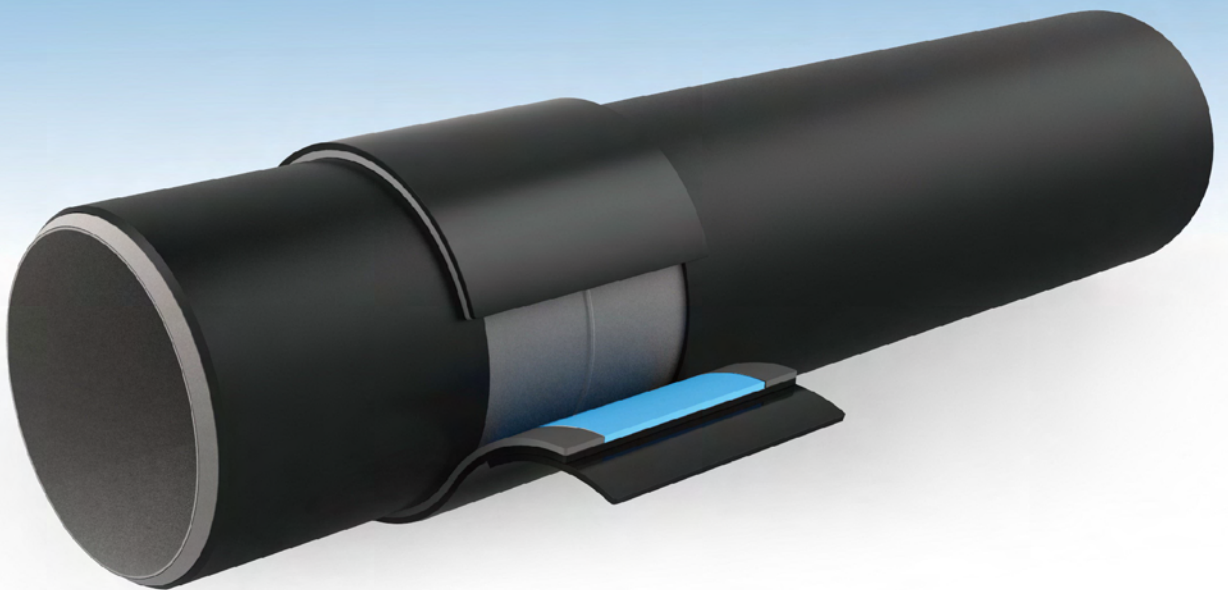


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CHERAY POLYMER

CORROSION PROTECTION

Product Manual (2014)



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CHERAY POLYMER,

Oil and Gas pipeline corrosion protection coating product and solution supplier
Professional team with more than 20 years experiences, focus on

- Corrosion protection field joint coating
- Factory coating
- Joint coating installation equipment and technology

Our Mission

- To contribute the best **SAFE** value to our customers and cooperation partner

Reference standards

- ISO/DIS-21809-3 (2011)
- DIN-EN12068 (1998)
- NACE RP0303 (2003)
- GB/T 23257 (2009)
- IGS-M-TP-014-3(1), IGS-M-TP-014-6(0) , IPS-M-TP-318
- 09-SAMSS-105



Product Overview

Product	Type	Feature	Factory coating	Max Operation Temp. °C	Min. Preheat Temp °C	
3LPE	HSS60 HSS80 HSS100	Long term corrosion protection; Corrosion protection in high operating temperature conditions and severe environments;	3LPE FBE	60 80 100	50 60 60	
	HSS60C HSS80C HSS100C	Excellent resistance to Cathodic disbondment; Resistance to moisture penetration and mechanical damage; Wet or dry epoxy application is optional; quick installation.		60 80 100	90 110 110	
	HRSS-DD	the best solution of Direct Drill joint coating		80	70	
3LPP	HSS100PP	Long term corrosion protection; Excellent resistance to Cathodic disbondment;	3LPP 3LPE FBE	110	140	
	HSS120PP	the best solution of joint coating for high operation temperature 3LPP pipe.	3LPP FBE TSA	125	160	
2LPE	3CS	Best resistance to cathodic disbondment, easy application, less heating, self-healing repair		80	40	
	HCS60 HCS80 HCS100	Best solution for joint coating without epoxy primer		60 80 100	80 120 120	
	HIS-50	Long term corrosion protection; Ultra-low temperature application environment in winter	3LPE FBE	60	40	
	HMS30 HMS65	Friendly installation, less heating	HDPUF AE	30 65	50 50	
	PE Repair Patch	CRP		100	100	
	Melt stick	MS	Hot melt adhesive for fill damage of coating		100	--
	Epoxy primer	CP-1 CP-2	high performance liquid epoxy coatings designed for the corrosion protection of buried pipelines, operating at temperatures up to 100°C can be used for new construction, including girth welds, bends, fittings etc.	3LPE FBE	80 80	50 100
CP-3			3LPP	120	100	

HSS 60/HSS80/HSS100 Heat Shrinkable Wrap-around Sleeve

3-layer Girth weld field joint coatings

Description

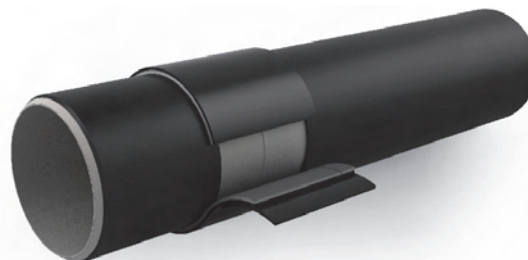
HSS60, HSS80, HSS100 Heat shrinkable wrap-around sleeve is designed for corrosion protection of girth weld joint buried steel pipeline, especially for 3PE/3PP/ FBE factory coating pipeline.

Construction: Three-layer system

First layer: Liquid epoxy primer CP-1, solvent-free two-component

Second layer: High shear strength hot-melt copolymer adhesive

Third layer: Radiation cross-linked, high density polyethylene backing, backing with **TIP** (Temperature Indicator Pattern) is optional.



Features & Benefits

- Excellent multifunctional adhesive allow for lower installation pre-heat temperature and super bonding to PE, PP and FBE, offer fully resistant to shear forces induced by soil and thermal movements.
- Superior cathodic disbondment and hot water immersion resistance offers the optimum barrier long term protection against corrosion.
- Saves time & cost by lower preheat temperature, wet epoxy primer application.
- Pattern backing provides a "heating temperature indicator" for application of heat, ensures correct application heating.

