

# TURRET & MOORING SYSTEMS

## SUPPLY RECORD





**TURRET & MOORING SYSTEMS**  
SUPPLY RECORD

<b>Introduction</b> .....	<b>5</b>
<b>60 Years of History</b> .....	<b>6</b>
<b>Terminology</b> .....	<b>7</b>
<b>Product Tagging</b> .....	<b>8</b>
<b>Product Classification</b> .....	<b>10</b>
<b>Track Record by Location</b> .....	<b>13</b>
<b>Bogie Turret</b> .....	<b>14</b>
<b>Flexible Turret</b> .....	<b>16</b>
<b>Disconnectable Internal Turret</b> .....	<b>18</b>
<b>Bottom Mounted Internal Turret</b> .....	<b>20</b>
<b>External Turret</b> .....	<b>24</b>
<b>Disconnectable External Turret</b> .....	<b>26</b>
<b>Clamped Turret</b> .....	<b>28</b>
<b>Spread Mooring</b> .....	<b>30</b>
<b>Tower Soft Yoke</b> .....	<b>32</b>
<b>CALM Soft Yoke</b> .....	<b>34</b>
<b>Disconnectable Tower Soft Yoke</b> .....	<b>36</b>
<b>Single Anchor Leg Storage</b> .....	<b>38</b>
<b>SALM with Rigid Arm</b> .....	<b>40</b>
<b>Single Buoy Storage</b> .....	<b>42</b>





















**SBM Offshore is the recognized market and technology leader for Turrets and Mooring Systems (TMS), having supplied over 100 permanent mooring systems to our clients worldwide over the last six decades. Our designs provide the industry with the complete range and variety of fit-for-purpose solutions from simple to top end mooring systems.**

From the seabed to the vessel: SBM Offshore is unique in being the only TMS provider to deliver a full EPCI product lifecycle, from mooring analysis and design, engineering, procurement and construction of turrets including swivels, weathervaning systems, mooring lines and anchors to integration into the hull, offshore installation, inspection, maintenance and change-out programs.

SBM's unique set of skills not only provides industry-leading expertise in turret systems including installation, but also in FPSO operations. SBM has also developed a recognized expertise in riser system definition including steel riser detailed design.

SBM Offshore's TMS experience stems from the world's first CALM system terminal delivered in 1959, and includes a large number of different 'world first' mooring systems. This catalogue provides a description of each of SBM Offshore's permanent mooring systems, illustrating the full range of solutions that SBM Offshore has provided to our clients.



<p><b>1959</b></p>  <p>First CALM Buoy</p>	<p><b>1972</b></p>  <p>First Mooring System</p>	<p><b>1985</b></p>  <p>First CALM Soft Yoke</p>	<p><b>1985</b></p>  <p>First Spread Mooring</p>	<p><b>1986</b></p>  <p>First Tower Soft Yoke</p>
<p><b>1987</b></p>  <p>First Disconnectable Turret</p>	<p><b>1987</b></p>  <p>First Cantilever Turret</p>	<p><b>1991</b></p>  <p>First Internal Turret</p>	<p><b>1998</b></p>  <p>First Bogie Turret</p>	<p><b>1999</b></p>  <p>Ballastable SALM System</p>
<p><b>2001</b></p>  <p>First Deep Water Buoy</p>	<p><b>2007</b></p>  <p>External Turret with GAP®</p>	<p><b>2008</b></p>  <p>World Record 75 risers</p>	<p><b>2008</b></p>  <p>MoorSpar Concept</p>	<p><b>2009</b></p>  <p>First Turret with Steel Risers</p>
<p><b>2012</b></p>  <p>5,000t Mooring Load Turret</p>	<p><b>2016</b></p>  <p>First Disconnectable Turret with Steel Risers</p>	<p><b>2017</b></p>  <p>Most Complex Turret Mooring System</p>	<p><b>2018</b></p>  <p>First Use of ARCA® technology</p>	<p><b>2019</b></p>  <p>10,000t Mooring Load Turret</p>

## Stationkeeping System

A *Stationkeeping System* is a system capable of limiting the excursions of a floating structure within prescribed limits (referred to as offsets), by using either a *Mooring System* (passive) or a dynamic positioning system (active), or a combination of the two.

A *Stationkeeping System* is used to facilitate the transfer of fluids, signals and power between subsea facilities and the floating structure.

## Weathervaning

*Weathervaning* is the process by which a floating structure adapts its heading in response to time-varying environmental actions. The large majority of production systems weathervane passively, i.e. without the use of active (i.e. energy consuming) systems such as thrusters.

The alternative to a *weathervaning* system is a system that maintains a fixed vessel heading, referred to as a multi moorings system or spread moored system.

## Availability

There are two categories of *Stationkeeping Systems*:

- **Non-permanent:** systems whereby the floating structure (e.g. shuttle tanker) is temporarily moored for transfer of cargo. They are also referred to as 'Terminals'.
- **Permanent:** systems whereby the floating structure (e.g. production platform) remains permanently on station. A *Permanent* system can be designed to be temporarily disconnectable for specific reasons.

This catalogue only covers *Permanent Mooring Systems*.

## Integration Type

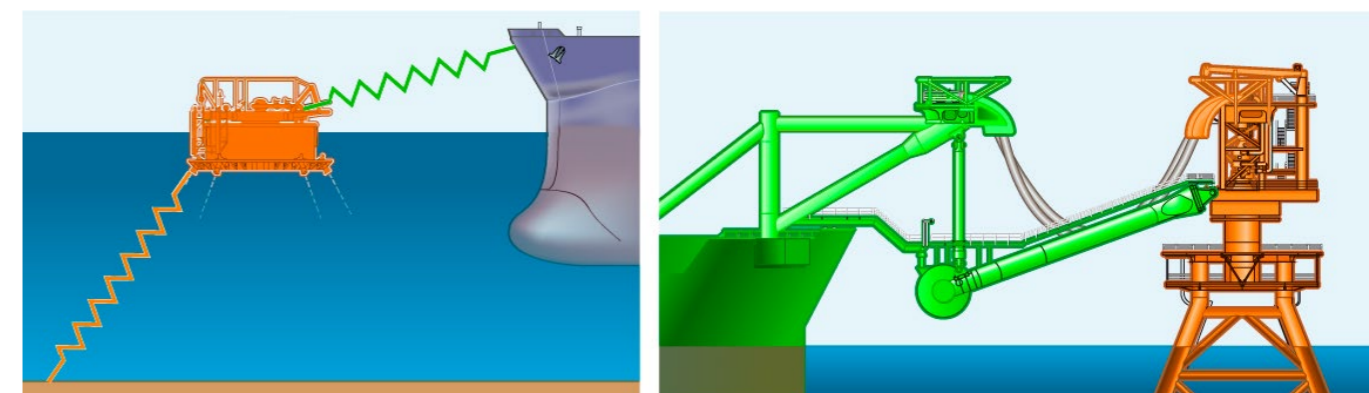
The *Integration Type* defines the method by which the *Mooring System* is structurally linked to the floating structure. There are three *Integration Types*:

- **Soft:** Connection made via a hawser system or any equivalent "flexible" system (e.g. ballasted or buoyant yoke).
- **Rigid Articulated:** Connection made via a rigid structure. Vertical loads are withstood by the buoyancy of the *Mooring System*, while horizontal mooring loads are transferred to the floating structure via a rigid arm.
- **Integrated:** The *Mooring System* is part of the hull structure. Vertical and horizontal loads are transferred to the floating structure via an integrated structure (referred to as insert).

