

MARINE SYSTEMS

TESTED AND TYPE APPROVED BY IACS MEMBERS
FOR NEW BUILDS, CONVERSIONS AND RETROFITS

THE WORLD LEADER IN MECHANICAL PIPE JOINING SOLUTIONS



THE WORLD LEADER IN MECHANICAL PIPE JOINING SOLUTIONS

FOR THE MARINE AND SHIP BUILDING INDUSTRIES

Since the first patent in 1919, Victaulic® has delivered innovative pipe joining solutions that help customers succeed worldwide. Look inside many of the world's most recognizable ships and vessels, and you'll find Victaulic solutions at work making bold design innovations possible, speeding time to completion and setting the stage for scalability.

From concept to commissioning, Victaulic provides the technologies and services necessary to simplify your next project.



Servicing the Marine industry since 1919.

APPROVALS & APPLICATIONS

Products Tested and Type Approved by IACS Members

(See the Victaulic® [IACS Member Certificates](#) for specific application information)



For details on US Coast Guard Acceptance, please contact Victaulic.

Sea Water

- Ballast
- Bilge
- Cooling
- Fire Main
- Non-essential Lines
- Scuppers and Discharge
- Tank cleaning
- Water Spray/Foam/Sprinkler Systems

Flammable Fluids

- Cargo Oil
- Crude Oil
- Crude Oil Washing
- Fuel Oil Transfer
- Hydraulic Oil
- Lubricating Oil
- Thermal Oil Lines
- Vent Lines
- Tankers/LPG/LNG

Inert Gas

- CO₂
- Main and Distribution Lines
- Scrubber Effluent
- Water Seal

Fresh Water

- Condensate Returns
- Cooling Water
- Deck Drains
- Fire Systems
- Non-essential lines
- Potable Water
- Sanitary Drains
- Sanitary
- Scuppers and Discharge
- Sounding and Venting
- Vents and Overflows
- Water Tanks/Dry Spaces

Miscellaneous

- Air Conditioning
- Air Piping
- Brine
- Bulk Handling System
- Deck Scupper
- Domestic Fresh Water
- Domestic Sanitary Drains
- Fire and Deck Wash Lines
- Heating and Air Conditioning
- Non-Essential
- Service Air (non-essential)



VESSEL TYPES

Container ships



Navy carriers



Tankers / LPG / LNG



Passenger ships



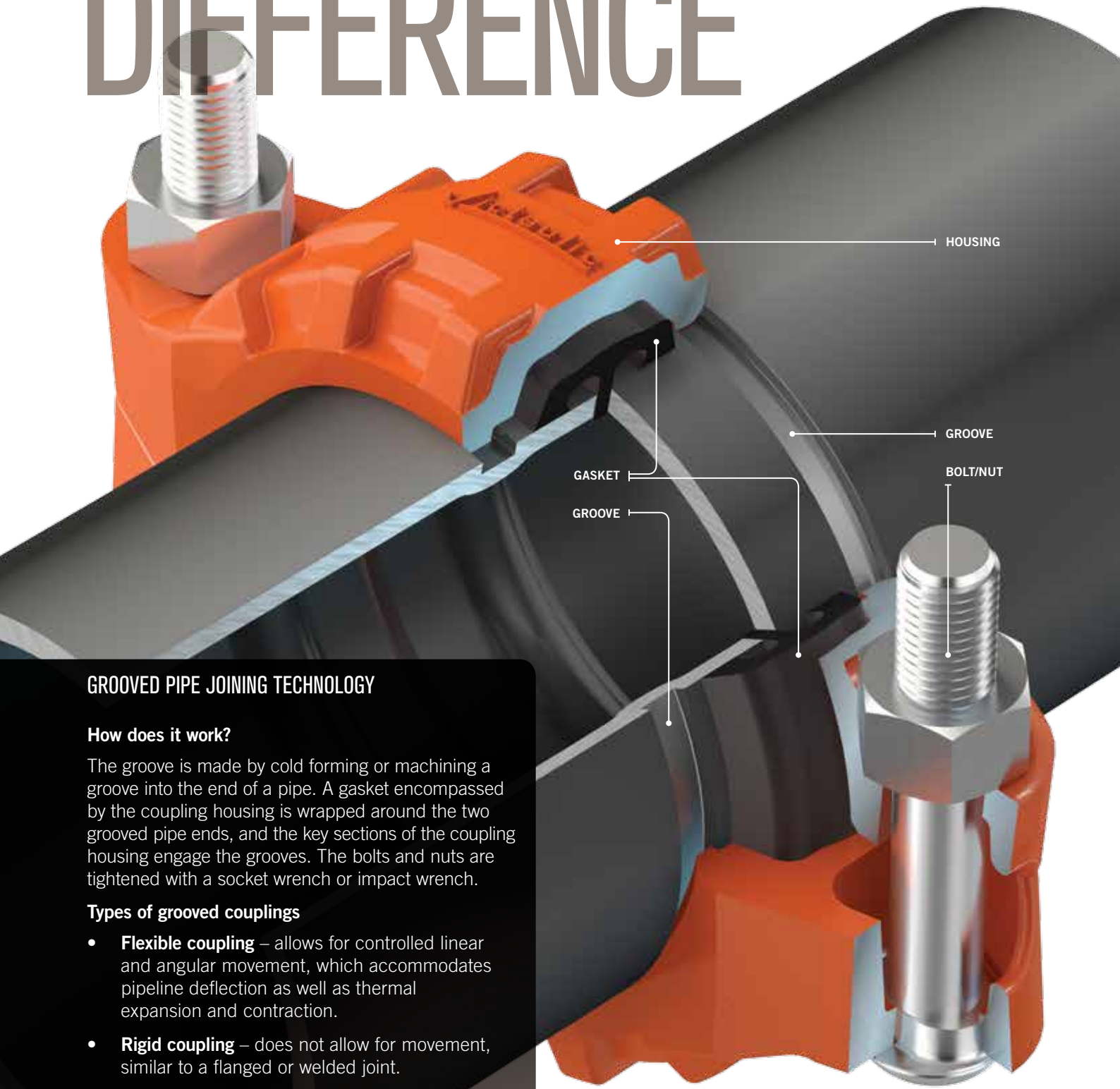
FPSO / Drillships



Tug / Workboats



THE VICTAULIC® DIFFERENCE



GROOVED PIPE JOINING TECHNOLOGY

How does it work?

