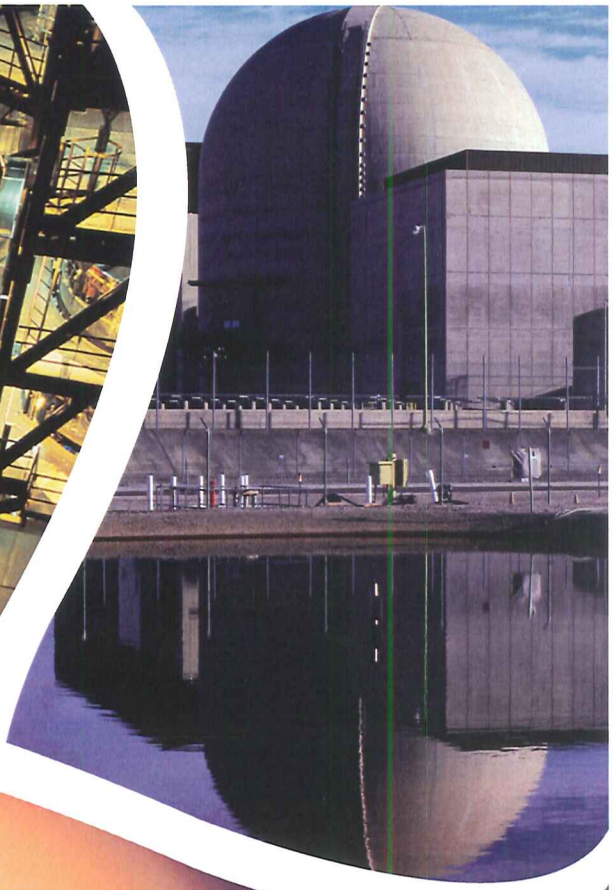
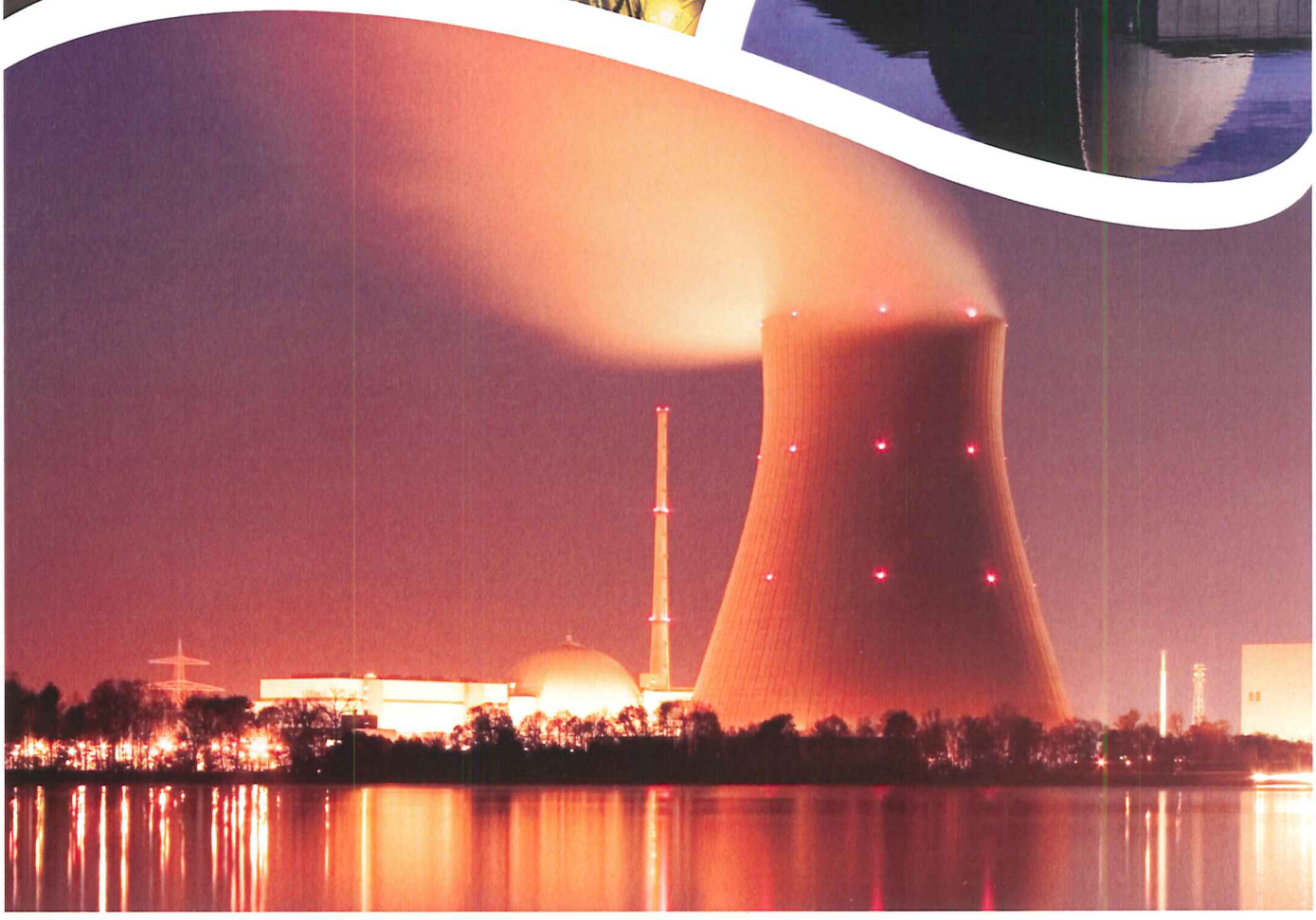
Habia Cable

