Raychem HTLP Wrap-around Sleeve & Epoxy System

The most widely used girth weld protection system for three-layer coated pipes.

Product description

HTLP60, HTLP80 field-joint coatings.
Construction: Three-layer system:
First layer: Liquid epoxy, solvent-free two-component.
Second layer: High shear strength copolymer adhesive.
Third layer: Radiation cross-linked, high density polyethylene with ***PCI*** (Permanent Change Indicator).

The HTLP system is a wrap-around heat-shrinkable sleeve which replicates the structure and performance of mill-applied three-layer PE coatings. HTLP also has excellent compatibility and has been extensively used on many other mill-applied coatings (see below). By far the majority of the girth welds worldwide on three-layer coated pipes, diameters up to 100" (DN2500), have been coated with HTLP.

During installation, the epoxy is applied to the prepared pipe surface and the heat-shrinkable sleeve is immediately wrapped around the joint over the wet epoxy. Heat is then applied to the sleeve which shrinks to form a tight fit around the joint. While curing, the epoxy forms strong mechanical and chemical bonds to the pipe surface & to the copolymer adhesive layer. The radiation cross-linked outer layer forms a tough barrier against mechanical damage and moisture transmission.

Product features/benefits

- **Fully resistant to shear forces induced by soil and thermal movements**
  The HTLP is tough & lasts as long a 3-layer, mill-applied coating.
- **Sleeve applied over wet epoxy---allowing formation of strong mechanical & chemical bonds**
  Allows fast application, combined with high performance!
- **Superior cathodic disbondment and hot water immersion resistance**
  Offers the optimum barrier protection against corrosion.
- **Fully reconstructs the coating of three-layer coated pipes**
  Thus, the HTLP allows the pipeline to have a virtually monolithic coating system.
- **Dimpled backing provides a "permanent change" indicator for application of heat**
  Ensures correct application heat & allows easy post-heat inspection.
  Reliable inspectability at any time.

Product selection guide

	HTLP60&65	HTLP80
Max operating temperature	60°C (140°F) & 65°C (149°F)	80°C (176°F)
Compatible line coatings	PE, PP, FBE, Coal Tar	PE, FBE, Coal Tar
Min preheat temperature	70°C (158°F)	70°C (158°F)
Recommended pipe preparation	SA 2½	SA 2½
Soil stress restrictions	None	None
Performance	EN 12068 Class C50	EN 12068 Class C50, Class C80

Product thickness

	/B *(US standard)*	/1-1.5	/1.4-1.5
Backing (as supplied)	0.030 in. 0.75 mm	0.030 in. 0.75 mm	0.041 in. 1.04 mm
Backing (fully free recovered)	0.039 in. 1.0 mm	0.039 in. 1.0 mm	0.055 in. 1.4 mm
Adhesive (as supplied)	0.039 in. 1.0 mm	0.060 in. 1.5 mm	0.060 in. 1.5 mm

Product properties: HTLP

Property	Test method	Typical Value HTLP60&65	Typical Value HTLP80
Backing			
Tensile strength	ASTM D-638	3000 psi (20 MPa)	3000 psi (20 MPa)
Elongation	ASTM D-638	580%	580%
Hardness, Shore D	ASTM D-2240	55	55
Shrink force	ASTM D-638, 150°C (302°F)	40 psi	40 psi
Dielectric strength	ASTM D-149	500 volts/mil (20 kV/mm)	500 volts/mil (20 kV/mm)
Moisture absorption	ASTM D-570	0.05%	0.05%
Adhesive			
Softening point	ASTM E-28	103°C (217°F)	120°C (248°F)
Lap shear	ASTM D-1002	350 psi @ 23°C (73°F)	750 psi @ 23°C (73°F)
		11 psi @ 65°C (149°F)	65 psi @ 80°C (176°F)
	EN 12068, @ 10 mm (0.40")/min.	0.22 N/mm² @ 50°C (122°F)	
Sleeve			
Peel to Steel	ASTM D-1000	25 lbs/in. width	21 lbs/in. width
	EN 12068, @ 10 mm (0.40")/min.	4.2 N/mm	4.0 N/mm
Cathodic disbondment	ASTM G-42, 30 days	13 mm radius @ 65°C (149°F)	12 mm radius @ 80°C (176°F)
Hot water immersion	ASTM D-870, 120 days	no delamination, no blisters	no delamination, no blisters
	@ 65°C (149°F), @ 80°C (176°F)	or water ingress	or water ingress
Soil stress creep resistance	TP-206		
	65°C (149°F)	0.0004 in. (0.009 mm)	
	80°C (176°F)		0.0001 in. (0.003 mm)
Low temperature flexibility	ASTM D-2671-C	-70°C (-94°F)	-25°C (-13°F)
Impact resistance	ASTM G-14	66 in-lbs	95 in-lbs
	EN 12068, class C	> 15 Nm *	> 15 Nm *
Penetration resistance	ASTM G-17, @ 65°C (149°F)	no holidays @ 10.000 volts	
	ASTM G-17, @ 80°C (176°F)		no holidays @ 10.000 volts
	EN 12068, Class C50	> 0.6 mm *	> 0.6 mm *

* *Remaining coating thickness for construction /1-1.5*

Ordering information

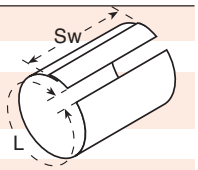
HTLP type products are available:

- as cut piece (pre-cut sleeve with separate closure patch)
- as Uni-sleeve (pre-cut sleeve with pre-attached closure patch)
- as a roll (closure patches to be ordered separately)

Select sleeve width that will overlap onto the mill-applied coating by 2 inches (50 mm) minimum on each side of the weld joint. Take a 10% shrinkage during installation of sleeve width into account when calculating the minimum sleeve width.

