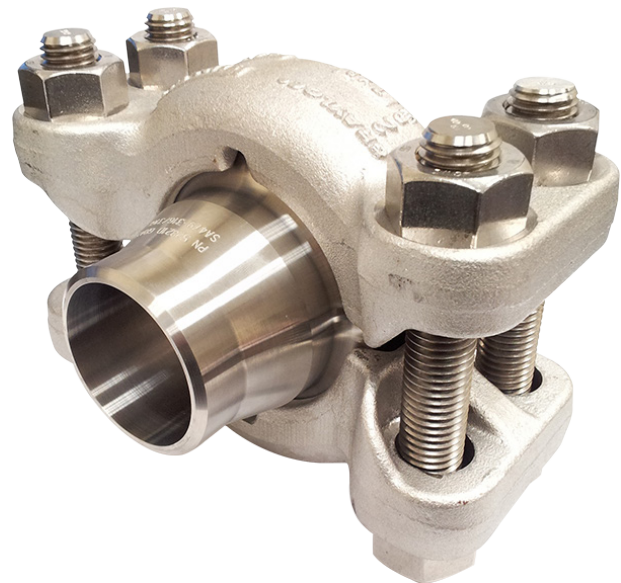
#### Project Overview

An Oceaneering client uses Grayloc® Clamp Connectors for its equipment and also for research and development (R&D) purposes. This client provides connection solutions for the oil and gas industry, specifically for well intervention, subsea controls, and topside transfer activities.

Due to the client's extensive test regime that it subjects its equipment to, Grayloc® Clamp Connectors enable the company to maximize these tests by reducing the time required for assembly prior to the test and for disconnection after the test. In addition, Grayloc® Clamp Connectors have a small footprint, enabling our client to do its work in small test bays. All of these benefits help the company to reduce the costs associated with its testing and validation regime.

#### Issues

As part of this company's internal test regime, connectors are subjected to different conditions, which requires each piece of equipment to be assembled and then stripped down continuously. Standard flange connections, due to their



larger amount of bolting and difficulties in correctly installing the joint, increase the time required for both assembly and strip-down procedures. Furthermore, the integrity of the joint may be affected by several factors, such as misalignment between the mating flanges and incorrect gasket installation. Additionally, the bigger footprints of these standard flange connections require larger testing bays. Testing costs are, therefore, higher with the use of standard flange connectors than with the use of Grayloc® Clamp Connectors.

### The Oceaneering Solution

These stated issues related to standard flange connectors have been resolved through the use of Grayloc® Clamp Connectors, which:

- » Improve health, safety, and environment (HSE) considerations during testing activities
- » Reduce the lead time required to prepare equipment prior to testing, along with the time required for disconnection procedures after testing
- » Decrease the final dimensions of the testing assembly
- » Remove misalignment issues
- » Increase the integrity of the connection
- » Reduce weight of assembly to enable vertical arrangements of equipment, thus further reducing space for testing bays
- » Decrease the CAPEX necessary for validation

### Execution Plan

Generally, the required components for Grayloc® Clamp Connectors are off the shelf from our Oceaneering Grayloc facilities in Aberdeen, Scotland, Houston, Texas, Burlington, Ontario, Canada, and K.L. Malaysia – thus greatly shortening lead times when compared to the use of standard flange connections.

### Challenges

Our client had a limited amount of space available to carry out its testing and validation regime, and the company also needed to keep its costs as low as possible.

### Equipment Highlights

Typically, the client ordered the following equipment:

- » 2-in (51-mm) Grayloc® Clamp Connectors
- » Two GR20 blind hubs
- » Heavy-duty blind, part no. 58954
- » Clamp assembly, part no. 49501 WB
- » Seal ring, part no. 50553N

### Results

The use of Grayloc® Clamp Connectors has enabled our client to improve HSE rates, reduce CAPEX, and decrease lead times associated with the company's testing and validation activities. Since side loads affect the functionality of the company's equipment design, our client prefers Grayloc® Clamp Connectors over standard flange connects because Grayloc® Clamp Connectors transfer fewer loads to this organization's equipment. Additionally, a smaller torque is required when installing Grayloc® Clamp Connectors, and it is easier to machine the Grayloc® profile onto our client's equipment, compared to standard flange features.

### Project Highlights

Grayloc® Clamp Connector technology has been beneficial for our client, as it has allowed the company to further streamline its testing and validation processes, and to reduce both costs and lead times for its qualification process. In addition, the small footprint of Grayloc® Clamp Connectors has enabled the organization to continue working within its existing testing bay capacity without having to incur cost to increase this space.