FENDERCTV

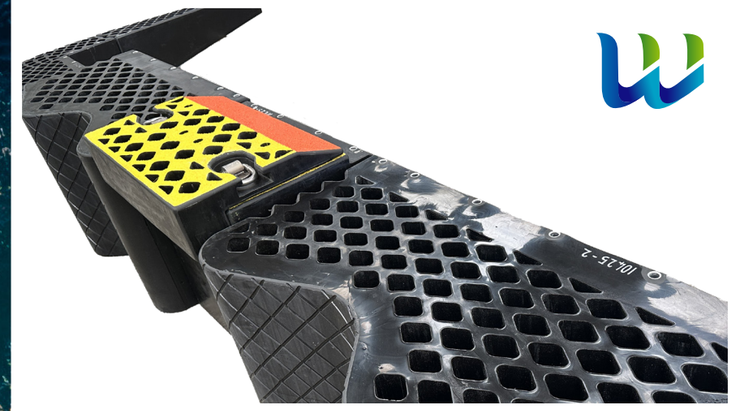
HIGH PERFORMANCE ADAPTABLE CREW TRANSFER VESSEL BOW FENDERING

LIGHTWEIGHT, LOW MAINTENANCE PROTECTION

BUOYANT WORKS

AN INNOVATIVELY ENGINEERED ALTERNATIVE TO RUBBER BOW FENDERS

- **MINIMUM 30% LIGHTER THAN RUBBER FENDERS OF EQUIVALENT SIZE**
- **MODULAR INNOVATIVELY ENGINEERED DESIGNS**
- **EXTREME DURABILITY AND WEAR RESISTANCE**
- **PROGRESSIVE COMPRESSION THROUGH MULTIPLE CAVITIES**
- **VARIABLE HARDNESS RANGE FOR TAILORED PERFORMANCE**
- **EASY, QUICK INSTALLATION AND REDUCED MAINTENANCE COSTS**
- **UNIQUE ADAPTABLE STEP UNIT TO SUIT ALL BOATLANDING CONFIGURATIONS**



CREW TRANSFER VESSEL BOW FENDER ARRANGEMENT
with impact fenders and step unit.

30 YEARS OF EXPERIENCE

Buoyant Works has developed the next generation of Crew Transfer Vessel Bow Fendering. Utilising our progressive compression technology and modular construction, we have achieved significant performance and environmental benefits.

We have replaced the traditional rubber bow fender with a new modular approach, comprising independent impact fenders and step units. This provides maximum design and operational flexibility to accommodate most vessel types and sizes.

APPLICATION

FENDERCTV provides a high performance, engineered approach to protecting the bows of Wind Farm Crew Transfer Vessels from costly structural damage and the turbines they push against.

The fenders work harder, for longer and under more challenging conditions than most other commercial vessels.

Within our **FENDERCTV** range, we have designed exceptionally robust and resilient fenders with outstanding grip and abrasion resistance, to enable Crew Transfer Vessels to operate safely and with precision.

THE FENDERS WORK HARDER, FOR LONGER AND UNDER MORE CHALLENGING CONDITIONS

REVOLUTIONISING
THE TRADITIONAL CTV BOW FENDER

FENDERCTV TECHNOLOGY

A modern approach to bow fender:

