

Smart[®] Products

Product Range – April 2016

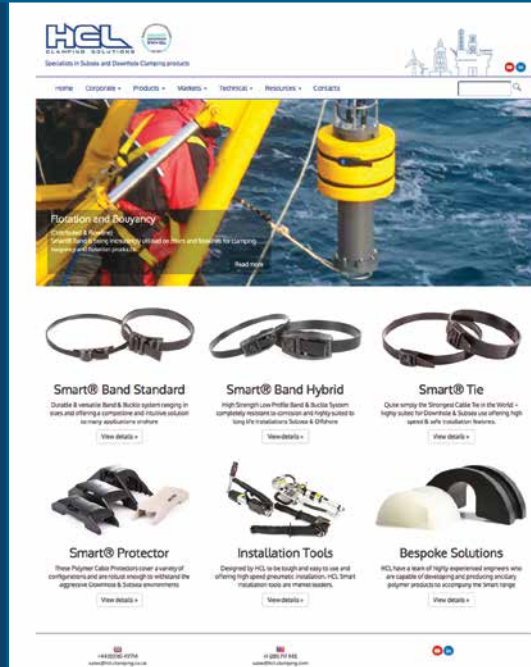


- *Smart[®] Band Standard*
- *Smart[®] Band Hybrid*
- *Smart[®] Tie*
- *Smart[®] Protector*
- *Smart[®] Installation Tools*

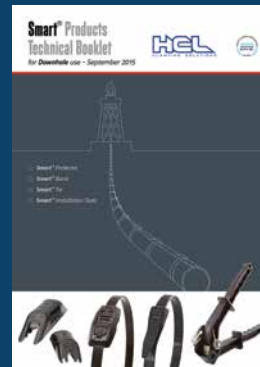


Smart[®] Product Literature

All HCL Smart[®] Product Literature can be downloaded from our website:
www.hclfasteners.com



Smart[®] Band & Smart[®] Tie Technical Booklet



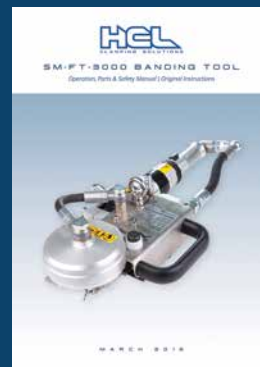
Smart[®] Downhole Product Technical Booklet



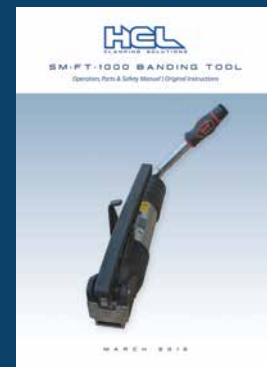
Smart[®] Range Application Track Record Booklet



Smart[®] Products Marine Corrosion Booklet



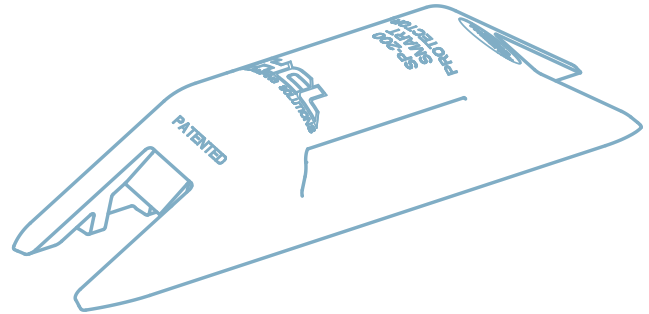
SM-FT-3000 Banding Tool Manual



SM-FT-1000 Banding Tool Manual

Over the past 20 years HCL have cemented their position as leaders in the manufacture and design of Subsea & Downhole clamping solutions. HCL manufacture a number of product categories within the **Smart®** product family which are displayed below. Based in Bath, in the south west of the United Kingdom, HCL are a family owned company with a proud history of innovation within the Oil & Gas industry.