*** Cut piece / Uni-sleeve**

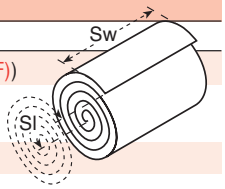
Example: HTLP60-16000X17/B (/UNI)		
		Standard Ordering options
60	Operating temperature in Celsius	60 (= 60°C (140°F)), 65 (= 65°C (149°F)), 80 (= 80°C (176°F))
16000	Outside pipe diameter in mils	2.375" – 100.000" (DN50 – DN2500)
17	Sleeve width in inches (Sw)	11" (285 mm) [1][2], 17" (450 mm) [1], 20" (514 mm) [1][2], 24" (600 mm) [1], 34" (870 mm) [1]
/B	Product thickness	/B, /1-1.5, /1.4-1.5
/UNI	Designates pre-attached closure	Optional



[1] *nominal width* [2] *not standard in all countries*

*** Roll form** (closure patches to be ordered separately)

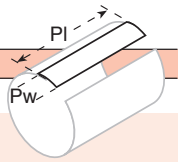
Example: HTLP60-20x100/1-1.5-RL		
		Standard Ordering options
60	Operating temperature in Celsius	60 (= 60°C (140°F)), 65 (= 65°C (149°F)), 80 (= 80°C (176°F))
20	Roll width in inches (Sw)	11" (285 mm) [1][2], 17" (450 mm) [1], 20" (514 mm) [1][2], 24" (600 mm) [1], 34" (870 mm) [1]
100	Roll length in feet (Sl)	100 ft (= 30 m), 66 ft (=20 m, for 34" (870 mm) width)
/B	Product thickness	/B, /1-1.5, /1.4-1.5



[1] *nominal width* [2] *not standard in all countries*

*** Closure patch**

Example: WPCP-IV-4X17		
4	Closure patch width in inches (Pw)	4" (100 mm), 5" (125 mm), 6" (150 mm), 8" (200 mm)
17	Closure patch length in inches (Pl)	11" (285 mm) [1][2], 17" (450 mm) [1], 20" (514 mm) [1][2], 24" (600 mm) (1), 34" (870 mm) [1]



[1] *nominal width* [2] *not standard in all countries*

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table AT-GIRTHWELD-REV-2-08/01. For proper product installation, see latest installation instruction.

HTLP type products are installed with epoxy primer:
HTLP60 is installed with S1239 or S1301 primer.
HTLP65&80 are installed with S1301 primer.

Epoxy Primers are ordered separately. For more ordering information on epoxy primers see application tables AT-S1239-REV-1-08/01 and AT-S1301-REV-2-08/01. As field application of primers may vary, consult a Tyco Adhesives Representative or Authorized Distributor for rate of coverage guidance.

DS-HTLP-REV-2-08/01

Tyco Adhesives
Corrosion Protection Group
www.TycoAdhesives.com

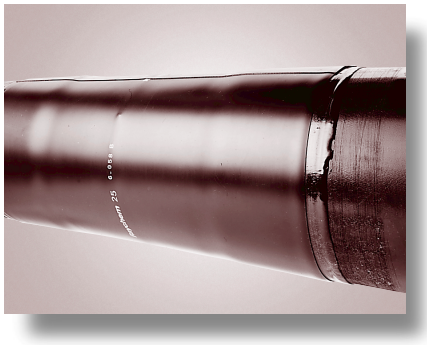
Headquarters:
Tyco Adhesives
1400 Providence Hwy
Norwood, MA 02062 USA
Int'l Tel: +1 781 440-6161
US Toll Free: +1 800 248-0149
Fax: +1 781 440-6271
E-mail: CPG@TycoAdhesives.com

In Europe, Middle East, Africa, Asia & Pacific:
Tyco Adhesives B.V.B.A.
Nieuwlandlaan B15
B-3200 Aarschot, Belgium
Tel: +32 16 55 36 00
Fax: +32 16 55 36 74
E-mail: CPGE@TycoAdhesives.com

In the Americas:
Tyco Adhesives L.P.
1675 Suite C Brandywine Avenue
Chula Vista, CA 91911 USA
TEL: Mexico +52 (664) 623 30 70
TEL: US +1 (619) 4 24 42 59
FAX: Mexico +52 (664) 623 64 63
FAX: US +1 (619) 4 24 42 58
E-mail: CPGTJ@TycoAdhesives.com

Local agent / Distributor:

Raychem WPC ambient Wrap-around Girth Weld Sleeve



The WPC ambient with *PCI* (Permanent Change Indicator) is a two-layer field-joint coating system for pipeline operating at ambient temperature.

Product description

WPCT, WPC/B, WPC-B30, WPC-C30 field-joint coatings.
Construction: Two-layer system:
First layer: Visco-elastic low preheat sealant adhesive.
Second layer: Radiation cross-linked, high density polyethylene with ***PCI*** (Permanent Change Indicator)

WPC ambient is a wrap-around heat-shrinkable, ready-to-fit assembly for the corrosion protection of field girth weld joints in distribution and transmission networks, for use especially in low shear or low stress environments and in moderate climates. (Above pipe diameter DN500 (20") in high shear and high stress environments, the use of WPC-C50, HTLP60 is recommended or contact a Tyco Adhesives representative).
WPC ambient is compatible with standard pipe coatings. WPC ambient can also be used for coating bare, replacement pipe sections and large radius bends. The system is designed to be applied with minimum preheating of the pipe.

The installation is carried out directly on the cleaned and pre-heated pipe surface without any primer being required. During installation, the heat-shrinkable sleeve is wrapped around and shrunk to form a tight fit around the joint. During recovery, the adhesive softens and flows to form a perfect bond with the pipe surface providing protection against corrosion. The radiation cross-linked outer layer forms a tough barrier against mechanical damage and moisture transmission.

Product features/benefits

- **Dimpled backing provides a 'permanent change" indicator for application of heat**
  Ensures correct application heat & allows easy post-heat inspection.
  Reliable inspectability at any time.
- **Low preheat sensitivity & proven functionality**
  Installation friendly in combination with high functional performance.
- **High impact and penetration resistance**
  Tough, but flexible even at low temperatures!
- **Available as all-in-one unit or roll form**
  Saves money by keeping inventory and logistics costs low.
- **Sealing adhesive automatically flows and repairs minor mechanical damages**
  "Self-healing effect". Saves extra intervention steps.
- **No special equipment or skills required**
  Makes installation fast and easy.
  Keeps installation costs low.

