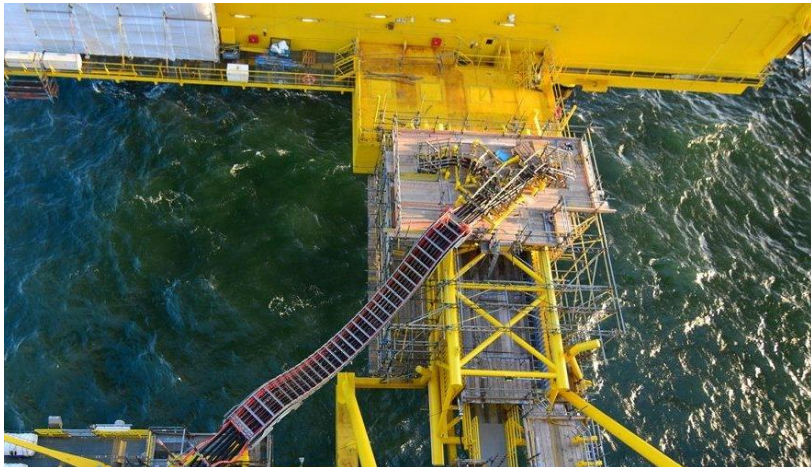


Main milestones and application of flexible HV cables

Main milestones

Main milestones:

- **Oct. 2011:** First request of a flexible 155 kV – cable system “moved while in service” - for the interconnection of two offshore platforms.
- **April 2012:** PPL and R&D Germany started the Project “**Flexible HV cables**”



- **May 2013: Release** of Full System **Type Test** (Kema) including fatigues tests.
- **June 2013:** Aker&Kvaerner, TenneT and Alstom **include** the **new product** in their Specifications even for some already **ongoing projects**

Main milestones and application of flexible HV cables

Main application

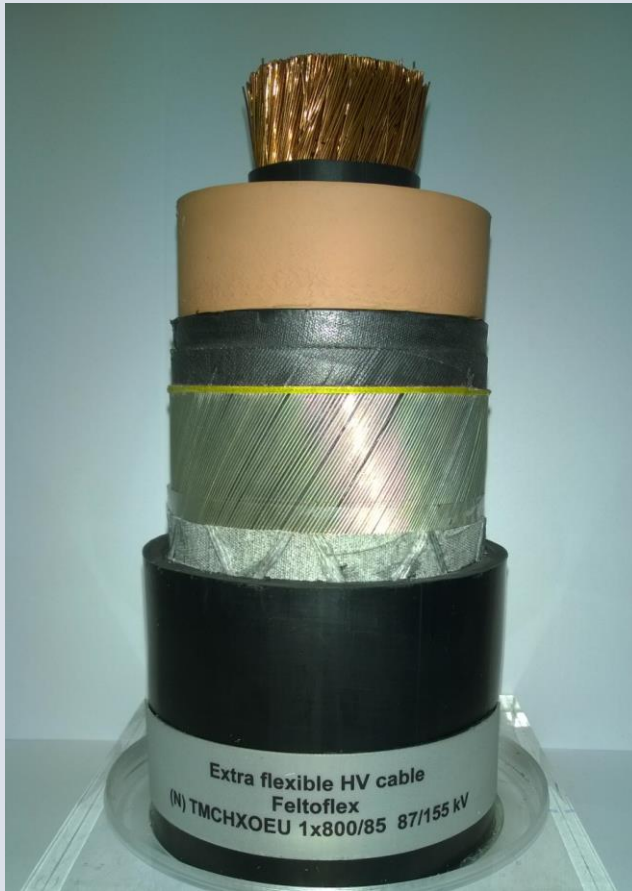
Application:

- **Mobile** interconnection **cable** between 2 platforms Topside – bridge
- Projects delivered: **Borwin 2, Helwin 2, Edvard Grieg, Ivar Aasen, Dolwin 3**
- **Further possible application: Temporary connection** even with aerial lines in onshore applications



Cable Design and main Features of Feltoflex® cables

Cable Design



- Extra flexible cl.5 conductor
- Rubber conductor screen
- HEPR - **super clean** HV Insulation
- Rubber insulation screen
- Flexible** Cu screen
- Outer sheath HF Type HXM1 (VDE 0266)
- + **optional** semicon layer for testing after laying

Cable Design and main Features of Feltoflex® cables

Main Features

Where *flexibility* counts:

- Ultrabendable also in cold conditions
 - Extremely small bending radius
 - Easy handling

Benefits for the customer:

- High quality and **fully qualified flexible HV-cable system** solution
 - Save construction/building cost (structure weights/space)
 - Installation/laying during winter / cold weather
 - Tailor-made and **wet design** variants available
 - **-Full Turn-Key** from Design to Monitoring



Application Test and References

Application test



Transport to bending test equipment and running bending test.
No of cycles: up to 142.255 - Result: **no wires broken and no damages detected** Samples: 1x240 132 kV and 1x800 155 kV

Application Test and References

References

Year	Customer/Enduser	Location / Project	Voltage [kV]	[mm ²]	length [m]
2011	Pfisterer	measuring cable	132	240	300
2011	ITC Berlin	unknown	132	240	300
2012	Alstom	test cable	155	800	400
2012	Siemens	measuring cable	155	240	700
2013	Pfisterer	temporary connection cable	132	240	1000
2013	TenneT	Borwin2	155	630	1000
2013	TenneT	Helwin2	155	630	2250
2014	AKER Solution	Edvard Grieg	132	240	500
2014	AKER Solution	Ivaar Aasen	132	240	1300
2015	TenneT/Alstom /Pfisterer	DolWin3	155	800	5700