HCL Subsea & Downhole Clamping Solutions



Smart® Product Group

Smart® Band



Standard

- 7mm (1/4") (90kgf/198lbf)
- 10mm (3/8") (264kgf/582lbf)
- 19mm (3/4") (440kgf/969lbf)



Hybrid

- 19mm (3/4") (1270kgf/2799lbf)
- 32mm (1 1/4") (2551kgf/5622lbf)

Smart® Tie



- 20mm (3/4") (513kgf/1131lbf)
- 32mm (1 1/4") (TBCkgf/TBClbf)

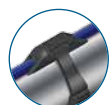
Smart® Protector



- SP-100
Min Tubing Dia - 2 3/8"
Cable size - Control Line 1/4" x 1 & 1/8" x 1, Fibre Optic 2mm x 1



- SP-100-2
Min Tubing Dia - 2 3/8"
Cable size - Control Line 1/4" x 2



- SP-200
Min Tubing Dia - 2 3/8"
Cable size - Square or Round 11mm x 1



- SP-300
Min Tubing Dia - 3 1/2"
Cable size - Square or Round 11mm x 2,
Control Line 1/4" x 2



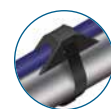
- SP-400-3820
Min Tubing Dia - 3 1/2"
Cable size - Flat ESP Cables - 38mm x 20mm



- SP-400-5228
Min Tubing Dia - 3 1/2"
Cable size - Flat ESP Cables - 52mm x 28mm



- SP-500-1721
Min Tubing Dia - 3 1/2"
Cable size - Round Cables - 17mm x 21mm



- SP-500-3338
Min Tubing Dia - 3 1/2"
Cable size - Round Cables - 33mm x 38mm

Installation Tools



- SM-TA-528A - Manual
For use with Smart® Band Standard
7mm (1/4") & 10mm (3/8")



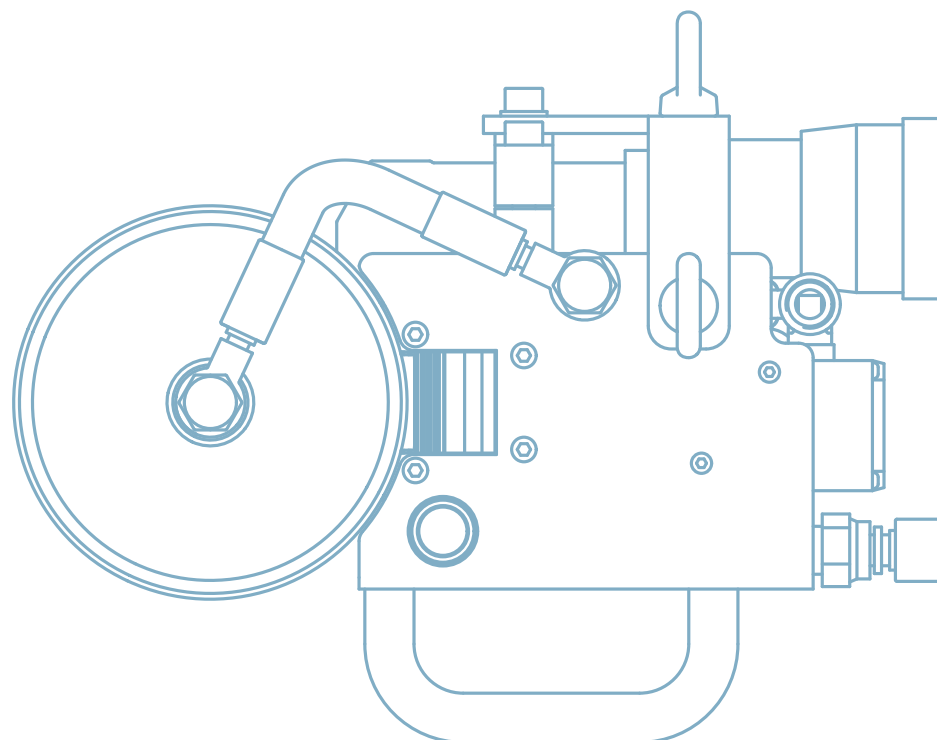
- SM-FT-1000 - Manual
For use with Smart® Band 19mm (3/4") & 32mm (1 1/4") and Smart® Tie 20mm (3/4") & 32mm (1 1/4")



- SM-FT-2000 - Manual
For use with Smart® Band 19mm (3/4") & 32mm (1 1/4") and Smart® Tie 20mm (3/4") & 32mm (1 1/4")



- SM-FT-3000 - Pneumatic
For use with Smart® Band 19mm (3/4") & 32mm (1 1/4") and Smart® Tie 20mm (3/4") & 32mm (1 1/4")



Smart[®] Band Standard

The standard name denotes the simplicity of the buckle design, allowing for ease of use & application and presenting itself within HCL's product range as the general industry solution.