Product selection guide

	WPCT	WPC/B	WPC-B30	WPC-C30
Max operating temperature	45°C (113°F)	45°C (113°F)	45°C (113°F)	45°C (113°F)
Compatible line coatings	PE, FBE, Coal Tar, Tape & Asphalt	PE, FBE, Coal Tar, Tape & Asphalt	PE, FBE, Coal Tar, Tape & Asphalt	PE, FBE, Coal Tar, Tape & Asphalt
Min preheat temperature	60°C (140°F)	60°C (140°F)	60°C (140°F)	60°C (140°F)
Recommended pipe preparation	ST2½ - ST3 or SA 2½	ST2½ - ST3 or SA 2½	ST2½ - ST3 or SA 2½	ST2½ - ST3 or SA 2½
Soil stress restrictions	Moderate	Moderate	Moderate	Moderate
Performance	EN 12068 class B30	EN 12068 class B30	EN 12068 class B30	EN 12068 class C30

Product thickness

	WPCT	WPC/B	WPC-B30	WPC-C30
Backing (as supplied)	0.022 in. (0.55 mm)	0.030 in. (0.76 mm)	0.030 in. (0.76 mm)	0.040 in. (1.0 mm)
Backing (fully free recovered)	0.030 in. (0.76 mm)	0.040 in. (1.0 mm)	0.040 in. (1.0 mm)	0.055 in. (1.4 mm)
Mastic sealant (as supplied)	0.055 in. (1.4 mm)	0.060 in. (1.5 mm)	0.047 in. (1.2 mm)	0.060 in. (1.5 mm)

Product properties: WPC ambient (1)

		WPCT	WPC/B	WPC-B30	WPC-C30
Property	**Test method**	**Typical Value**			
Backing					
Tensile strength	ASTM D-638	3000 psi (20 MPa)	3000 psi (20 MPa)	3000 psi (20 MPa)	3000 psi (20 MPa)
Elongation	ASTM D-638	580%	580%	580%	580%
Hardness, Shore D	ASTM D-2240	55	55	55	55
Shrink force	ASTM D-638 150°C (302°F)	40 psi	40 psi	40 psi	40 psi
Dielectric strength	ASTM D-149	500 volts/mil 20 kV/mm	500 volts/mil 20 kV/mm	500 volts/mil 20 kV/mm	500 volts/mi 20 kV/mm
Water absorption	ASTM D-570	0.05%	0.05%	0.05%	0.05%
Adhesive					
Softening point	ASTM E-28	90°C (194°F)	90°C (194°F)	92°C (198°F)	92°C (198°F)
Lap shear	ASTM D-1002 EN 12068 @ 10 mm(0.4")/min.	35 psi 22 N/cm²	35 psi 22 N/cm²	8 N/cm²	8 N/cm²

DS-WPC ambient-REV-2-08/01

Product properties: WPC ambient (2)

		WPCT	WPC/B	WPC-B30	WPC-C30
Property	**Test method**		**Typical Value**		
Sleeve					
Peel to Steel	ASTM D-1000 EN 12068 @ 10mm (0.4")/min.	14 lbs/in.width 1.6 N/mm	14 lbs/in.width 1.6 N/mm	 0.9 N/mm	 0.9 N/mm
Cathodic disbondment	EN 12068, 30 days	8 mm radius	8 mm radius	9 mm radius	9 mm radius
Impact resistance	ASTM G-14 EN 12068	35 in-lbs > 8 Nm	50 in-lbs > 8 Nm	 > 8 Nm	 > 15 Nm
Penetration resistance	ASTM G-17 EN 12068 class B30 (1 N/mm²) class C30 (10 N/mm²)	 > 0.6 mm *	no holiday with 10 kV detector > 0.6 mm *	no holiday with 10 kV detector > 0.6 mm *	no holiday with 10 kV detector > 0.6 mm *

* *Remaining coating thickness*

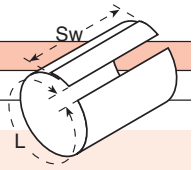
Ordering information

WPCT, WPC/B and WPC-C30 type products are available:
- as Uni-sleeve (pre-cut sleeve with pre-attached closure patch)
- as a roll (closure patches to be ordered separately)

WPC-B30 type products are only available
- as a roll (closure patches to be ordered separately)

Select sleeve width that will overlap onto the mill-applied coating by 2 inches (50 mm) minimum on each side of the weld joint.
Take a 10% shrinkage during installation of sleeve width into account when calculating the minimum sleeve width.

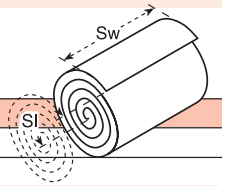
*** Cut piece / Uni-sleeve**



Example: WPCT-10750X17/UNI - WPC-10750X17/B/UNI - WPC-C30-DN250-450

		Standard Ordering options
WPC...	Product type	WPCT, WPC/B, WPC-C30
10750	Outside pipe diameter in mils	2.375" – 68.000" (1)
DN250	Pipe diameter in DN	DN50 – DN 1700 (1)
17	Sleeve width in inches (Sw)	11" (285 mm) (2), 17" (450 mm) (2), 24" (600 mm) (2), 34" (870 mm)(2)
450	Sleeve width in mm (Sw)	17" (450 mm) (2), 24" (600 mm) (2)
/UNI	Designates pre-attached closure patch	optional

(1) *Above pipe diameter 20" (DN500) in high shear and high stress environments, the use of WPC-C50, HTLP60 or others are recommended.*
(2) *Nominal width*

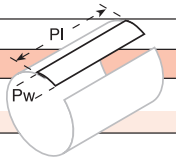


*** Roll form** (closure patches to be ordered separately)

Example: WPCT-17x100-RL

		Standard Ordering options
WPC...	Product type	WPCT, WPC/B, WPC-B30, WPC-C30
17	Roll width in inches (Sw)	11" (285 mm) (1), 17" (450 mm) (1), 24" (600 mm) (1), 34" (870 mm) (1)
100	Roll length in feet (Sl)	100 ft (= 30 m), 66 ft (= 20 m, for C30/width 34" (870 mm) only)

*** Closure patch**



Example: WPCP-IV-4x17

4	Closure patch width in inches (Pw)	4" (100 mm), 5" (125 mm), 6" (150 mm), 8" (200 mm)
17	Closure patch length in inches (Pl)	11" (285 mm) (1), 17" (450 mm) (1), 24" (600 mm) (1), 34" (870 mm) (1)

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table AT-GIRTHWELD-REV-2-08/01.
For proper product installation, see latest installation instruction.