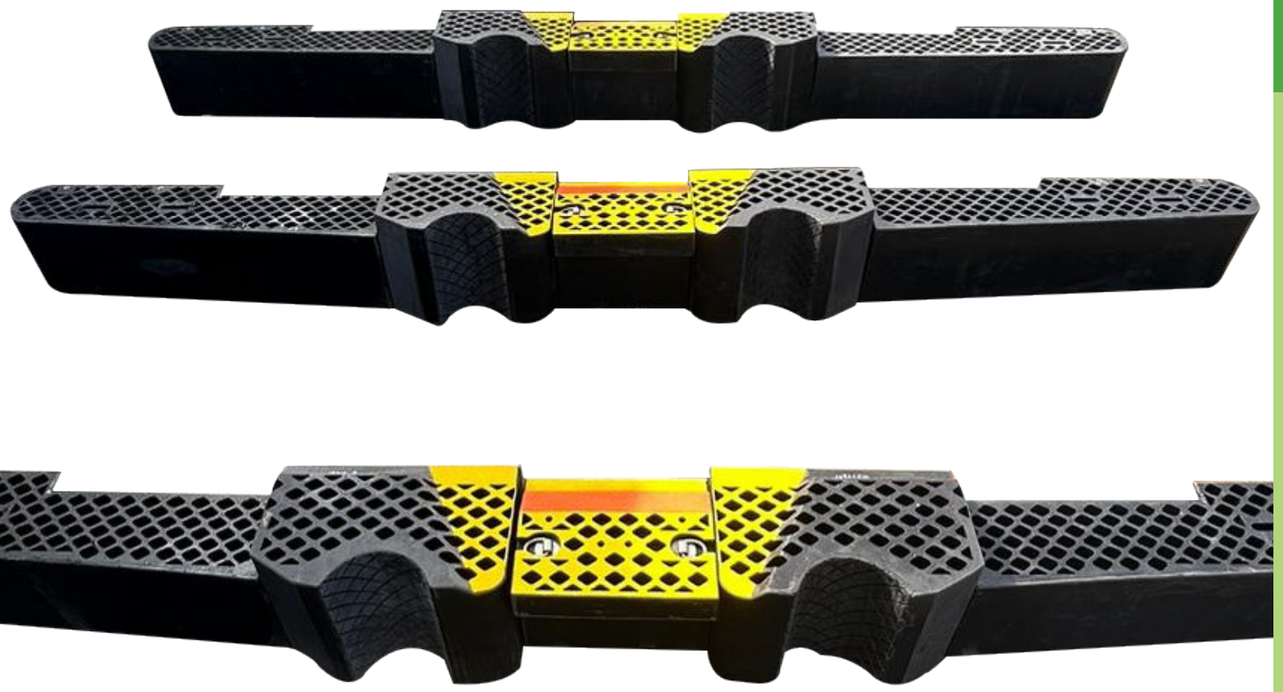
- **DESIGN**
- **FUNCTION**
- **PERFORMANCE**

FEATURES

- **HIGHER LEVEL OF PRODUCT ENGINEERING** than traditional crew transfer vessel fenders
- **HIGH PERFORMANCE POLYMER CONSTRUCTION**
- **A MINIMUM OF 30% LESS WEIGHT** than an equivalent rubber fender
- **EXCEPTIONAL LONG-TERM DURABILITY**
- **MODULAR CONFIGURATION** to enable maximum design and operational flexibility
- **MULTI CAVITITY DESIGNS** generate high levels of energy absorption with a low reaction force
- **LONG TERM CONSISTENT PERFORMANCE**