Smart[®] Band Standard

Key Features

- Strength up to 440kgf (969lbf)
- Non-corrosive
- Safe and easy to Fit
- Cut to length for any size
- Long life materials
- Full range of Installation Tools
- Suitable for divers

7mm (1/4 inch)

10mm (3/8 inch)

19mm (3/4 inch)

Smart[®] Band Standard is a non-metallic band and buckle system. It is a highly intuitive product making it very easy to fit (even subsea when divers often have to install in waters with very low visibility). It is the ideal strapping solution for less aggressive applications both on and offshore.

Smart[®] Band Standard system is available in a variety of materials, sizes and reel lengths. It offers long-life and non-corrosive properties, making it the ideal alternative to many high grade stainless steel strapping solutions.



Performance & Material

System		Material	Max System Strength		Min Diameter		Max Diameter		Max Temp Resistance*	
Dimensions			kgf	lbf	mm	in	mm	in	°C	°F
mm	in									
7	1/4	Nylon 66	90	198	75	3	600	24	125	260
10	3/8	Nylon 66	264	582	75	3	600	24	125	260
10	3/8	Nylon 11	198	435	75	3	600	24	105	221
19	3/4	Nylon 66	440	969	75	3	800	32	125	260

* Life expectancy is dependant on the working temperature. Refer to the Smart Products Technical Booklet for Downhole Use



Dimensions, Part Numbers & Packaging

System		HCL Part No		Band Dimensions						Buckle Dimensions			Buckle
Dimensions				Width		Thickness		Band Reel Lengths		Height	Length	Width	Pack Qty
mm	in	Band	Buckle	mm	in	mm	in	m	ft	mm/in	mm/in	mm/in	
7	1/4	SB-BA-1/4	SB-BU-1/4-ST	7	1/4	2.5	0.1	30/250	100/820	19.2/0.76	76/2.99	15.1/0.59	100
10	3/8	SB-BA-3/8	SB-BU-3/8-ST	10	3/8	3.6	0.14	30/125	100/410	21.5/0.85	77.2/3.04	22.9/0.9	100
19	3/4	SB-BA-3/4	SB-BU-3/4-ST	19	3/4	3.6	0.14	30/60	100/200	28.3/1.11	63.8/2.51	30.2/1.19	50



Tool Options & Retention

System		Tool	Min System Retention			Speed of Installation	Tool Type	Tension Control
Dimensions			N	kgf	lbf			
mm	in							
7	1/4	SM-TA-528A	200	20	45	10 secs	Manual	Hand
10	3/8	SM-TA-528A	750	77	169	10 secs	Manual	Hand
19	3/4	SM-FT-1000-19	1200	122	270	20 secs	Manual	Torque Wrench
		SM-FT-2000-19	1200	122	270	10 secs	Manual	Hand



SM-TA-528A



SM-FT-1000-19



SM-FT-2000-19

Smart[®] Band Hybrid

The Hybrid name points to the unique patented design of the teeth that sit within the buckle. The low profile buckle is made from a composite of materials allowing for greater flexibility and providing a significant increase in strength over the Standard system.



Smart[®] Band Hybrid

19mm (3/4 inch)

32mm (1 1/4 inch)

Key Features

- Low Profile Buckle
- High strength up to 2704kgf (5960lbf)
- Long-life materials
- Safe and easy to fit
- High speed installation
- Cut to length for any size
- High retention force - above 918kgf (1798lbf)
- Suitable for divers

Smart[®] Band Hybrid is HCL's premium high strength composite polymer based band and buckle system. With a range of installation tools including the high speed 3000 pneumatic tool the **Smart[®] Band Hybrid** is the ideal solution for many offshore and onshore applications.

Smart[®] Band Hybrid is typically used as an alternative to high grade corrosion resistant alloy strapping solutions such as Inconel 625, Monel & Titanium. The Hybrid system combines a number of excellent qualities such as high strength, ease of use, high retention, relaxation properties and long life, to provide the ideal strapping solution for offshore & subsea use.