The groove is made by cold forming or machining a groove into the end of a pipe. A gasket encompassed by the coupling housing is wrapped around the two grooved pipe ends, and the key sections of the coupling housing engage the grooves. The bolts and nuts are tightened with a socket wrench or impact wrench.

Types of grooved couplings

- **Flexible coupling** – allows for controlled linear and angular movement, which accommodates pipeline deflection as well as thermal expansion and contraction.
- **Rigid coupling** – does not allow for movement, similar to a flanged or welded joint.

At the core of all the benefits that Victaulic® solutions bring to a project – such as productivity, safety, design flexibility and quality – are the unique features of our products.

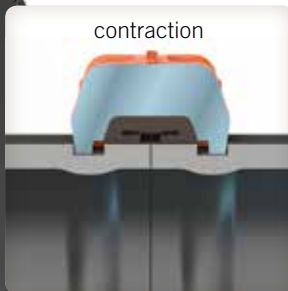
VICTAULIC® GROOVED END PIPING SYSTEMS PROVIDE:



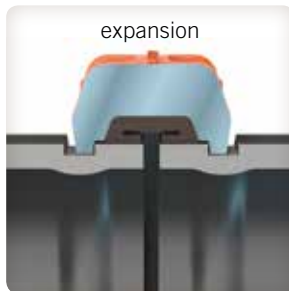
Easy system maintenance and expansion – through simple coupling disassembly that allows for easy access.



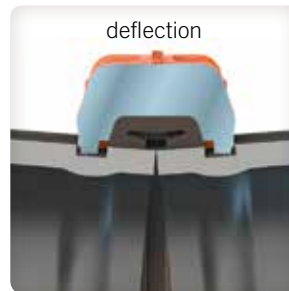
Alignment ease – through a design that allows for full rotation of the pipe and system components before tightening.



contraction

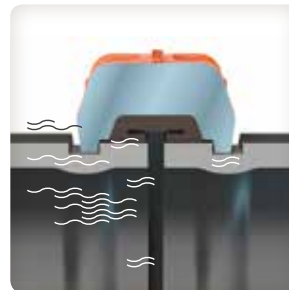


expansion

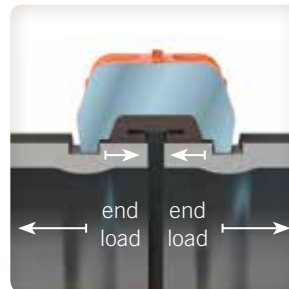


deflection

Flexibility – with the inherent axial movement and deflection properties of flexible couplings in a groove system. May be used to accommodate pipeline thermal expansion and contraction, misalignment and settlement, and seismic stress absorption.



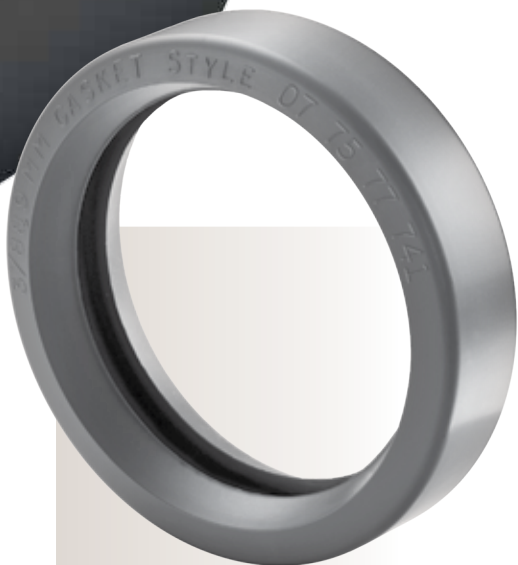
Noise and vibration attenuation – by isolating the transference of vibration at each joint.



Self restrained pipe joints – Couplings engage the pipe grooves to hold the pipes against full pressure thrust loads without the need of supplemental restraints.



Rigidity – with an angled pad design that provides positive clamping of the pipe to resist torsional and flexural loads.



Victaulic gaskets – Unlike flanged systems which are manufactured with asbestos material, Victaulic gaskets are not and have a much longer life cycle than the standard flanged gasket.

GROOVE VS. FLANGE

REDUCING WEIGHT AND SAVING SPACE

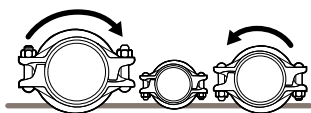


Space requirements

Problem: Confined spaces

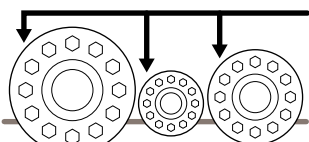
Solution: Grooved couplings have a smaller product profile than flanged components. Couplings can be rotated 360 degrees to ease installation.