## Mooring System Principals

The *Mooring System* is the system by which the floating structure is moored. There are three principal types of *Mooring Systems*, defined by their dynamic behavior:

- **Tower:** Tower systems are rigidly fixed to the seabed structures. They provide no ability to absorb wave motions.
- **Column:** Column systems are buoyant columns linked to the seabed via one chain or an articulated rigid structure. The floating body of the system is such that the ratio height / diameter is large.
- **Mooring Legs:** Mooring legs systems are flexible linear elements (e.g. chains, polyester ropes, wire ropes) connected to a buoy or a turret. In the case of a buoy, the floating body of the system is such that the ratio of height / horizontal dimensions is low.



**MOORING SYSTEM  
INTEGRATION TYPE**

## Weathervaning

NW	Non Weathervaning
WV	Weathervaning

## Disconnectability

ND	Non-disconnectable
DI	Disconnectable

## Integration Type

S	Soft
R	Rigid Articulated
I	Integrated

## Mooring System

T	Tower
C	Column
L	Mooring Legs

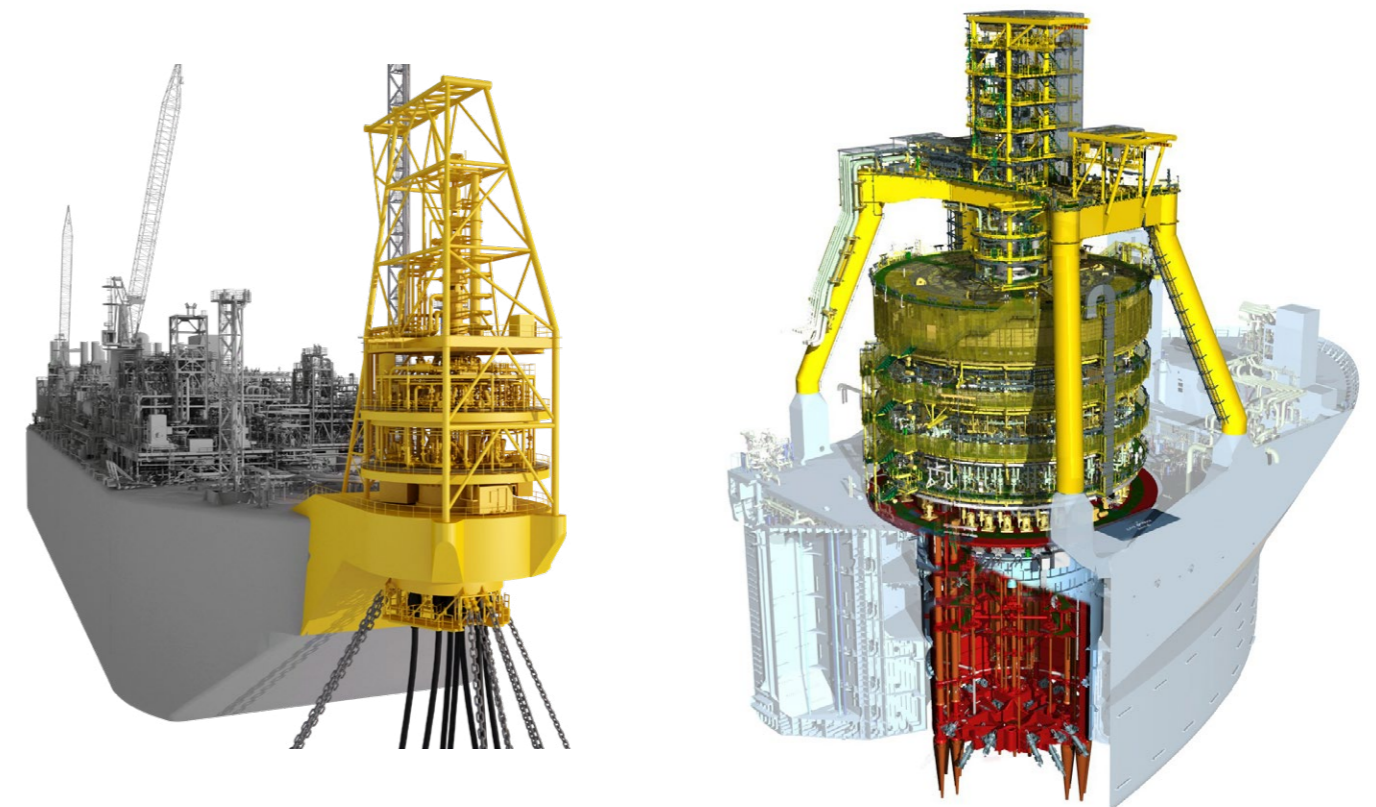
## Classification

BU	Buoy
MP	Multi Points
PR	Platform with Rotating head
SA	Single column Articulated
TB	Turret with Bogies
TC	Turret Clamped
TE	Turret External
TF	Turret Flexible
TI	Turret Internal

Mooring Type	Product Code	Product Tag				
		Weathervaning	Disconnectability	Integration Type	Mooring System	Classification
INTERNAL TURRET	TMIT	WV	ND	I	L	TB
	FLEX	WV	ND	I	L	TF
	BTM	WV	DI	I	L	TI
	BMIT	WV	ND	I	L	TI
EXTERNAL TURRET	EXT	WV	ND	I	L	TE
	RTM	WV	DI	I	L	TE
	SPT	WV	ND	I	L	TC
SPREAD MOORING	SM	NW	ND	I	L	MP
	TSY	WV	ND	S	T	PR
YOKE / SPECIAL	CSY	WV	ND	S	L	BU
	DTSY	WV	DI	S	T	PR
	SALS	WV	ND	S	C	SA
	SALMRA	WV	ND	R	C	SA
	SBS	WV	ND	R	L	BU

