



RETROPOD™ CATHODIC PROTECTION LIFE-EXTENSION ANODE POD

RetroPod is designed to cut costs significantly by reducing installation time for anode retrofit projects.

The RetroPod is an aluminum anode system arranged in stable, self-contained “pods” which are ideal for replacing depleted anodes on mature assets. The pods are lowered to the sea floor and connected electrically to the target structure via Deepwater’s RetroClamp system. The traditional cathodic protection retrofit method of clamping dual anodes onto existing jacket members is much more time-consuming and expensive. The RetroPod can be installed in less than a quarter of the time it would take to install an equivalent amount of cathodic protection anodes using the traditional method.

Diver or ROV installed

A RetroPod is installed on the seabed just inside or outside the base of the jacket and attached with one or two RetroClamps. Depending on the depth, the RetroClamp can be easily installed by diver or ROV onto any tubular member, flange, or subsea support beam. Speed of installation makes the RetroPod extremely cost-effective, as installation costs dominate budgeting for most anode retrofit projects.

Safe for divers

There is no direct diver interaction with the heavy aluminum anodes when installing the RetroPod. A crane lowers the Pod onto the sea floor and the diver simply installs the RetroClamp tie-back. The clamp can also be installed via ROV. Traditional dual clamp-on anodes require a considerable amount of dangerous intervention while the dual clamp-on is being guided into place.

A reliable connection

The RetroClamp is patented technology, developed at Deepwater and not available elsewhere. The RetroClamp connects the RetroPod electrically to the asset it is protecting via two armored cables. The floating plate on top of the clamp ensures a strong and constant connection that won’t damage the structure. The ease of installation makes the RetroClamp incredibly cost-effective in comparison to underwater welding or other attachment methods.

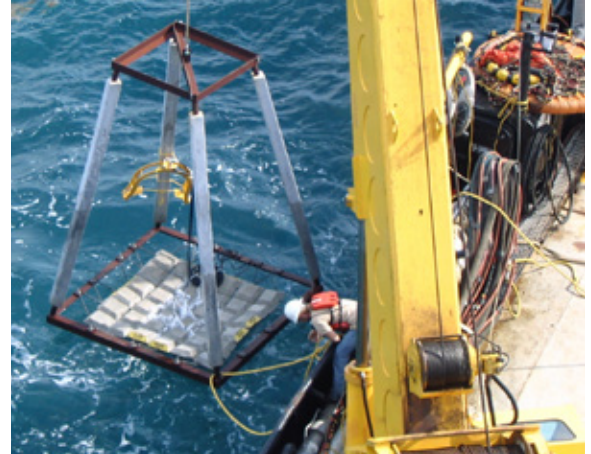
Traditional offshore structures

The RetroPod system is extremely cost-effective for replacing or supplementing cathodic protection (CP) on aging offshore structures sitting in 85 to 300 feet of seawater. The system has performed well in some installations for over 14 years, which is more than half of the design life of a standard retrofit. Since the pods can be installed with ROVs, there is no depth limit to the structures that can be retrofitted. However, some deeper structures may require additional CP near the surface.

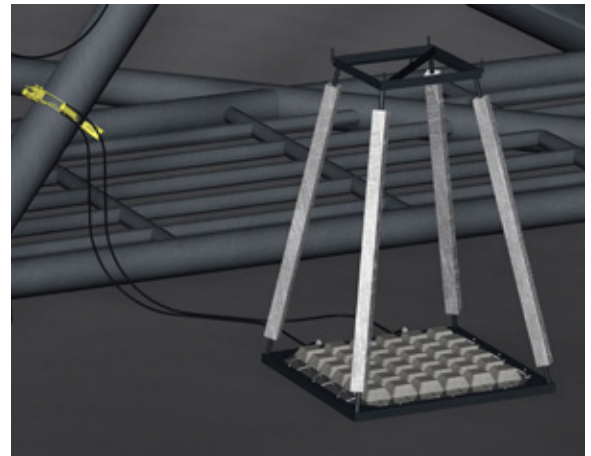
Deep-water production equipment

Taking advantage of reduced currents in deep water, many operators have begun using the RetroPod system along with Retroclamps to retrofit cathodic protection on deep-water production equipment. The large amount of anode material on one RetroPod combined with the relatively small amount of exposed steel involved in a deep-water field allows one pod to adequately protect multiple wellheads, manifolds and trees.