Application guide	HSS 60	HSS 80	HSS 100
Standard reference	EN 12068 Class C50 NACE RP0303 ISO/DIS 21809-3	EN 12068 Class C HT UV NACE RP0303 ISO/DIS 21809-3	EN 12068 Class C HT UV ISO/DIS 21809-3
Compatible line coatings	FBE, PE, PP	FBE, PE, PP	FBE, PE, PP
Soil stress restriction	None	None	None
Max operating temperature	60°C	80°C	100°C
Preheat temperature	50 - 70°C	60 - 80°C	60 - 80°C
Recommended pipe preparation	SA 2½ or ST 3.0	SA 2½	SA 2½

Ordering information

HSS type products are available: • as cut piece (pre-cut sleeve with separate 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. Sleeve width(mm): 18", 20", 24", 36" Other width (10"-36") are available, please note when make order.	Product thickness(mm)		
	Adhesive	Total thickness (as supplied)	Total thickness (recovered on pipe)
	1.0	1.8	2.0
	1.2	2.2	2.4
	1.5	2.5	2.8
	1.5	2.7	3.0
	1.7	3.2	3.5
Other sleeve thickness (1.4~3.5mm) are available, please note when make order.			

Standard Ordering options

Cut piece		* Roll form(closure patches to be ordered separately)	
Example:	HSS 60-24X18/2.5	Example	HSS 80-20x100f/2.7-RL
60	Operating temperature 60°C	80	Operating temperature 80°C
24	Outside pipe diameter in inch	100f	Roll length in feet
18	Sleeve width in inch	20	Roll width in inch
/2.5	Sleeve thickness in mm	2.7	Roll thickness in mm
		-RL	Supplied in rolls

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table.

For proper product installation, see installation instruction.

HSS type products are installed with CP-1 Epoxy primer, epoxy primers are ordered separately.

For more ordering information on epoxy primers see application tables.

Product properties:

Property	Test Method	Typical Value		
		HSS 60	HSS 80	HSS100
Backing				
Tensile strength	ASTM D-638	22MPa	22MPa	22MPa
Elongation	ASTM D-638	550%	550%	550%
Thermal ageing 150°C 21d elongation	ASTM D-638	460%	460%	460%
Hardness, Shore D	ASTM D-2240	54	54	54
Shrink force	ASTM D-638, 150°C	43psi	43psi	43psi
Dielectric voltage breakdown	ASTM D-149	30KV/mm	30KV/mm	30KV/mm
Moisture absorption	ASTM D-570	0.05%	0.05%	0.05%
Adhesive				
Softening point	ASTM E-28	102°C	122°C	146°C
Lap shear @23°C @Tmax	ASTM D-1002	1.3N/mm ² 0.1N/mm ²	1.5N/mm ² 0.1N/mm ²	1.5N/mm ² 0.1N/mm ²
Sleeve				
Peel to primer @23°C @Tmax	ASTM D-1000	120N/cm 15N/cm	120N/cm 8N/cm	80N/cm 8N/cm
Cathodic disbondment	ASTM G-42, 30 days ASTM G-8, 30 days	10mm @ 65°C 3mm @ 23°C	10mm @ 80°C 3mm @23°C	10mm @80°C 3mm @ 23°C
Hot water immersion	ASTM D-870, 120 days @Tmax	no delamination, no blisters or water ingress	no delamination, no blisters or water ingress	no delamination, no blisters or water ingress
Resistance to thermal ageing (100d/100°C) Peel strength layer to layer P ₁₀₀ /P _T Peel strength to pipe surface P ₁₀₀ /P _T	EN 12068, Class C 80	1.05 0.95	1.05 0.95	1.05 0.95
Low temperature flexibility	ASTM D-2671-C	-25°C	-25°C	-15°C
Impact resistance	EN 12068, class C	15J no holiday	15J no holiday	15J no holiday
Penetration resistance	EN 12068, Class C	no holidays @10KV >0.6mm @ 65°C	no holidays @10 KV >0.6mm @ 80°C	no holidays @10 KV >0.6mm @ 100°C

Service Life: More than 30 years

Normal Packing: Carton (Maximum 45kg)

Storage Condition:

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Shelf Life: 2 years, under correct storage condition.

HSS60C/HSS80C/HSS100C Dry film heat shrinkable wrap-around sleeve

Dry Epoxy Primer Film Application

Description

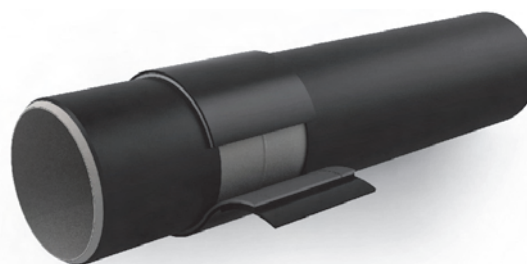
HSS 60C, HSS 80C Heat shrinkable wrap-around sleeve is designed for corrosion protection of girth weld joint buried and exposed steel pipes, especially for 3-layer coated oil and gas pipeline project need dry epoxy primer installation application.

Construction: Three-layer system

First layer: Cured epoxy primer CP-2, solvent-free two-component.

Second layer: High shear strength hot-melt copolymer adhesive.

Third layer: Radiation cross-linked, high density polyethylene backing, backing with **TIP** (Temperature Indicator Pattern) is optional.



Features & Benefits

- Excellent multifunctional adhesive allow for lower installation pre-heat temperature and super bonding to PE, PP, FBE, offer fully resistant to shear forces induced by soil and thermal movements.
- Superior cathodic disbondment and hot water immersion resistance offers the optimum barrier long term protection against corrosion.
- Dry epoxy primer application.
- Pattern backing provides a “heating temperature indicator” for application of heat, ensures correct application heating.

Application guide	HSS 60C	HSS 80C	HSS 100C
Performance	EN 12068 Class C50 NACE RP0303 ISO21809-3	EN 12068 Class C HT UV NACE RP0303 ISO21809-3	EN 12068 Class C HT UV ISO21809-3
Compatible mainline coatings	FBE, PE, PP	FBE, PE, PP	FBE, PE, PP
Soil stress restriction	None	None	None
Max operating temperature	60°C	80°C	100°C (212°F)
Preheat temperature	90°C ~ 120°C	110°C~ 130°C	110-130°C
Recommended pipe preparation	SA 2½ or ST 3.0	SA 2½	SA 2½

Ordering information

HSS type products are available: • as cut piece (pre-cut sleeve with separate 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. Sleeve width(mm): 18", 20", 24", 36" Other width (10"-36") are available, please note when make order.	Product thickness (mm)		
	Adhesive	Total thickness (as supplied)	Total thickness (recovered on pipe)
	1.0	1.8	2.0
	1.2	2.2	2.4
	1.5	2.5	2.8
	1.5	2.7	3.0
	1.7	3.2	3.5
Other sleeve thickness (1.4~3.5mm) are available, please note when make order.			