Performance & Material

System			Max System Strength		Min Diameter		Max Temp Resistance*	
Dimensions		Material	kgf	lbf	mm	in	°C	°F
mm	in							
19	3/4	Nylon 66**	1215	2677	200	4	125	257
19	3/4	Nylon 12 GF	1270	2799	200	4	110	230
19	3/4	Nylon 11 GF	1088	2399	200	4	115	239
19	3/4	Acetal POM	1018	2244	200	4	95	203
32	1 1/4	Nylon 66**	2704	5960	400	8	125	257
32	1 1/4	Nylon 12 GF	2346	5170	400	8	110	230
32	1 1/4	Nylon 11 GF	2079	4581	400	8	115	239
32	1 1/4	Acetal POM	1754	3867	400	8	95	203

* Life expectancy is dependant on the working temperature. Refer to the Smart Products Technical Booklet for Downhole Use.
** Nylon 66 is not suitable for long term applications where the product is submersed in water due to its hygroscopic nature.



Dimensions, Part Numbers & Packaging

System				Band Dimensions						Buckle Dimensions			Buckle
Dimensions		HCL Part No		Width		Thickness		Band Reel Lengths*		Height	Length	Width	Pack Qty
mm	in	Band	Buckle	mm	in	mm	in	m	ft	mm/in	mm/in	mm/in	
19	3/4	SB-BA-3/4	SB-BU-3/4-HY	19	3/4	3.6	0.14	30/60	100/200	12.8/0.50	99.0/3.90	53.0/2.09	50
32	1 1/4	SB-BA-1-1/4	SB-BU-1-1/4-HY	32	1 1/4	4.7	0.19	30	100	16.8/0.66	135.5/5.33	76.8/3.02	25

*Band is available in pre-cut lengths with buckle fitted for large volume orders



Tool Options & Retention

System			Min System Retention*			Speed of Installation	Tool Type	Tension Control
Dimensions		Tool	N	kgf	lbf			
mm	in							
19	3/4	SM-FT-1000-19	3500	357	787	20 secs	Manual	Torque Wrench
		SM-FT-2000-19	2000	204	450	10 secs	Manual	Hand
		SM-FT-3000-19	3500	357	787	5 secs	Pneumatic	Air Regulator
32	1 1/4	SM-FT-1000-32	7000	714	1574	20 secs	Manual	Torque Wrench
		SM-FT-2000-32	4000	408	899	10 secs	Manual	Hand
		SM-FT-3000-32	9000	918	1798	5 secs	Pneumatic	Air Regulator

*Values may be lower depending on materials chosen please refer to Technical Booklets for more information.



Smart[®] Tie

Smart[®] Tie incorporates the Hybrid feature of the Smart[®] Band and creates the strongest Polymer Cable Tie in the World.



Smart[®] Tie

20mm (3/4 inch)

32mm (1 1/4 inch)

Key Features

- High temperature resistance up to 250°C (482°F)
- High strength up to 514kgf (1133lbf)
- Safe and very easy to fit
- High speed installation
- 100% recyclable
- Non-corrosive
- Long life materials
- Suitable for divers

Smart[®] Tie is a patented heavy duty polymer tie wrap, able to withstand system loads in excess of 500kgf.* It has the advantage of being manufactured from a range of high temperature polymers, giving it superior chemical and temperature resistance up to 250°C*.

Lightweight and very easy to use the **Smart[®] Tie** has become the ideal downhole cable tie solution and compatibility with the **Smart[®] Protector** provides a complete solution for many down-hole applications. The **Smart[®] Tie** is also used widely in offshore applications such as Cable Protection and can be manufactured from long-life Nylon 11 & Nylon 12.

*Depending on material choice.



Performance & Material

System			Max System Strength		Min Diameter		Max Temp Resistance*		Longevity*	Gas Resistance	
Dimensions		Material	kgf	lbf	mm	in	°C	°F		CBM Coal Seam Gas	H ₂ S Sour Gas
mm	in										
20	3/4	Nylon 66	513	1131	60	2.36	125	257	Medium term	Limited	Limited
		Nylon 12	414	881	60	2.36	100	212	Long term	Fair	Fair
		Nylon 11	400	881	60	2.36	105	221	Long term	Fair	Fair
		PPS	514	1133	60	2.36	175	347	Long term	Very Good	Very Good
		PEEK	>815	1794	60	2.36	250	482	Long term	Excellent	Excellent
32	1 1/4	Nylon 66	TBC	TBC	60	2.36	125	257	Medium term	Limited	Limited
		Nylon 12	984	2170	60	2.36	100	212	Long term	Fair	Fair
		Nylon 11	1045	2304	60	2.36	105	221	Long term	Fair	Fair
		PPS	1264	2785	60	2.36	175	347	Long term	Very Good	Very Good