End view
grooved pipe gallery



Can be rotated
for easy installation

End view
flanged pipe gallery



Rear bolts and nuts
are inaccessible

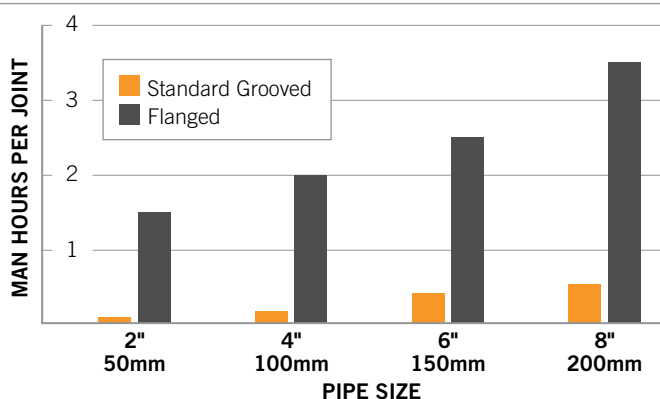
WHY IS THIS IMPORTANT?

Flanges are considerably larger than grooved mechanical couplings. This makes installation and maintenance much harder in tight spaces.

Compressed schedules

Problem: Lengthy installations

Solution: With only two bolts/nuts, compared to a minimum of 4 bolts/nuts, for flanging, installation can be cut to half the time.



WHY IS THIS IMPORTANT?

Reducing downtime during retrofits could save you thousands on labor and resource costs. Victaulic® also provides an asbestos free gasket solution, reducing retrofit time and increasing safety. Get your ship back in service faster.

“ONE OF THE BENEFITS OF VICTAULIC® FLEXIBLE COUPLINGS IS THAT THEY OFFER EXCELLENT VIBRATION ATTENUATION COMPARED WITH FLANGING.”

Willem van Koningsbruggen,
Superintendent for Smit International



Weight Constraints

Problem: Heavy system components

Solution: Lighter weight mechanical pipe-joining technique

Example of one valve assembly (6" | 150 mm):

Flanged:

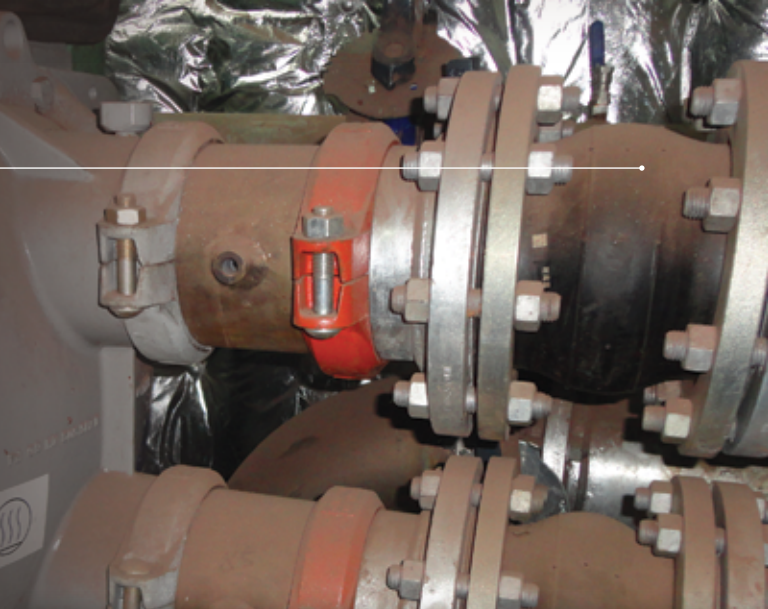
- 1 lug butterfly valve
- 2 weld-neck flanges
- 8 bolts and nuts
- Approximate weight: 86 lbs. | 39 kg

Grooved:

- 1 grooved end butterfly valve
- 2 couplings with 2 bolts and nuts each
- Approximate weight: 36 lbs. | 16.3 kg

WHY IS THIS IMPORTANT?

Flanged systems are more than double the weight of grooved solutions. This not only makes installation an exercise but adds a significant amount of weight to a vessel.



A WEIGHT REDUCTION OF **58%**
COMPARED TO THE FLANGED ASSEMBLY.



GROOVE VS. WELD

SAVING YOU TIME AND RESOURCES



Reduce expenses

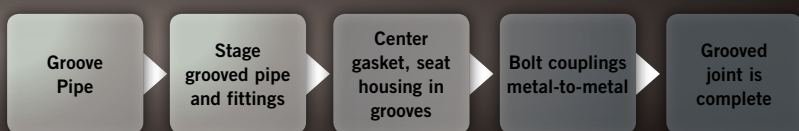
Problem: Costly mandatory expenses with welding on existing vessels.

Solution: Grooved pipe-joining solutions eliminate the need for fire watches, marine chemists and gas-free certifications.

WHY IS THIS IMPORTANT?

Welding installations require expensive and time consuming fire watches and rescue procedures, increasing project costs and extending schedules. Savings of thousands of dollars can be achieved where hot works can be replaced with grooved mechanical-joining solutions that don't require a fire watch and rescue procedures.

Grooved Installation Process



Safer installations

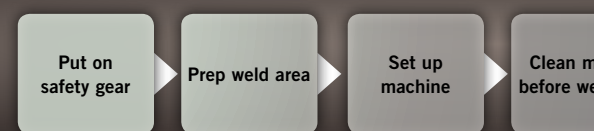
Problem: Safety hazards during installation in regards to proper ventilation and equipment obstructions

Solution: Eliminate fire watches, weld and toxic fumes with a flame free installation.

WHY IS THIS IMPORTANT?

Welding fumes and tripping hazards are two main concerns with the welding process. Victaulic® grooved mechanical couplings and fittings require no additional equipment, electrodes or cords to join the pipe ends. Pipe-joining without hot works eliminates the toxic fumes, creating a safe environment.

Welded Installation Process



“THERE’S NO WAY YOU CAN MAINTAIN A WELDED SYSTEM IN SITU. YOU HAVE TO COMPLETELY REMOVE THE PIPE FROM WHERE IT’S INSTALLED IN THE BILGES UNDERNEATH THE DECK PLATE, TAKE IT TO THE WORKSHOP, FIX IT AND BRING IT BACK. IT’S INCONVENIENT.”

