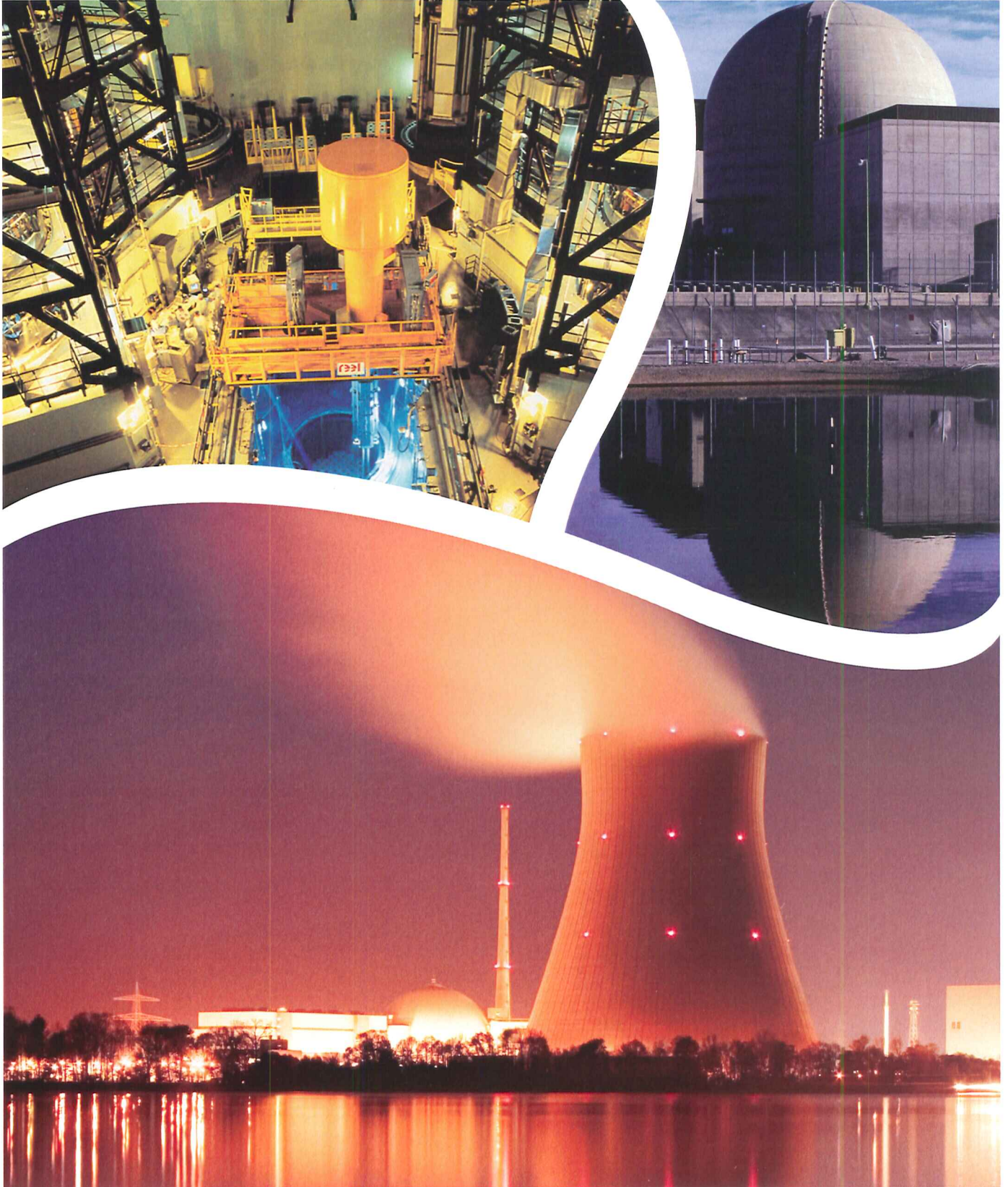


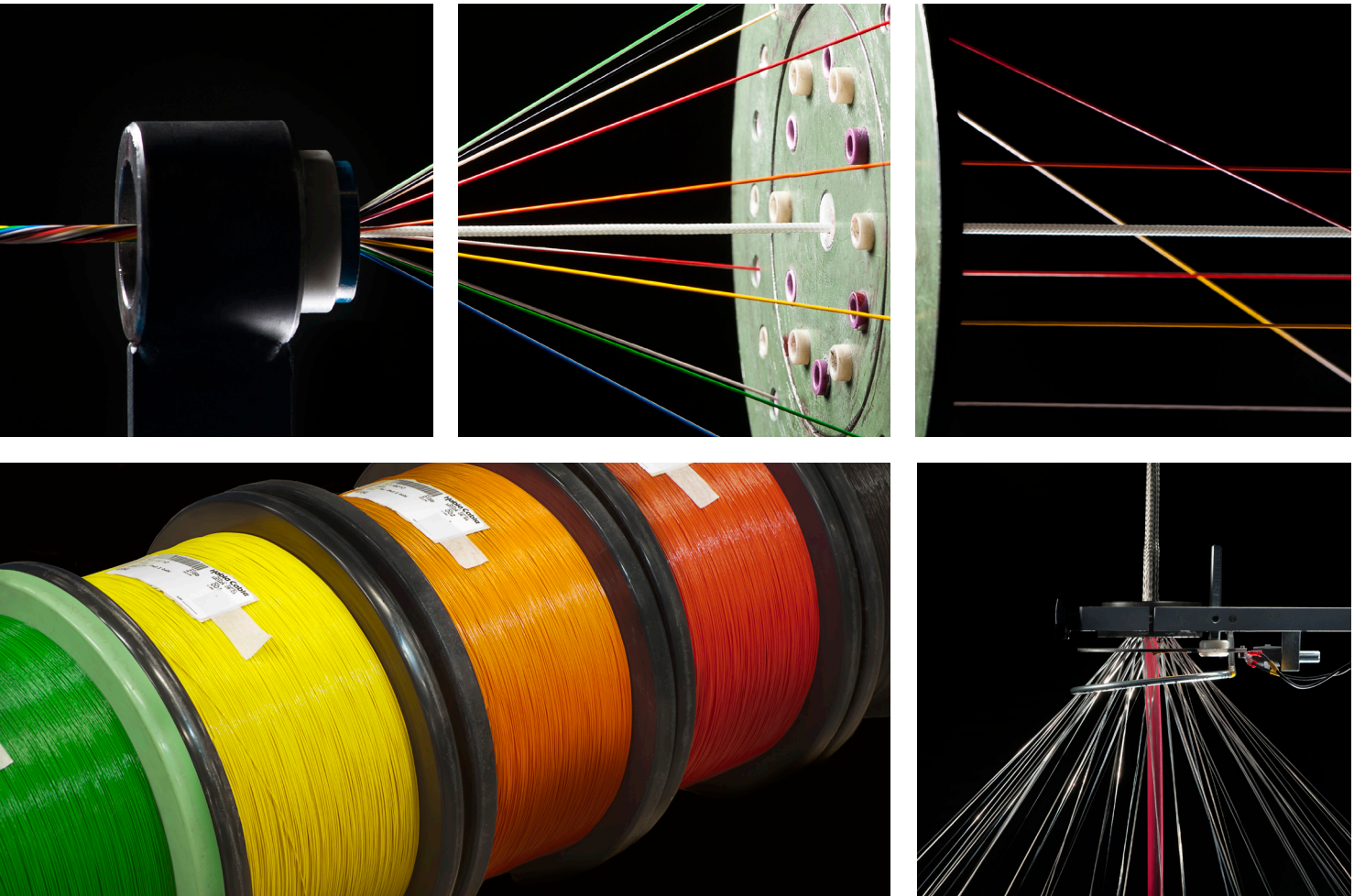
Habiatron

Radiation Tolerant Cables for Nuclear Applications

Represented In Canada By: Scinrad Technologies Inc. (www.scinrad.com)



Habia Cable



World Class Solutions

Wires, Cables and Cable Systems

Creative Cable Solutions for your business

Habia Cable is today one of Europe's leading manufacturers of special wire, cable and cable systems. Habia Cable has built an enviable reputation for the design and manufacture of high performance standard and custom-designed cables and cable systems, using constructions and materials to meet the most demanding requirements. Our products are found in nuclear, defence, telecom and a variety of industrial applications.