Standard Ordering Options

Cut piece		* Roll form(closure patches to be ordered separately)	
Example:	HSS 60C-24X18/2.5	Example	HSS 80C-20x100f/3.0-RL
60	Operating temperature 60°C	80C	Operating temperature 80°C, cured primer application
C	Cured primer application	100f	Roll length in feet
24	Outside pipe diameter in inch	20	Roll width in inch
18	Sleeve width in inch	3.0	Roll thickness in mm
/2.5	Sleeve thickness in mm	-RL	Supplied in rolls

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table.

For proper product installation, see installation instruction.

HSS60C type products are installed with CP-3 Epoxy primer, epoxy primers are ordered separately.

For more ordering information on epoxy primers see application tables.

Product properties:

Property	Test Method	Typical Value		
		HSS 60C	HSS 80C	HSS100C
Backing				
Tensile strength	ASTM D-638	22MPa	22MPa	22MPa
Elongation	ASTM D-638	550%	550%	550%
Thermal ageing 150°C 21d elongation	ASTM D-638	460%	460%	460%
Hardness, Shore D	ASTM D-2240	54	54	54
Shrink force	ASTM D-638, 150°C	43psi	43psi	43psi
Dielectric voltage breakdown	ASTM D-149	30KV/mm	30KV/mm	30KV/mm
Moisture absorption	ASTM D-570	0.05%	0.05%	0.05%
Adhesive				
Softening point	ASTM E-28	95°C	110°C	135°C
Lap shear @23°C @Tmax	ASTM D-1002	1.3N/mm ² 0.1N/mm ²	2.5N/mm ² 0.1N/mm ²	2.5N/mm ² 0.1N/mm ²
Sleeve				
Peel to primer @23°C @Tmax	ASTM D-1000	100N/cm 8N/cm	100N/cm 8N/cm	80N/cm 8N/cm
Cathodic disbondment	ASTM G-42, 30 days ASTM G-8, 30 days	10mm @ 65°C 3mm @ 23°C	10mm @ 80°C 3mm @ 23°C	10mm @ 80°C 3mm @ 23°C
Hot water immersion	ASTM D-870, 120 days @Tmax	no delamination, no blisters or water ingress	no delamination, no blisters or water ingress	no delamination, no blisters or water ingress
Resistance to thermal ageing (100d/100°C) Peel strength layer to layer P ₁₀₀ /P _T Peel strength to pipe surface P ₁₀₀ /P _T	EN 12068, Class C 80	1.05 0.95	1.05 0.95	1.05 0.95
Low temperature flexibility	ASTM D-2671-C	-35°C	-35°C	-35°C
Impact resistance	EN 12068, class C	15J no holiday	15J no holiday	15J no holiday
Penetration resistance	EN 12068, Class C	no holidays @10KV >0.6mm @ 65°C	no holidays @10 KV >0.6mm @ 80°C	no holidays @10 KV >0.6mm @ 100°C

Service Life: More than 30 years

Normal Packing: Carton (Maximum 45kg)

Storage Condition:

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Shelf Life: 2 years, under correct storage condition.

HSS100PP /HSS120PP Heat Shrinkable Wrap-around Sleeve

Girth weld field joint coatings for 3-layer PP coated pipes

Description

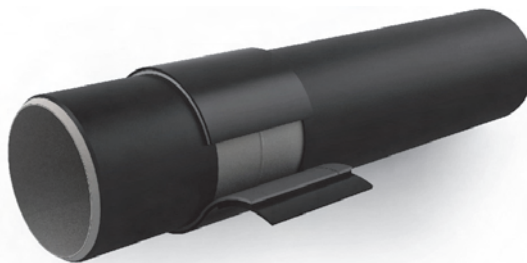
HSS100PP, HSS120PP Heat shrinkable wrap-around sleeve 3-layer system is engineered for special need of corrosion protection for high operation temperature pipeline joints. Once installed, the system effectively bonds and protects steel substrates and common main line pipe with coatings such as PP or other coatings. Especially applied for rapid installation requirement under higher stress conditions caused by elevated temperatures.

Construction: Tri-layer system

First layer: FBE or CP-3 epoxy primer (sleeve installed after epoxy primer cured)

Second layer: High copolymer hot-melt adhesive

Third layer: Radiation cross-linked polypropylene backing



Features & Benefits

- Excellent multifunctional adhesive allow for lower installation pre-heat temperature and super bonding to coating.
- Superior cathodic disbondment and hot water immersion resistance offers the optimum barrier long term protection against corrosion.
- Easy field installation, saves time & cost, HSS 100PP/HSS120PP can be installed quickly and easily in most environments
- Covers wide range of operating temperature ratings, offers a solution for nearly every application.

Application guide	HSS 100PP	HSS120PP
Performance	DIN 30678 DIN-EN12068 ISO/DIS 21809-3	DIN 30678 DIN-EN12068 ISO/DIS 21809-3
Compatible line coatings	FBE, PP, PE	FBE, PP,
Soil stress restrictions	None	None
Max operating temperature	100°C	120°C
Min preheat temperature	140°C	160°C
Recommended pipe preparation	SA 2½	SA 2½

Ordering information

HSS type products are available:

- as cut piece (pre-cut sleeve with separate 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.

Product recommend thickness(mm): 1.8, 2.2, 2.5, 3.0

Other product thickness (1.6~3.5mm) are available, please note when make order.

Product recommend width(inch): 18", 20", 24", 34"

Other product width (12"~34") are available, please note when make order.

Standard Ordering Options

Pre-cut piece in joint		* Roll form (closure patches to be ordered separately)	
Example:	HSS 100PP-24X18/2.5	Example	HSS 120PP-20x100f/2.2-RL
100	Operating temperature 100°C	120PP	Operating temperature 120°C, Polypropylene backing
PP	Polypropylene backing	100f	Roll length in feet
24	Outside pipe diameter in inch	20	Roll width in inch
18	Sleeve width in inch	2.2	Roll thickness in mm
/2.5	Sleeve thickness in mm	-RL	Supplied in rolls

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table. For proper product installation, see installation instruction.