*Life expectancy is dependant on the working temperature. Refer to the Smart Products Technical Booklet for Downhole Use



Dimensions, Part Numbers & Packaging

System			Band Dimensions						
Dimensions		HCL Part No	Maximum Length		Band Width		Band Thickness	Head Width	Head Height
mm	in		mm	in	mm	in	mm/in	mm/in	mm/in
20	3/4	ST-20-450	470.0	18.50	20	0.79	3.6/0.14	35.0/1.38	12.0/0.47
		ST-20-600	620.0	24.41					
		ST-20-750	770.0	30.31					
32	1 1/4	ST-32-550	573.0	22.56	32	1.26	4.6/0.18	50.0/1.97	20.0/0.79
		ST-32-850	873.0	34.37					



Tool Options & Retention

System			Min Retention*			Speed of Installation	Tool Type	Tension Control
Dimensions		Tool	N	kgf	lbf			
mm	in							
20	3/4	SM-FT-1000-20ST	1500	153	337	20 secs	Manual	Torque Wrench
		SM-FT-2000-19	1800	184	405	10 secs	Manual	Hand
		SM-FT-3000-20ST	1600	163	360	5 secs	Pneumatic	Air Regulator
32	1 1/4	SM-FT-1000-32ST	2500	255	562	20 secs	Manual	Torque Wrench
		SM-FT-2000-32	2500	255	562	10 secs	Manual	Hand
		SM-FT-3000-32ST	4000	408	899	5 secs	Pneumatic	Air Regulator

*Values may be lower depending on materials chosen please refer to Technical Booklets for more information.



Smart[®] Protector

A range of polymer cable protectors for use in Downhole, subsea and flow line applications



Key Features

- High temperature resistance up to 250°C (482°F)
- Fits any tubing diameter or coupling length
- Can be used for multi-line installations
- Prevents cable snagging
- Low profile and low friction coefficient
- Available for many different cable configurations
- Will not hang in BOP stack
- Easy to mill

Smart[®] Protector

SP-100	SP-100-2	SP-200	SP-300
SP-400-3820	SP-400-5228	SP-500-1721	SP-500-3338

The **Smart[®] Protector** is a patented product developed in co-operation with Shell. It is designed to operate within restricted annular clearances, to accommodate various tubing diameters, all coupling types and most cable combinations.

The **Smart[®] Protector** is not only used as a cable protector downhole it can be used to protect & attach cables in many other situations in conjunction with either the **Smart[®] Band** or **Smart[®] Tie**. One of the most successful applications is the attachment of Cathodic protection cables to Marine structures.