Habiatron

Radiation Tolerant Cables for Nuclear Applications





Habia Cable

The Company

Specialist wire and cable manufacture

Established in 1941, Habia Cable has developed a wealth of experience in the design and manufacture of high performance wires and cables to meet the requirements of international standards and exacting customer specifications.

Manufacturing facilities in Sweden, Germany, China and Poland together with Research and Development provide a high level of support to Habia Cable's network of Sales Offices throughout Europe and the Far East.

Habia Cable holds accreditation to ISO 9001 and ISO 14001.

Habia Cable is owned by the Beijer Alma group of companies, an internationally active industrial group, focussed on production of components for customers in the high technology sectors. The company aim is to create competitive companies in selected market segments through active, long term development.

Nuclear Power Generation

Nuclear

Habia Cable's experience in the nuclear wire and cable industry is strong and diverse. Our range of Habiatron specialist wires and cables has been developed following considerable research and development into the unique needs of nuclear environments and naturally it incorporates all the quality, reliability, consistency and efficiency aspects which have become the hallmark of Habia Cable.

We can also offer custom-designed solutions which are engineered to meet the most demanding nuclear applications.

Habiatron cables are specifically designed to be 'Fit for Purpose'

We have applied our cable knowledge from applications in the management of the manufacturing of the fuel, to its long-term safe storage sites. Cable and cable systems are designed with the environment in mind, providing a solution that is 'fit for purpose'.

Our understanding and knowledge on the effects of radiation on polymers has been gained through working with and learning from large organisations such as Westinghouse Atom (Sweden), BNFL (UK), CERN (Switzerland) and SCK/CEN (Belgium). Habia Cable also employs and cooperates with research institutes to prove our materials are suitable for each specific application.

With our Habiatron range of cable products, we now believe that we have insulation and sheathing materials with unique radiation tolerant properties and that by working closely with engineers and specifiers, we can supply proven materials into the World Nuclear Market.

Operational	Including in the same cable not only power, control and measurement, but also air or hydraulic power and longitudinal reinforcement
Dimensional	Responding to requirements in terms of minimum diameter or reduced bending radius
Safety	Guaranteeing no flame propagation and non-emission of toxic gases for intrinsically safe circuits
Immunity	Assuring the cable gives optimum protection against electromagnetic interference
Reliability	Ensuring valid operational parameters for a given lifetime.

Our Habiatron solutions can significantly extend the lifetime of the cables you buy from us, giving you value for money and the confidence that you can rely on our cables to do their work.

Habia Cable

Radiation Tolerant Cables

High performance cables in the nuclear market

With over 30 years experience in the design and manufacture of wires and cables for demanding applications, our experience in the nuclear industry is strong and diverse.