Habia Cable's most important competitive advantages are a high level of service, high technical competence and a global organisation. With sales offices across Europe and Asia, and

production facilities in Sweden, Germany, Poland and China, we sell our products in 50 countries on five continents.

Habia Cable is a Swedish company, founded in 1941, and has been a cable manufacturer since 1957. Sales annually are around 70 Million Euro and the number of employees is approximately 500. Habia Cable is owned by Beijer Alma, an industrial group listed on the Stockholm Stock Exchange, which is focused on production of components for customers in high technology sectors.



Photo: Söderfors factory, Sweden



Photo: Norderstedt factory, Germany

A focus on service

As one of Europe's most successful manufacturers of special wire, cable and cable systems, we recognise the importance of providing a consistently high level of service to our customers.

We offer:

- A prompt response to enquiries and queries
- Short lead-times
- Low minimum order quantities
- Cost effective standard products and custom designed solutions
- Local support to our customers thanks to our network of sales offices and factories

Our expertise

Habia Cable has over 50 years' experience in designing and manufacturing cables for harsh environmental conditions. This is reflected in our material portfolio, which includes fluoropolymers, and high performance halogen free materials.

Over the years, we have built up a significant knowledge covering industrial, defence, nuclear and telecommunications applications.

Our promise

We at Habia Cable are committed to the highest standards in quality, environment and business ethics. All our offices and production facilities are ISO 9001:2000 certified. In the nuclear area, we work according to the industry standards NQA1 and 10 CFR 50 B. Our production facility in Sweden is ISO 14001 certified, and all other production facilities will soon have the same certification.

Habia Cable has implemented a policy for corporate social responsibility. This policy is based on international agreements and guidelines, and enables us to meet our customers' increasing expectations regarding business ethics, and social and environmental responsibility.



Photo: Lubieszyn factory, Poland



Photo: Changzhou Production, China

Creative Cable Solutions for your business

The Product Range

Equipment Wires

To various standards including NF, SS, NEMA, DEF STAN.
Voltage rating to 1000v.

- **ETFE** - Temperature Range **-65 to +155°C**
- **FEP** - Temperature Range **-65 to +200°C**
- **PTFE** - Temperature Range **-65 to +260°C**
- **PFA** - Temperature Range **-65 to +260°C**
- **Polyimide** - Temperature Range **-65 to +200°C**
- **PEEK** - Temperature Range **-60 to +190°C**
Radiation tolerance **>107 Gy**

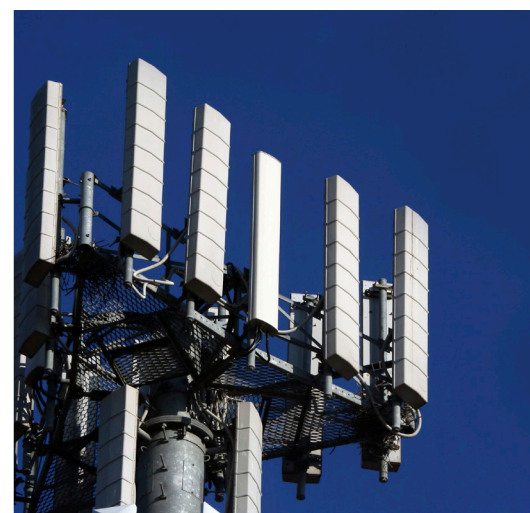
Coaxial Cables

- A wide range of standard RG style cables in addition to low noise, low loss, super screened and sub-miniature versions.
- **Speedflex** - LSOH alternatives to RG styles. Operating frequency up to **3GHz**.
- **Speedfoam** - A low-cost, low-loss flexible communications cable. Operating frequency up to **2,5GHz**.
- **Speedfoam 240 und 400 HT** – high temperature, low loss coax. Temperature Range **-65 to +200°C**

- **Flexiform** - A hand-formable alternative to semi-rigid cables used successfully at operating frequencies up to **18GHz**.
- **Multibend** - A flexible alternative to semi-rigid cables. Operating frequency up to **18GHz**.

Defence Standards

- **LSI 155** - Cross-linked ETFE to Defence Standard 61-12 Part 33/001
- **HFI 140** - HFI 140 to Defence Standard 61-12 Part 18. Low-smoke and zero halogen.
- **Multicore cables** to Defence Standard 61-12 Part 25.
- **Hi-Flex** - Power Cores for Armoured Land Vehicles Power cables are designed to be tough and highly flexible, with exceptional current carrying capabilities.
- **Landguard** - Jacketed cables for Armoured Vehicles to meet German VG 95218 Pt 24K, 25G, 27B & 28D specifications, these cables are tough, durable and resistant to variety of oils, fuels and other chemicals.



Fire Performance Wires and Cables

- **Habiaflame²** - Flame retardant to IEC 60332-3-24
Continuous operating temperature of **-200 to +260°C**
120 Minutes at **+830°C** - Excursions to **+1565°C**
- **HFFR (Halogen Free Flame Retardant)** - A wide range of LSOH insulation materials to meet IEC 60332 and as well as options to meet IEC 60331.

Shielded Signal Cables

From our extensive range of equipment wires, Habia Cable are able to offer a wide range of shielded cables incorporating pairs, triples and quads. Various levels of screening can be achieved using a combination of braids, foils and tapes.

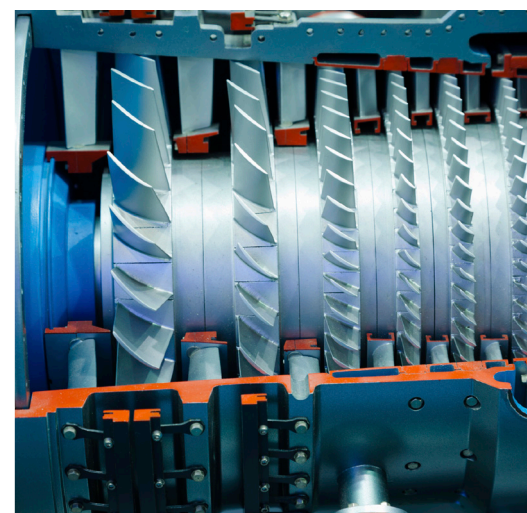
Custom Multicore and Hybrid Cables

Custom designed cables provide a solution to the customer's unique technical challenge, and can also be a cost effective alternative to standard products. Elements may include signal, power, coaxes, fibre, pneumatics, strain members and any numbers of pairs, triples etc., individually or overall screened to

meet specific electrical requirements. A wide range of insulation and sheathing materials gives us the flexibility to offer for even the most demanding customer applications.

Demands may include:

- Water resistance
- Fire resistance and flame retardancy
- Low temperature - High temperature
- Small diameter, Lightweight
- Strahlungsbeständigkeit
- Radiation resistance
- Halogen-free
- Low smoke and toxicity
- Fuel, oil and chemical resistance
- Flexibility and long flexlife
- Stiffness
- Vibration
- Cut-through and abrasion resistance
- Electrical parameters



Creative Cable Solutions for your business

The Product Range

Habiatron Radiation Tolerant Cables and Coaxes for Nuclear Applications

- Flame retardant and good chemical resistance
- Small size and weight in relation to performance
- Low and high temperature
- Small minimum order quantities
- In-house harness assembly production

International Nuclear Approvals:

- IEEE 383-1974
- IEEE 383-2003 (60 years)
- IEC 60754 and 60544

Cable Systems

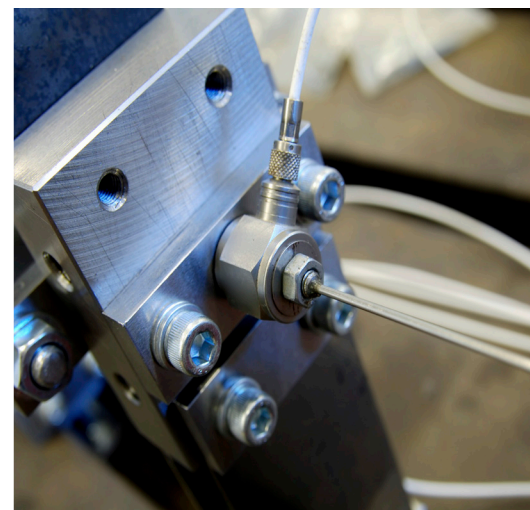
Our Cable Systems Division are experts in design and manufacture of cable assemblies for demanding environments. We can achieve properties such as water blocking, long flex life, resistance to temperatures and chemicals, and spiralsation. Applications include gas turbines, industrial power tools, weapon systems, military communication equipment, and ROVs and submarines. We use hot and cold moulding to achieve tough yet cost effective cable harnesses.