Cable Configurations & Dimensions

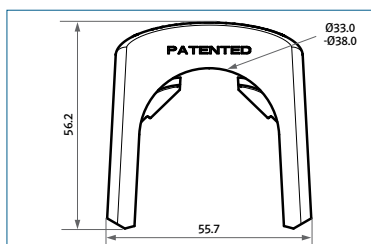
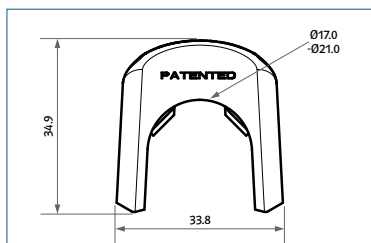
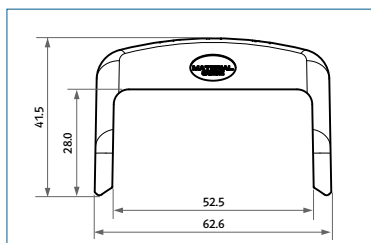
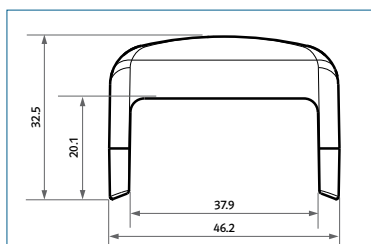
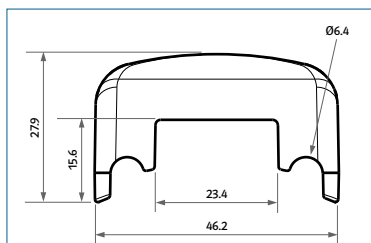
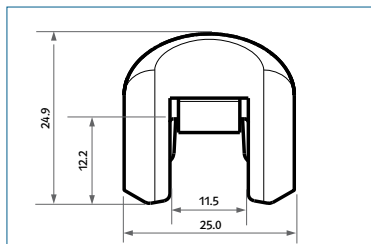
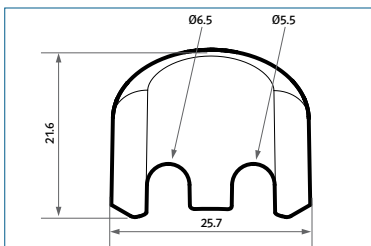
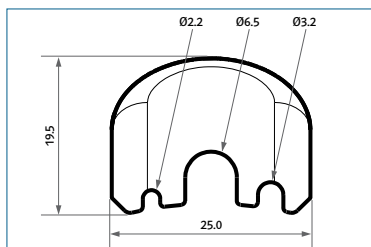
Part	Cable Configuration/Options	Strapping Compatibility		Height	Length	Width
		20mm/¾ inch	32mm/1¼ inch	mm/in	mm/in	mm/in
SP-100	1 x ¼ inch control line 1 x ½ inch control line 1 x 2mm fibre optic	Yes	No	19.5/0.77	75.5/2.97	25.0/0.98
SP-100-2	2 x ¼ inch control line	Yes	Yes	21.6/0.85	25.7/0.99	104.2/4.10
SP-200	1 x 11mm square or round encapsulated line	Yes	Yes	24.9/0.98	114.0/4.49	25.0/0.98
SP-300	1 or 2 x 11mm square or round encapsulated line 1 or 2 x ¼ inch control lines	Yes	Yes	27.9/1.10	160.0/6.30	46.2/1.82
SP-400-3820	Flat Packs & Flat ESP Cables up to 38mm width & 20mm height	Yes	Yes	32.5/1.28	160.0/6.30	46.2/1.82
SP-400-5228	Flat Packs & Flat ESP Cables up to 52mm width & 28mm height	Yes	Yes	41.5/1.63	160.0/6.30	62.6/2.46
SP-500-1721	Round Cables between 17mm to 21mm Diameter	Yes	Yes	35.0/1.38	122.7/4.83	33.8/1.33
SP-500-3338	Round Cables between 33mm to 38mm Diameter	Yes	Yes	56.2/2.19	181.0/7.13	55.7/2.19



Performance & Material

Material	Max Temp [°]		Longevity [°]	Gas Resistance		Rotational Load	Crush Load
	°C	°F		CBM Coal Seam Gas	H ₂ S Sour Gas	kgf	kgf
Nylon 66	125	260	Medium term	Limited	Limited	50	2000
Nylon 11	105	221	Long term	Fair	Fair		
Nylon 12	105	221	Long term	Fair	Fair		
PPS	175	347	Long term	Very Good	Very Good		
PEEK	250	482	Long term	Excellent	Excellent		

[°]Life expectancy is dependant on the working temperature. Refer to the Smart Products Technical Booklet for Downhole Use.



Smart[®] Installation Tools

To enable the installation of the Smart[®] Band and Smart[®] Tie HCL had to design and manufacture a range of specific installation tools.



Smart[®] Installation Tools

SM-TA-528A

SM-FT-1000

SM-FT-2000

SM-FT-3000

HCL has developed a range of tooling suitable for the installation of its range of **Smart[®] Band** and **Smart[®] Ties**.