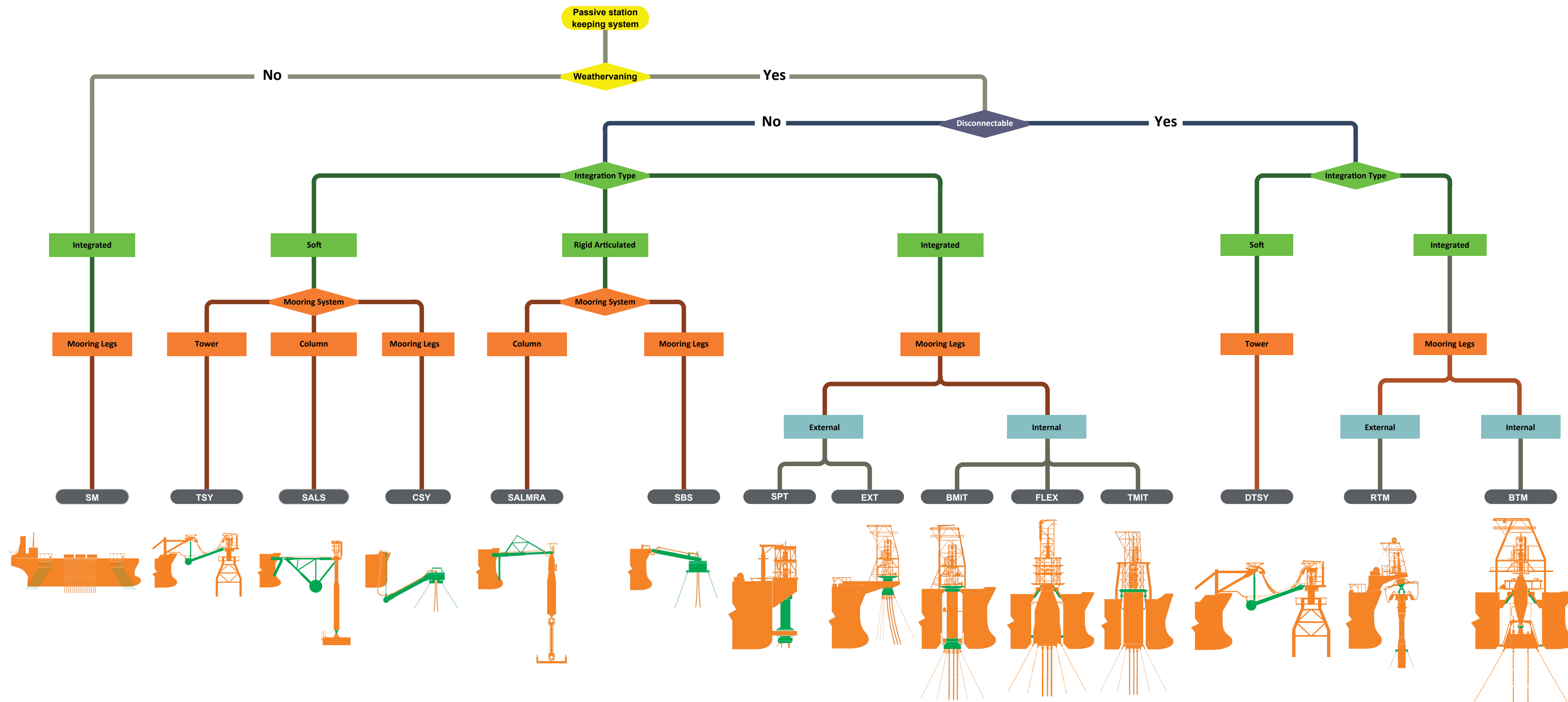
Product Code	Product Code Description	Commercial Name
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TMIT	Top Mounted Internal Turret	Bogie Turret
FLEX	Internal turret with spherical bearing	Flexible Turret
BTM	Buoy Turret Mooring	Disconnectable Internal Turret
BMIT	Bottom Mounted Internal Turret	Bottom Mounted Internal Turret
EXT	External turret in cantilever	External Turret
RTM	Riser Turret Mooring	Disconnectable External Turret
SPT	Single Point Turret	Clamped Turret
SM	Spread Mooring	Spread Mooring
TSY	Tower Soft Yoke	Tower Soft Yoke
CSY	Catenary Anchor Leg Mooring Soft Yoke	CALM Soft Yoke
DTSY	Disconnectable Tower Soft Yoke	Disconnectable Tower Soft Yoke
SALS	Single Anchor Leg Storage	Single Anchor Leg Storage
SALMRA	Single Anchor Leg Mooring with Rigid Arm	SALM with Rigid Arm
SBS	Single Buoy Storage	Single Buoy Storage



External Turret

Internal Turret





Product Code	Number of units
TMIT	12
FLEX	5
BTM	4
BMIT	5
EXT	21
RTM	6
SPT	7

Product Code	Number of units
SM	14
TSY	3
CSY	4
DTSY	2
SALS	4
SALMRA	5
SBS	10

DESCRIPTION

The *Bogie Turret* is an internal turret integrated into a forward tank of the vessel, and supported by modular axial and radial bearing components (called bogies and wheels), which run on rail sectors. All components can be replaced in-situ offshore, should this ever be required.

This type of turret has virtually no limit: the turret diameter and the number of bogies & wheels can easily be adapted to meet project specific load requirements as well as the number of risers. It can also be supplied with lower radial stoppers mounted near the vessel keel in order to cope with the harshest environments.

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

This type of turret is well suited for harsh to very harsh conditions and / or very high number of risers, and provides the highest degree of reliability.

The *Bogie Turret* concept was developed in the mid 1990's when SBM Offshore developed the mooring for a 154,000 DWT FPSO for a continuous period of 15 years in the West of Shetlands, with 24 risers. SBM Offshore has since successfully deployed *Bogie Turrets* worldwide, including one (FPSO P-53), with a world record of 75 risers.