Product properties:

Property	Test Method	Typical Value	
		HSS100PP	HSS120PP
Backing			
Tensile strength	ASTM D-638	26Mpa	26Mpa
Elongation	ASTM D-638	500%	500%
Hardness, Shore D	ASTM D-2240	60	60
Adhesive			
Softening point	ASTM E-28	135°C	160°C
Lap shear strength @23°C @Tmax	ISO21809-3 annex L, @ 10 mm/min.	4.5N/mm2 0.5 N/mm2	4.5N/mm2 0.5 N/mm2
Sleeve installation system			
Peel strength to primer @23°C @Tmax	ISO/DIS 21809-3 annex D	100N/cm 20N/cm	100N/cm 20N/cm
To factory coating @23°C @Tmax		100N/cm 20N/cm	100N/cm 20N/cm
Cathodic disbondment 28days @23°C @95°C	ISO/DIS 21809-3 annex F	6mm 18mm	6mm 18mm
Impact resistance (holiday detection 5kv +5kv/mm)	ISO/DIS 21809-3 annex G	10 J/mm	10 J/mm
Thermal ageing resistance (aged @105°C)			
Elongation at break E_{100}/E_0	ISO/DIS 21809-3 annex N	≥0.85	≥0.85
Peel strength to pipe surface P_{100}/P_0		≥0.85	≥0.85

Service Life: More than 30 years

Normal Packing: Carton (Maximum 45kg)

Storage Condition:

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Shelf Life: 2 years, under correct storage condition.

HRSS-DD Direct Drill Heat Shrinkable Wrap-around Sleeve

High performance fiberglass reinforced coating protection sleeve

Description

HRSS-DD is designed for girth weld joint corrosion protection on pipe used in directional drilling application or offshore towing pipe outer coating protection.

Construction: Three-layer system

- First layer:** Liquid epoxy primer CP-1, solvent-free two-component.
- Second layer:** High shear strength hot-melt copolymer adhesive.
- Third layer:** High performance fiberglass reinforced radiation cross-linked polyethylene backing, backing with **TIP** (Temperature Indicator Pattern) is optional.



Features & Benefits

- HRSS has excellent resistance to shear and peel force after installed and offers abrasion and wear resistance at pull through application. Simultaneously HRSS has excellent anti-corrosion performance and easy installation, it could be installed cover wet epoxy primer instead of dry epoxy primer coating.

Application guide

Ordering guide

Performance	EN 12068 Class C	HRSS Heat shrinkable direct drill wrap around sleeve, could be ordered bulk rolls or in kit	
Compatible line coatings	FBE, PE, PP	Example:	HRSS 20"×2.5(15)
Soil stress restriction	None	HRSS-DD	Heat shrinkable direct drill wrap around sleeve
Max operating temperature	80°C (176°F)	20"	Sleeve width, inch
Min preheat temperature	70°C (158°F)	2.5	Sleeve thickness, mm
Recommended pipe preparation	SA 2½ or ST 3.0	(15)	Sleeve length 15m(roll)

Specification

All specification of HRSS is in accordance with difference pipeline diameter with outer corrosion protection. Backing thickness is 1.5mm and adhesive thickness is 1.0mm. If need, other specification is available, please make note in the order.

Product properties:

Property	Test Method	Typical Value HRSS-DD
Backing		
Bursting strength	DIN 30672	2400N
Adhesive		
Softening point	ASTM E-28	122°C
Lap shear	EN 12068	3N/mm ²
Sleeve		
Peel strength to primer @23°C	ASTM D1000	85N/cm
to factory coating @23°C		85N/cm
Cathodic disbondment	EN12068 30 days@65°C	8mm

Service Life: More than 30 years

Normal Packing: Carton (Maximum 45kg)

Storage Condition:

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Shelf life: 2 years, under correct storage condition.

CP Series Epoxy Primer & Applicator kit

Description

CP series Epoxy primer is specially formulated 100% volume solids (free-solvent) 2 component epoxy, designed for corrosion protection of steel pipeline. CP series epoxy primer provides excellent anticorrosion properties to resist cathodic disbondment, impact and abrasion of sand and stone.

CP series epoxy primer also show excellent electric insulation properties during pipeline running in various environments and can be used independently with durable protection against various chemical attacks, also can be used with heat shrinkable sleeve to provide last protection of metal pipeline.

CP series epoxy primer can be coated by paintbrush, applicator pad and epoxy primer pump.



Application guide

Recommended use:

As an epoxy primer in a 3 layer polyethylene coating system for superior corrosion protection of field welded joints of steel pipes. The CP series Epoxy primer needs to be applied onto the steel surface and onto the line coating if need, when this line coating is PE, PP, FBE or CTE. CP series epoxy primer include:

- CP-1 used for HSS60/80/100, wet application;
- CP-2 used for HSS60C/80C/100C, cured application;
- CP-3 used for HSS100PP/120PP, cured application.

Application

1. Prepare the pipe surface as recommended in the product application guide
2. Pour curing agent into base as per mixing ratio. Stir the mixture for approximately 1 minute to ensure a homogeneous mixture.
3. Carefully apply mixed epoxy primer as indicated in the product application guide.

Properties		CP-1	CP-2	CP-3
color		black	black	black
Solid content		100%	100%	100%
density	Part A	1.27	1.27	1.27
	Part B	1.00	1.00	1.00
Surface Cured time	@23°C	8hr	4hr	1.5hr
	@70°C	35min	20min	20min
	@120°C	10min	5min	5min
Primer maximum thickness by one times paint		120μ	120μ	100μ
Pot life	@23°C	35min	20min	15min
	@40°C	15min	10min	10min
Shelf life		2yrs	2yrs	2yrs
Flash point	Part A	145°C	145°C	145°C
	Part B	118°C	118°C	118°C

Ordering information:

Epoxy primer kit : CP-1-KIT-150-0.75sqm

This kit includes measured quantities of Epoxy resin and Curing agent, a stirring stick, applicator pad.

This kit contains sufficient primer for 0.75sqm of coverage.

Bulk Epoxy:

Epoxy : CP-1-PART-A-18L-25KG

Curing agent: CP-1-PART-B-18L-19KG

Always order in multiples of 2 pails of part A by 1 pail of part B

For accessories to apply epoxy primer see Application table.



