

# COSASCO® POLYMER COUPON MONITORING

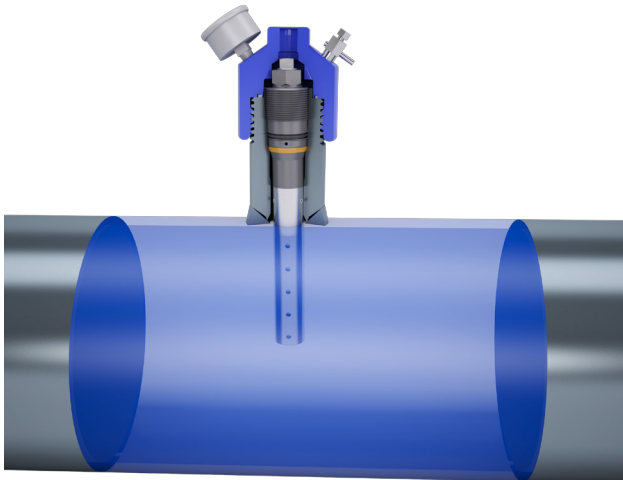
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## Flexible Pipe-Polymer Coupon Monitoring

Flexible risers are now more common in recent years due to the increase in deep water oil and gas exploration. The flexible riser is a connection between typically a floating production system, and the subsea well or pipeline and often a means of transporting Oil & Gas. A Flexible Riser is composed of both metallic and polymer layers designed for optimal strength, weight, and flexibility under high pressures and temperature variances. The polymer sheath layer contains the process fluid and consists of certain types of polymers to form a pressure barrier that has to be resistant to chemical and mechanical degradation over time.

To maintain the integrity of the flexible riser it is important to monitor the condition of the polymer in the pressure barrier sheath. The Cosasco® Polymer Monitoring System is used for determining the potential breakdown or ageing of the polymer material under operating conditions. A number of Polymer coupons of the same material as the sheath are inserted into the flow for a certain period of time and then removed one at a time and analyzed to evaluate the condition of the pressure sheath. Based on a quantitative analysis of the coupons, an estimate of the remaining service life of the pressure sheath may be determined along with any changes to the molecular structure or chemical properties that may affect the overall strength and structural integrity of the sheath.

The Cosasco® Polymer Monitoring System consists of a polymer coupon holder and solid plug assembly installed in a standard 2" Access Fitting that would normally be located in a topside rigid pipe, downstream of the riser end connection. The assembly is also offered for use in the Cosasco 2" Hydraulic Access Fitting System. The polymer coupon assembly may be installed and retrieved under pressure using a Cosasco RSL or RBS/RBSA Retriever and Cosasco Single or Double Block and Bleed Service Valve.



### Features

Determines Potential Breakdown and Ageing of Polymer Material Under Operating Conditions to Estimate Remaining Service Life of Pressure Sheath

Robust Construction (Plug and Holder) for Maximum Durability and Insertion Length Under Variable Flow Conditions

Fits in all Cosasco and Standard 2" Access Fittings

Removable Under Pressures up to 6000 psi

### Options

Material —SS316 or Duplex Stainless Steel

Accommodates up to 10 or more Polymer Disc Coupons

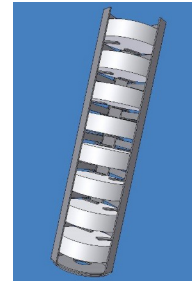
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## Flexible Pipe-Polymer Coupon Monitoring

The coupon holder assembly is designed for maximum strength/insertion length and to reflect the process conditions the polymer sheath will be exposed to under normal production conditions over time.