OTHER FEATURES INCLUDE

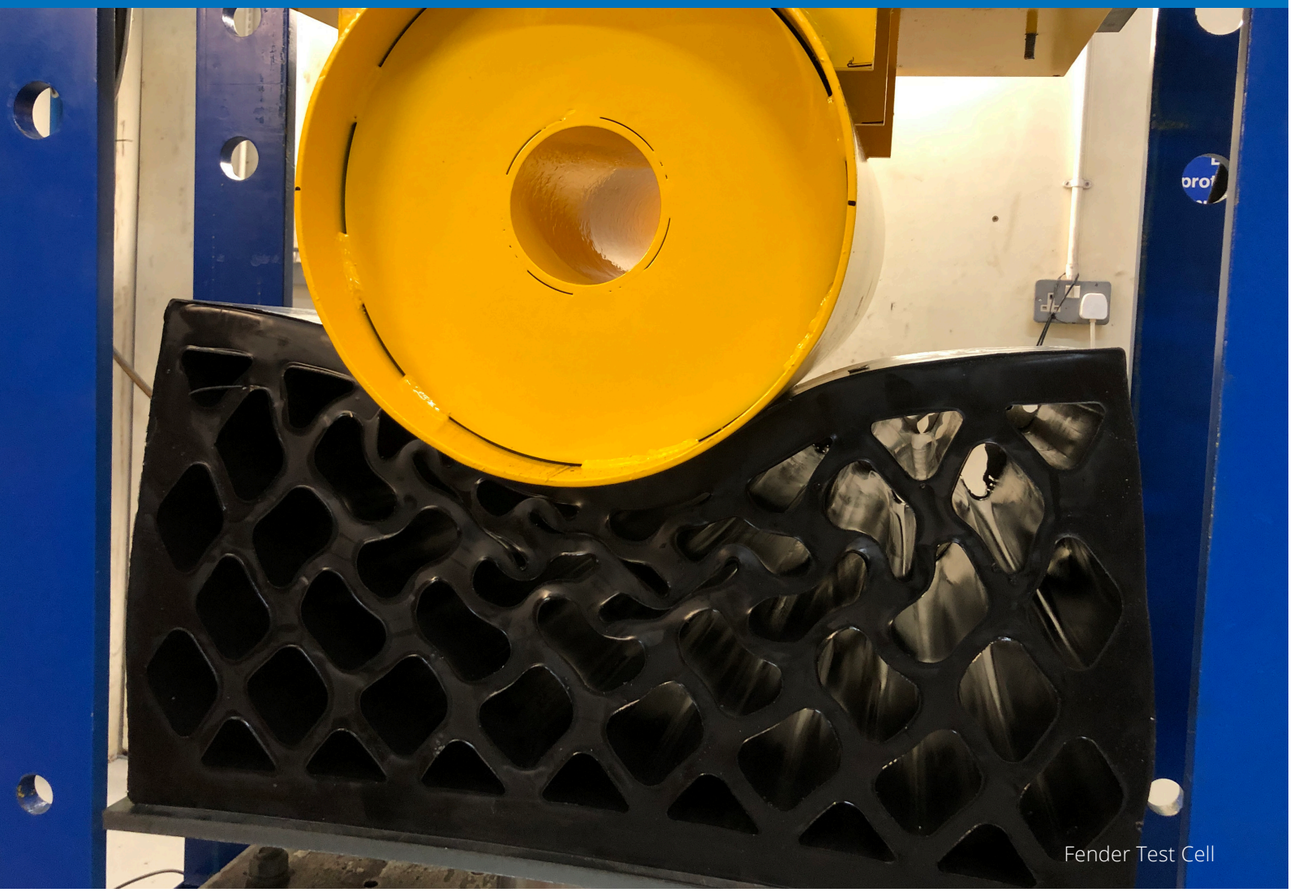
- Progressive compression
- Excellent abrasion resistance (up to 5x better than rubber)
- Tensile strength and tear resistance properties are superior to alternative fender technologies
- Non-marking single material construction
- Wide hardness range available enabling great performance flexibility
- Sophisticated and consistent production process enables tight weight and performance tolerances to be achieved
- Custom sections available to suit more complex requirements
- **Available in a variety of colours**



BENEFITS

- **LONG TERM CONSISTENT PERFORMANCE** reduces maintenance costs and vessel operation downtime
- **SIGNIFICANT WEIGHT SAVINGS** generate performance and operational benefits
- **WEIGHT SAVINGS LEAD TO LOWER FUEL CONSUMPTION,** generating environmental benefits and lower operational cost
- **A MODULAR APPROACH HELPS** with installation and maintenance requirements
- **SMALL PARTS ARE CHEAPER AND EASIER TO REPLACE** if and when required
- **ULTRA-LOW WASTE PRODUCTION METHOD**
- **CAN BE RECYCLED** for other applications

IN-HOUSE PERFORMANCE TESTING



Fender Test Cell

FENDERCTV

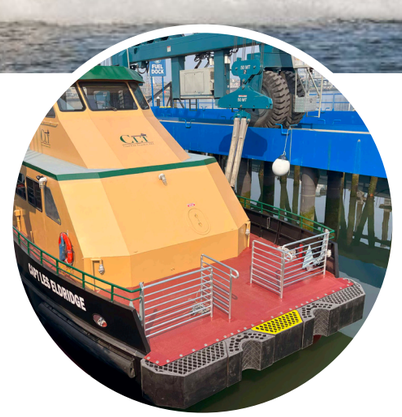
To be sure the fenders we manufacture for you meet your performance requirements, we have a fender press test rig at our production facility in Cornwall and can perform fender profile performance testing (compression and durability) with independent data verification.