3C Dual-Adhesive Heat Shrinkable Wraparound Sleeve

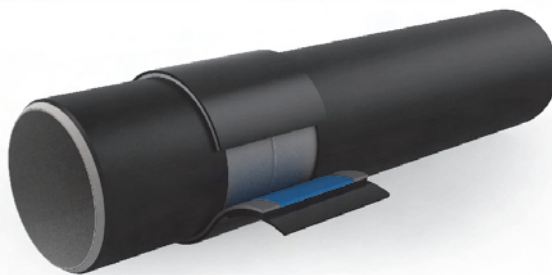
Viscoelastic-mastic adhesive composite configuration coating for field girth weld joint

3C Heat Shrinkable Wraparound Sleeve

(*Viscoelastic-Mastic Composite Configuration Coating Sleeve, 3CS*), is the latest product specially designed and developed by Cheray Polymer Co., aim at pipeline field joint corrosion protection technology trend and client actual requirement. It completely solves various application defect of common heat shrinkable wraparound sleeve, such as complicated installation technological requirements, longer installation time, unstable manual installation quality and unsatisfied corrosion protection long term performance. 3CS has excellent competitive advantage as follow:

installation technological is simple and quick; easy learn and operate; much save construction and maintenance cost; excellent corrosion protection long term performance. It is the perfect solution of field joint corrosion protection.

3C Heat shrinkable wraparound sleeve is compatible to girth weld field joint coatings such PE, PP, FBE and PU, also for pipe bend, pipe elbow, fitting and coating repairing.



Configuration:

3C Dual-Adhesive Heat Shrinkable Wraparound Sleeve is composited adhesive configuration with 2 layers:

Layer 1: Viscoelastic adhesive and mastic adhesive composite configuration. Viscoelastic adhesive coated on the central part of sleeve, mastic adhesive coated on the two side parts like a belt along the sleeve radial direction, two type of adhesive seamless connect.

Layer 2: Radiation cross-linked high density polyethylene.

Installation feature:

- Steel pipeline surface preparation just meet ST2.0~3.0, get rid of humidity absorbed water on steel surface is enough;
- No need coat epoxy primer;
- Closure patch is pre-installed, save time;
- Installation process is same with common heat shrinkable sleeve, post heating is not necessary after shrunk;
- Installation can be done under ambient temperature -40°C.

Benefit:

After installation, the 3C heat shrinkable sleeve form complete sealing and corrosion protection integrated system:

- Central Visco-elastic adhesive never dried, cover the welded steel surface and overlap adjacent part to seal and construct the effective corrosion protection;
- Mastic adhesive covered on both sides of pipeline coating such as PE, FBE, to be the sticky and sealing corrosion to proof water and other corrosive into the steel surface. Meanwhile, high-performance mastic adhesive supply the coating with excellent property such as lap shear strength and peel strength.
- Radiation cross-linked polyethylene backing constructs the strong outside protection from the mechanical damage.
- The whole coating system is anti-puncture & self-healing, ignore the damage of cathodic disbondment in service life.

Shelf life:

2 years, under correct storage condition

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Application Guide	3C Heat Shrinkable Sleeve
Performance Standard	ISO/DIS 21809-3
Compatible mainline coatings	PE, PP, FBE, PU
Soil stress restrictions	None
Max operating temperature	80°C
Environment temperature range	-40°C ~60°C

Specification	Order Information
Backing thickness mm 1.0, 1.2, 1.5	Example: 3CS-550/2.5
Adhesive thickness mm 0.8, 1.0, 1.5, 2.0	3CS - 3C Heat shrinkable wrap-around sleeve
Sleeve width mm 450, 500, 550, 600	550 - Sleeve width, mm
Pipe diameter DN80- DN1200	2.5 - Sleeve total thickness, mm
width 400~750mm are available, please note when make order.	Closure patch is pre-attached.

Properties

Property	Test method	3CS Typical Value
PE Backing		
Tensile strength	ASTM D638	22Mpa
Elongation at Break	ASTM D638	550%
Dielectric strength	ASTM D149	30MV/m
Volume resistivity	ASTM D257	1.0×10 ¹³ Ω·m
Heat shock (225°C,4hrs)	ASTM D2671	No cracking, flow, or dripping
Thermal ageing (150°C,21d)	ASTM D638	
Tensile strength		17 Mpa
Elongation at break		400%
Visco-elastic Adhesive		
Low temperature Flexibility	ASTM D2671	<-40°C
Peel strength		
to Steel @23°C	ISO 21809-3	2 N/cm (100% cover steel surface)
to Steel @-45°C	Annex D	50 N/cm
Impact resistance	ISO 21809-3 Annex G	5J/mm
Cathodic disbondment resistance	ISO 21809-3	2mm
@65°C , 28d,	Annex F	
Mastic adhesive		
Low temperature Flexibility	ASTM D2671	<-40°C
Lap shear strength		
@23°C	ISO 21809-3	0.15MPa
@60°C	Annex L	0.04MPa
Peel strength	ISO 21809-3	22N/cm
@23°C To factory coating	Annex D	
Impact resistance @23°C	ISO 21809-3 Annex G	10J/mm
Peel Strength after Thermal ageing: Tmax+20°C		
@23°C to PE P ₁₀₀ /P ₀	ISO 21809-3	0.92
P ₁₀₀ /P ₇₀	annex N	0.90

HCS 60 /HCS80 /HCS100 Offshore Heat Shrinkable Sleeve

2-layer Girth weld field joint coatings

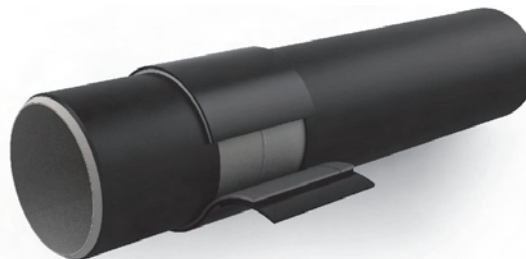
Description

HCS 60 /HCS80 /HCS100 Offshore heat shrinkable sleeve 2-layer system are engineered for special need of corrosion protection for offshore and submarine steel pipeline joints. Once installed, the system effectively bonds and protects steel substrates and common main line pipe with coatings such as AE, Coal tar, FBE, PE, PP and TSA. Especially applied for rapid installation requirement under higher stress conditions caused by elevated temperatures.

Construction: Two-layer system

First layer: Hot-melt adhesive

Second layer: Radiation cross-linked, high density polyethylene backing with *TIP* (Temperature Indicator Pattern)



Features & Benefits

- Excellent multifunctional adhesive allow for lower installation pre-heat temperature and super bonding to coating, offer fully resistant to shear forces induced by tide and thermal movements.
- Superior cathodic disbondment and hot water immersion resistance offers the optimum barrier long term protection against corrosion.
- Easy field installation, saves time & cost, HCS can be installed quickly and easily in most environments.
- Pattern backing provides a “heating temperature indicator” for application of heat. Ensures correct application heating.
- Covers wide range of operating temperature ratings, offers a solution for nearly every application.