Igor Shlyk, FRPD



On board and at sea maintenance

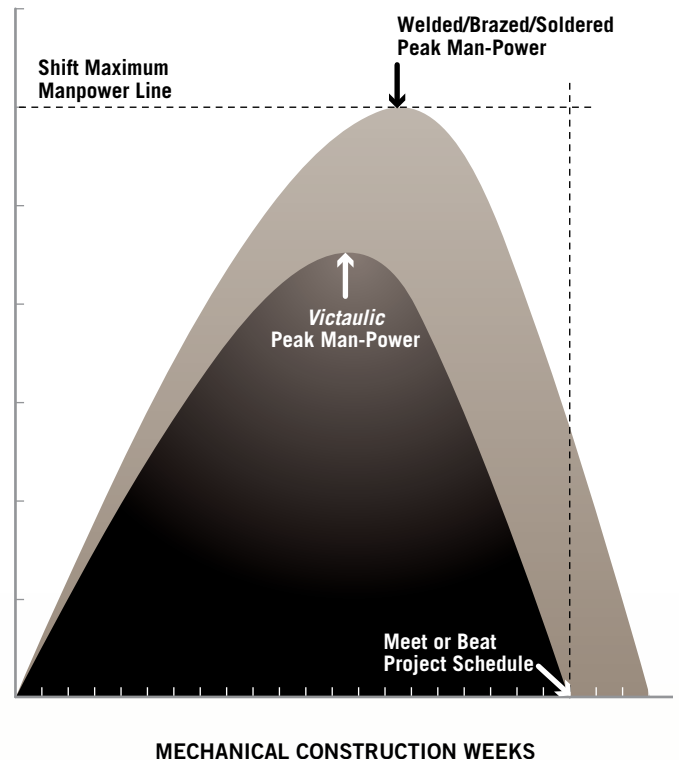
Problem: Retrofit challenges with welded systems

Solution: Victaulic® solutions provide a union at every joint allowing easy access for maintenance and retrofits without the need to cut out sections of pipe and re-weld.

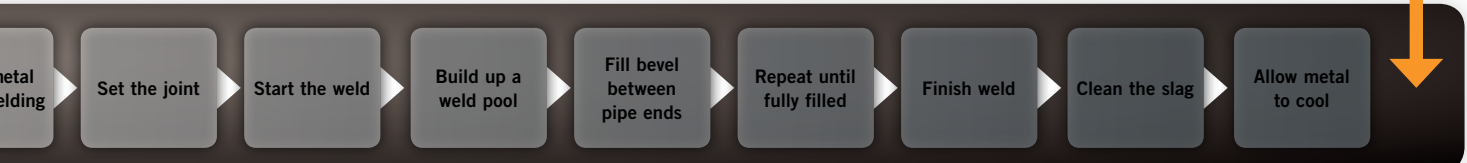
WHY IS THIS IMPORTANT?

Confined spaces in vessels create welding maintenance challenges. Once two abutted pipe ends have been joined by welding the pipe/joint cannot be re-adjusted. Rework is necessary to correct improper pipe joining. This could cost you unnecessary time and money.

Grooved mechanical pipe-joining solutions provide a union at every joint allowing for inline maintenance in less than half the time and man power. In many cases, retrofit can be made while the ship is in service.



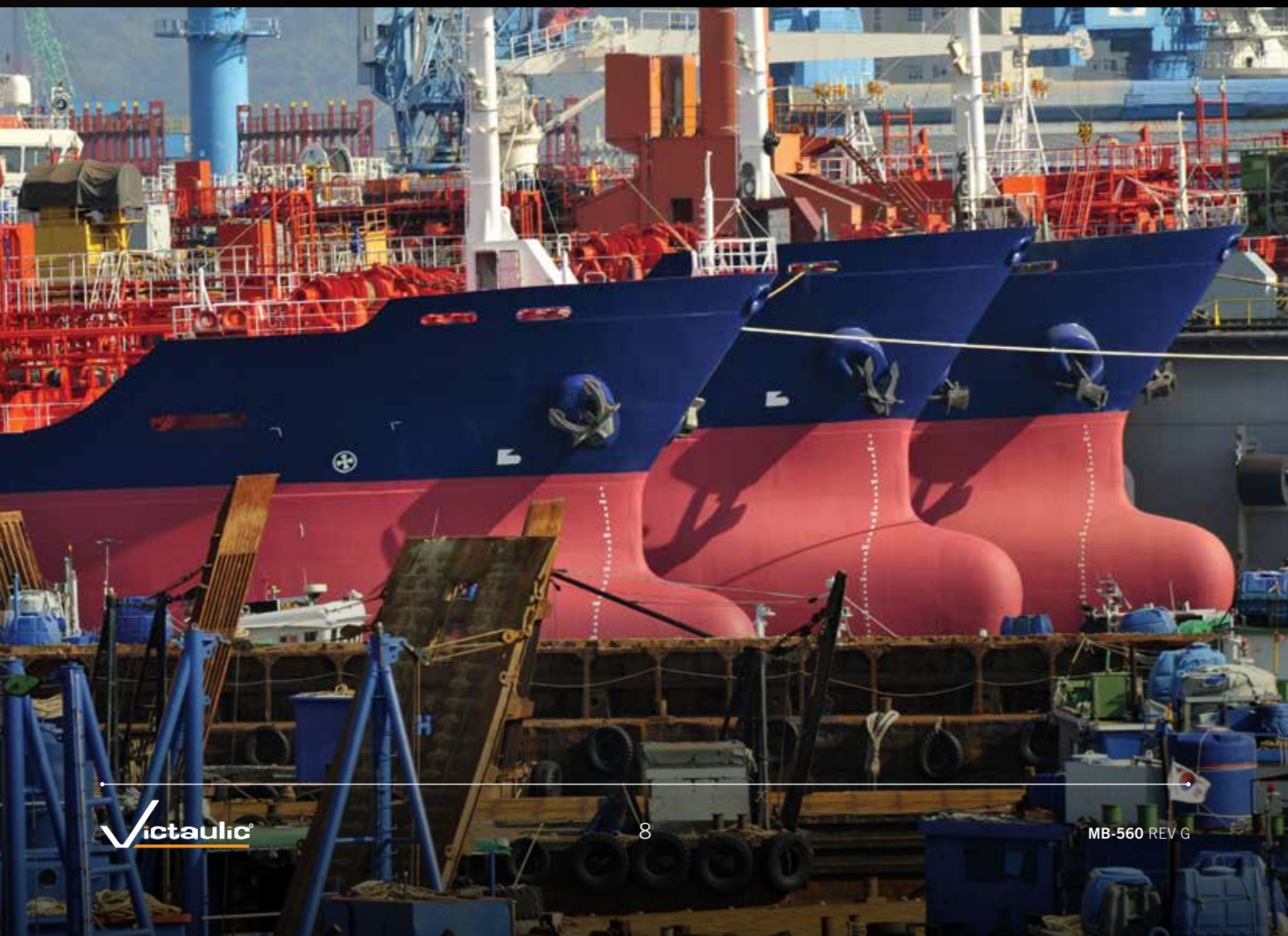
WELDED SYSTEMS REQUIRE OVER 65% MORE MAN-HOURS ON AVERAGE