Habiatron specialist wires and cables

Our range of Habiatron custom design and hybrid cables have been developed following considerable research and development into the unique needs associated with nuclear environments and naturally incorporate all the elements you would expect from Habia: QUALITY, RELIABILITY, CONSISTENCY, EFFICIENCY

As a leading manufacturer of special wires and cables, Habia Cable are active in many nuclear programs around the world. We are also able to meet specific customer requirements by incorporating various power and signal wires into hybrid cables.

We can also offer custom-designed solutions which are engineered to meet the most demanding nuclear applications.

Habiatron Nuclear Cable Types

Habiatron performance

The new generation of extended life LOCA approved cables with HFI 260 conductor insulation and HFS 105 XL B sheating offers an actual lifetime in a nuclear environment when considering the measured activation energy is 60 years at insulation temperature up to 109ºC and jacket temperature 61ºC (see Habiatron Q for further details).

Specialist products

Custom Design	Hybird wires and cables and coaxial cables
Cable Systems	Custom design moldings, harnesses and cable assemblies
Flexiform	Re-formable alternative to semi-rigid coaxial cables (suitable for low dose areas only)
Hi-Flex	Power cables for dynamic applications
Habiaflame²	Fire resisting cables
Habiatron	Cables for the nuclear industry
Multibend	Flexible alternative to semi-rigid coaxial cables (suitable for low dose areas only)
Speedflex	Halogen-free coaxial cables
Speedfoam	Low loss, halogen free coaxial cables
Speedfoam HT	Low loss, high temperature coaxial cables (suitable for low dose areas only)

Habiatron C:

Speedflex coaxial cables are used for surveillance and control. Remote monitoring through CCTV systems and communications channels. All types are halogen free and are qualified to IEEE 383.

Habiatron MM:

Manufactured in conjunction with Ultra Electronics - used in systems that require high immunity from the surrounding environment, high radiation and temperature resistance. Performance is guaranteed by using optimised braids, high permitivity magnetic tapes and anti-microphonic coatings

Habiatron Q:

Designed for use in Class 1 safety systems such as primary pumps, safety valves, volume controls and emergency shut-down systems (where the cable must continue operation). Habiatron Q is independently qualified for an operational life of 60 years operating at up to 109°C, with a jacket operating temperature of 61°C.

Habiatron R:

Safety cables used for monitoring safety related functions within the power plant. Mainly in containment areas where they offer a high level of performance, coupled with excellent smoke generation and flame retardancy.

Habiatron ZH:

Safety cables used for monitoring. Designed to meet the requirements of the 'R' specification, but with all the advantages associated with the use of Low Smoke Zero Halogen (LS0H) materials.

Habia Cable

Materials for Nuclear Environments

HFI 150

HFI 150 was designed to offer an increased temperature range than many standard halogen free cables whilst also providing a very highly radiation tolerant cable. As an insulation material it is slightly thicker than HFI 120 or HFI 140, however unlike those materials it is suitable for use, not only as an insulation and inner jacket material, but also as an outer jacket material enabling Habia to offer a complete solution.

Key features:

-50°C to +135°C
Flame retardant
Low smoke generation
Zero halogen
Good for use in acids, fuels and oils
Radiation tolerance: >10E6 Gy

HFI 260

HFI 260 is a material with which Habia can get closer to the performance of a fluoropolymer cable than any other whilst still offering a solution that is completely LS0H. With a continuous temperature rating of +200°C and an excursion temperature (when used with a NPC conductor) of +260°C, HFI 260 has an unmatched radiation tolerance that makes it the ideal choice for use in demanding nuclear applications. Along with ETFE, HFI 150 and HFS 105 XL B, HFI 260 is releasable to IEEE 323 and IEEE 383.

Key features:

-60°C to +190°C
Thin wall insulation
Highly flame retardant
Low smoke generation
Zero halogen
Excellent for use in water, fuels, oils, acids and bases
Radiation tolerance: >10E7 Gy

HFS 105 XL B

HFS 105 XL B was developed to fulfil a need for a cross-linked material that would meet the requirements of IEEE 323 and IEEE 383: an American National Standard for Type Test of Class IE Electric Cables Field Splices and Connections for Nuclear Power Generating Stations. As well as being an excellent material for use in radiation, HFS 105 XL B is also very highly flame retardant and has virtually no halogen content at all making it ideal for use in highly populated areas. The thermal stability is also improved by the cross-linking of the material.