Application guide	HCS 60	HCS 80	HCS 100
Performance	EN 12068 Class C50	EN 12068 Class C HT	EN 12068 Class C HT
Compatible line coatings	FBE, AE*, Coal Tar, HDPUF*, PE	FBE, AE*, Coal Tar, PE, PP, TSA*	FBE, AE*, Coal Tar, PE, PP, TSA*
Soil stress restriction	None	None	None
Max operating temperature	65°C	80°C	100°C
Min preheat temperature	80°C	120°C	120°C
Recommended pipe preparation	SA2.5	SA2.5	SA2.5
	AE=Asphalt Enamel	TSA=Thermal Sprayed Aluminum	HDPUF=High Density Polyurethane Foam

Ordering information

HCS type products are available:

- as cut piece (pre-cut sleeve with separate 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.

Product recommend thickness(mm): 1.8, 2.2, 2.5

Other product thickness (1.6~2.5mm) are available, please note when make order.

Product recommend width(inch): 18", 20", 24", 34"

Other product width (12"~34") are available, please note when make order.

Standard Ordering Options

Cut piece		* Roll form(closure patches to be ordered separately)	
Example:	HCS 60-24X18/2.5	Example	HCS 100-20x100f/2.2-RL
60	Operating temperature 65°C (140°F)	100	Operating temperature 100°C (212°F)
24	Outside pipe diameter in inch	100f	Roll length in feet
18	Sleeve width in inch	20"	Roll width in inch
/2.5	Sleeve thickness in mm	2.2	Roll thickness in mm
		-RL	Supplied in rolls

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table. For proper product installation, see installation instruction.

Product properties:

Property	Test Method	Typical Value		
		HCS 60	HCS 80	HCS 100
Backing				
Tensile strength	ASTM D-638	22MPa	22MPa	22MPa
Elongation	ASTM D-638	550%	550%	550%
Hardness, Shore D	ASTM D-2240	52	52	52
Dielectric strength at 23°C	ASTM D-149	30KV/mm	30KV/mm	30KV/mm
Moisture absorption	ASTM D-570	0.05%	0.05%	0.05%
Adhesive				
Softening point	ASTM E-28	102°C	120°C	146°C
Lap shear	ASTM D-1002	2.30N/mm ²	2.8N/mm ²	2.8N/mm ²
Sleeve				
Peel strength				
to Steel @23°C	ASTM D-1000	85N/cm	80N/cm	80N/cm
@T _{max}		12N/cm	8N/cm	8N/cm
to PE @23°C		80N/cm	80N/cm	80N/cm
@T _{max}		12N/cm	10N/cm	10N/cm
Cathodic disbondment	ASTM G-42, 30days @23°C _{max}	8mm	8mm	8mm
Hot water immersion	ASTM D-870, 120 days @ T _{max}	no delamination, no blisters or water ingress	no delamination, no blisters or water ingress	no delamination, no blisters or water ingress
Resistance to thermal ageing (100d/100°C)	EN 12068			
Elongation at break E ₁₀₀ /E ₇₀		1.08	1.08	1.08
Low temperature flexibility	ASTM D-2671-C	-25°C	-25°C	-15°C
Impact resistance	EN 12068, class C	>15J no holiday	>15J no holiday	>15J no holiday
Penetration resistance	ASTM G-17, EN 12068, Class C	no holidays @10KV >0.6mm @ 65°C	no holidays @10 KV >0.6mm @ 80°C	no holidays @10 KV >0.6mm @ 80°C

Service Life: More than 30 years

Normal Packing: Carton (Maximum 45kg).

Storage Condition:

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Shelf Life: 2 years, under correct storage condition.

HMS 30/65 Mastic Heat Shrinkable Sleeve

2-layer Girth weld field joint coatings

Description

HMS 30/65 Mastic heat shrinkable sleeve 2-layer system are engineered for ready-to-fit assembly for the corrosion protection of field girth weld joints in water supply or gas distribution and transmission networks, especially for use in low & middle shear or low stress environments in moderate climates.

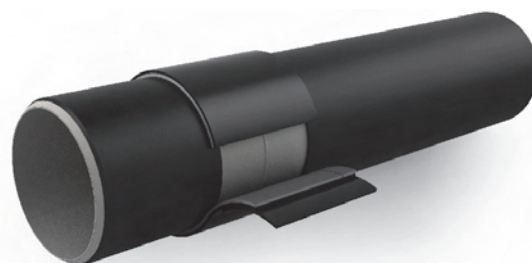
Construction: Two-layer system

First layer: Low preheat viscoelastic mastic sealant (**HMS 30**)
 Low preheat middle shear strength half-rigid mastic sealant (**HMS 65**)

Second layer: Radiation cross-linked, high density polyethylene backing with **TIP** (Temperature Indicator Pattern)

HMS is compatible with standard pipe coatings, can also be used for coating bare, replacement pipe sections and large radius bends. The system is designed to be applied with minimum preheating and is ideal for large diameter water pipe.

(Above pipe diameter DN750 (30") in high shear and high stress environments, the use of HCS 65, HSS 60/80 is recommended).



Features & Benefits

- Excellent mastic adhesive allow for lower installation pre-heat temperature and super bonding to coating, offer fully resistant to shear forces induced by soil and thermal movements.
- Superior cathodic disbondment and offers the optimum barrier long term protection against corrosion.
- Easy field installation, saves time & cost, HMS can be installed quickly and easily in most environments.
- Pattern backing provides a "heating temperature indicator" for application of heat. Ensures correct application heating.
- Covers a wide range of operating temperature ratings from -25°C to 65°C, offers a solution for nearly every application.