Habiasense Measurement Cables

- Typical sensor applications include accelerometers (including positioning, speed, vibration and displacement), chemical (including lambda / O2), level and flow, metrology, pressure, proximity and radiation.
- Measurement cable types - the variety of environments our cables are subjected to requires a varied range of Habiasense products.
- External factors such as high and low temperature exposure, vibration and movement, oil, fuel and water immersion and even radiation all influence the cable's overall performance.

Habiatherm Thermocouple Cables

- Extension and Compensating Cables
- Types - E, J, K, R, S, T, NB
- Conductors to International Standards
- Standard types - single, twin twisted and twin flat
- Specials - multicores, individually and collectively screened



Application areas

With more than 50 years' experience in special cable manufacturing, we understand our customers' cable needs,

and work closely together with them to find the best solution for their application – be it a standard or custom designed product.

Defence

- Surface ship and submarine systems
- Fighting vehicles
- Electronic warfare
- Weapon
- Military communications
- Radar systems

Control and Instrumentation

- Sensors
- Measurement
- Control panels
- Probes
- Heating

Nuclear

- NPP inside and outside containment
- Instrumentation
- Control
- Power
- Data/Video
- Special cables

Industrial

- Gas turbines
- Offshore
- Raw material processing
- Lighting
- Power Tools

Transport

- Rolling stock
- Signalling
- Automotive
- Power distribution
- Lifts
- Escalators
- Alarm systems
- Space
- Marine diesel engines

Telecom

- Antennas
- Base stations
- Site installations

Offshore

- Topside
- Subsea
- Downhole
- Medium Voltage high temp
- Splices and termination



Habia Cable

Habia Cable develops, manufactures and markets standard and custom designed cables and cable assemblies and harness systems for demanding industry applications.

In its segment,

Habia Cable is today one of Europe's leading wire and cable manufacturers.

The company has a global presence and sales in more than 50 countries worldwide.

Habia Cable's most important competitive advantages are a high level of service, high technical competence and a global organisation.

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Email: info.uk@habia.com

OTHER MARKETS
See www.habia.com for distributors and agents worldwide.

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DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 98-SKM-AQ-037

This is to certify that

Habia Cable AB

Habia Kabel Produktions GmbH & Co.KG
Habia Kabel GmbH
Habia Cable China Ltd
Habia Cable Asia Ltd
Habia Cable Asia Ltd Korean Branch Office
Habia Cable Ltd
Habia Cable BV
Habia Cable SA
Habia Cable Sp.z o.o

Locations according to appendix

has been found to conform to the Management System Standard:

ISO 9001:2008

This Certificate is valid for:

Sales, design and manufacture of electrical wires, cables, cable systems and harnesses

Initial Certification date:

1993-02-11

Place and date:

Stockholm, 2013-12-20

This Certificate is valid until:

2016-12-31

for the Accredited Unit:
DNV CERTIFICATION AB,
SWEDEN

*The audit has been performed
under the supervision of:*

Henrik Bäckman
Lead Auditor



Ann-Louise Pått
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.



DNV BUSINESS ASSURANCE

APPENDIX TO CERTIFICATE

This Appendix refers to Certificate No. 98-SKM-AQ-037

Habia Cable AB

locations included in the certification are as follows:

Habia Kabel Produktions GmbH & Co.KG
Habia Kabel GmbH
Habia Cable China Ltd
Habia Cable Asia Ltd
Habia Cable Asia Ltd Korean Branch Office
Habia Cable Ltd
Habia Cable BV
Habia Cable SA
Habia Cable Sp.z o.o

locations included in the certification are as follows:

UPPLANDS VÄSBY and SÖDERFORS, SWEDEN
NORDERSTEDT and NEU-ULM, GERMANY
CHANGZHOU, JIANGSU, CHINA
KOWLOON, HONG KONG
SEOUL, KOREA
BRISTOL, UK
BREDA, THE NETHERLANDS
SAINT JEAN DE BRAYE, FRANCE
LUBIEZYN, POLAND

Initial Certification date:

1993-02-11

This Certificate is valid until:

2016-12-31

*The audit has been performed
under the supervision of:*

Henrik Bäckman
Lead Auditor

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Place and date:

Stockholm, 2013-12-20

for the Accredited Unit:
DNV CERTIFICATION AB,
SWEDEN



1053
ISO/IEC 17021

Ann-Louise Pått
Management Representative



DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 95442-2011-AE-SWE-SWEDAC

This is to certify that

Habia Cable AB

at

SÖDERFORS and UPPLANDS VÄSBY, SWEDEN

has been found to conform to the Management System Standard:

ISO 14001:2004

This Certificate is valid for:

Design, research and development, manufacture of electrical wires, cables and cable systems

Initial Certification date:

2000-12-21

This Certificate is valid until:

2017-04-08

*The audit has been performed
under the supervision of:*

Henrik Bäckman
Lead Auditor



Place and date:

Stockholm, 2014-04-01

for the Accredited Unit:
DNV CERTIFICATION AB,
SWEDEN

Ann-Louise Pätt
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

February 2016

Conflict Minerals Policy

In August 2012, the United States and Exchange Commission (SEC) approved the final rule regarding the sourcing of conflict minerals as defined in the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502.

Conflict minerals are defined as: Gold (Au), tantalum (Ta), tin (Sn) and tungsten (W) derived from ores which have been mined in the Democratic Republic of Congo or adjoining countries. Profits from the mining are used to finance ongoing conflicts and the extraction of minerals is under terrible conditions with forced labours and violation of human rights.

To act in accordance with above mentioned regulation Habia Cable is committed to take action to prevent the sourcing of “conflict minerals” from Democratic Republic of Congo or adjoining countries and by that not contribute to armed conflict.

Habia Cable request its suppliers to determine the source of specified minerals and have implemented procedures to ensure that these metals contained in products do not originate from mines within the area concerned.

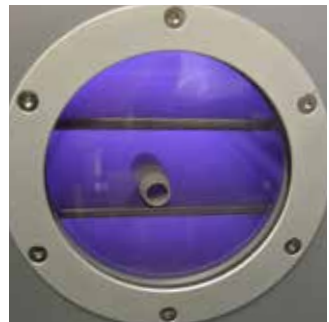
Appropriate action will be taken if it comes to our attention that a suppliers product containing minerals from a conflict area.

Habia Cable Group



Carl Modigh
CEO

Habia Cable



Cable Systems

Interconnect Solutions

Cable Systems and Interconnect Solutions

Our Experience

As one of Europe's most successful manufacturers of cable systems, we recognise the importance of providing a consistently high level of service to our customers. Habia Cable has experience in designing and manufacturing cable systems for harsh environmental conditions. This is reflected in our material portfolio, which includes harnesses resistant to pressure, temperature, humidity and various high performance halogen free materials. Over the years, we have built up a significant knowledge covering industrial, defence and offshore applications.



A Focus on Quality

We at Habia Cable are committed to the highest standards in quality, environment and business ethics. All our offices and production facilities are ISO 9001:2000 certified. In the nuclear area, we work according to the industry standards NQA1 and 10 CFR 50 B. Our production facility in Sweden is ISO 14001 certified, and all other production facilities will soon have the same certification.

Habia Cable has implemented a policy for corporate social responsibility. This policy is based on international agreements and guidelines, and enables us to meet our customers' increasing expectations regarding business ethics, and social and environmental responsibility.



Cable Systems and Interconnect Solutions

With a High Level of Service

Flexible production with expertise

As one of Europe's most successful manufacturers of cable systems, we recognise the importance of providing a consistently high level of service to our customers. Our factory in Poland uses innovative production methods and all operators are certified according to IPC A620 standard.