HFS 105 XL B supercedes HFS 105XL for all new designs, however HFS 105XL is still available for existing customers if needed for specifications.

Key features:

-40°C to +105°C
Flame retardant
Low smoke generation
Zero halogen
Good for use in acids and bases
Radiation tolerance: 10E6 Gy

HFS 107 XL

HFS 107 XL has been designed to meet the requirements of Defence Standard 61 12 Part 31. As this is primarily a naval specification the material performs well in water and is very good in terms of LS0H and flame retardant properties (essential for use onboard ship). As a cross-linked product HFS 107 XL also has the benefits of a more rugged construction and improved thermal stability.

Key features:

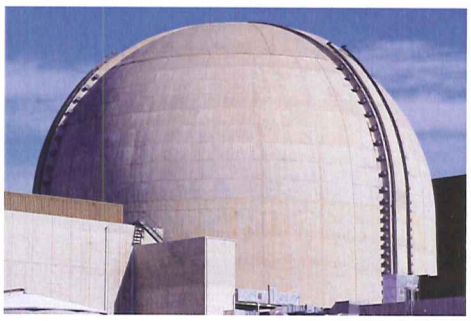
-40°C to +125°C
Flame retardant
Low smoke
Zero halogen
Radiation tolerance: 10E5 Gy
Fully approved to: UK Def Stan 61-12 Pt 31

ETFE

ETFE is a tough material with a good balance of mechanical properties - excellent tear strength, good tensile strength with moderate stiffness, outstanding impact strength and a good flex life. The material is good for use as a dielectric - it has a dielectric constant of 2.6, a high dielectric strength, excellent resistvity and a low dissipation factor of magnitude 0.003. Its low dielectric constant is essentially constant with changing frequency or temperature. ETFE has a broad and useful temperature range, usually set to -65°C to +150°C continuously, it retains remarkable toughness at very low temperatures and the embrittlement temperature of ETFE is below -100°C. In addition to this, ETFE passes several severe flame tests, for example IEEE 383 and has also the UL 94 V-0 rating.

Key features:

-65°C to +150°C
Thin wall material
Highly flame retardant
Low smoke generation
Excellent for use in water, fuels, oils, acids and bases



LOCA Environments

Cables to nuclear industry approvals

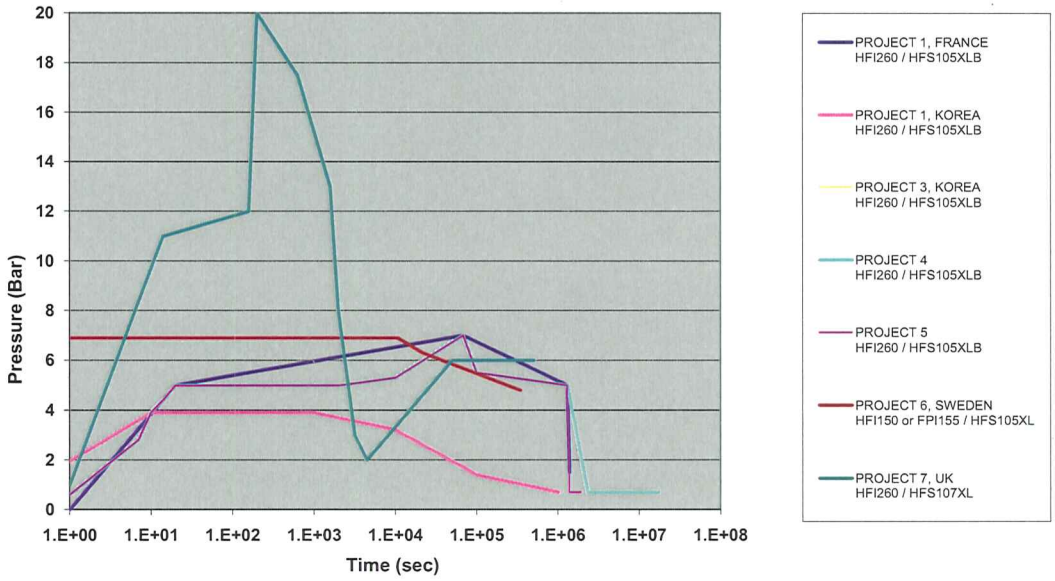
The Habiatron range complies with most standards established by the International Nuclear Authorities:
- IEEE (LOCA)
- IEC 60331
- IEC 60332
- NF C 32070 C1 or C2
- IEC 60754, IEC 60544.