Application guide	HMS 30	HMS 65	Product thickness		
			Pipeline diameter (inch)	Mastic sealant (mm)	Total thickness as supplied (mm)
Performance	EN 12068 Class C30 ISO21809-3	EN 12068 Class C50 ISO21809-3			
Compatible line coatings	PE, FBE, Coal Tar, AE	PE, FBE, Coal Tar, AE	3-10	0.8	1.8
Soil stress restriction	None	None	12-30	1.2	2.2
Max operating temperature	30°C (86°F)	65°C (149°F)	Above pipe diameter DN750 (30") in high shear and high stress environments, the use of HCS 65, HSS 60/80 is recommended.		
Min preheat temperature	50°C (122°F)	50°C (140°F)			
Recommended pipe preparation	St 2.0 ~ St 3.0	St2.0 ~ St3.0			

Standard ordering options

Cut piece		* Roll form(closure patches to be ordered separately)	
Example:	HMS 30-12X18/1.8	Example	HMS 65-20x100f/2.2-RL
30	Operating temperature 30°C	65	Operating temperature 65°C
12	Outside pipe diameter in inch	100f	Roll length in feet
18	Sleeve width in inch	20	Roll width in inch
/1.8	Sleeve thickness in mm	2.2	Roll thickness in mm
		-RL	Supplied in rolls

Sleeve cut lengths and appropriate closure patch widths depend on the pipe size and product construction, see application table. For proper product installation, see installation instruction.

Product properties:

Property	Test Method	Typical Value HMS 30	Typical Value HMS 65
Backing			
Tensile strength	ASTM D-638	22MPa	22MPa
Elongation	ASTM D-638	550%	550%
Thermal ageing 150°C 21d elongation	ASTM D-638	460%	460%
Hardness, Shore D	ASTM D-2240	54	54
Shrink force	ASTM D-638, 150°C	43psi	43psi
Dielectric voltage breakdown	ASTM D-149	30KV/mm	30KV/mm
Moisture absorption	ASTM D-570	0.05%	0.05%
Adhesive			
Softening point	ASTM E-28	95°C	115°C
Lap shear @23°C	ASTM D-1002	0.3N/mm ²	0.3N/mm ²
@T _{max}		0.1N/mm ²	0.05N/mm ²
Sleeve			
Peel strength to Steel @23°C to PE @23°C	ASTM D-1000	75N/cm 75N/cm	90N/cm 90N/cm
Cathodic disbondment	EN12068 30days	8mm @23°C	8mm @65°C (149°F)
Hot water immersion	ASTM D-870, 120 days @T _{max}	no delamination, no blisters, or water ingress	no delamination, no blisters, or water ingress
Low temperature flexibility	ASTM D-2671-C	-25°C	-25°C
Impact resistance	EN 12068, class C	15J no holiday	15J no holiday
Penetration resistance	EN 12068, Class C	no holidays @10KV >0.6mm	no holidays @10KV >0.6mm

Service Life: More than 30 years

Normal Packing: Carton (Maximum 45kg).

Storage Condition:

- To ensure maximum performance, store CHERAY POLYMER products in a dry, ventilated area.
- Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements.
- Avoid prolonged storage at temperatures above 40°C or below -20°C.
- Product installation should be done in accordance with local health and safety regulations.

Shelf Life: 2 years, under correct storage condition.

HIS-50 Ultra-low temperature super-tough heat shrinkable sleeve

2PE insulation pipeline joint coating & mainline coating

Description

HIS-50 Ultra-low temperature Heat Shrinkable wraparound Sleeve is designed 2-layer joint coating for corrosion protection of girth weld joint buried and exposed insulation steel pipes, it is combined with radiation cross-linked high strength super-tough polyethylene backing and special type of rubber adhesive with endure high temperature and ultra-low temperature feature, HIS-50 can be constructed under ambient temperature low to -50°C.

When installing the HIS-50, use propane torch flame simply remove moisture on the surface of insulation layer or outside coating, wrap HIS-50 heat shrinkable sleeve on the insulation pipe, ensure the overlap width is more than 100mm between sleeve and coating. Uniformly heat HIS-50 by torch, the sleeve uniform shrunk on radial direction by heating, at the same time, special adhesive layer melt, uniformly cover and fill the surface of pipeline. After cooling to ambient temperature, cross-linked high strength super-tough polyethylene backing form a outside shield to resist the mechanical damage and moisture immerse, special adhesive layer can form strong physical bonding with PE backing and insulation coating, build a continue ,tight waterproof and anti-corrosion system, it effectively resist soil stress, water pressure, chemical corrosion and mold erosion. HIS-50 is applied for field girth weld joint coating for insulation pipeline with PE factory coating, the whole insulation pipeline outside coating and outside coating repairing, it can be used one joint overlap another joint to continuously protect the whole pipe.



Construction: Two-layer system

First layer: Endure High & Ultra-low temperature rubber elastic sealant

Second layer: Radiation cross-linked, high strength super tough polyethylene backing with **TIP** (Temperature Indicator Pattern)

Application guide	HIS-50	Ordering information	
Performance	EN12068	HIS-50 apply for 2PE insulation pipeline joint coating & mainline coating, normal specification is as follow, Example: HIS-50—500 -2.5(15)	
Compatible line coatings	PE, PP	Backing thickness mm	1.0, 1.2, 1.5 HIS-50 -sleeve can be constructed in -50°C ambient temperature
Soil stress restrictions	None	Adhesive thickness mm	0.8, 1.0, 1.5, 2.0 500 - sleeve width, mm
Max operating temperature	100°C	Sleeve width mm	500, 550, 600, 800 2.5 - sleeve total thickness, mm
Environment temperature range	-50°C ~70°C	pipe diameter	DN300-DN2200 Closure patch is included

Product properties

Property	Test method	Typical Value HIS-50
Backing		
Tensile strength	ASTM D-638	22MPa
Elongation	ASTM D-638	500%
Thermal ageing 150°C 21d elongation	ASTM D-638	400%
Hardness, Shore D	ASTM D-2240	52
Shrink force	ASTM D-638, 150°C	43psi
Dielectric voltage breakdown	ASTM D-149	28KV/mm
Moisture absorption	ASTM D-570	0.05%
Adhesive		
Softening point	ASTM E-28	142°C
Lap shear	ASTM D-1002	1.0N/mm ²
Sleeve		
Peel to PE coating	ASTM D-1000	75N/cm
Hot water immersion	ASTM D-870, 120 days @50°C	no delamination, no blisters or water ingress
Low temperature flexibility	ASTM D-2671-C	-45°C
Impact resistance	EN 12068, class C	15J no holiday

CRP Repair Patch, Melting Stick, Mastic Sealant Filler

Steel Pipeline factory Coating Repair Materials

Description

CRP is specifically designed for seal and protection of damaged pipeline or filling damaged hole (voids) of coating pipeline. CRP consists of repair patch, Melting Stick and mastic sealant filler.



CRP Repair patch Construction: 2-layer

First layer: Copolymer hot melting adhesive

Second layer: Radiation-cross-linked, high density polyethylene (unexpanded)

Melting Stick is made of hot melt adhesive same with first layer of CRP

In general, CRP is available for repairing damage less than 150mm×150mm in size.