NEW SHIP CONSTRUCTION

FASTER INSTALLATION. FASTER RESULTS.

No matter what type of vessel you are constructing Victaulic® will be there through the life cycle of your project; from pre-planning strategies to commissioning. The Victaulic grooved system saves space and maintains a safe working environment while reducing piping system weight. The faster you get your vessel out to sea, the faster you can see a return on your investment.



Maintain a safe work environment

ERECTING A VESSEL IN THE 21ST CENTURY REQUIRES PROPER RESOLUTIONS OF PRIOR CONCERNS. SAFETY, AMONG THE HIGHEST RANKING GROUNDS FOR ACTION, IS EASILY PROVIDED WHEN ELIMINATING THE NEED FOR HOT WORKS. UNLIKE GROOVED MECHANICAL PIPING SOLUTIONS, WELDING AND SOLDERING POSE SAFETY RISKS WHEN EXECUTED IN CONFINED SPACES.



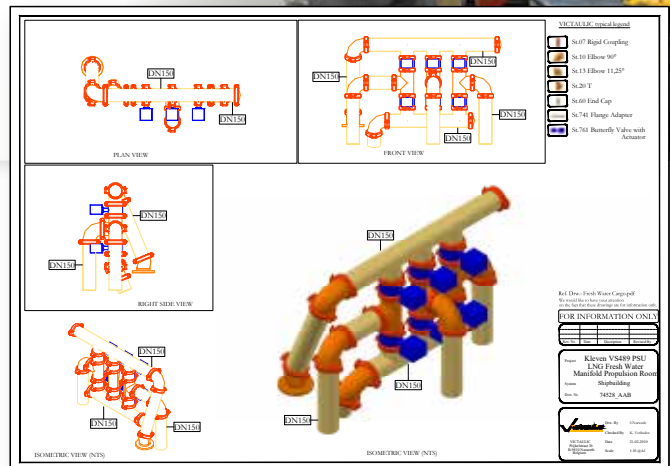
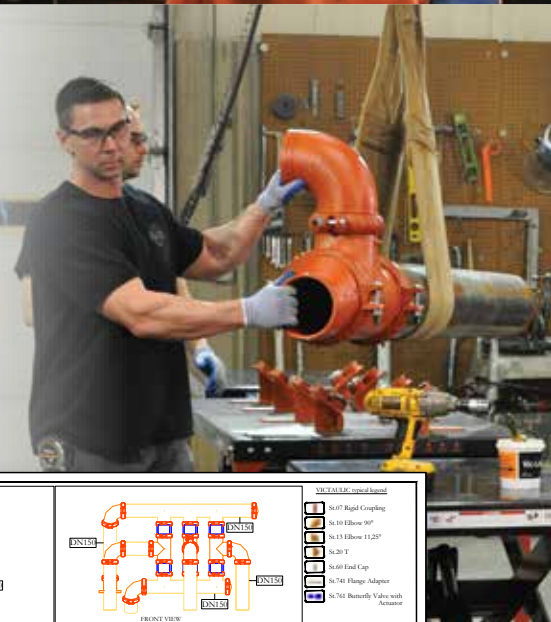
Accommodate hull flexing

Flexible solutions that accommodate expansion, contraction and deflection during the vessels voyage result in a longer life for the system.

Compressed project schedules and eliminate rework

Grooved piping reduces the installation time required for piping projects by a minimum of 30% allowing new ships to be put in service quickly and efficiently.

Hydro-testing requires hundreds of man hours assembling and disassembling thousands of bolts/nuts on flanges. Save time and money by employing Victaulic® mechanical pipe-joining solutions.