Our Habiatron nuclear cable solutions can significantly extend the lifetime of the cables you buy from us, giving you value for money and the confidence that you can rely on our cables to do their work.

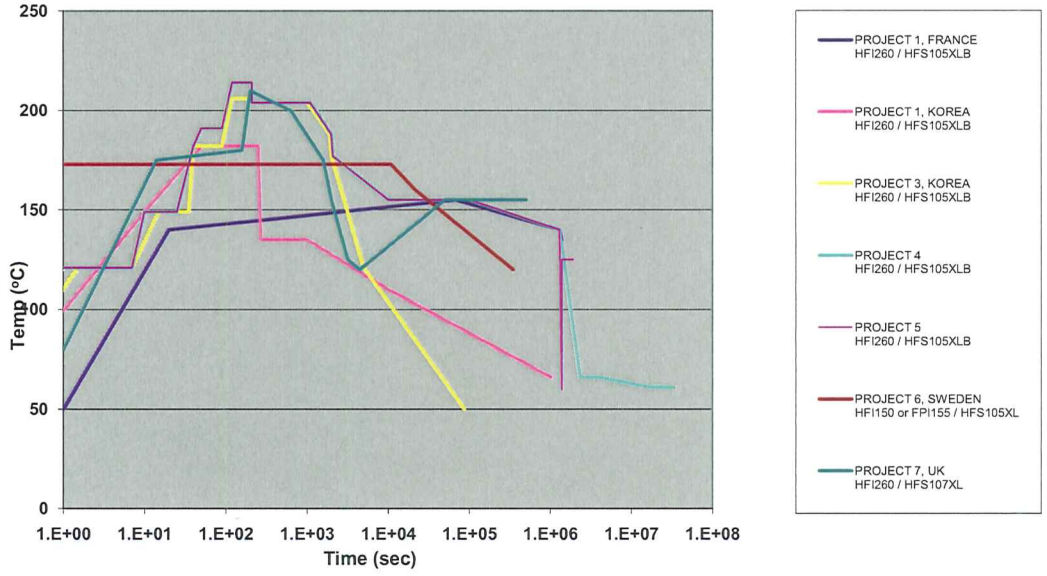
LOCA

The term: LOCA refers to a 'Loss Of Coolant Accident'. Under LOCA conditions, cabling is subjected to extreme pressures and temperatures for a limited time. Habia is one of the leading manufactures of cables that can operate under these conditions.

Pressure



Temperature



Habia Cable

Nuclear Experience

AECL - Canada
Radiation tolerant cables for waste processing application

Babcock Nuclear Ltd - UK
Custom design cables for reactor inspection

BAE Systems - UK
Reactor Class 1E LOCA cables

British Energy - UK
Fuel Grab multicore cables

BNFL Magnox - UK
Fuel Handling Special Cables

Borssele NPP - Netherlands
Dynamic crane flexible multicore cables

British Nuclear Group - UK
Waste Processing – radiation tolerant custom design cables

CERN - Switzerland
Radiation tolerant cables

COGEMA - France
Vitrification Lines for high level waste – radiation tolerant multicore cables

Electrabel - Belgium
Control Rod Position Indicator (CRPI) multicore cables

Iberdrola - Spain
Cofrentes Control Rod Position Indicator (CRPI) cable harness systems

Iberdrola - Spain
Vandellos PLIM/PLEX cables

KHNP - South Korea
Class 1E LOCA safety cables for Yanggwang, Ulchin, Shin Kori and Shin Wolsong NPP