If damaged area of coating pipeline is larger than 150mm×150mm, Heat shrinkable wraparound sleeve (or HWT wraparound tape) is recommended.

Installation is done with gas torches. To repair a damaged area, installers round out, roughen, clean and preheat the area and apply the HMAS to fill up the holiday. CRP, cut to size, is positioned onto the treated area and heated. During heating, the adhesive softens and flows to form a tight bond with the backing. The bond strength builds up during cool-down and is fully retained after repairing completion.

Features & Benefits

CRP provides excellent abrasion resistance, inert to acids and alkalis and solvents, moisture and corrosion resistance. The hot melting adhesive stick is supplied as rods for sealing or repairing smaller damage hole or crack (up to 10mm×10mm), which provides excellent adhesion (to PE, FBE and steel) and moisture resistance.

Application guide	CRP	Melt Stick	Mastic Sealant filler
Performance	EN 12068 Class C, HT UV	EN 12068 Class C, HT UV	EN 12068 Class C, HT UV
Compatible line coatings	PE, FBE, Coal Tar	PE, FBE, Coal Tar	PE, FBE, Coal Tar
Soil stress restriction	None	None	None
Max operating temperature	80°C (176°F)	80°C (176°F)	80°C (176°F)
Min preheat temperature	70°C (158°F)	70°C (158°F)	70°C (158°F)

Specification

Standard Ordering Options

The following specifications are available:		Example:	CRP 150×150-2.2 HMAS 20/250
Thickness mm	1.8, 2.2, 2.5	CRP	Coating repair patch for protection corrosion of damage pipeline
Patch width(piece) mm	100, 150, 200, 250	150×150	The size of CRP, mm×mm
Patch length(piece) mm	100, 150, 200, 250	2.2	CRP thickness, mm
Hot melting adhesive stick	Diameter 20mm, length 250mm	HMAS	Hot melting adhesive stick
	or Diameter 25mm, length 300mm	20/250	Stick diameter 20mm, length 250mm
CRP could also be ordered in bulk roll			

Product properties:

Property	Test Method	Typical Value CRP
Backing		
Tensile strength	ASTM D-638	22MPa
Elongation	ASTM D-638	550%
Hardness, Shore D	ASTM D-2240	54
Dielectric strength at 23°C	ASTM D-149	30KV/mm
Moisture absorption	ASTM D-570	0.05%
Patch Adhesive and Melt stick		
Softening point	ASTM E-28	122°C
Lap shear	ASTM D-1002	1.5N/mm ²
Peel strength to PE @23°C	ASTM D-1000	60N/cm



CERT

DVGW type examination certificate
DVGW-Baumusterprüfzertifikat

DV-5180BT0507

Registration Number
 Registriernummer

Field of Application <i>Anwendungsbereich</i>	products of gas and water supply <i>Produkte der Gas- und Wasserversorgung</i>
Owner of Certificate <i>Zertifikatinhaber</i>	CHERAY POLYMER CO. Mingyang Rd, Beiqiao Hope IZ, CN-215144 Xiangcheng District, Suzhou
Distributor <i>Vertreiber</i>	CHERAY POLYMER CO. Mingyang Rd, Beiqiao Hope IZ, CN-215144 Xiangcheng District, Suzhou
Product Category <i>Produktart</i>	greasing and sealing materials: Protection tape against corrosion (5180)
Product Description <i>Produktbezeichnung</i>	heat shrinkable wraparound sleeve
Model <i>Modell</i>	HSS 80
Test Reports <i>Prüfberichte</i>	laboratory control test: 13/302/5180/01 from 19.11.2013 (EBI)
Test Basis <i>Prüfgrundlagen</i>	DIN EN 12068 (01.03.1999)

70028-04-A-02E

Date of Expiry / File No. 13.11.2018 / 14-0100-GNV
Ablaufdatum / Aktenzeichen

14.02.2014 Fi A-1/2

Date, Issued by, Sheet, Head of Certification Body
 Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle

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QUALITY MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 00113Q213754R0M/3200

We hereby certify that
Cheray Polymer Co.

No.15,Mingyang Road,Beiqiao Hope Industrial Zone,Suzhou City,Jiangsu
Province,P.R.China

by reason of its
Quality Management System
has been awarded this certificate for compliance with the standard
ISO9001: 2008
GB/T 19001-2008

The Quality Management System Applies in the following area:
**Research & Development and Production of Heat Shrinkable Sleeve for Pipeline Joint
Corrosion Protection**

Certified since: Dec. 26, 2013 Valid from: Dec. 26, 2013 Valid until: Dec. 25, 2016

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC.
Please access www.cqc.com.cn for checking validity of the certificate.



Signed by: Wang Kejiao



CHINA QUALITY CERTIFICATION CENTRE

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<http://www.cqc.com.cn>

INGEER CERTIFICATION ASSESSMENT SERVICE



CERTIFICATE OF REGISTRATION

Certificate No.: 117 13 E1 0749 R1S

This is to certify the environmental management systems of

Cheray Polymer Co.

Registered Address **Beiqiao Hope Industrial Zone, Xiangcheng District, Suzhou, Jiangsu Province, China**

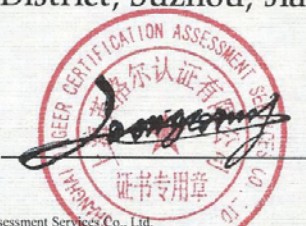
Auditing Address **No. 15 Mingyang Road, Beiqiao Hope Industrial Zone, Xiangcheng District, Suzhou, Jiangsu Province, China**

has been assessed and registered as meeting the requirements of **GB/T24001-2004/ISO14001:2004**

Scope of approval

The Related Environmental Management Activities of Manufacture of Polymer Composite Materials for Pipeline Anti-corrosion Protection for Cheray Polymer Co. Located in No. 15 Mingyang Road, Beiqiao Hope Industrial Zone, Xiangcheng District, Suzhou, Jiangsu Province, China

Signed by:



Approval Date: 07 Nov. 2013
Expiry Date: 06 Nov. 2016

Shanghai Ingeer Certification Assessment Services Co., Ltd.
Certification and Accreditation Administration of P.R.C. CNCA-R-2003-117
China National Accreditation Service for Conformity Assessment: CNAS C117-E
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ISO14001 Management System CNAS C117-E

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First Surveillance Audit Second Surveillance Audit Third Surveillance Audit

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CHERAY POLYMER

Pipeline Corrosion Protection Coatings

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