Tyco Adhesives
Corrosion Protection Group
www.TycoAdhesives.com

Headquarters:
Tyco Adhesives
1400 Providence Hwy
Norwood, MA 02062 USA
Int'l Tel: +1 781 440-6161
US Toll Free: +1 800 248-0149
Fax: +1 781 440-6271
E-mail: CPG@TycoAdhesives.com

In Europe, Middle East, Africa, Asia & Pacific:
Tyco Adhesives B.V.B.A.
Nieuwlandlaan B15
B-3200 Aarschot, Belgium
Tel: +32 16 55 36 00
Fax: +32 16 55 36 74
E-mail: CPGE@TycoAdhesives.com

In the Americas:
Tyco Adhesives L.P.
1675 Suite C Brandywine Avenue
Chula Vista, CA 91911 USA
TEL: Mexico +52 (664) 623 30 70
TEL: US +1 (619) 4 24 42 59
FAX: Mexico +52 (664) 623 64 63
FAX: US +1 (619) 4 24 42 58
E-mail: CPGTJ@TycoAdhesives.com

Local agent / Distributor:

Raychem DIRAX Wrap-around Sleeve & Epoxy System

A high performance fiberglass reinforced sleeve specifically designed for girth weld corrosion protection on pipes used in directional drilling applications.

Product description

DIRAX field-joint coating for directional drilling.
Construction: Three-layer system:
First layer: Liquid epoxy, solvent-free two-component.
Second layer: High shear strength copolymer adhesive.
Third layer: Thick, fiberglass reinforced, radiation cross-linked polyethylene.
Additional component: Wear Cone as extra protection against pull-through forces, of the same construction as the main sleeve.

The DIRAX system is a wrap-around heat-shrinkable sleeve reinforced with fiberglass. DIRAX is designed to protect girth welds against corrosion and is the optimum joint protection for PE and FBE coated pipes used in directional drilling applications. The reinforcement gives the backing greater wear resistance.

During installation, the epoxy is applied to the prepared pipe surface and the heat-shrinkable sleeve is immediately wrapped around the joint over the wet epoxy. Heat is then applied to the sleeve, which shrinks to form a tight fit around the joint. While curing, the epoxy forms strong mechanical and chemical bonds to the pipe surface & to the copolymer adhesive layer. The radiation cross-linked outer layer forms a tough barrier against mechanical damage and moisture transmission. A wear cone is then applied over the leading edge of the sleeve.

Product features/benefits

- **Highly resistant to shear and peel forces induced by soil and thermal movements**
  The DIRAX is tough!
- **DIRAX offers abrasion and wear resistance at pull-through comparable to mill coatings**
  Provides a monolithic coating system.
- **Wear cone protects leading edge of sleeve against pull-through forces**
  Provides additional strength and security---increases reliability.
- **Sleeve applied over wet epoxy---there are no curing or waiting times / formation of strong mechanical & chemical bonds**
  Allows fast application---saves time!
  Ensures high performance!
- **Superior cathodic disbondment and hot water immersion resistance**
  Offers the optimum barrier protection against corrosion.
- **Pre-attached closure patch**
  Allows fast and easy application.
- **Low preheat requirements**
  Makes installation faster and saves time.

Product selection guide

	DIRAX
Max operating temperature	50°C (122°F)
Compatible line coatings	PE, FBE
Min preheat temperature	70°C (158°F)
Recommended pipe preparation	SA 2½
Soil stress restrictions	None
Performance	EN 12068 Class C50

Product thickness

	Unit
Backing (as supplied)	1.85 mm (0.073 in.)
Backing (fully free recovered)	2.3 mm (0.091 in.)
Adhesive (as supplied)	1.2 mm (0.047 in.)
Wear cone (incl. coating) (as supplied)	3.05 mm (0.12 in.)

Product properties: DIRAX

Property	Test method	Typical Value
Backing		
Bursting strength	DIN 30672	2350 N
Adhesive		
Softening point	ASTM E-28	94°C (201°F)
Lap shear	EN 12068 @ 10mm (0.40")/min.	0.55 N/mm² @ 50°C (122°F)
Sleeve		
Peel to steel	EN 12068 @ 10mm (0.40")/min.	18 N/mm
Specific coating resistance	DIN 30672, 100 days immersion	6 X 10^8 Ωm²
Impact resistance	EN 12068, Class C	Pass 15 J
Penetration resistance	EN 12068, Class C50	> 0.6 mm * @ 50°C (122°F)
Cathodic disbondment	EN 12068, 30 days	8 mm radius @ 50°C (122°F)