More info at www.stoprust.com



HEADED FOR THE SEABED
A RetroPod being deployed offshore in the Gulf of Mexico.



RETROPODS ATTACH ELECTRICALLY USING RETROCLAMPS
One retroPod can protect multiple subsea components.



VERY COST-EFFECTIVE
RetroPod installation time is only one-fourth that of traditional anode retrofits.



RETROPOD™

General

RetroPod is a retrofit sacrificial anode system designed to maximize current output with reduced installation time. The optimized shape reduces mutual anode interference, provides stability and increases ease of handling offshore.

Note: This configuration is not recommended for use in water depths less than 160 ft [50 m].

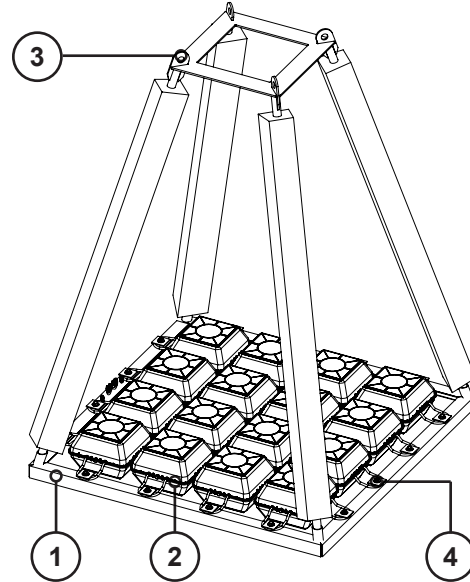
Frame (Item 1)

Steel grade ASTM A53 [ASTM A106]
ASTM A36 [EN 10025 S355]

Welding All welding conducted in accordance with Steel Structural Welding Code – AWS D1./ D1.1M:2006 [EEMUA 158]

Gravity base (Item 2) Provided by RetroMat (see RetroMat technical datasheet)
16 blocks,
Block size - 20" x 20" x 12"
[500 x 500 x 300 mm]
Block volume - 1.5 ft³ [0.042 m³]
concrete blocks only

Lifting (Item 3) 1/2" [12.7 mm] Padeye

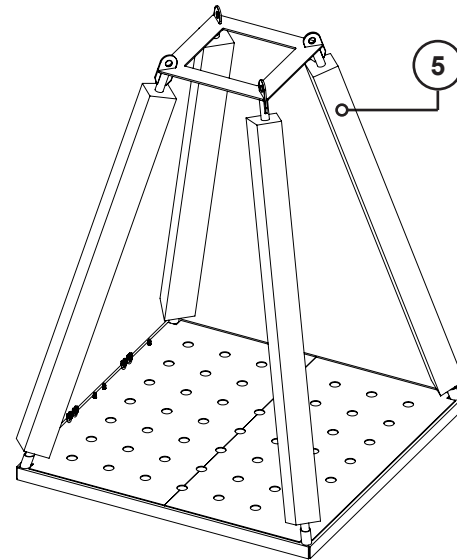


Connection details (Item 4)

RetroPod 2 x Ø 1/2" [M12] Stud-welded to frame

Structure RetroClamp (See RetroClamp technical datasheet). Quantity as per requirements, typically 1 per RetroPod.

Cable 4/0 AWG [~107 mm²], EPDM insulated, heavy-duty flexible cable
2 per RetroClamp



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Deepwater offers four standard dimensions of anode for the RetroPod. The anode size is selected based on design life.