We offer:

- Product development
- R&D
- Technical support
- Project management
- Industrialisation
- Testing
- Design
- Qualifications and product validation
- Assembly on site and in the premises of a client
- Consultancy services performed on offshore installations
- Hand build cable for faster reaction times and lower MOQ

Cable assemblies for demanding environments

Our teams are experts in design and manufacture of cable assemblies for demanding environments. We can achieve properties such as water blocking, long flex life, resistance to temperatures and chemicals, as well as spiralisation.

Applications include gas turbines, industrial power tools, weapon systems, military communication equipment, and ROVs and submarines. We use hot and cold moulding to achieve tough yet cost effective cable harnesses.

Demands may include:

- Water resistance
- Fire resistance and flame retardancy
- Low temperature - High temperature
- Small diameter, Lightweight
- Radiation resistance
- Halogen-free
- Low smoke and toxicity
- Fuel, oil and chemical resistance
- Flexibility and long flexlife
- Stiffness
- Vibration
- Cut-through and abrasion resistance
- Electrical parameters



Cable Systems and Interconnect Solutions

Our Innovative Products

Moulding technology

Habia Cable use two different moulding technics: Two-component moulding and injection. We have developed different surface treatment techniques (including plasma and chemical treatment) for polyethylene and polyurethane based materials. Developments in the over-moulding methods, in combination with the advanced surface preparation allow Habia Cable to design reliable water resistant features with complex geometry and functionality.

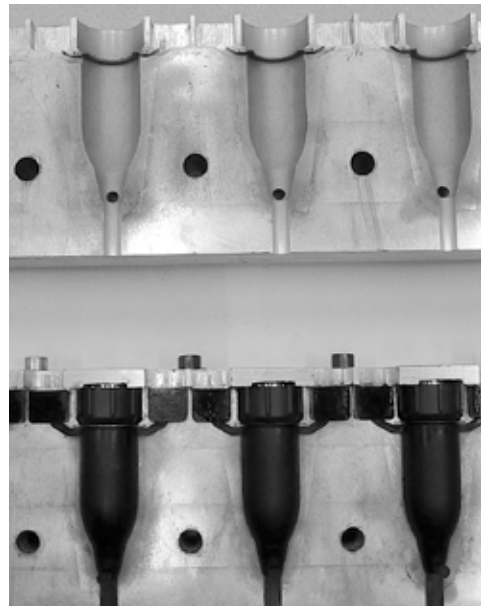
Habia Cable has also invested in suitable equipment to perform the necessary routine inspections for the Connector / Cable integration manufactured harnesses. These include pressure tank, electrical testers and mechanical resistance testing tools.



Moulding materials

There are a number of different groups of materials. Each has its own distinct properties, benefits and uses. These are used in moulding processes.

- TPU 90 - polyolefin insulation, good electrical and excellent water barrier properties
- HFS 100 - general industrial polyurethane jacket, glossy or dull finish, halogen free flame retarded
- HFI 90 - general industrial polyurethane jacket, glossy or dull finish, suitable for overmoulding applications
- TPU Type 9 - polyurethane material with improved water barrier properties
- TPS 130 - general insulation and jacket materials with the basic polyester properties. Strong mechanical properties, excellent fuel and oil resistance.



Cable Systems and Interconnect Solutions

Custom Designed Projects

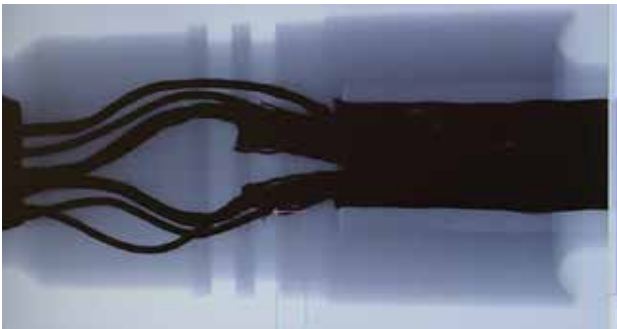
Tooling

Habia Cable offers Workshop services that perfectly support production in order to decrease lead times and adjust to the most non-typical requirements of the customers. We use fixtures to meet customers requirements and ensure repeatability as well as maintain a high quality.

Electrical testing

Habia Cable's standard practice is 100% electrical testing and visual inspection on all cables and harnesses. To aid our harness testing we have a number of computerised automatic testing machines with up to 512 measuring points and are able to test up to 1500 VDC or 1000 VAC.





Cable Systems and Interconnect Solutions

A Swedish Company with Long History

Habia Cable is today one of Europe's leading manufacturers of special wire, cable and cable systems. Habia Cable has built an enviable reputation for the design and manufacture of high performance standard and custom-designed cables and cable systems, using constructions and materials to meet the most demanding requirements. Our products are found in nuclear, defence, telecom and a variety of industrial applications.

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Habia Cable

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OTHER MARKETS
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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.

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 sheathing offers an actual lifetime in a nuclear environment when considering the measured activation energy is 60 years at insulation temperature up to 109°C and jacket temperature 61°C (see Habiatron Q for further details).

Specialist products

Custom Design	Hybrid 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
Habiaflame ²	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 permittivity 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.

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 LSOH. 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.

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

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 LSOH 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:

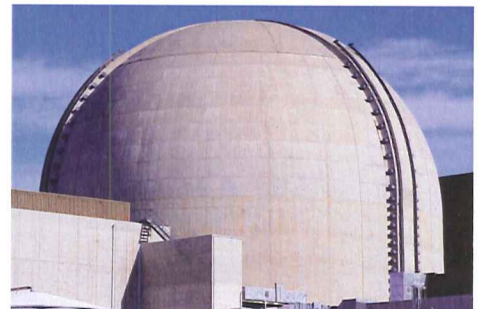
- 40°C to +125°C
- Flame retardant
- Low smoke
- Zero halogen
- Radiation tolerance: 10E5 Gy
- Fully approved to: UK Def Stan 61-12 Pt 31

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 resistivity 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



Note: All dimensions in mm and ±4% unless stated Date: 2010-09-07 Created: SY Approved: CJV Reference: Habiatron 1.2
Data provided indicates nominal values unless stated otherwise and is only valid for reference purposes at the time of publication and is subject to change without prior notice.

LOCA Environments

Cables to nuclear industry approvals

The Habiatron range complies with most standards established by the International Nuclear Authorities:

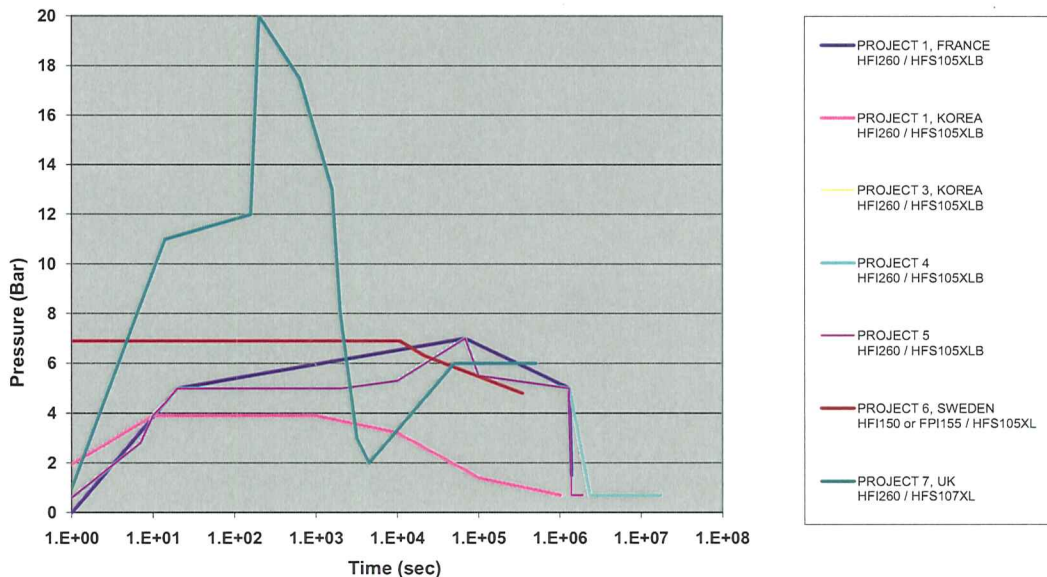
- IEEE (LOCA)
- IEC 60331
- IEC 60332
- NF C 32070 C1 or C2
- IEC 60754, IEC 60544.

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.