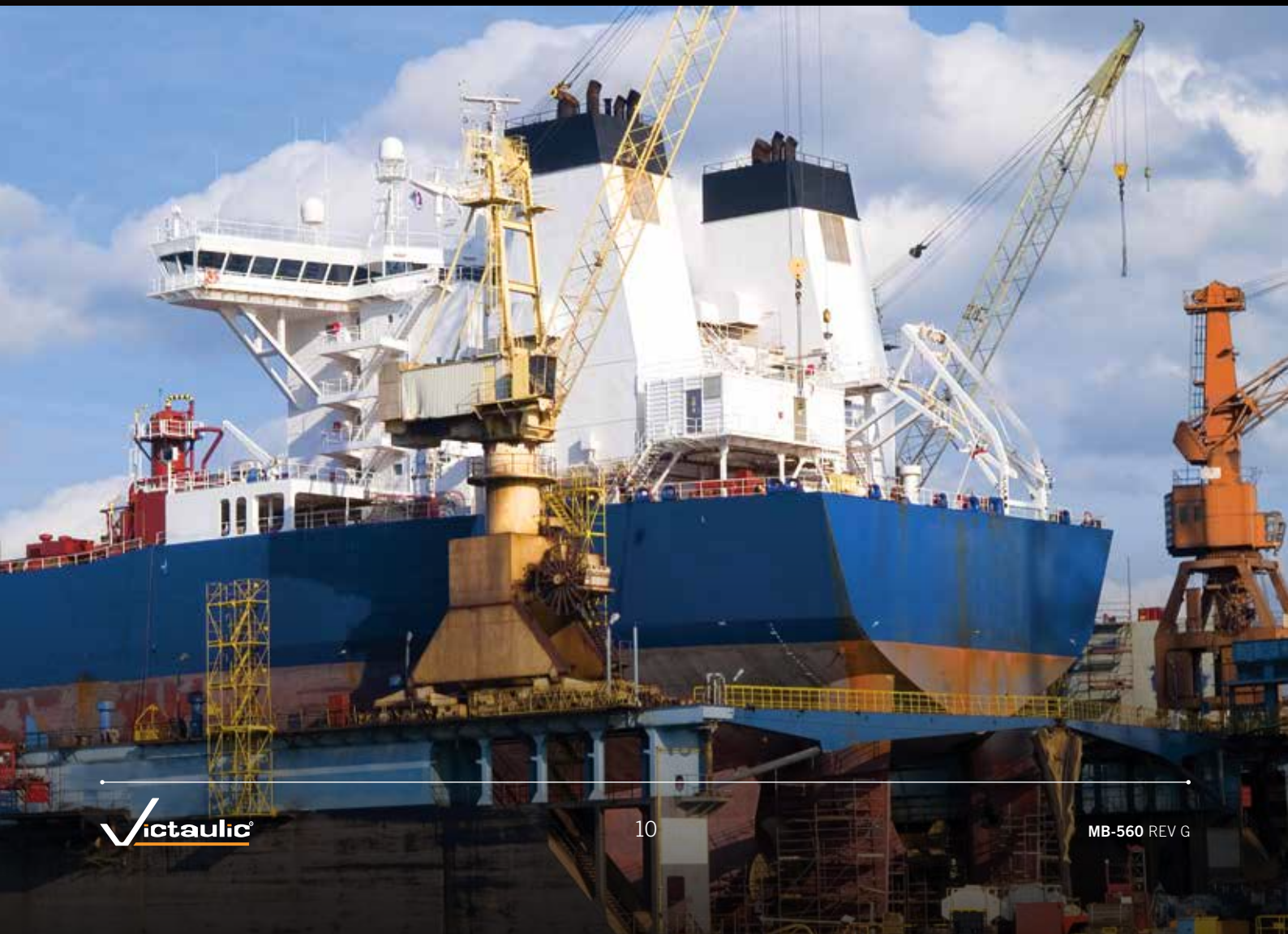
Planning prefab strategies

Reduce on-board installation man-hours and costs from start to finish. Pre-assembled units reduce job site handling and the number of field connections required to complete the system. Productivity gains of up to 30% are typical for prefab installations.

SHIP RETROFIT

MAINTAIN. SUSTAIN. PROCEED.

Simplify conversions and retrofits by reducing down time with faster installation. Getting your vessel out to sea as fast as possible, while maintaining safety and reducing system weight, is as important to you, as it is to us.



Every hour in dry dock costs YOU money

"I SAVED MYSELF SEVERAL THOUSAND DOLLARS ON A MARINE CHEMIST, SEVERAL THOUSAND DOLLARS ON CLEANING THE TANKS, AND THE AGGRAVATION OF WAITING SEVERAL YEARS UNTIL THE NEXT DRYDOCK... BY DOING IT THE WAY WE DID, IT WAS A FRACTION OF THE COST AND IT TOOK US THREE HOURS TO DO IT, COMPARED TO PROBABLY A WEEK"

Carlo Parrotta, Port Engineer

Reduce your time in drydock or avoid it altogether.

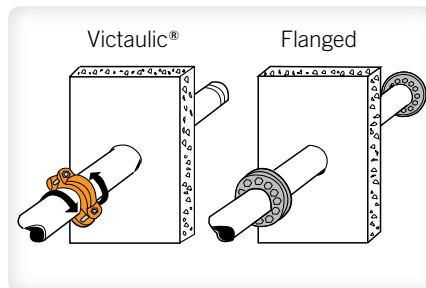


Simplified maintenance

Victaulic systems offer easy access for servicing or changing out equipment with no need to cut out sections of pipe; resulting in easy retrofits at the dock or at open sea.

Victaulic also provides solutions designed for plain end carbon steel pipe. No pipe end prep is required. Simply bolt the coupling together and the gripping teeth create a secure, reliable joint. The Victaulic Style 99 *Roust-A-Bout* couplings allows ship owners to accomplish retrofit quickly, at a lower cost and in a safer manner than conventional methods.

For more info on how the Style 99 provided a quick fix for leaky joints, please reference page 16.