* *Remaining coating thickness*

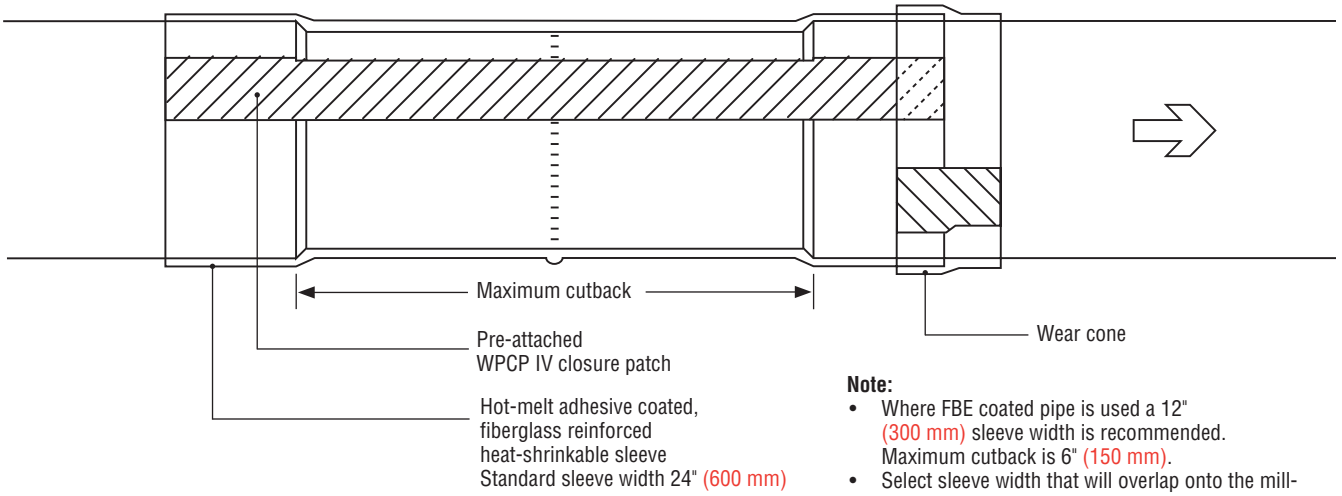
DS-DIRAX-REV-2-08/01

Ordering information

DIRAX type products are available:

- as a kit, containing:
  - a Uni-sleeve (pre-cut sleeve with pre-attached closure patch)
  - a wear cone (also pre-cut with pre-attached closure patch)

Dirax is installed with S1239 2-component epoxy primer which has to be ordered separately.



Note:

- Where FBE coated pipe is used a 12" (300 mm) sleeve width is recommended. Maximum cutback is 6" (150 mm).
- Select sleeve width that will overlap onto the mill-applied coating by 2 inches (50 mm) minimum on each side of the weld joint.

Example: DIRAX-16000-24/1K		
		Standard Ordering options
16000	Outside pipe diameter in mils	3.500" – 48.000" (DN80 – DN1200)
24	Sleeve width in inches	12" (300 mm)(1),17" (430 mm)(1) , 24" (600 mm)(1), 34" (863 mm) (1)
/1K	Number of primer kits required	1, 2 or 3 S1239 kits according to size (to be ordered separately)
	Wear cone	Width 3" = 3.125" (80 mm) (included)

(1) *Nominal width*

For proper product selection, see application table AT-DIRAX-REV-1-08/01.

Tyco Adhesives
Corrosion Protection Group

www.tycoadhesives.com

Headquarters
Tyco Adhesives
1400 Providence Hwy
Norwood, MA 02062 USA
Int'l Tel. +1 781 440-6161
US Toll Free +1 800 248-0149
Fax +1 781 440-6271
E-mail: CPG@tycoadhesives.com

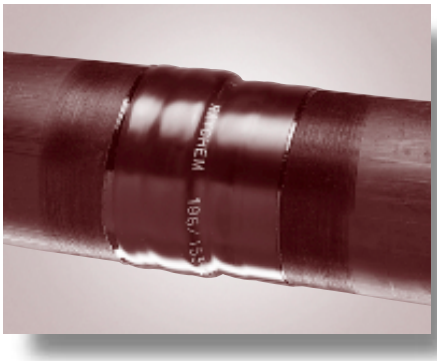
In Europe, Middle East, Africa, Asia & Pacific
Tyco Adhesives B.V.B.A.
Nieuwlandlaan B15
B-3200 Aarschot, Belgium
Tel. +32 16 55 36 00
Fax +32 16 55 36 74
E-mail: CPGE@tycoadhesives.com

In the Americas
Tyco Adhesives L.P.
1675 Suite C Brandywine Avenue
Chula Vista, CA 91911 USA
Tel. Mexico +52 (664) 607 09 26
Tel. US +1 (619) 4 24 42 59
Fax Mexico +52 (664) 623 64 63
Fax US +1 (619) 4 24 42 58
E-mail: CPGTJ@tycoadhesives.com

Local agent / Distributor:

DS-DIRAX-REV-2-08/01

Raychem TPSM/138 Tubular Sleeve



Tubular sealing sleeve for sealing of pipe joints in pre-insulated pipe systems.

Product description

TPSM/138 with *PCI* (Permanent Change Indicator) sealing of pre-insulated pipe.
Adhesive: Temperature-stabilized, high strength, visco-elastic sealant.
Backing: Radiation cross-linked, high density polyethylene with ***PCI***
(Permanent Change Indicator).

TPSM/138 is a heat-shrinkable, tubular sleeve for joint sealing of oversized and heat-shrinkable casings in standard conditions. Generally, TPSM/138 is used as an additional outside seal against moisture ingress for small and medium diameter heat-shrinkable casings.

During shrinking, the adhesive easily melts and flows, filling in the transition between the pipe jacket and the oversized casing. The adhesive ensures a firm bond between the sleeve and the pipe/casing surface. The dimpled backing permanently indicates that the sleeve is completely shrunk.

Product features/benefits

- **High shrink force HDPE backing**
  Creates tight, high performance bond and a strong seal.
  Secures anchoring of casing and pipe jacket.
- **High mechanical resistance HDPE backing**
  Easily survives temperature cycling, soil stresses, pipe movements & chemical attack. Extremely resistant!
- **No special installation equipment required**
  Easy installation: just 'slide over & shrink'.
- **Individual packaging precludes contamination prior to application**
  Stays clean and uncomplicated. Less work.
- **Permanent Change Indicator**
  Ensures correct application heat & allows easy post-heat inspection.
  Reliable inspectability at any time.