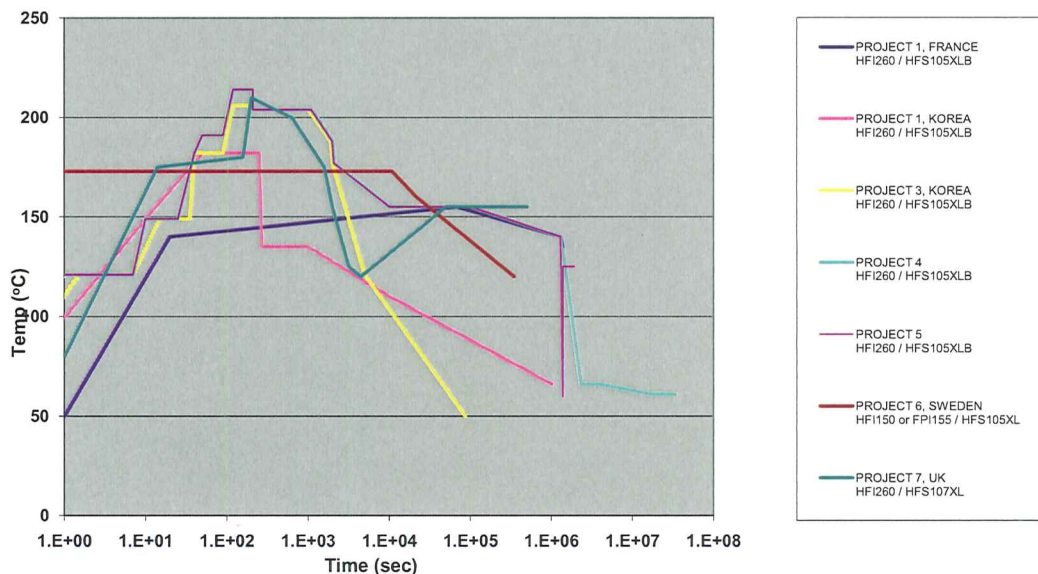
LOCA

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



Note: All dimensions in mm and ±4% unless stated Date: 2010-09-07 Created: SY Approved: CJV Reference: Habiatron 1.2
Data provided indicates nominal values unless stated otherwise and is only valid for reference purposes at the time of publication and is subject to change without prior notice.

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

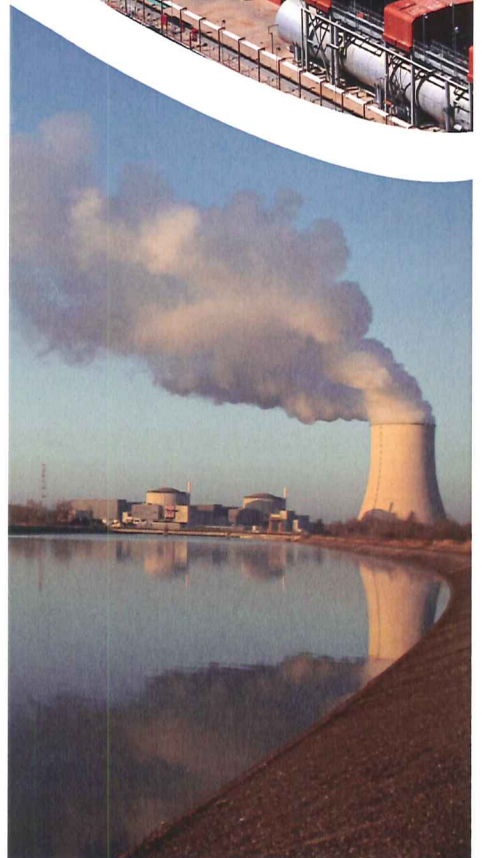
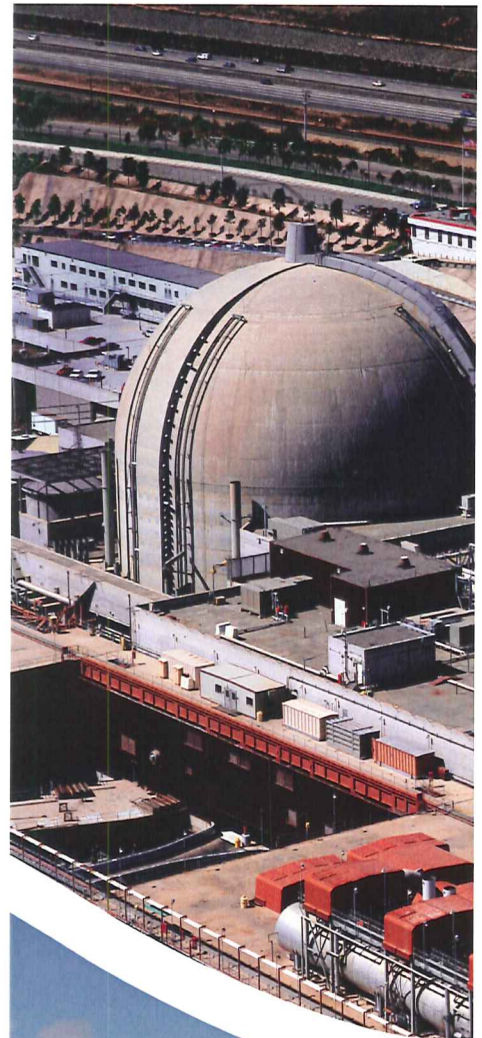
Control Rod Drive Mechanism (CRDM) harnesses

Vattenfall - Sweden

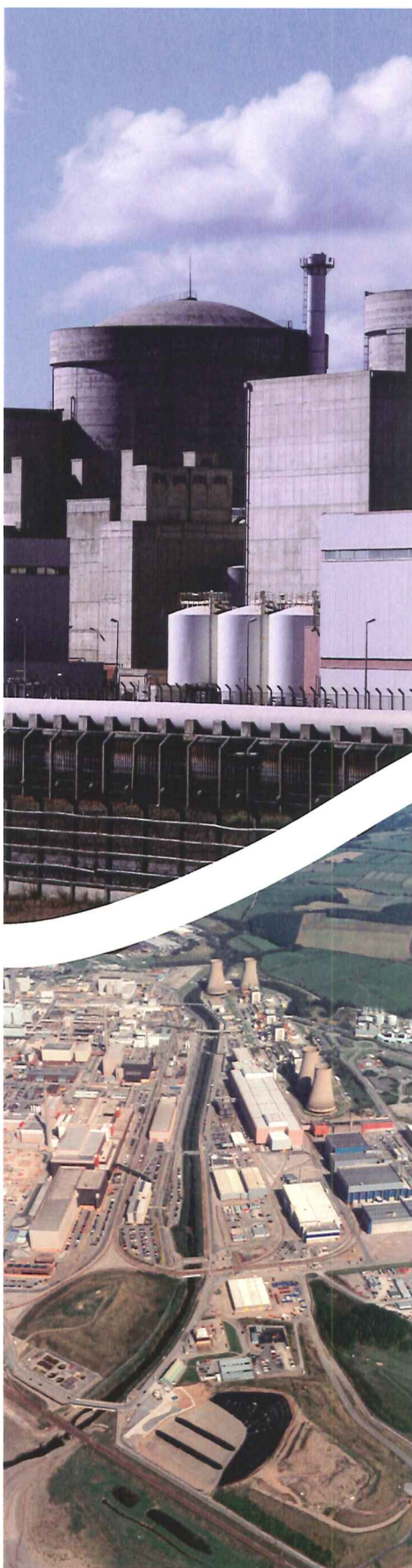
Class 1E LOCA cables

Westinghouse SRS - USA

High radiation cables



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.