WV-ND-I-L-TB



FPSO Glen Lyon

CLASSIFICATION

Mooring Type	<input checked="" type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> Disconnectable	<input type="checkbox"/> No	Product Code <input type="checkbox"/> TMIT
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

TRACK RECORD

Number of slots	15 to 75
Water Depth	135 m to 1,780 m
Hs (100y)	2.5 m to 18 m
Vessel size	133,000 DWT to 600,000 DWT

BEARING OPTIONS

<input type="checkbox"/>	Slewing bearing
<input checked="" type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Schiehallion	New Build	1998	BP	Schiehallion	UK	2013
FPSO Capixaba	New Build Relocation	2006 2010	Petrobras Petrobras	Golfinho Cachalote	Brazil Brazil	2009 -
FPSO P-53	New Build	2008	Petrobras	Marlim Leste	Brazil	-
FPSO Frade	New Build	2009	Chevron	Frade	Brazil	-
FPSO Espirito Santo	New Build	2009	Shell	BC-10	Brazil	-
FPSO Aseng	New Build	2011	Noble Energy	Aseng	Equatorial Guinea	-
FPSO OSX 2	New Build	2011 (CA) On lay up	OSX	Designed for Waimea	Brazil	-
FPSO Skarv	New Build	2012	BP	Skarv	Norway	-
FPSO Glen Lyon	New Build	2017	BP	Quad 204	UK	-
FPSO Johan Castberg	New Build	2017 (CA)	Statoil	Johan Castberg	Norway	-
FPSO Ichthys Venturer	New Build	2018	Inpex	Ichthys	Australia	-
FLNG Prelude	New Build	2019	Technip	Prelude	Australia	-

## DESCRIPTION

The *Flexible Turret* is an internal turret integrated into a forward tank of the vessel, connected to the vessel via two bearings – a friction bearing below sea level and a slewing bearing mounted above deck on an elastomeric foundation for an optimum distribution of loads between the two bearings.

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

The *Flexible Turret* concept was developed in the mid 1990's when SBM Offshore was contracted to moor two large deepwater FPSO's with a large number of risers offshore Brazil. Since then, the *Flexible Turret* has been used on several FPSO's located in Brazil.



FPSO Brasil

WV-ND-I-L-TF

## TRACK RECORD

Number of slots	30 to 47
Water Depth	780 m to 1,360 m
Hs (100y)	7.8 m
Vessel size	244,000 DWT to 278,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO P-33	New Build	1998	Petrobras	Marlim South	Brazil	-
FPSO P-35	New Build	1999	Petrobras	Marlim South	Brazil	-
FPSO Espadarte (Relocation of FPSO VI)	New Build	2000	Petrobras	Espadarte, Marimba	Brazil	2011
FPSO Cidade de Anchieta	Relocation	2012	Petrobras	Baleia Azul	Brazil	-
FPSO Brasil	New Build	2002	Petrobras	Roncador	Brazil	2014
FPSO Marlim Sul	New Build	2004	Petrobras	Marlim South	Brazil	2015

## CLASSIFICATION

Mooring Type	<input checked="" type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Disconnectable	Product Code
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	FLEX
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	



## DESCRIPTION

The concept of disconnectable turrets was developed to allow production where adverse weather conditions (cyclones, typhoons, hurricanes, icebergs) could threaten the integrity of the facility.

The *Disconnectable Internal Turret*, also called BTM (Buoyant Turret Mooring), is integrated into a forward tank of the vessel, and consists of an independant mooring buoy connected to the internal turret structure via a collet-type connector or several distributed structural connectors. The disconnection is achieved by isolating the risers and disengaging the buoy by activating rapid release of the connectors. The buoy is provided with sufficient buoyancy to support the weight of anchor legs and risers at the disconnected depth.

This turret is supported by either a slewing bearing (as for the *Flexible Turret* or the *Bottom Mounted Internal Turret*) or a bogies and wheels system (as for the *Bogie Turret*).

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

The *Disconnectable Internal Turret* concept was developed in the late 1980's for the FPSO Nan Hai Fa Xian, and installed offshore Hong Kong in the typhoon affected environment of the South China Sea in 1991.

WV-DI-I-L-TI



FPSO Turretella

## TRACK RECORD

Number of slots	3 to 13
Water Depth	100 m to 2,900 m
Hs (100y)	8.2 m to 15.5 m
Vessel size	140,000 DWT to 250,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input checked="" type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Nan Hai Fa Xian	New Build	1991	ACT-OG	Huizhou 21-1	China	2018
FPSO Nan Hai Kai Tuo	New Build	1994	Phillips	Xijiang	China	2010
FPSO Sea Rose	New Build	2005	Husky Oil	White Rose	Canada	-
FPSO Turretella	New Build	2016	Shell	Stones	USA	-

## CLASSIFICATION

Mooring Type	<input checked="" type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input checked="" type="checkbox"/> Yes	Product Code
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	BTM
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

## DESCRIPTION

The *Bottom Mounted Internal Turret* (BMIT) is integrated into a forward tank of the vessel and consists of a chainable structure connected to the vessel moonpool via a watertight slewing bearing, located near the keel of the vessel. Due to the short distance between the chain connectors and the bearing, this type of turret provides the capacity to accommodate a large mooring force.

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

This type of turret is well suited for harsh conditions and a moderate number of risers. It has been successfully deployed in the North Sea and Australia.

SBM Offshore supplied the first internal turret in 1991, a *Bottom Mounted Internal Turret*, for the FSU Alba, located in the UK sector of the North Sea.

## WV-ND-I-L-TI



FPSO Anasuria

## TRACK RECORD

Number of slots	4 to 21
Water Depth	90 m to 420 m
Hs (100y)	5.4 m to 13.8 m
Vessel size	100,000 DWT to 180,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FSU Alba	New Build	1991	Chevron	Alba	UK	-
FPSO Anasuria	New Build	1996	Shell	Teal, Teal South Guillemot	UK	-
FPSO Maersk Curlew	New Build	1997	Shell	Curlew	UK	2019
FPSO Northern Endeavour	New Build	1999	Woodside	Laminaria, Corallina	Australia	-
FPSO HYSY119	New Build	2018 (CA)	CNOOC	Liuhua 16-2 20-2 21-2	China	-

## CLASSIFICATION

Mooring Type	<input checked="" type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
				BMIT
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	



## DESCRIPTION

The *External Turret* is integrated at the bow of the vessel. Mooring and riser loads are transferred to the vessel via a slewing bearing and the rigid arm. The overall geometry is such that the bearing remains above water in normal operating conditions.

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

This type of turret presents several advantages such as ease of fabrication and integration, and it does not impact the tanker storage capacity or deck layout.

The *External Turret* is well suited to applications in mild to medium sea states, with examples being mostly located in West Africa and South East Asia.

SBM Offshore supplied the first *External Turret* in 1987 for the FSO Alba Marina, located offshore Italy in the Adriatic Sea.