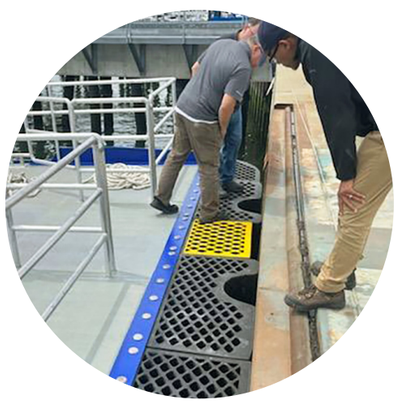
FIXING OPTIONS

1 ***MOUNTING WITH A VERTICAL PINNING SYSTEM***

2 ***CAN ALSO BE CONFIGURED FOR A HORIZONTAL FIXING ARRANGEMENT***

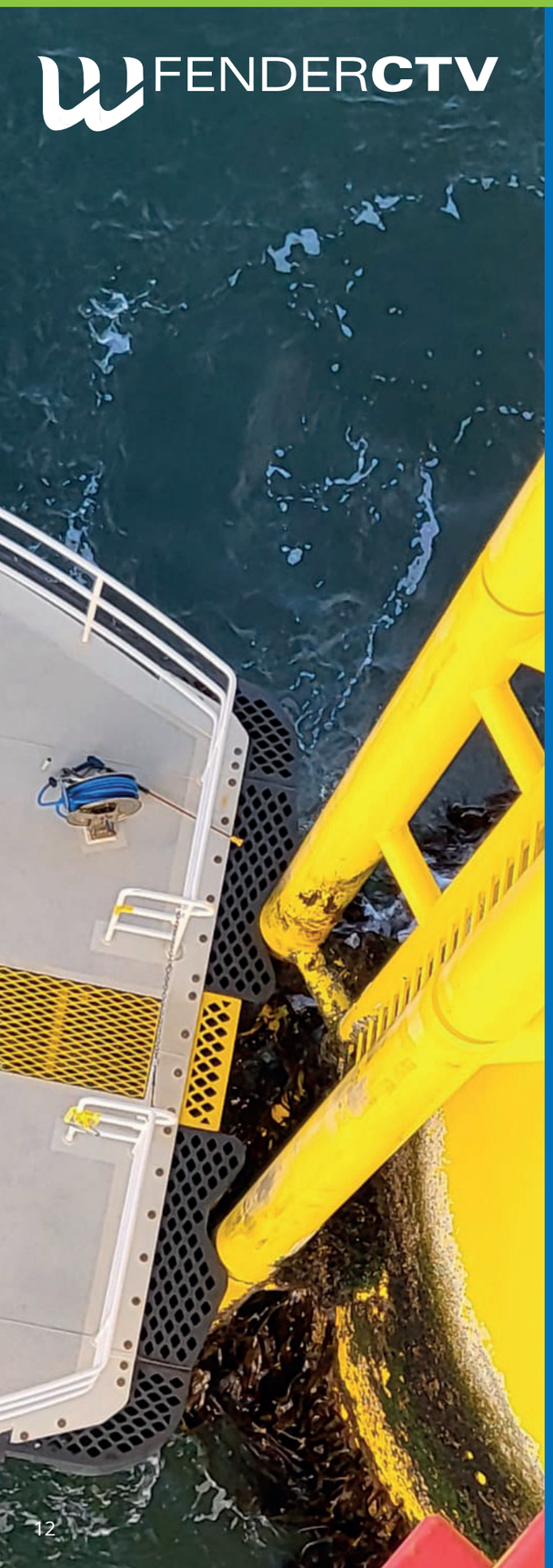
FENDERCTV NEXT GENERATION BOW FENDER product range for crew transfer vessels





Five standard Bow Fender systems have been designed as a modern alternative to traditional wind farm crew transfer vessel bow fender systems. Available to suit most vessel sizes and configurations and customisable where possible.