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Söderfors, Sweden



Lubieszyn, Poland



Norderstedt, Germany



Changzhou, China

CABLE DRAWING



Drawing Number 700019000	Revision No 0	Status Released	Phase Production
Description RGL 174 (XL)		Habia Inspection Plan (HIP) HIP-G-302	Page 1 of 1
Customer Product Number		Created by E. Österlund	Approved by H. Bertilsson
Customer Product Description		Creation Date 2009-09-30	Approval Date 2009-09-30

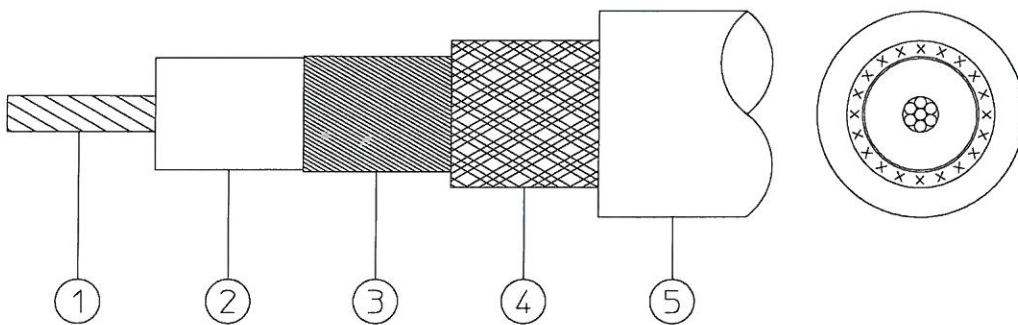
Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 132	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	N/A	V AC
Capacitance	107	nF / km
Impedance	50 ± 3	Ω
Attenuation	89,9	dB / 100m at 400 MHz
Radiation Tolerance	10 ⁶	Gy
Weight	13	g / m
Temperature Rating	-40 / +100	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Silver plated copper conductor	26 AWG	0,48	7 x 0,16
2.	Dielectric of solid XLPE, Natural		1,52	
3.	Low-noise dispersion layer		1,57	
4.	Braided screen of tin plated copper wire	0,10	2,0	
5.	Jacket of HFS 100, Black	0,40	2,8 ± 0,2	

Cable construction:

Low Smoke Zero Halogen (LS0H)
Flame retardant



CABLE DRAWING



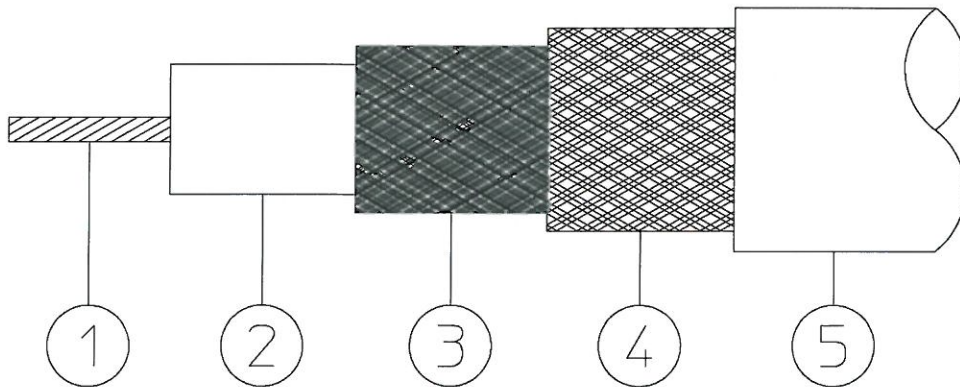
Drawing Number 00169023010	Revision No 00	Status Released	Phase Production
Description RGL 174		Habia Inspection Plan (HIP) -	Page 1 of 1
Customer Product Number -		Created by C. Vestey	Approved by A. Rickardsson
Customer Product Description -		Creation Date 2009-02-09	Approval Date 2009-02-09

Technical Data	Values at +20°C	Unit
Conductor resistance	Max: 132	Ω/km
Test Voltage	3	KV DC
Capacitance	107	nF / km
Impedance	50 ± 3	Ω
Attenuation	89,9	dB / 100m at 400 MHz
Radiation Tolerance	10 E6	Gy
Weight	12	g / m
Temperature Rating	-40 / +85	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Silver plated copper conductor	26 AWG	0,48	7 x 0,16
2.	Solid PE dielectric		1,52	
3.	Low-noise dispersion layer		1,57	
4.	Braided screen of tin plated copper wire	0,10	2,0	
5.	Jacket of HFS 100, Black	0,40	2,8 ± 0,2	

Cable construction:
Low Smoke Zero Halogen (LS0H)
Flame retardant



CABLE DRAWING



Drawing Number 700019001	Revision No 0	Status Released	Phase Production
Description RGL 174 (XL) - TI 3		Habia Inspection Plan (HIP) HIP-G-402	Page 1 of 1
Customer Product Number		Created by E. Österlund	Approved by H. Bertilsson
Customer Product Description		Creation Date 2009-09-30	Approval Date 2009-09-30

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max:132	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	N/A	V AC
Capacitance	107	nF / km
Impedance	50 ± 3	Ω
Attenuation	89,9	dB / 100m at 400 MHz
Radiation Tolerance	10 ⁶	Gy
Weight	70	g / m
Temperature Rating	-40 / +100	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	RG 174 (XL): See drawing: 700019000			7 x 0,16
	Silver plated copper conductor	26 AWG	0,48	
	Dielectric of solid XLPE, Natural		1,52	
	Low-noise dispersion layer		1,57	
	Braided screen of tin plated copper	0,10	2,0	
	Jacket of HFS 100, Black & numbered 1-3	0,40	2,8 ± 0,2	
2.	Solid LT filler		1,3	
3.	Wrapped non woven polyester binder		6,2	
4.	Jacket of HFS 100, Black	1,00	8,2 nom	

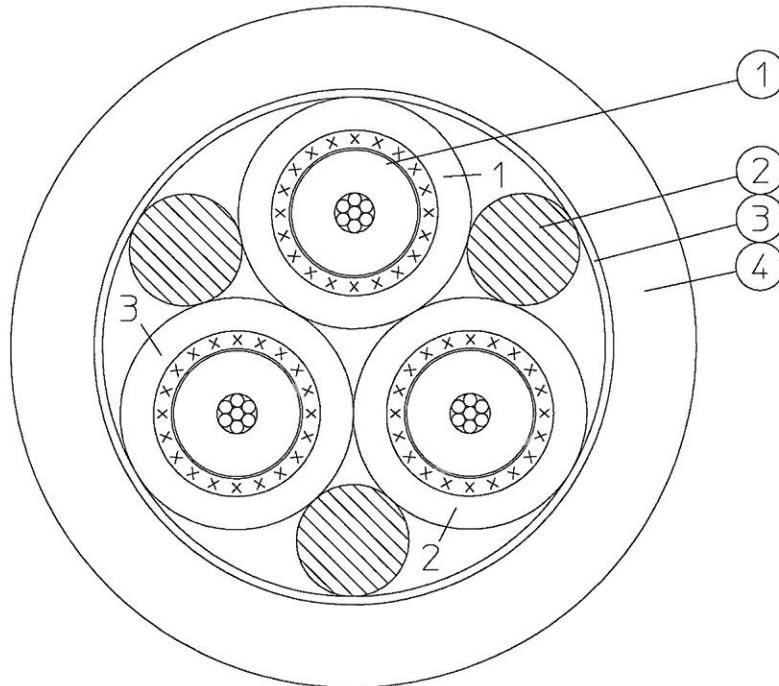
Jacket marking in contrasting colour, intervals of 250 mm:

Habia Cable - 700019001 - YYYY-Www - batchcode

YYYY-Www to be replaced with year and week of manufacture Batchcode to be replaced with manufacturers traceability code

Cable construction:

Low Smoke Zero Halogen (LS0H)
Flame Retardant



CABLE DRAWING



Drawing Number 700041838	Revision No 00	Status Released	Phase Proposal for Production
Description RG 62 coaxial type		Habia Inspection Plan (HIP) HIP-G-320	Page 1 of 1
Customer Product Number 988-1		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 56.6	Ω/km
Insulation Resistance	N/A	MΩ x km
Test Voltage	6	KV DC
Voltage Rating	Max 750	V AC
Capacitance	Max 47	nF / km
Impedance	Aim to meet 93±3	Ω
Attenuation	400 MHz: nom 17,5	dB / 100m
Radiation Tolerance	TID 1x10 ⁵	Gy
Weight	Nom 120	g / m
Temperature Rating	-30/+70 Max conductor temperature: 90	°C
Core Current Rating	N/A	Amps at 40°C ambient air temp.

All dimensions in mm, unless otherwise stated.