## WV-ND-I-L-TE



FPSO Kikeh

## TRACK RECORD

Number of slots	1 to 17
Water Depth	44 m to 1,350 m
Hs (100y)	3.3 m to 10.2 m
Vessel size	50,000 DWT to 340,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FSO Alba Marina	New Build	1987	Elf	Rospo Mare	Italy	2004
FSO Palanca	New Build	1991	Elf (Sonangol)	Palanca	Angola	-
FSO XV Domy	New Build	1993	Elf	OML100, OML102	Nigeria	2003
FSO Nkossa I	New Build	1996	Elf	Nkossa	Congo	2003
LPG FSO Nkossa II	New Build	1996	Total E&P Congo	Nkossa	Congo	-
FPSO Rang Dong I	New Build	1998	JVPC	Rang Dong	Vietnam	2008
FSO Benchamas Explorer	New Build	1999	Chevron (Pogo)	Benchamas	Thailand	2018
FSO Yetagun	New Build	2000	Petronas	Yetagun	Myanmar	2018
FPSO Falcon	New Build	2002	ExxonMobil	Yoho	Nigeria	2009
FSO Unity	New Build	2003	Elf (Total)	Amenam, Kpono	Nigeria	-
FPSO Serpentina	New Build	2003	ExxonMobil	Zafiro	Equatorial Guinea	-
FSO PM-3 CAA	New Build	2003	TPOT	PM-3	Malaysia	-
FPSO Xikomba	New Build	2003	ExxonMobil	Xikomba	Angola	2011
FPSO N'Goma	Relocation	2014	ENI Angola	Block 15/06	Angola	-
FSO Yoho	New Build	2004	ExxonMobil	Yoho	Nigeria	-
LPG FPSO Sanha	New Build	2005	Chevron	Sanha	Angola	-
LPG FSO Gas Concord	New Build	2006	Conoco	Belanak	Indonesia	2016
FPSO Kikeh	New Build	2007	Murphy Sabah Oil	Kikeh	Malaysia	-
FPSO Mondo	New Build	2008	ExxonMobil	Mondo	Angola	-
FPSO Saxi Batuque	New Build	2008	ExxonMobil	Saxi, Batuque	Angola	-
FSO Queensway	New Build	2008	TPOT/CLJOC	Su Tu Vang	Vietnam	2013
FPSO Ruby II	New Build	2009	Petronas (MISC)	Ruby	Vietnam	-

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input checked="" type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
				EXT
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

## DESCRIPTION

The concept of disconnectable turrets was developed to allow production where adverse weather conditions (cyclones, typhoons, hurricanes, icebergs) could threaten the integrity of the facility.

The *Disconnectable External Turret*, also called RTM (Riser Turret Mooring) is integrated externally at the bow of the vessel and consists of a riser turret incorporating an independent disconnectable riser column. The rapid disconnection is achieved by isolating the risers and disengaging the riser column. The riser column is designed to have sufficient buoyancy to support the weight of the anchor legs and risers when disconnected.

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

SBM Offshore supplied the first *Disconnectable External Turret* in 1987 for the FPSO Jabiru Venture, located in the cyclone-prone region off the northwest coast of Australia.

## WV-DI-I-L-TE



FPSO Okha

## TRACK RECORD

Number of slots	3 to 14
Water Depth	79 m to 600 m
Hs (100y)	5.1 m to 11 m
Vessel size	99,000 DWT to 160,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Jabiru Venture	New Build	1987	BHPP	Jabiru	Australia	2010
FPSO Skua Venture	New Build	1991	BHPP	Skua	Australia	2007
FPSO Griffin Venture	New Build	1993	BHPP	Griffin	Australia	2009
FPSO Cossack Pioneer	New Build	1995	Woodside	Wanaea, Cossack	Australia	2011
FPSO Nghanhurra	New Build	2006	Woodside	Enfield	Australia	2019
FPSO Okha (Relocation of FSO Okha)	New Build	2011	Woodside	Cossack, Wanaea, Lambert, Hermes	Australia	-

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input checked="" type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input checked="" type="checkbox"/> Yes	Product Code
				RTM
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

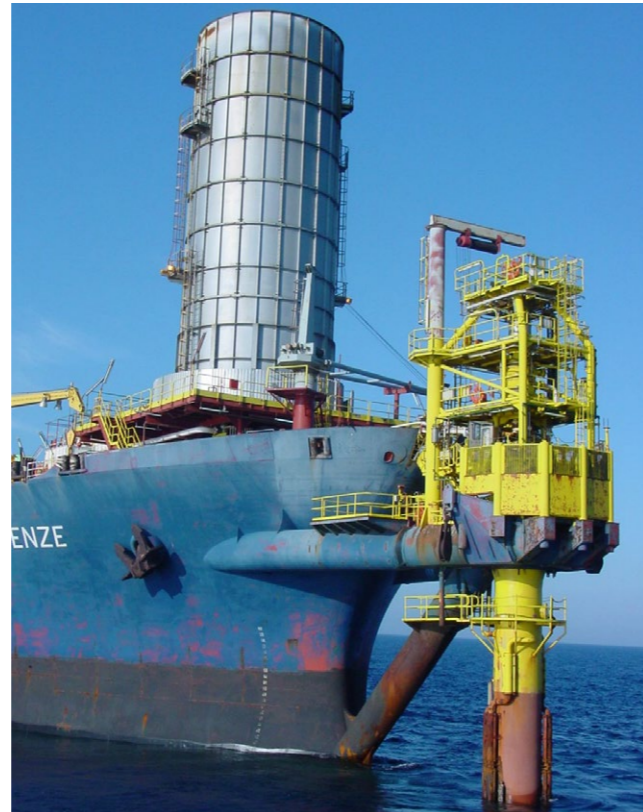
## DESCRIPTION

The *Clamped Turret*, also called SPT (Single Point Turret), is integrated externally at the bow of the vessel. Mooring and riser loads are transferred to the vessel via two bearings – a friction bearing below sea level in the proximity of the chaintable, and a slewing bearing on the upper collar.

The manifold structure houses the process facilities and supports the swivel stack. An overhead gantry structure is used to drive the outer part of the swivels, provide access and support the piping running from the swivels to the vessel topsides.

This type of turret is used for mild to medium sea states, and examples are mostly located in West Africa and South East Asia. With the increasing capacities of slewing bearings, this type of mooring system has been largely replaced by the cantilever *External Turret*, but can still provide an optimum solution in certain cases.

SBM Offshore supplied the first *Clamped Turret* in 1985 for the FPSO Agip Firenze, located offshore Italy in the Adriatic Sea.



FPSO Firenze

WV-ND-I-L-TC

## TRACK RECORD

Number of slots	2 to 6
Water Depth	59 m to 850 m
Hs (100y)	5.3 m to 9.8 m
Vessel size	13,000 DWT to 175,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input checked="" type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Agip Firenze	New Build	1985	Agip	Nilde	Italy	1998
FPSO Firenze	Relocation	1998	Agip	Aquila	Italy	2006
FSO Puteri Dulang	New Build	1991	Petronas	Dulang	Malaysia	-
FSO Intan	New Build	1992	Conoco	Belida	Indonesia	-
FPSO Tantawan Explorer	New Build	1997	Chevron	Tantawan	Thailand	2019
FPSO Bunga Kertas	New Build	2004	MISC	Lukut	Malaysia	-
FSO Pattani Spirit	New Build	2005	Unocal	Big Oil	Thailand	-
FSO Oguzhan	New Build	2006	Petronas	Barinov, Livanov, Gubkin	Turkmenistan	2018

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input checked="" type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
				SPT
Integration Type	<input type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

## DESCRIPTION

A *Spread Moored* vessel is moored in a fixed heading with mooring lines distributed from the bow and stern. The selected heading is determined by the prevailing sea and weather conditions.