Magnox Electric - UK
Umbilical cables for decommissioning

Nuclear Power Corp. - India
High temp radiation tolerant cables

Nuclear Power Corp. - India
IEEE 383 Fire safety coaxial cables

Nukem - UK
Radiation tolerant cables for decommissioning

REEL - France
Overhead Crane Multicore cables

SCK/CEN - Belgium
Dynamic cable research for high radiation tolerant cable applications

Sellafield Ltd - UK
Special radiation tolerant reeling cables

SKODA Nuclear - Czech
Fire resisting cables for Temelin 2

Tractebel - Belgium
Reactor Head high temperature harness assemblies

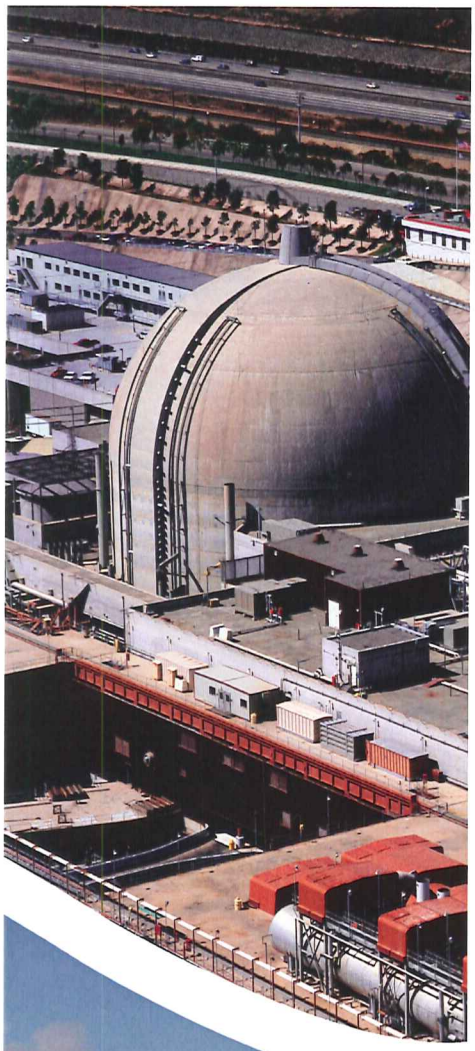
Ultra Electronics - UK
Super-screened Coaxial cables for Neutron Detectors

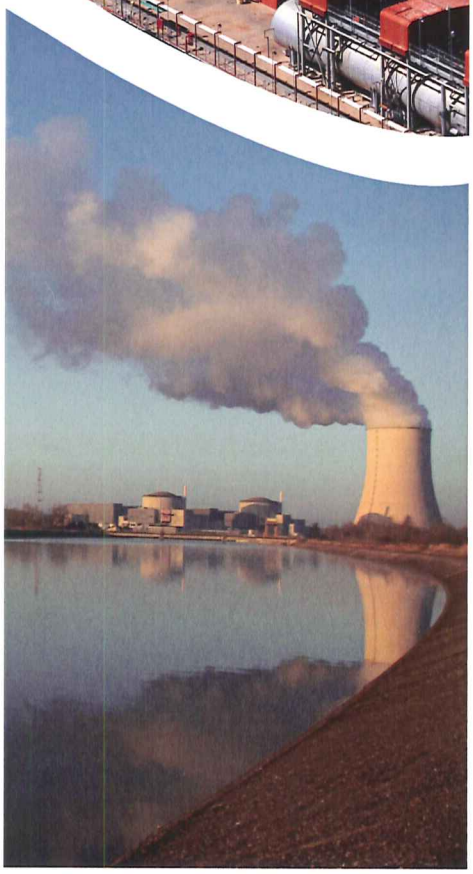
Vattenfall - Sweden
Control Rod Position Indicator (CRPI) harnesses