Applicable specification

Flame retardant acc to IEEE 383 VTFT

INFO

Jackets separable from each other

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Conductor of solid bare copper	22AWG	0,64	Solid
2.	Dielectric of foamed XLPE		3,71	
3.	Braid of bare copper wire	Wire diam 34AWG	4,4	Optical coverage nom 97%
4.	Wrapped copper/PET foil		4,55	
5.	Inner jacket of HFS 80N, black		6,15	
6.	Outer jacket of HFS 80N, black		9,8 10,2 max	

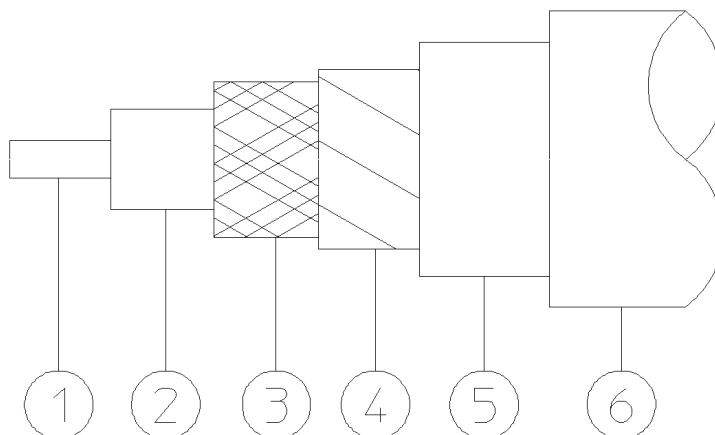
Jacket marking with length indication in contrasting colour every foot

Habia Cable - 700041838 - YYYY-Www - batchcode - L m

YYYY-Www to be replaced with year and week of manufacture.

Batch code to be replaced with manufacturers traceability code

L indicates continuous marking and is replaced with actual length every foot



CABLE DRAWING



Article Number/Doc Number 700059482	Revision No 00	Status Released	Phase Proposal for Production
Description RG 59, Q Class, Black		Habia Inspection Plan (HIP) HIP-C-700042097	Page 1 of 1
Customer Product Number		Created by L. Jian	Approved by L. Jian
Customer Product Description		Creation Date 2014-12-24	Approval Date 2014-12-24

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max 172 (52.4)	Ω / km (Ω / 1000ft)
Insulation Resistance	Min 1500 (4920)	MΩ x km (MΩ x 1000ft)
Test Voltage	5 min: 20	kV DC
Voltage Rating	Max 1700	V AC
Capacitance	Max 72 (22)	nF / km (pF / ft)
Impedance	75±3	Ω
Attenuation	Nom at 1000 MHz: 39.4 (12.0)	dB / 100m (dB / 100ft)
Radiation, Total Integrated Dose (TID)	Max 2.3x10 ⁶	Gy
Weight	125 (0.083)	g / m (lb / ft)
Temperature Rating	Max conductor temperature, 60 years: 90 (194)	°C (°F)

RoHS Compliant.

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Conductor of bare copper-covered steel	23AWG	0.57 (0.022)	Solid
2.	Dielectric of XLPE	t nom 1.56 (61.6)	3.70 (0.146)	
3.	Copper/polyester foil, longitudinal		3.80 (0.150)	Cu side outwards
4.	Braid of silver-plated copper	Wire diam 0.16 (6.3) Thickness 0.32 (12.5)	4.50 (0.177)	Optical coverage min 95%
5.	Jacket of XLPE, Black	t nom 0.83 (32.5)	6.15 (0.242)	
6.	MICA foil		6.50 (0.256)	
7.	Jacket of HFS 105 XL type B, Black	t nom 1.65 (65.0)	9.8 (0.386) Max 10.2 (0.400)	

Jacket marking in contrasting colour

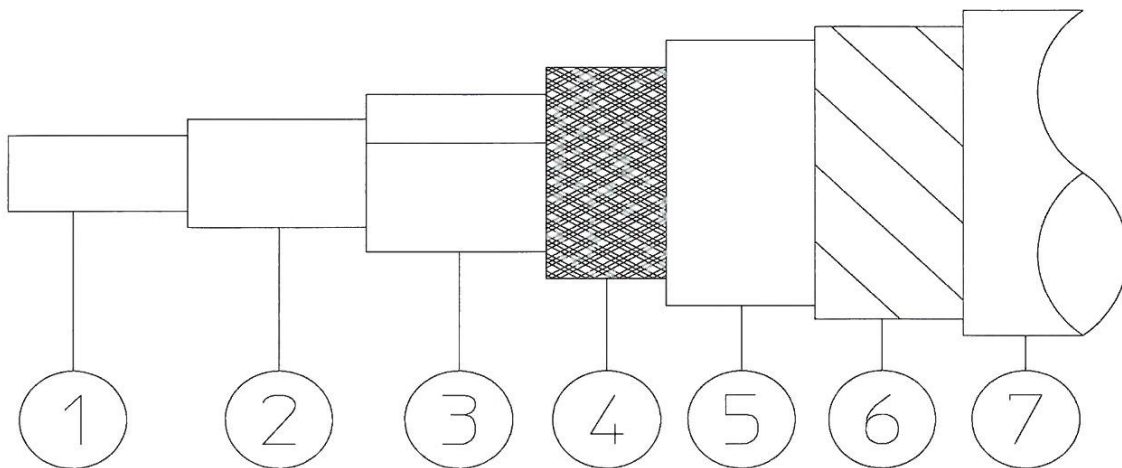
L Habia Cable AB 1700V 23AWG COAX RG59 XLPE/HFS 105 XL type B YYYY-Www batchcode 700059482

YYYY-Www to be replaced with year and week of manufacture.

Batchcode to be replaced with manufacturers traceability code e.g. 091109019

L is replaced with sequential length marking every two (2) feet. Tag on reel indicates first and last number of lengths

Coaxial Cable



CABLE DRAWING



Article Number/Doc Number 700064734	Revision No 01	Status Released	Phase Proposal for Production
Description M/TPC 10 TQ 4		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description Power Cable 4 x 10 sqmm, 1000V		Creation Date 2015-10-14	Approval Date 2015-10-14

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max: 2.05	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	600 / 1000	V
Radiation Tolerance	TID: 2.3 x 10 ⁶	Gy
Weight	530	g / m
Temperature Rating	Max conductor temperature (60 years): +90	°C
Minimum Bend Radius	Fixed: 110 Flexing: 220	mm

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260 (M/TPC 10/4.83)	10mm ² T = 0.45 (.018")	3.93 (.154") 4.83 (.190")	80 x 0.40
2.	Filler			
3.	Wrapped non woven polyester binder		11.8 (.464")	
4.	Jacket of HFS 105 XL B, Black	T = 1.30 (.051")	Nom 14.4 (.567")	

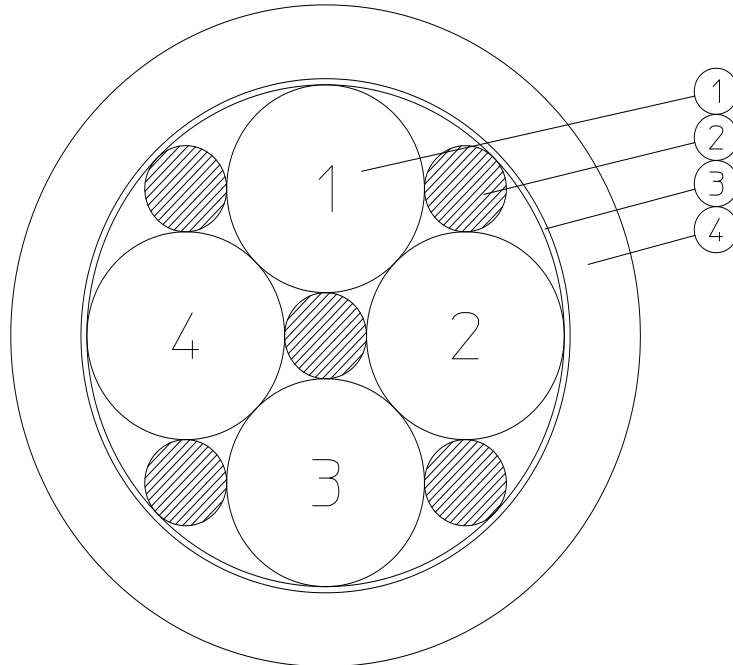
Core identification:

All cores Natural, numbered according to drawing.