Fluid transfer is achieved via risers from the seabed connected to riser balconies located on the side(s) of the vessel.

This type of mooring system is used in areas where current, waves and winds are very moderate, or typically originate from a prevailing direction.

SBM Offshore supplied the first *Spread Mooring* system in 1985 for the FPSO Al Kahera, located offshore Egypt in the Gulf of Suez.

NW-ND-I-L-MP



FPSO Cidade de Paraty

## CLASSIFICATION

<b>Mooring Type</b>	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input checked="" type="checkbox"/> Spread Mooring	<input type="checkbox"/> Yoke / Special
<b>Weathervaning</b>	<input type="checkbox"/> No	<b>Disconnectable</b>	<input type="checkbox"/> No	<b>Product Code</b>
				SM
<b>Integration Type</b>	<input checked="" type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input checked="" type="checkbox"/> Integrated	
<b>Mooring System</b>	<input checked="" type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

## TRACK RECORD

<b>Number of slots</b>	2 to 80
<b>Water Depth</b>	58 m to 2,140 m
<b>Hs (100y)</b>	3.2 m to 11.6 m
<b>Vessel size</b>	40,000 DWT to 394,000 DWT

## BEARING OPTIONS

<input type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input checked="" type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Al Kahera	New Build	1985	Geisum Oil	Geisum	Egypt	1993
FPSO Kuito	New Build	1999	Chevron	Kuito	Angola	2013
FPSO Jamestown	New Build	2001	Agip	Okono, Okpoho	Nigeria	2003
FPSO Mystras II	New Build	2004	Agip	Okono, Okpoho	Nigeria	-
FPSO Bonga	New Build	2005	Shell	Bonga	Nigeria	-
FPSO Agbami	New Build	2008	Chevron	Agbami	Nigeria	-
FPSO P-57	New Build	2010	Petrobras	Jubarte	Brazil	-
FPSO Cidade de Paraty	New Build	2013	Petrobras	Lula Nordeste	Brazil	-
FPSO Cidade de Ilhabela	New Build	2014	Petrobras	Sapinhoás	Brazil	-
FPSO Cidade de Maricá	New Build	2016	Petrobras	Lula Alto	Brazil	-
FPSO Cidade de Saquarema	New Build	2016	Petrobras	Lula Central	Brazil	-
FPSO Liza Destiny	New Build	2019	ExxonMobil	Liza	Guyana	-
FPSO Liza Unity	New Build	2018 (CA)	ExxonMobil	Liza	Guyana	-
FPSO Sepetiba	New Build	2019 (CA)	Petrobras	Mero	Brazil	-

## DESCRIPTION

The *Tower Soft Yoke* consists of a self-contained compact jacket / tower permanently connected to the vessel mooring structure by a ballasted yoke that provides the required restoring capacity.

Fluid transfer is achieved by rigid piping from the seabed to the top of the tower, swivels, and jumper hoses. Manifolding, pigging and auxiliary equipment are located on the manifold structure situated on the tower.

This type of mooring system is well suited for very shallow to shallow waters.

SBM Offshore supplied the first *Tower Soft Yoke* in 1986 for the FPSO VI, located offshore Nigeria.

WV-ND-S-T-PR



FPSO Sea Eagle

## TRACK RECORD

Number of slots	3 to 5
Water Depth	20 m to 42 m
Hs (100y)	3.2 m to 5.5 m
Vessel size	52,000 DWT to 285,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO VI	New Build	1986	Ashland	Antan	Nigeria	1998
FPSO Chang Qing Hao FPSO Hai Yang Shi You 102	New Build Relocation	1990 2009	JCODC/BOC CNOOC	Bozhong 34-2 Bozhong 28-2S	China China	2007 -
FPSO Sea Eagle	New Build	2003	Shell	EA	Nigeria	-

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input checked="" type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
				TSY
Integration Type	<input checked="" type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input type="checkbox"/> Integrated	
Mooring System	<input checked="" type="checkbox"/> Tower	<input type="checkbox"/> Column	<input type="checkbox"/> Mooring Legs	



## DESCRIPTION

The CALM Soft Yoke consists of a CALM (Catenary Anchor Leg Mooring) buoy permanently connected to the vessel mooring structure by a ballasted yoke that provides the required restoring capacity.

The buoy is made of two parts, the fixed part linked to the sea bed via the anchoring system, and the rotating part including the yoke.

Fluid transfer is achieved via risers from the seabed to the buoy, rigid piping and swivel(s) in the buoy, rigid piping on the yoke and jumper hoses.

This type of mooring system is well suited for shallow water applications.

SBM Offshore supplied the first CALM Soft Yoke in 1985 for the FPSO Chi Linh, located offshore Vietnam.

## WV-ND-S-L-BU



FPSO Chi Lang

## TRACK RECORD

Number of slots	2
Water Depth	43 m to 50 m
Hs (100y)	4.9 m to 8.7 m
Vessel size	150,000 DWT to 260,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Chi Linh	New Build	1985	Vietsovpetro	White Tiger	Vietnam	2019
FPSO Licorne Pacifique	New Build	1988	Elf Angola	Palanca	Angola	1992
FPSO Chi Lang	New Build	1992	Vietsovpetro	White Tiger	Vietnam	2000
FPSO Ba VI	New Build	1994	Vietsovpetro	Dragon	Vietnam	2008

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input checked="" type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
Integration Type	<input checked="" type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

## DESCRIPTION

The *Disconnectable Tower Soft Yoke* consists of a self-contained compact jacket / tower connected to the vessel mooring structure by a ballasted yoke that provides the required restoring capacity.

Under ice or adverse weather conditions, after draining the water ballast, the mooring legs can be disconnected either from the yoke or from the tower, to allow the vessel to leave its station.

Fluid transfer is achieved by rigid piping from the seabed to the top of the tower, swivels, rigid piping on the yoke and jumper hoses. Manifolding, pigging and auxiliary equipment are located on the manifold structure situated on the tower.

This type of mooring system is well suited for very shallow to shallow waters where weather or ice requires the vessel to disconnect.