- a. **SM-TA-528A** - Lightweight and easy to use, the 528A tool is a manual tool for the smaller Standard systems
- b. **SM-FT-1000** - A highly specified manual tool which can incorporate the addition of a torque wrench to enable consistent tightening to a set tension
- c. **SM-FT-2000** - The divers choice. Loved for its exceptional ease of use and its ability to provide high retention forces
- d. **SM-FT-3000** - Exceptionally fast, the 3000 tool has been designed to enable installation of **Smart[®] Bands** and **Smart[®] Ties** in under 5 seconds



Tool Options

Tool	Part Number	System Compatibility				Tool Weight		Speed of Installation	Control Type
		System		Product	Buckle	kg	lb		
		mm	in						
528A	SM-TA-528A	7	¼	Smart [®] Band	Standard	0.43	0.95	10 secs	Manual
		10	¾	Smart [®] Band	Standard				
1000	SM-FT-1000-19	19	¾	Smart [®] Band	Standard & Hybrid	2.79	6.14	20 secs	Manual with Torque capability
	SM-FT-1000-20ST	20	¾	Smart [®] Tie					
	SM-FT-1000-32	32	1¼	Smart [®] Band	Hybrid				
	SM-FT-1000-32ST	32	1¼	Smart [®] Tie					
2000	SM-FT-2000-19	19	¾	Smart [®] Band	Standard & Hybrid	0.75	1.65	10 secs	Manual
		20	¾	Smart [®] Tie					
	SM-FT-2000-32	32	1¼	Smart [®] Band	Hybrid	1.33	2.93		
		Smart [®] Tie							
3000	SM-FT-3000-19	19	¾	Smart [®] Band	Standard & Hybrid	6.40	14.08	5 secs	Pneumatic Tightening & Cutting
	SM-FT-3000-20ST	20	¾	Smart [®] Tie					
	SM-FT-3000-32	32	1¼	Smart [®] Band	Hybrid	7.50	16.50		
	Smart [®] Tie								



SM-TA-528A



SM-FT-1000



SM-FT-2000-19



SM-FT-2000-32



SM-FT-3000

Smart[®] Product Applications

Piggyback Pipelay



There are numerous requirements for piggyback pipe lay including the attachment of Fibre Optic, Methanol and DEH lines (Direct Electrical Heating). Smart[®] Band is an ideal solution for attachment in conjunction with piggyback clamps of the piggyback line to the main pipeline.

Cable, Riser & Flowline Protection



The installation of Subsea Cables is widespread. A key issue in this area is cable protection. HCL works alongside Half Shell Cable protection providers to provide a complete solution to the client. The Smart[®] Band is ideal for such applications offering good impact and abrasion resistance alongside its usual features of high strength, long life and price competitiveness.

Flotation and Buoyancy



Smart[®] Band is being increasingly utilised on risers and flowlines for clamping buoyancy and flotation products. Offering High Strength and excellent Elastic and Hydrostatic Compression characteristics the Smart[®] Band works with the buoyancy products to provide excellent long term retention.

VIV Strakes



Smart[®] Band is an ideal clamping solution for Strakes to risers and in particular in the deepwater environment. In these areas the Elasticity of the band and the excellent Hydrostatic Compression data become increasingly important. Specifically any applications where there is a susceptibility to compression.

Wind Farms



Attaching cables or brackets to the main structure of a Wind Farm can be expensive and fraught with difficulty. The ease of installation and the non-corrosive nature of the Smart[®] Band makes it an ideal solution for this application and it has been installed successfully in many projects worldwide.

One of the most common applications for Smart® Band offshore is subsea/offshore attachment of all sorts of cables and umbilicals. In many cases Smart® Band is the ideal solution. It's safe and easy to fit and because it has no sharp edges to damage the cables etc. We have an extensive track record in this area.



Cable Attachment

Sensor attachment is a common application offshore and subsea as companies attempt to identify patterns and record data. Smart® Band and Smart® Tie have both been extensively utilised in this area.



Sensor Attachment

Attaching corrosion protective Jackets to Jetty Piles has been one of the most successful applications for the Smart® Band and in terms of strapping has become the number 1 solution in this application. Key benefits are the corrosion resistance, ease of use, competitive pricing and also Smart® Band is not easily recyclable therefore will not get stolen from the Jettys once installed.



Pile Protection

Downhole is a very specific and aggressive application and attaching cables downhole often can often be a headache. The Smart® Tie is being increasingly utilised in this area replacing standard metal solutions which often causes significant disruption when they fail and fall to the bottom of the well.



Downhole

The uses for Smart® Band and Smart® Tie offshore and subsea are simply endless. Wherever something needs to be attached then these products can often be used.



Other Applications



Visit www.hclfasteners.com to view our complete range of products.

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