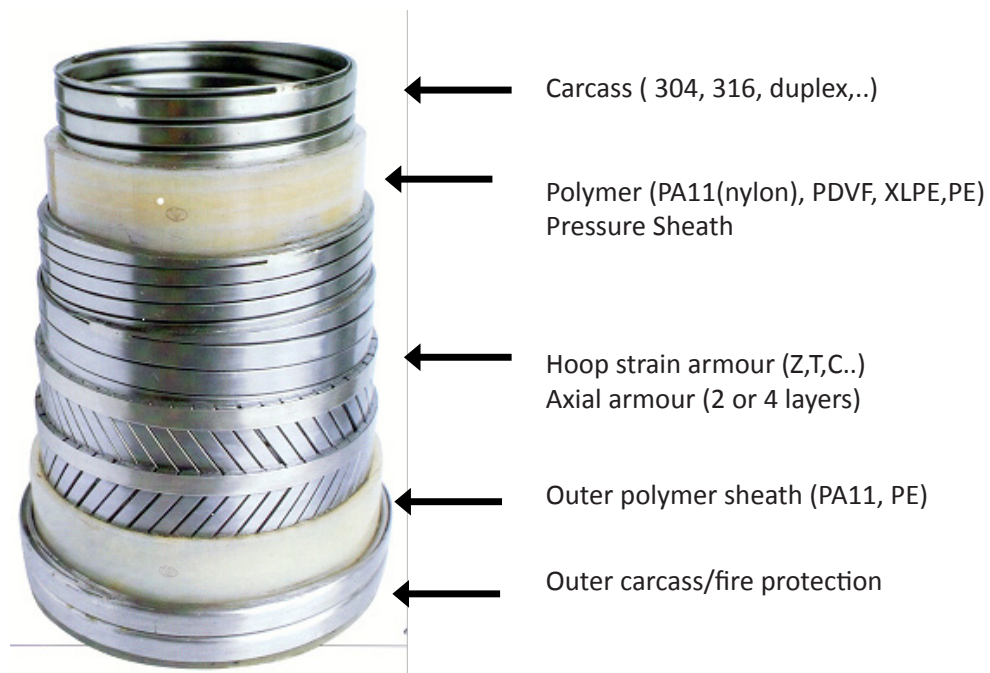
### Disc Coupons

Disc polymer coupons are the most common type used for determining changes in molecular weight, chemical properties and hardness of the polymer pressure sheath. Typically they are arranged in the coupon holder in quantities of 8-10, spaced, for full exposure on all sides. The number of coupons will depend on the pipe diameter and insertion length, determined by the flow conditions in the pipe. This design allows for a similar process fluid environment as would be encountered in the riser pressure sheath and carcass. Each disc has the same thickness of the polymer pressure sheath and specially cut from the original sheath material.

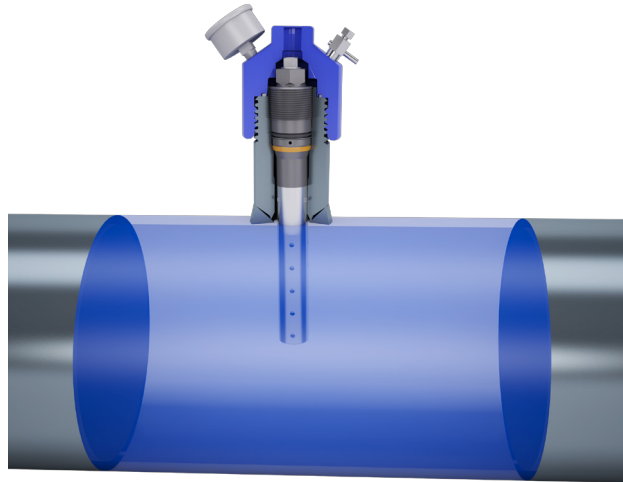


Disc Coupons

### Typical Flexible Pipe Composition



## Polymer Coupon Holder Sizing Formulas



### Top of the Line Monitoring

Coupon holder positions the effective length of coupons into pipe vessel.

$$(A + Pw + Wg) - 1 \frac{1}{4}''$$

### Middle of the Line Monitoring

Coupon holder positions 1/2 of the coupons on either side of pipe centerline.

$$(A + \frac{1}{2}Pd + Wg) - 4''$$

### Bottom of the Line Monitoring

Coupon holder positions coupons approximately 1/4" off bottom of line.

$$(A + Pd + Wg) - (7'' + Pw)$$

### Where:

**A** = Length of access fitting body.

**Pw** = Pipe wall (wall thickness of pipe)

**Pd** = Pipe diameter (outside diameter of pipe)

**El** = Effective length of coupon (the portion of the coupon exposed to the environment, i.e. 3" coupon = 1-5/8", 6" coupon = 4-3/4")

**Wg** = Weld gap (per weld procedures, 1/16" is normal per ANSI B31.1 1973)

## Ordering Information Polymer Disc Coupon Holder

Model	Polymer Disc Coupon Holder	
629023	Polymer Disc Coupon Holder Assembly	
629023	<b>Code</b>	<b>Shroud Body Material</b>
	S31603	316/316L Stainless Steel
	N10276	Hastelloy C-276
	S21800	Nitronic 60
	K03011	Carbon Steel
N06625	Inconel 625	
S31803	2205 Duplex Stainless Steel	
629023	<b>Code</b>	<b>Order Length</b>
	6.75	Order length in inches (6.75" Standard)
629023 — S31603 — 6.75		Example

\* Nominal Temperature Range

### Access Fitting

Cosasco 2" Access fitting for coupon retrieval under pressure. Flareweld or Flanged, material to suit. See Access Fitting Datasheets for ordering information. The assembly is also offered for use in the Cosasco 2" Hydraulic Access Fitting System.

### Polymer Coupons

Polymer Coupon Type	Description	Size	Part Number
Disc Coupons	Typically 8-10, spaced, with full exposure all sides.	Typically 23mm dia x sheath thickness	Consult Factory

Note: Customer will supply polymer pressure sheath material.

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