- **DAUGHTER CRAFT**
- **100 SERIES BOW FENDER**
  UP TO 20M CTVS
- **200 SERIES BOW FENDER**
  20-25M CTVS
- **300 SERIES BOW FENDER**
  26M+ CTVS
- **400 SERIES BOW FENDER**
  30M+ CTVS



COMMON FEATURES across all five designs:

- Multi cavity designs generate high levels of energy absorption with a low reaction force
- Long term consistent performance
- Independent impact fenders and step units to optimise each fender element for its intended function
- Interchangeable step units so that standoff distances between the fender edge and boat landing ladder can be maintained at between 500mm and 650mm
- Non-slip surface applied to step units
- Contoured impact surface to help maximise initial contact area and develop grip/friction

MULTI CAVITY DESIGNS GENERATE HIGH LEVELS OF ENERGY ABSORPTION WITH A LOW REACTION FORCE

- Integrated mounting system
- Optimized for mounting with a vertical pinning system but can also be configured for a horizontal fixing arrangement where required
- A variety of fender heights from 400mm to 1000mm
- Some configurations enable left/right impact fenders to be swappable, helping to reduce spare part requirements
- 3 standard material hardnesses available – soft, medium and hard
- Retention of physical properties at elevated temperatures
- Low heat build-up under load and repeated deformations
- Variety of corner fender arrangements available to suit most vessel types and requirements

ADD ONS

ADAPTABLE STEP EXTENSION SYSTEM

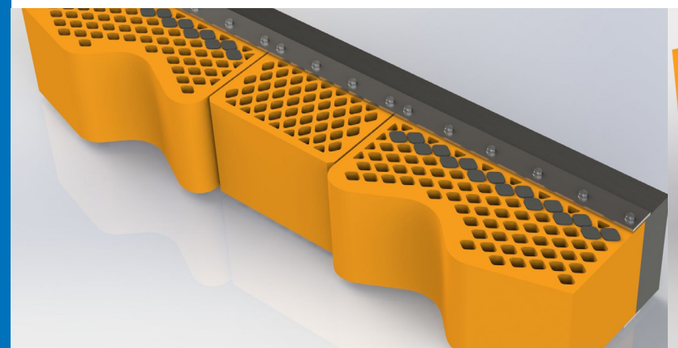
We have developed a step extension system for CTV's. At times when it is required to carry out crew transfers on multiple wind turbine boat landing configurations, this can be fitted to an existing step unit and locked in place. Sizes ranging from 75mm to 250mm. A "Type 2" version which is longer, extending back to the hull is also available.

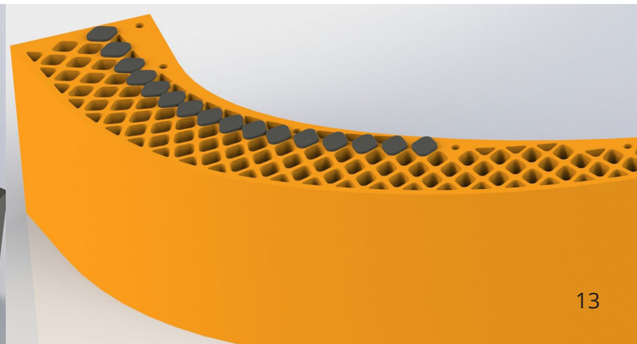
IT WEIGHS LESS THAN 40KG AND IS AVAILABLE IN 5 STANDARD SIZES.