Product selection guide

	TPSM/138
Max operating temperature	50°C (122°F) (50°C (122°F) under expansion cushions)
Type joint	Oversized casing, Heat-shrinkable casing
Min preheat temperature	60°C (140°F)
Recommended pipe preparation	Cleaning & Abrading
Soil stress restrictions	Moderate
Pressure testing after installation	No (foaming before installation)
Product recommended for	Service lines
Performance	> 50 cycles, 8% sand humidity, FFI

Product thickness

	TPSM/138
Backing (as supplied)	0.026 - 0.030 in. (0.65 - 0.75 mm)
Backing (fully free recovered)	0.039 in. (1.0 mm)
Elastomeric sealant (as supplied)	0.032 in. (0.8 mm)

Product properties: TPSM/138

Property	Test method	Typical value
Casing material		
Tensile strength	ASTM D-638	3000 psi 20 MPa
Elongation	ASTM D-638	580%
Hardness, Shore D	ASTM D-2240	55
Shrink force	ASTM D-638 150°C (302°F)	40 psi
Moisture absorption	ASTM D-570	0.05%
Adhesive		
Softening point	ASTM E-28	135°C (275°F)
Lap shear	ISO 4587	28 N/cm^2 (40 psi)
Sleeve		
Peel to PE	ASTM D1000	87.5 N/cm (50 lbs/in. width)
Soil stress resistance	EN 489 8.0% sand humidity	 min. 50 cycles
External pressure test after soil stress	DS 2182 23°C (73°F), 0.7 bar, 24 hrs.	Pass
Low temperature impact	-14° C (6.8°F), 1 kg at 1 m height, ∅ 22mm 1 mm (0.04")/min	Pass

DS-TPSM/138-REV-3-04/03

Ordering information

TPSM/138 type products are available:
- as ready-to-size tubular sleeve

Example: TPSM-196/153-150		
		Standard ordering options
196/153	Recovery ratio in mm	80/55 for pipe jacket ∅63 (2.5")
		92/67 for pipe jacket ∅75 (3")
		112/81 for pipe jacket ∅90 (3.5")
		135/93 for pipe jacket ∅110 (4.3")
		150/104 for pipe jacket ∅125 (4.9")
		165/127 for pipe jacket ∅140 (5.5")
		196/153 for pipe jacket ∅160 (6.3")
		215/150 for pipe jacket ∅180 (7.1")
		230/170 for pipe jacket ∅200 (7.9")
		255/190 for pipe jacket ∅225 (8.9")
		300/225 for pipe jacket ∅250 (9.8")
		340/255 for pipe jacket ∅280 (11")
		380/285 for pipe jacket ∅315 (12.4")
		405/325 for pipe jacket ∅355 (14")
		460/360 for pipe jacket ∅400 (15.7")
		510/410 for pipe jacket ∅450 (17.7")
		565/450 for pipe jacket ∅500 (19.7")
150	Sleeve width in mm	150 mm (6") (∅63 (2.5") - ∅315 (12.4"))
		225 mm (9") (∅90 (3.5") - ∅500 (19.75"))

For proper product installation, see latest installation instruction.

Tyco Adhesives
Corrosion Protection Group
www.TycoAdhesives.com

Headquarters:
Tyco Adhesives L.P.
1400 Providence Hwy
Norwood, MA, 02062 USA
Int'l Tel.: +1 718 440 6161
US Toll Free: +1 800 248 0149
Fax: +1 781 440 6271
Email: CPG@tycoadhesives.com

In the Americas:
Tyco Adhesives
1675 Suite C Brandywine Avenue
Chula Vista, CA91911 USA
Tel. Mexico: +52 664 607 09 26
Tel. US: +1 619 4 24 42 59
Fax Mexico: +52 664 623 64 63
Fax US: +1 619 4 24 42 58
Email: CPGTJ@tycoadhesives.com

Local agent / Distributor:

Tyco Adhesives (Houston)
11010 Wallisville Road
Houston, TX 77013 USA
Tel.: +1 713 676 0085
US Toll Free: +1 888 676 7202
Fax: +1 713 676 0086
Email: CPGH@tycoadhesives.com

In Europe, Middle East, Africa, Asia & Pacific:
Tyco Adhesive B.V.B.A.
Nieuwlandlaan B15
B-3200 Aarschot, Belgium
Tel.: +32 16 55 36 00
Fax: +32 16 55 36 74
Email: CPGE@tycoadhesives.com

DS-TPSM/138-REV-3-04/03

Raychem

CPSM/XCSM Tubular sleeve

Heat-shrinkable tubular pipe sleeve for corrosion protection and sealing of mechanical couplers & fittings on pipelines.

Product description

CPSM, XCSM fittings & mechanical coupler coating and sealing.
Construction: two-layer system:
first layer: visco-elastic mastic sealant.
second layer: thick-walled, radiation-cross-linked, high density polyethylene.

CPSM, XCSM are thick-wall, high expansion heat-shrinkable tubular sleeves remarkable for their high shrink ratio allowing awkward, irregular shapes to be coated easily. This makes them specifically useful for corrosion prevention and sealing of screw- or other mechanical couplers in distribution networks.

CPSM, XCSM are typically used for small diameters and high percentage transitions.
CPSM, XCSM can also be used on small diameter bends, like riser bends.

The installation is carried out directly on the cleaned and dried (pre-heated) coupler & pipe surface without any primer being required. CPSM/XCSM is positioned on the pipes prior to coupling them together and, after installation of the coupler, slid centrally over the joint to be protected. When heated, the CPSM/XCSM sleeve shrinks and the sealant melts, encapsulating mechanical couplings and straight pipes with a strong impervious seal. While the sleeve conforms to the shape of the coupling or pipe, the melted sealant is forced into all surface irregularities providing a permanent environmental seal.