SBM Offshore supplied the first *Disconnectable Tower Soft Yoke* in 1988 for the FPSO Bohai You Yi Hao, located offshore China in Bohai Bay.

## WV-DI-S-T-PR



FPSO Bohai Ming Zhu

## TRACK RECORD

Number of slots	2 to 4
Water Depth	23 m to 31 m
Hs (100y)	5.3 m to 5.4 m
Vessel size	52,000 DWT to 55,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Bohai You Yi Hao	New Build	1988	JCODC/BOC	Bozhong 28-1	China	1993
	Relocation	1995	JCODC/BOC	CFD 16	China	2003
	Relocation	2004	CNOOC	Bozhong 28-1	China	-
FPSO Bohai Ming Zhu	New Build	1993	BOC	Suizhong 36-1	China	2001
	Relocation	2003	CNOOC	Peng Lai 19-3	China	2009
	Relocation	2009	CNOOC	Bozhong 25-1	China	2013

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input checked="" type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input checked="" type="checkbox"/> Yes	Product Code
				DTSY
Integration Type	<input checked="" type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input type="checkbox"/> Integrated	
Mooring System	<input checked="" type="checkbox"/> Tower	<input type="checkbox"/> Column	<input type="checkbox"/> Mooring Legs	

## DESCRIPTION

The *Single Anchor Leg Storage* (SALS) is an articulated column anchored to the seabed via a gravity or piled base. The column is connected to the base via a universal joint.

The vessel is permanently moored to the column by a yoke which incorporates a buoyancy tank to generate the required restoring force. The yoke connects the vessel to the column via a tri-axial joint at the top of the column and hinges at the vessel providing the required degrees of freedom.

Fluid transfer is achieved by rigid piping along the column, a swivel stack at top of the column, rigid piping along the yoke and jumper hoses.

This concept was developed when the pressure capacity of flexible pipe technology was limited.

The *Single Anchor Leg Storage* concept was first developed for the Shell Castellon Project, and was ordered for the FPSO Delta in 1976, located offshore Spain in the Mediterranean Sea

## WV-ND-R-C-SA



FPSO Tazerka

## TRACK RECORD

Number of slots	1 to 38
Water Depth	66 m to 143 m
Hs (100y)	6.7 m to 9.8 m
Vessel size	59,000 DWT to 210,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input checked="" type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Delta	New Build	1976 (CA)	Shell	Castellon	Spain	1986
FSO Esso Mercia	New Build	1977 (CA)	Esso Malaysia	Pulai	Malaysia	1987
FPSO Agip Milano	New Build	1978 (CA)	Agip	Nilde	Italy	1986
FPSO Tazerka	New Build	1981 (CA)	Shell	Tazerka	Tunisia	1997

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input checked="" type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
Integration Type	<input checked="" type="checkbox"/> Soft	<input type="checkbox"/> Rigid Articulated	<input type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input checked="" type="checkbox"/> Column	<input type="checkbox"/> Mooring Legs	

## DESCRIPTION

The *Single Anchor Leg Mooring with Rigid Arm*, also called *SALM with Rigid Arm (SALMRA)* is an articulated column providing buoyancy which is anchored to the seabed via a gravity or piled base. The column is connected to the base via a universal joint. The buoyancy of the column provides the required restoring force.

The vessel is permanently moored to the column by a rigid arm connected via a tri-axial joint at the top of the column and hinges at the vessel providing the required degrees of freedom.

Fluid transfer is achieved by rigid piping along the column, a swivel stack at top of the column, rigid piping along the arm and jumper hoses.

This type of mooring system is well suited for shallow to mid depth waters.

SBM Offshore supplied the first SALMRA in 1981 for the FPSO Santa Ynez, located offshore California in the Santa Barbara Channel.

WV-ND-R-C-SA



FSO Vega Oil

## TRACK RECORD

Number of slots	2 to 23
Water Depth	30 m to 167 m
Hs (100y)	5 m to 11 m
Vessel size	50,000 DWT to 250,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input checked="" type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FPSO Santa Ynez	New Build	1981	Exxon	Santa Ynez	USA	1994
FSO Hudbay Riau	New Build	1986	Hudbay	Selat Lalang	Indonesia	2003
FSO Vega Oil FSO Leonis	New Build	1987 2008	Montedison Edison S.p.A.	Vega	Italy	2008 -
FSO Sloug	New Build	1988	Agip	Bouri	Libya	2015
FPSO Challis Venture	New Build	1989	BHP	Challis	Australia	2013

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input checked="" type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
Integration Type	<input type="checkbox"/> Soft	<input checked="" type="checkbox"/> Rigid Articulated	<input type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input checked="" type="checkbox"/> Column	<input type="checkbox"/> Mooring Legs	

## DESCRIPTION

The *Single Buoy Storage* (SBS) consists of a buoy permanently connected to the vessel via a rigid yoke. Two hinges connects the rigid yoke to the vessel while a bearing on the buoy turntable allows the vessel to weathervane.

The buoy is made of two parts, the fixed part linked to the sea bed via the anchoring system and the rotating part including the rigid yoke.

Fluid transfer is achieved by risers from the seabed to the buoy, rigid piping and swivels in the buoy, rigid piping on the arm and in-line swivels or jumpers at mechanical articulations.

The impact on the floater structure is minimal and allows integration at quay side without the need for dry docking.

This type of mooring system is well suited for shallow to ultra deep waters.

The first *Single Buoy Storage* was ordered in 1972 for the FSO Ifrikia, located offshore Tunisia.

## WV-ND-R-L-BU



FPSO II

## TRACK RECORD

Number of slots	2 to 7
Water Depth	25 m to 1,260 m
Hs (100y)	4.1 m to 9.1 m
Vessel size	52,000 DWT to 252,000 DWT

## BEARING OPTIONS

<input checked="" type="checkbox"/>	Slewing bearing
<input type="checkbox"/>	Multi bogie bearing system
<input type="checkbox"/>	Bush
<input type="checkbox"/>	N/A

## REFERENCE LIST

UNIT	MOORING SYSTEM SCOPE	FIRST OIL or CONTRACT AWARD (CA)	CLIENT	FIELD	COUNTRY	LAST OIL
FSO Ifrikia	New Build	1972 (CA)	Serept	Ashtart	Tunisia	1979
FSO Ardjuna Sakti	New Build	1975 (CA)	Arco	Ardjuna	Indonesia	2013
FSO Lynda	New Build	1975 (CA)	Cities Services	Poleng	Indonesia	1976
FSO J. Ed Barren	New Build	1977 (CA)	Cities Services	South Nido	Philippines	1983
FSO Tropical Lion	New Build	1977 (CA)	Amerada Hess	Arzanah	UAE	1994
FSO Ifrikia II	New Build	1980	Serept	Ashtart	Tunisia	2015
FSO Udang Natuna	New Build	1980	Conoco	Udang	Indonesia	1990
FSO Cilacap	Relocation	1997	Santa Fe	Tuban	Indonesia	-
FPSO II	New Build	1981	Amaco	Cadlao	Philippines	1990
	Relocation	1992	Alcorn	West Linapacan	Philippines	1996
	Relocation	1997	Petrobras	Marlim South	Brazil	2001
FPSO P.P. De Moraes*	New Build	1982	Petrobras	Garoupa	Brazil	1986
	Relocation	1986	Petrobras	Albacora	Brazil	1994
FPSO Kakap Natuna	New Build	1986	Marathon	Kakap	Indonesia	-