SHOCK STOP

'Shock Stop' has been developed to compliment the FENDERCTV range of CTV Bow Fender Systems. It is designed to help absorb the larger shock loads generated from higher speed accidental impacts reducing the risk of damage to either a boat landing or CTV. The components fit into existing cavities in our fender modules and perform in a similar way to a crash helmet. They can be fitted to any fender section (not just the impact pads). If any of these components are crushed, they are simply replaced. Normal push-on performance is not affected with "Shock Stop" fitted.

DESIGNED TO HELP ABSORB THE LARGER SHOCK LOADS GENERATED FROM HIGHER SPEED ACCIDENTAL IMPACTS





Product Reference	Profile Specification						Fixing Method	Profile Image
	Profile Width (mm)	Profile Height (mm)	Weight per Metre (kg)	Number of Cavities	Outer Wall Tickness (mm))	Profile Type	Adhesive	
BWF10006001	100	60	3.8	3	9	Rectangular		
BWF10010002	100	100	5	3	15	D-Fender		
BWF15007901	150	79	4.2	3	8	Trapezoid		
BWF15008601	150	86	3	4	13	D-Fender		
BWF15011301	150	113	7.5	3	10	D-Fender		
BWF15015002	150	150	10	6	10	D-Fender		
BWF16015701	160	157	9.7	7	10	D-Fender		
BWF16109601	161	96	4.6	3	7	Trapezoid		
BWF17505601	175	56	3.6	3	7	Trapezoid		
BWF18008201	180	82	7.4	5	8	Rectangular		
BWF18310501	180	105	8	6	8	Trapezoid		
BWF19008201	190	82	5.6	3	9	Trapezoid		
BWF19015801	190	158	11	11	10	Trapezoid		
BWF20008001	200	80	7.6	5	8	Rectangular		
BWF20010001	200	100	8.8	3	10	D-Fender		
BWF23710001	237	99	7.6	5	11	Trapezoid		
BWF28610501	286	105	12	10	8	Trapezoid		
BWF31310001	313	100	10.3	7	11	Trapezoid		

FENDERCTV- MATERIAL PHYSICAL PROPERTY DATA COMPARED WITH TYPICAL RUBBER PROPERTIES

	Units	Test Method	FENDERIT **High Performance Polymer**						Typical Rubber
			Soft	Soft	Medium	Medium	Hard	Hard	
Material Density	kg/ cu.m.		1080	1090	1090	1100	1120	1130	1200
Shore Hardness	Shore A Scale		70	75	80	85	90	95	65-78
Tensile Strength	mPa	BS903ptA2-ISO37	37	37	39	46	47	51	11.0-16.0
Elongation at Break	%age	BS903ptA2-ISO37	750	710	600	630	560	500	280-400
Tear Strength (Die C)	KN/m	ISO 34-1	74	83	103	100	104	113	35-60
Tear Strength (Trouser)	KN/m	ISO 34-1	37	38	38	39	41	40	
Compression Set	%age	BS903ptA6-ISO815	44	46	40	36	34	33	25-40
Resilience	%age	AST-MD2632-92	55	51	47	46	41	37	
Abrasion Loss **	cubic mm	DIN53516	37	40	40	47	58	59	150-250

***For Abrasion Loss, the lower the stated figure, the better the wear/abrasion resistance is.*

ABOUT US

Buoyant Works is an innovative designer and manufacturer of high performance, fendering and offshore wind farm impact protection products.

Born out of 30 years of fender design experience, our fender range is a modern, engineered polyurethane alternative to rubber fendering. It utilises the most efficient processing technology to provide lightweight, durable fender solutions which maximise vessel / quayside protection, increase operational performance and help to lower your running and maintenance costs.

FENDERCTV has a dynamic range of applications:

- **Crew Transfer Vessels**
- **Tug Boats**
- **Pilot Boats**
- **Military and Patrol Boats**
- **Lifeboats**
- **Fishery Vessels**
- **Harbour and Marine Pontoons**
- **Quayside Jetties**
- **Wharfs and Inland Waterways**

Please get in touch to discuss how we can help you:

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