Confined space requirements

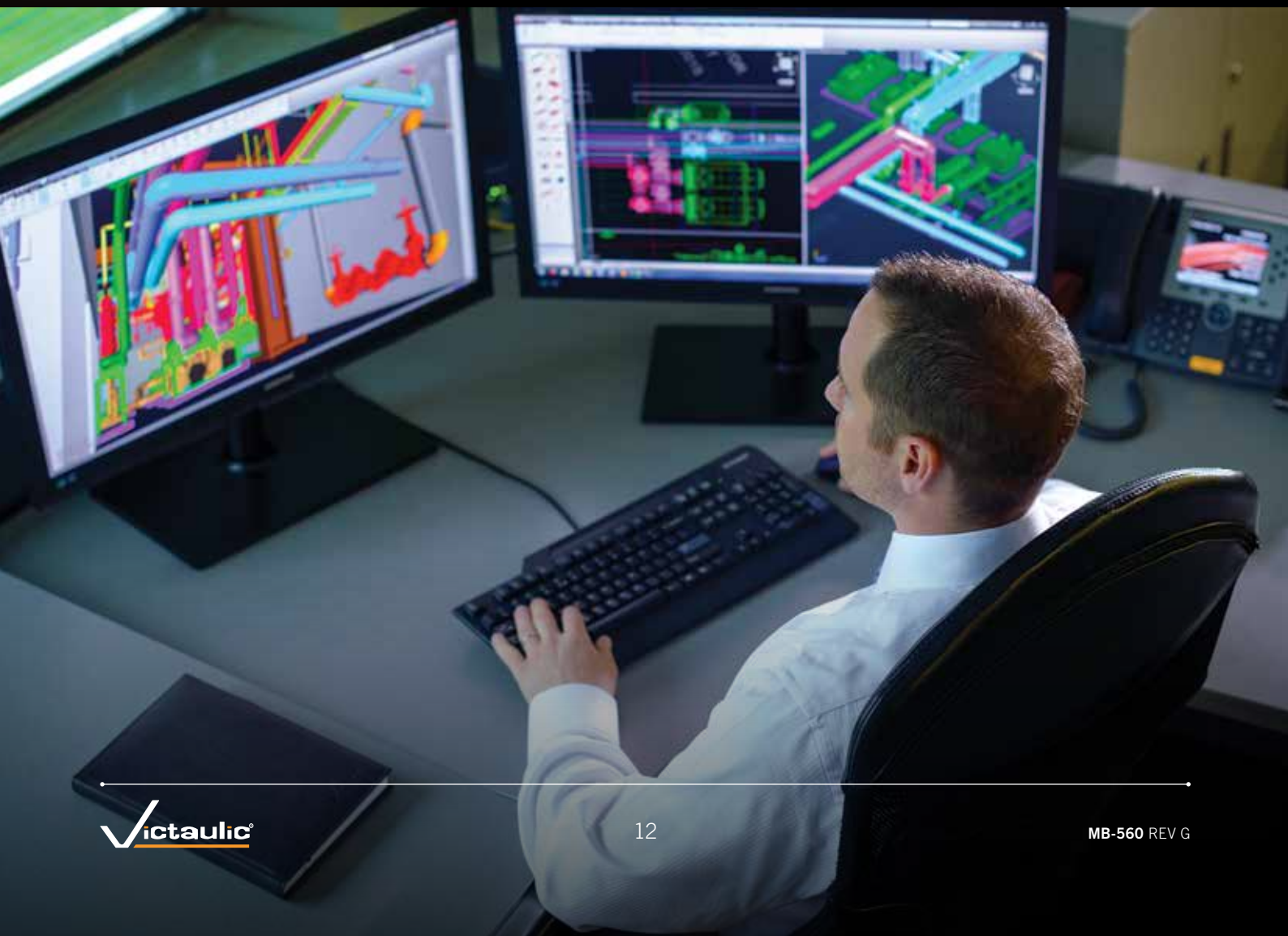
Grooved systems have a much smaller product profile than flanged systems. Victaulic couplings give you the ability to install in 360 degrees, allowing you to rotate the coupling as necessary; a huge advantage when performing maintenance in confined spaces. In certain circumstances, welded systems limit your ability to get around the full diameter of the pipe.



CONSTRUCTION PIPING SERVICES

SERVICING YOU FROM PRE-CONSTRUCTION TO COMMISSIONING

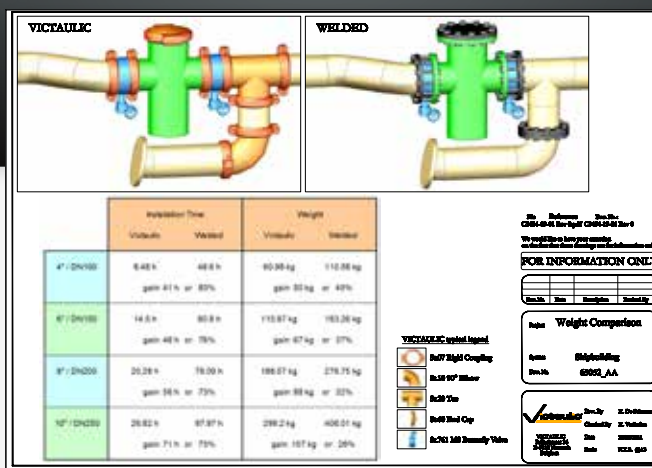
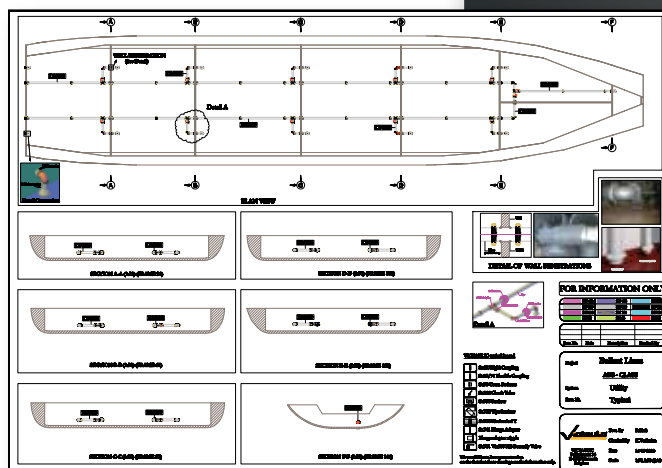
Victaulic® provides an integrated product delivery process that walks you through every step of your project. Let us assist you with on-board installation training, software solutions and construction drawings.