Product features/benefits

- **No primer required**
  No drying time and easy application.
- **Low preheat sensitivity & proven functionality**
  Allows easy application combined with high functional performance.
- **Highly resistant**
  Trustful as CPSM/XCSM resists bending, impact, abrasion, penetration, corrosive gases or fluids, disbonding and long-term storage.
  Remains user-friendly (even at low temperatures).
- **Copes with difficult shapes**
  Makes installation & protection a child's play.
  Saves time and money.
- **Specially formulated sealants**
  Ensures a strong bond & impervious seal.
- **Self-healing effect**
  Saves extra intervention steps (Sealing adhesive automatically flows and seals off minor mechanical damages).
- **Copes with relatively high transitions (high shrink ratio)**
  Minimizes inventory, thus economical.
- **No special equipment or skills required**
  Makes installation fast and easy.
  Keeps installation costs low.

Product selection guide

	CPSM/87	CPSM-C30	XCSM-87
Max operating temperature	30°C (86°F)	30°C (86°F)	30°C (86°F)
Compatible line coatings	PE, FBE, Tape, Coal tar Asphalt, Plastics	PE, FBE, Tape, Coal tar Asphalt, Plastics	PE, FBE, PP, Tape, Coal tar Asphalt, Plastics
Min preheat temperature	60°C (140°F)	60°C (140°F)	60°C (140°F)
Recommended pipe preparation	Clean, dry and free of grease	Clean, dry and free of grease	Clean, dry and free of grease
Soil stress restrictions	None	None	None
Performance		EN12068 class C30	

Product thickness

	CPSM/87	CPSM-C30	XCSM-87
Backing (as supplied)*	0.028 - 0.047 in. (0.7 - 1.2 mm)	0.028 - 0.047 in. (0.7 - 1.2 mm)	0.028 - 0.047 in. (0.7 - 1.2 mm)
Backing (fully free recovered)*	0.091 in. (2.30 mm)	0.091 in. (2.30 mm)	0.13 in. (3.30 mm)
Adhesive (as supplied)	0.028 in. (0.7 mm)	0.028 - 0.035 in. (0.7 - 0.9 mm)	0.028 in. (0.7 mm)

Product properties: CPSM/87 - CPSM C30 - XCSM

		CPSM/87	CPSM-C30	XCSM-87
Property	**Test method**		**Typical value**	
Backing				
Tensile strength	ISO R527	20 MPa	20 MPa	20 MPa
Elongation	ISO R527	580%	580%	580%
Hardness, shore D	ASTM D-2240	55	55	55
Shrink force	ASTM D-638 150°C (302°F)	40 psi	40 psi	40 psi

DS-CPSM/XCSM-REV-3-07/02

Property	Test method	CPSM/87	CPSM-C30	XCSM-87
			Typical value	
Adhesive				
Softening point	ASTM E-28	94°C (201°F)	92°C (198°F)	94°C (201°F)
Shear strength	EN 12068 @ 10 mm (0.4")/min.	0.18 N/mm²	0.18 N/mm²	0.18 N/mm²
Sleeve				
Peel to steel	EN 12068 @ 10 mm (0.4")/min.	0.3 N/mm	0.9 N/mm	0.3 N/mm
Cathodic disbondment	EN 12068, 30 days	10 mm radius	9 mm radius	10 mm radius
Impact resistance	EN 12068	> 8 Nm	> 15 Nm	> 8 Nm
Penetration resistance	EN 12068			
	Class B30 (1 N/mm²)	> 0,6 mm*		> 0,6 mm*
	Class C30 (10 N/mm²)		> 0,6 mm*	

** Remaining coating thickness*

Ordering information

CPSM/XCSM type products are available:

- as ready-to-size tubular sleeves

Example: CPSM-90/36-1500/87 • CPSM-C30-90/36-1000 • XCSM-130/41-500/87

		Standard ordering options		
		CPSM/87	CPSM-C30	XCSM
C30	Performance classification		C30	
90/36	Recovery ratio in mm	25/8 (1/0.32")	25/8 (1/0.32")	30/8 (1.18/0.32")
130/41	(supplied diameter/	35/12 (1.38/0.47")	37/12 (1.46/0.47")	44/12 (1.73/0.47")
	recovered diameter)	50/16 (2/0.63")	50/18 (2/0.71")	55/18 (2.17/0.71")
		70/26 (2.76/1.02")	70/26 (2.76/1.02")	85/22 (3.35/0.87")
		90/36 (3.54/1.42")	90/36 (3.54/1.42")	115/30 (4.53/1.18")
		120/54 (4.72/2.13")	120/54 (4.72/2.13")	130/41 (5.12/1.61")
		164/80 (6.46/3.15")	164/80 (6.46/3.15")	160/55 (6.30/2.17")
		195/102 (7.67/4.02")	195/102 (7.67/4.02")	178/60 (7.01/2.36")
1500	Sleeve width in mm *	350 mm (14")	350 mm (14")	300 mm (12")
1000		500 mm (19.75")	500 mm (19.75")	500 mm (19.75")
500		1000 mm (39.5")	1000 mm (39.5")	1000 mm (39.5")
		1500 mm (59")		1500 mm (59")

** Take a 10% shrinkage during installation of sleeve width into account when calculating the minimum sleeve width.*

For proper product installation, see latest installation instruction.

Tyco Adhesives
Corrosion Protection Group

www.tycoadhesives.com

Headquarters:
Tyco Adhesives
1400 Providence Hwy
Norwood, MA 02062 USA
Int'l Tel: +1 781 440-6161
US Toll Free: +1 800 248-0149
Fax: +1 781 440-6271
E-mail: CPG@tycoadhesives.com

In Europe, Middle East, Africa, Asia & Pacific:
Tyco Adhesives B.V.B.A.
Nieuwlandlaan B15
B-3200 Aarschot, Belgium
Tel: +32 16 55 36 00
Fax: +32 16 55 36 74
E-mail: CPGE@tycoadhesives.com

In the Americas:
Tyco Adhesives L.P.
1675 Suite C Brandywine Avenue
Chula Vista, CA 91911 USA
Tel Mexico: +52 (664) 623 30 70
Tel US: +1 (619) 4 24 42 59
Fax Mexico: +52 (664) 623 64 63
Fax US: +1 (619) 4 24 42 58
E-mail: CPGTJ@tycoadhesives.com

Local agent / Distributor:

Raychem FLEXCLAD Heat-Shrinkable Tape Wrap for Pipe Bends

Hand-wrapped, heat-shrinkable corrosion protection tape.