Vattenfall - Sweden
Control Rod Drive Mechanism (CRDM) harnesses

Vattenfall - Sweden
Class 1E LOCA cables

Westinghouse SRS - USA
High radiation cables

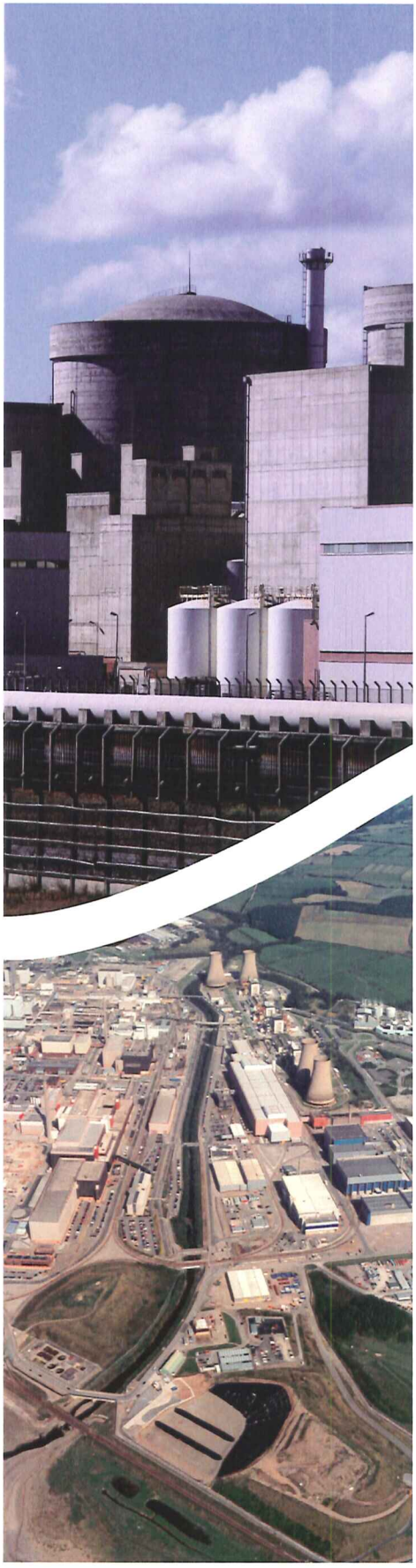




Note: All dimensions in mm and ±4% unless stated Date: 2010-09-07 Created: SY Approved: CJV Reference: Habiatron 1.2

Habia Cable

Approvals and Certificates



Nuclear approvals and certificates

1.0 Rolls Royce Nuclear Sector Approval number 00015 19 November 2009
Certificate of Approval for Habia Cable Production
Approved Supplier for Design, manufacture and test of cabling

2.0 Westinghouse Atom Report SMT 99-311 revision 2.
Document ID SMT 01-013
Cable type HFI 260/HFS 105 XL to IEEE 383-74 & IEEE323-74,
ASTM D882-97. Instrumentation cables, thermocouple extension wire and splice

3.0 Westinghouse Atom Report SMT 00-070 revision 0.
Document ID SMT 01-014
Cable type HFI 260/HFS 105XL to IEEE 383-74 & IEEE323-74,
ASTM D882-97. Power cable and splice

4.0 ABB Atom Report NL 95-106 June 16 1996
Cable type HFI 150/XLHFS 105 to IEEE 383-74 & IEEE323-74,
SS-IEC 216

5.0 ABB Atom Report NL 95-106 Feb 15 1996
Cable type FPI 155/XLHFS 105 to IEEE 383-74 & IEEE323-74,
SS-IEC 216

6.0 Tractebel Energy Engineering
Certificate of Authorization No-1754
Manufacturer in accordance with 10CFR50 Appendix B for the design, procurement, manufacturing, examination, testing, handling, packaging, storage and shipping of Thermocouples and coaxial cables, qualification level 1EA

7.0 Framatome ANP Quality Approval KTA 1401 and QSP 4a
For the design and manufacture of wires and cables

8.0 AEA Technology Radiation Testing Service
Irradiation Test report Number TR277 dated 30/10/1992
Copies of any of the above certificates are available on request.