“VICTAULIC® CONSTRUCTION PIPING SERVICES ALLOWED US TO WORK MULTIPLE AREAS OF THE PROJECT SIMULTANEOUSLY. THEY WERE PROMPT AND ADJUSTED WELL TO AN EVER CHANGING WORKFLOW.

I WILL USE THEM AGAIN.”

Project Manager, Integrator



Piping layouts

Victaulic offers a variety of libraries for CAD software including, but not limited to, Autodesk™ 3D Revit™ or AutoCAD™ drafting for presentation purposes. These models can be utilized to offer you a head start on construction drawings.

Construction Piping Services can also provide detailed time comparisons for groove vs flange or welded systems to show the benefits and time savings.

JOHN W. BROWN LIBERTY SHIP

SEVENTY YEARS LATER AND STILL LEAK-FREE





World War II Liberty Ship tests longevity of grooved piping systems

To address the sudden need for supplies overseas during World War II, the United States government launched an emergency shipbuilding program in 1941 that resulted in the construction of 2,700 cargo ships. Dubbed Liberty ships, these vessels were designed as economically and quickly built cargo steamers that formed the backbone of a massive seafaring of troops, arms, materiel and ordnance to every theater of the war. Liberty ships, like the Brown, were not expected to last much longer than five years, but the 441-foot-6-inch-long Brown looks and sails almost exactly as she did at the end of the war and the Victaulic® products installed are still holding water after more than 70 years. In fact, the vessel still sails today on living history tour cruises in Baltimore, Maryland.



CASE STUDIES



"I'M HAPPY. I'VE BEEN USING [VICTAULIC® COUPLINGS] FOR YEARS, AND I'VE NEVER HAD A PROBLEM."

Carlo Parotta, Port Engineer



McAllister

Founded in 1864, McAllister Towing & Transportation is one of the oldest and largest family-owned marine towing and transportation companies in the United States. With a fleet of over 70 tugs and barges in 17 locations along the eastern seaboard, McAllister is familiar with the term "maintenance."

After several owners and multiple name changes, the now, Robert E. McAllister, was in need of some TLC. Despite the upgrades performed by McAllister during her rebuild, a bolted sleeve type coupling on the engine cooling water supply line sprung a leak, calling for immediate maintenance. This joint had leaked before in the past and it was time to fix this once and for all.

Port Engineer, Carlo Parrotta, familiar with mechanical pipe-joining systems manufacturer Victaulic, knew that welding would have taken Robert E. out of service too long and decided to employ the Style 99 plain end *Roust-A-Bout* coupling to replace the bolted sleeve couplings. This rigid coupling has integral hardened carbon steel "teeth" that bite into the outside of each

pipe end, providing a steel-to-steel engagement. There was no special pipe preparation—beyond ensuring a smooth, debris-free surface at the pipe ends. Having multiple IACS type approvals that cover fresh water systems, sea water cooling, ballast systems, vents overflows, potable water systems and multiple others, provides a huge advantage for this coupling.

Once the bolted sleeve couplings were disassembled and removed, the pipe was pulled from the hangers and the pipe-ends were cleaned of scaling, rust and paint the new couplings were repositioned and installed in just over an hour.

By eliminating welding, Parrotta saved time, money and his sanity. The Victaulic Style 99 plain end *Roust-A-Bout* coupling has proven advantageous for McAllister Towing & Transportation in multiple ways, from reducing time out of service, to limiting retrofit costs and safety hazards. Parrotta said of the solution: "... I'm Happy. I've been using [Victaulic couplings] for years, and I've never had a problem."

From port to sea with maximum ease. You can find Victaulic® couplings, fittings and valves on hundreds of renowned vessels in multiple shipboard piping systems.

For a complete list of references please visit the maritime solutions page on victaulic.com



Celebrity Eclipse

When one of the most luxurious cruise ships in the world, the Celebrity Eclipse, operated by Celebrity Cruises, needed a quick upgrade in the Port of Malaga, the contractor, Servyman del Estrecho S.L. and system provider, Mahle – Industrial Filtration, relied on Victaulic piping solutions to meet the operator's demanding time schedule.

With only a scheduled stop-over of 6 hours to install a new oil/water filter between two containers, Mahle went looking for a solution that was easy and quick to install and enabled Servyman del Estrecho S.L. to prefabricate part of the installation before the ship arrived at the port.

By employing Victaulic couplings and fittings they were reassured of a smooth and fast installation.

Once boarded, Servyman del Estrecho S.L., finished the whole installation in three hours, which included cutting and grooving some pipes on board, resulting in plenty of time left to test the entire system. Installing Victaulic couplings and fittings proved to be the ideal solution to meet and even beat the deadline allowing the Celebrity Eclipse to continue its journey on the Mediterranean Sea with no delays. Thus, resulting in elaborate cost savings for Celebrity Cruises.



La Superba

One of the world's largest and fastest luxury cruise ferries, La Superba can house 2,920 passengers and 1,000 vehicles. The owners of the ferry cruise needed a world class piping solution. Noise and vibration attenuation, as well as ease of installation and maintenance, made Victaulic a natural choice.

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MB-560 0748 REV G 01/2015

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