Product description

FLEXCLAD pipe bend coating.
Construction: Multi wrap construction:
Adhesives: Semi-crystalline mastic sealant (Flexclad),
High-shear strength copolymer adhesive (Flexclad-II-C30).
Backing: Flexible, radiation cross-linked, low density polyethylene.

FLEXCLAD tapes are stretchable, hand-wrapped, heat-shrinkable tapes used for corrosion protection of pipe bends and also for small diameter straight pipes in distribution networks.

FLEXCLAD is available in 2 mechanical classes: B30 = FLEXCLAD; C30 = FLEXCLAD-II-C30.

The installation is carried out directly on the cleaned and prepared pipe surface without any primer. During installation, FLEXCLAD(-II) is to be wrapped spirally around the bend with a 50% overlap. The carrier is heated and shrinks tightly around the substrate; at the same time, the sealing adhesive melts and is forced into all surface irregularities, forming a thorough coating and a complete bond with the substrate.

Product features/benefits

- **Different mechanical classes**
  Provides options to the customer and allows cost savings.
- **Highly flexible**
  Easy to apply at both low or high temperatures & on pipes of small diameter.
- **Compatible with varying pipe diameters**
  Minimizes inventory, thus saving money.
- **Self-tensioning, heat-shrinkable backing**
  Easy to use. Saves time.
- **No special equipment required**
  Keeps installation costs low.

Product selection guide

	FLEXCLAD	FLEXCLAD-II-C30
Max operating temperature	50°C (122°F)	50°C (122°F)
Compatible line coatings	PE, FBE, Tape & Coal Tar	PE, FBE, Tape & Coal Tar
Min preheat temperature	70°C (158°F)	70°C (158°F)
Recommended pipe preparation	ST3 or SA 2½	ST3 or SA 2½
Soil stress restrictions	None	None
Performance	EN 12068 B30	EN 12068 C30

Product thickness

	FLEXCLAD	FLEXCLAD-II-C30
Backing (as supplied)	0.020 in. (0.5 mm)	0.020 in. (0.5 mm)
Backing (fully free recovered)	0.020 in. (0.5 mm)	0.020 in. (0.5 mm)
Adhesive (as supplied)	0.028 in. (0.7 mm)	0.028 in. (0.7 mm)

Product properties: FLEXCLAD

Property	Test method	Typical Value FLEXCLAD	Typical Value FLEXCLAD-II-C30
Backing			
Tensile strength	ASTM D-638	22 MPa	22 MPa
Elongation	ASTM D-638	900%	900%
Adhesive			
Softening point	ASTM E-28	82°C (180°F)	94°C (201°F)
Shear strength	ASTM D-1002	120 psi	170 psi
	EN 12068	80 N/cm²	120 N/cm²
	@ 10 mm (0.40")/min.		
Sleeve			
Peel to Steel	ASTM D-1000	45 lbs/in.width	68 lbs/in.width
	EN 12068	5.6 N/mm	7.6 N/mm
	@ 10 mm (0.40")/min.		
Cathodic disbondment	EN 12068	11 mm radius	11 mm radius
	30 days		
Impact resistance	EN 12068		
	Class B	> 8 Nm	
	Class C		> 15 Nm
Penetration resistance	EN 12068		
	Class B (> 1 N/cm²)	> 0.6 mm *	
	Class C (> 10 N/cm²)		> 0.6 mm *

* *Remaining coating thickness*

Ordering information

FLEXCLAD type products are available:

- as a roll (closure patches included)

FLEXCLAD

Example: FLEXCLAD-50X15000 **FLEXCLAD-II-C30-50x15000**		
		Standard Ordering options
FLEXCLAD...	Product type	Flexclad, Flexclad-II-C30
50	Roll width in mm	35 mm (1.50"), 50 mm (2"), 75 mm (3"), 100 mm (4")
15000	Roll length in mm	15000 mm = 15 m (50 ft)

Calculated material usage (including 50 mm overlap on the mill-applied coating)

		3 D-Bend	**5 D-Bend**
		B/C 30	**B/C 30**
Pipe diameter	Recommended tape width in mm	Tape length FLEXCLAD (II) in m	Tape length FLEXCLAD (II) in m
DN 25	35	3.10	3.40
DN 40	35	4.80	5.40
DN 50	35	6.30	7.30
DN 80	50	7.50	9.00
DN 100	50	10.60	13.20
DN 125	50	14.50	18.50
DN 150	50	18.80	24.40
DN 200	75	19.10	25.40
DN 250	75	27.20	37.00
DN 300	100	27.30	37.60

For pipe sizes exceeding DN300, the use of MEPS, WPC or HTLP is recommended.
For small riser bends also CPSM tubular sleeves can be used.

For proper product installation, see latest installation instruction.

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www.tycoadhesives.com

Headquarters:
Tyco Adhesives
1400 Providence Hwy
Norwood, MA 02062 USA
Int'l Tel: +1 781 440-6161
US Toll Free: +1 800 248-0149
Fax: +1 781 440-6271
E-mail: CPG@tycoadhesives.com

In Europe, Middle East, Africa, Asia & Pacific:
Tyco Adhesives B.V.B.A.
Nieuwlandlaan B15
B-3200 Aarschot, Belgium
Tel: +32 16 55 36 00
Fax: +32 16 55 36 74
E-mail: CPGE@tycoadhesives.com

In the Americas:
Tyco Adhesives L.P.
1675 Suite C Brandywine Avenue
Chula Vista, CA 91911 USA
Tel Mexico: +52 (664) 623 30 70
Tel US: +1 (619) 4 24 42 59
Fax Mexico: +52 (664) 623 64 63
Fax US: +1 (619) 4 24 42 58
E-mail: CPGTJ@tycoadhesives.com

Local agent / Distributor:

DS-FLEX-REV-2-08/01