Net weight	285 lb [129 kg]	325 lb [148 kg]	540 lb [245 kg]	725 lb [329 kg]
Gross weight	360 lb [163 kg]	410 lb [186 kg]	625 lb [284 kg]	850 lb [386 kg]
Dimensions (L x W x H)	120" x 5.25" x 5.5" [2438 x 133 x 140 mm]	120" x 5.5" x 5.9" [2438 x 140 x 150 mm]	–	–
Core	2" Sch 80 pipe	2" Sch 80 pipe	2" Sch 80 pipe	2" Sch 160 pipe
Quantity	4	4	4	4



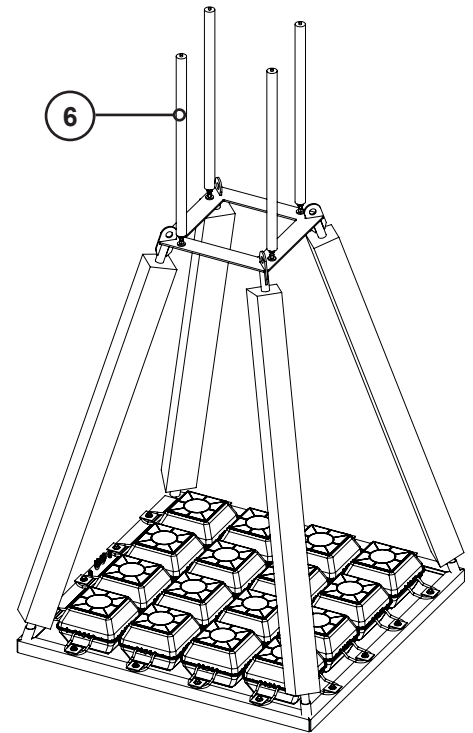
Overall weights & dimensions*

	(When using 325 lb anodes)	(When using 725 lb anodes)
Dimensions (W x D x H)	96" x 96" x 140" [2440 x 2440 x 3560 mm]	96" x 96" x 140" [2440 x 2440 x 3560 mm]
Weight (Air)	6050 lb [2750 kg]	7650 lb [3470 kg]
Weight (Water)	3800 lb [1730 kg]	4550 lb [2070 kg]

*Excluding RetroClamp, connection cable and polarization booster anodes

Polarization booster anodes - option (Item 6)

Description	If required, four small booster anodes can be added to the RetroPod for a structure that has lost all cathodic protection. The additional upper anode array provides a 15% current boost for the first 2-3 months to quickly re-establish cathodic polarization.
Net weight	40 lb [18 kg]
Gross weight	48 lb [21.5 kg]
Dimensions	Ø 3" x 60" [Ø 75 mm x 1525 mm]
Core	3/4" x 62" [19 mm x 1575 mm] Stud
Quantity	4



Anode composition / electrical properties

Description	RetroPod is available with two anode compositions: Deep10 alloy, designed as an effective, general-purpose offshore alloy for use in tropical water environments, and Deep7 alloy with low iron content, which is more effective in cold, deep water.	
Composition (%)	Deep7	Deep10
Iron (Fe)	0.07 max.	0.10 max.
Silicon (Si)	0.10 max.	0.10 max.
Copper (Cu)	0.003 max.	0.006 max.
Zinc (Zn)	4.75 - 5.25	3.00 - 6.00
Indium (In)	0.015 - 0.025	0.010 - 0.020
Titanium (Ti)	0.025 max.	0.025 max.
Cadmium (Cd)	Part of others	Part of others
Others (each)	0.02 max.	0.02 max.
Aluminium (Al)	Remainder	Remainder
Open circuit potential (sw)	(-) 1.08 V vs Ag/AgCl	(-) 1.08 V vs Ag/AgCl
Closed circuit potential (sw)	(-) 1.05 V vs Ag/AgCl	(-) 1.05 V vs Ag/AgCl
Seawater capacity @ 25°C	1100 AHr/lb [2420 AHr/kg]	1100 AHr/lb [2420 AHr/kg]
Seawater capacity @ 5°C	1100 AHr/lb [2420 AHr/kg]	Variable
Seabed Mud Capacity @ 25°C	950 AHr/lb [2090 AHr/kg]	950 AHr/lb [2090 AHr/kg]
Seabed Mud Capacity @ 5°C	950 AHr/lb [2090 AHr/kg]	Variable