\* Disconnectable

## CLASSIFICATION

Mooring Type	<input type="checkbox"/> Internal Turret	<input type="checkbox"/> External Turret	<input type="checkbox"/> Spread Mooring	<input checked="" type="checkbox"/> Yoke / Special
Weathervaning	<input checked="" type="checkbox"/> Yes	Disconnectable	<input type="checkbox"/> No	Product Code
				SBS
Integration Type	<input type="checkbox"/> Soft	<input checked="" type="checkbox"/> Rigid Articulated	<input type="checkbox"/> Integrated	
Mooring System	<input type="checkbox"/> Tower	<input type="checkbox"/> Column	<input checked="" type="checkbox"/> Mooring Legs	

UNIT NAME	UNIT TYPE	SYSTEM TYPE	PAGE n°
II	FPSO	SBS	43
VI	FPSO	TSY	33
XV Domy	FSO	EXT	25
Agbami	FPSO	SM	31
Agip Firenze	FPSO	SPT	29
Agip Milano	FPSO	SALS	39
Al Kahera	FPSO	SM	31
Alba	FSU	BMIT	21
Alba Marina	FSO	EXT	25
Anasuria	FPSO	BMIT	21
Ardjuna Sakti	FSO	SBS	43
Aseng	FPSO	TMIT	15
Ba VI	FPSO	CSY	35
Benchamas Explorer	FSO	EXT	25
Bohai Ming Zhu	FPSO	DTSY	37
Bohai You Yi Hao	FPSO	DTSY	37
Bonga	FPSO	SM	31
Brasil	FPSO	FLEX	17
Bunga Kertas	FPSO	SPT	29
Capixaba	FPSO	TMIT	15
Challis Venture	FPSO	SALMRA	41
Chang Qing Hao	FPSO	TSY	33
Chi Lang	FSO	CSY	35
Chi Linh	FSO	CSY	35
Cidade de Anchieta	FPSO	FLEX	17
Cidade de Ilhabela	FPSO	SM	31
Cidade de Maricá	FPSO	SM	31
Cidade de Paraty	FPSO	SM	31
Cidade de Saquarema	FPSO	SM	31
Cilacap	FSO	SBS	43
Cossack Pioneer	FPSO	RTM	27
Delta	FPSO	SALS	39
Espadarte	FPSO	FLEX	17
Espirito Santo	FPSO	TMIT	15
Esso Mercia	FSO	SALS	39
Falcon	FPSO	EXT	25
Firenze	FPSO	SPT	29
Frade	FPSO	TMIT	15
Gas Concord	LPG FSO	EXT	25
Glen Lyon	FPSO	TMIT	15
Griffin Venture	FPSO	RTM	27
Hai Yang Shi You 102	FPSO	TSY	33
Hudbay Riau	FSO	SALMRA	41
HYSY119	FPSO	BMIT	21
Ichthys Venturer	FPSO	TMIT	15
Ifrikia	FSO	SBS	43
Ifrikia II	FSO	SBS	43
Intan	FSO	SPT	29
J. Ed Barren	FSO	SBS	43
Jabiru Venture	FPSO	RTM	27
Jamestown	FPSO	SM	31
Johan Castberg	FPSO	TMIT	15
Kakap Natuna	FPSO	SBS	43
Kikeh	FPSO	EXT	25

UNIT NAME	UNIT TYPE	SYSTEM TYPE	PAGE n°
Kuito	FPSO	SM	31
Leonis	FSO	SALMRA	41
Licorne Pacifique	FSO	CSY	35
Liza Destiny	FPSO	SM	31
Liza Unity	FPSO	SM	31
Lynda	FSO	SBS	43
Maersk Curlew	FPSO	BMIT	21
Marlim Sul	FPSO	FLEX	17
Mondo	FPSO	EXT	25
Mystras II	FPSO	SM	31
Nan Hai Fa Xian	FPSO	BTM	19
Nan Hai Kai Tuo	FPSO	BTM	19
Nganhurra	FPSO	RTM	27
N'Goma	FPSO	EXT	25
Nkossa I	FSO	EXT	25
Nkossa II	LPG FSO	EXT	25
Northern Endeavour	FPSO	BMIT	21
Oguzhan	FSO	SPT	29
Okha	FPSO	RTM	27
OSX 2	FPSO	TMIT	15
P.P. De Moraes	FPSO	SBS	43
P-33	FPSO	FLEX	17
P-35	FPSO	FLEX	17
P-53	FPSO	TMIT	15
P-57	FPSO	SM	31
Palanca	FSO	EXT	25
Pattani Spirit	FSO	SPT	29
PM-3 CAA	FSO	EXT	25
Prelude	FLNG	TMIT	15
Puteri Dulang	FSO	SPT	29
Queensway	FSO	EXT	25
Rang Dong I	FPSO	EXT	25
Ruby II	FPSO	EXT	25
Sanha	LPG FPSO	EXT	25
Santa Ynez	FPSO	SALMRA	41
Saxi Batuque	FSO	EXT	25
Schiehallion	FPSO	TMIT	15
Sea Eagle	FPSO	TSY	33
Sea Rose	FPSO	BTM	19
Sepetiba	FPSO	SM	31
Serpentina	FPSO	EXT	25
Skarv	FPSO	TMIT	15
Skua Venture	FPSO	RTM	27
Sloug	FSO	SALMRA	41
Tantawan Explorer	FPSO	SPT	29
Tazerka	FPSO	SALS	39
Tropical Lion	FSO	SBS	43
Turritella	FPSO	BTM	19
Udang Natuna	FSO	SBS	43
Unity	FSO	EXT	25
Vega Oil	FSO	SALMRA	41
Xikomba	FPSO	EXT	25
Yetagun	FSO	EXT	25
Yoho	FSO	EXT	25



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The sole intention of this brochure is to share  
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**Contact Details**

[turretandmooringsystems@sbmoffshore.com](mailto:turretandmooringsystems@sbmoffshore.com)

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