Note: All dimensions in mm and ±4% unless stated Date: 2010-09-07 Created: SY Approved: CJV Reference: Habiatron 1.2

Habia Cable

Contact us

Head office

Habia Cable AB
Kanalvägen 18, Box 5076
SE-194 05 Upplands Väsby
SWEDEN
Tel: +46 (0) 8 630 74 40
Fax: +46 (0) 8 630 74 81
Email: info.se@habia.com

Sales offices

Habia Cable AB
Kanalvägen 18, Box 5076
SE-194 05 Upplands Väsby
SWEDEN
Tel: +46 (0) 8 630 74 40
Fax: +46 (0) 8 630 74 81
Email: info.se@habia.com

Habia Cable China Ltd
No 16 Changjiang Middle Road
New District of Changzhou, Jiangsu
Postcode 213022
CHINA
Tel: +86 (0) 5198 511 80 10
Fax: +86 (0) 5198 510 29 98
Email: info.cn@habia.com

Habia Cable AB
Tinghøjvej 5
DK-3650 Ølstykke
DENMARK
Tel: +45 (0) 70 22 83 03
Fax: +45 (0) 47 17 50 10
Email: info.dk@habia.com

Habia Cable AB
Jukolansuora 3 C5
FIN-04340 Tuusula
FINLAND
Tel: +358 (0) 20 155 25 30
Fax: +358 (0) 20 155 25 39
Email: info.fi@habia.com

Habia Cable SA
94 Avenue Denis Papin
45800 Saint Jean de Braye
FRANCE
Tel: +33 (0) 2 38 22 15 70
Fax: +33 (0) 2 38 22 15 79
Email: info.fr@habia.com

Habia Kabel GmbH
Zeppelinstrasse 5/1
D-89231 Neu-Ulm
GERMANY
Tel: +49 (0) 731 70 47 95 0
Fax: +49 (0) 731 70 47 95 99
Email: info@habia-kabel.de

Habia Cable Asia Ltd
Flat 1109, 11F, Fast Industrial Building
658 Castle Peak Road, Lai Chi Kok
Kowloon
HONG KONG
Tel: +852 2591 1375
Fax: +852 2838 0229
Email: info.hk@habia.com

Habia Cable India Ltd
Techno Fibres
Flat S3, Second Floor
Adarsh Apartments
1-1-581 Gandhi Nagar
Hyderabad-500 080
Andhra Pradesh State
INDIA
Tel: +91 40 55824396
Tel: +91 40 27640518
Fax: +91 40 55824027
Email: info.in@habia.com

Habia Cable Asia Ltd
Korean Branch Office
Rm 814, Gwachoen Officetel
1-14 Byeollyang-dong
Gwachoen-city, Gyunggi-do
427-040
KOREA
Tel: +82 (0) 2 504 6674
Fax: +82 (0) 2 504 6675
Email: info.kr@habia.com

Habia Cable BV
Voorerf 33
4824 GM Breda
NETHERLANDS
Tel: +31 (0) 76 541 6400
Fax: +31 (0) 76 541 8289
Email: info.nl@habia.com

Habia Cable Limited
Unit 10, Short Way
Thornbury
Bristol, BS35 3UT
UNITED KINGDOM
Tel: +44 (0) 1454 412522
Fax: +44 (0) 1454 416121
Email: info.uk@habia.com

Production

Habia Cable AB
Elementvägen 8, Box 8
SE-81575 Söderfors
SWEDEN
Tel: +46 (0) 293 22000
Fax: +46 (0) 293 30751
Email: info.se@habia.com

Habia Cable CS Technology AB
Dalénum 27
SE-181 70 Lidingö
SWEDEN
Tel: +46 (0) 8 544 813 40
Fax: +46 (0) 8 544 813 49
Email: info@cstechnology.se

Habia Kabel Produktions
GmbH & Co. KG
Oststrasse 91
D-22844 Norderstedt
GERMANY
Tel: +49 (0) 40 53 53 50 0
Fax: +49 (0) 40 53 53 50 35
Email: info@habia-kabel.de

Habia Cable China Ltd
No 16 Changjiang Middle Road
New District of Changzhou, Jiangsu
Postcode 213022
CHINA
Tel: +86 (0) 5198 511 80 10
Fax: +86 (0) 5198 510 29 98
Email: info.cn@habia.com

Habia Cable SP.Z.O.O.
Lubieszyn 8
72-002 Doluje
POLAND
Tel: +48 (0) 91 311 56 50
Fax: +48 (0) 91 311 88 87
Email: info.pl@habia.com

Söderfors, Sweden

Lubieszyn, Poland

Norderstedt, Germany

Changzhou, China

Habiatron Version 1.2: 2010-09-07