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:

Habia Cable - 700064734 - YYYY-Www - batchcode - L

YYYY-Www to be replaced with year and week of manufacture Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING

Habia Cable

Type: HFI 150 mini coaxial	Habia inspection plan		Date of issue 1996-01-18		Drawing no 31789-004-01
	Issued by PJ	Reviewed by	Approved by	Rev. no 4	Revised by JN

Elektriska data vid +20 °C / Electrical data at +20 °C (nom. data)

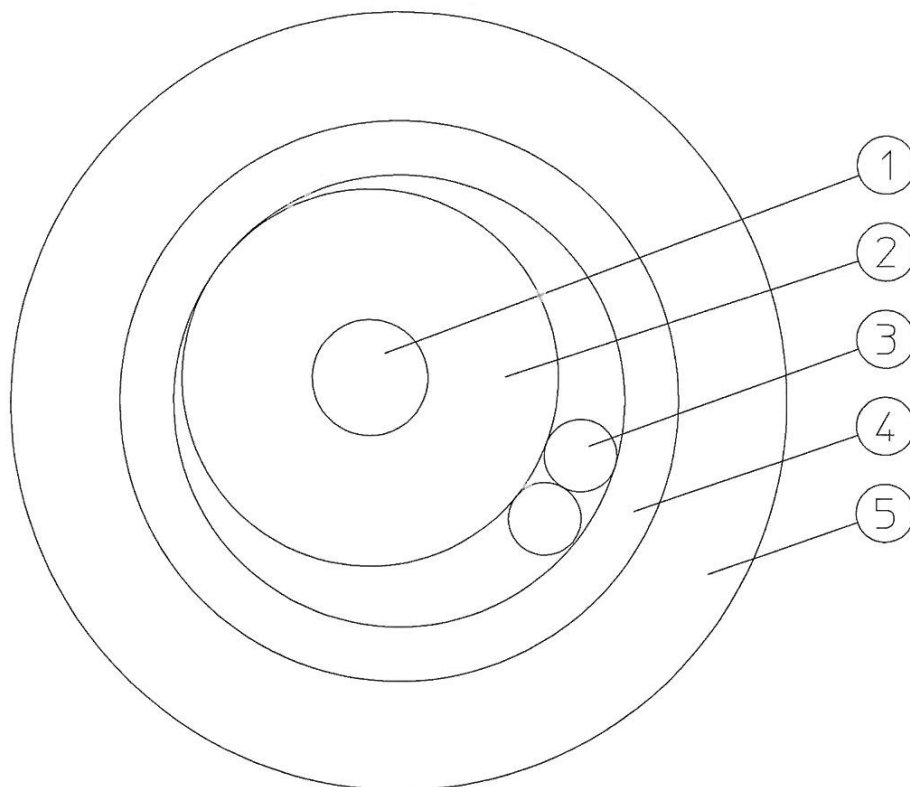
1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE	max 1040	OHMS/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE	>1500	MOHMS x km
KAPACITANS / CAPACITANCE	nom 120	nF/ km
IMPEDANS / IMPEDANCE	at 13 MHz: 50±5	OHMS
DÄMPNING / ATTENUATION	400 MHz 130 dB/100 m
PROVSPÄNNING / TEST VOLTAGE	1min 3	kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING	-50/+135	°C
DRIFTSPÄNNING / VOLTAGE RATING	2000 DC	VOLTS
VIKT / WEIGHT	1,3	kg/km

This drawing remains a property of HABIA CABLE and it is forbidden to copy, show or give it to third part or other unauthorized persons without our written permission.

Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam.	Anm./Remarks
1	Conductor of high strength silver-plated copper alloy	SPTF 3401	0,16	1x0,16
2	Dielectric of HFI 150		0,52	
3	Drain wire of silver plated copper	wire diam. 0,102 x 2		
4	Wrap of Aluminium/Polyester foil		0,75	
5	Jacket of HFI 150, natural	t=0,15	1,05 max 1,15	

Break-down voltage: > 20 kV DC



CABLE DRAWING



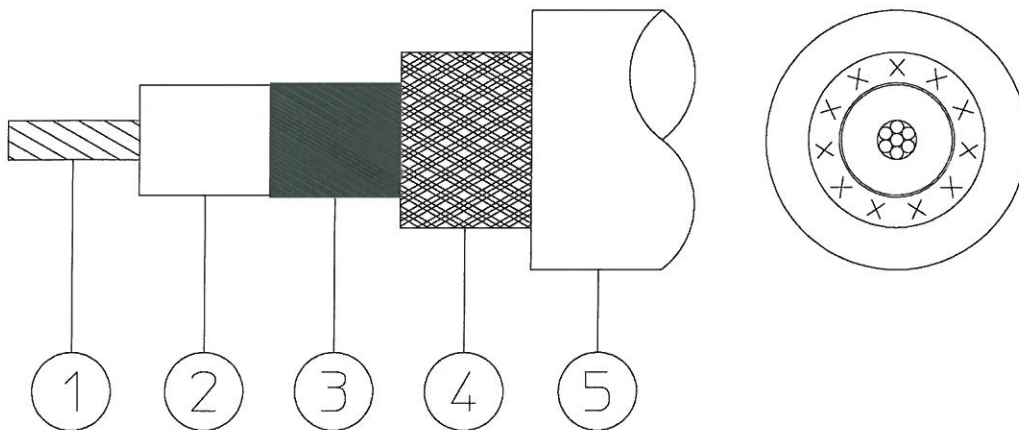
Drawing Number 700020751	Revision No 2	Status Released	Phase Production
Description XLPE/SPC 3007/0,85 - LSTI 1		Habia Inspection Plan (HIP) HIP-G-302	Page 1 of 1
Customer Product Number		Created by H. Bertilsson	Approved by T. Wärefors
Customer Product Description		Creation Date 2009-10-22	Approval Date 2009-10-22

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 344	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	250	V AC
Capacitance	Nom: 100	nF / km
Impedance	Nom: 50 ± 5	Ω
Radiation Tolerance	>10 ⁶	Gy
Weight	7	g / m
Temperature Rating	-40 / +100	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Silver plated copper conductor	30 AWG	0,30	7 x 0,10
2.	Dielectric of solid, cross-linked PE		0,85 ± 0,04	
3.	Semi-conductive layer		0,88	
4.	Braided screen of silver plated copper wire	0,10	1,35	Nom coverage: 85%
5.	Jacket of HFS 100, Green		2,00 ± 0,10	

Note: All materials are halogen free (LSOH), flame retardant jacket



CABLE DRAWING



Drawing Number 700062921	Revision No 00	Status Released	Phase Proposal for Production
Description RG 62 Coax (Stranded)		Habia Inspection Plan (HIP) HIP-G-320	Page 1 of 1
Customer Product Number 988-1		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-06-22	Approval Date 2015-06-21

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max 83.3	Ω/km
Insulation Resistance	N/A	MΩ x km
Test Voltage	6	KV DC
Voltage Rating	Max 750	V AC
Capacitance	Max 44	nF / km
Impedance	Aim to meet 93±3	Ω
Attenuation	400 MHz: nom 21	dB / 100m
Radiation Tolerance	TID 1x10 ⁵	Gy
Weight	Nom 120	g / m
Temperature Rating	-30/+70 Max conductor temperature: 90	°C

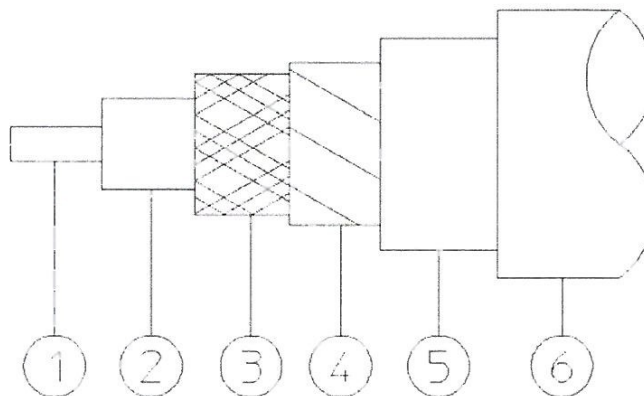
All dimensions in mm, unless otherwise stated.

Applicable specification
Flame retardant acc to IEEE 383 VTFT

INFO
Jackets separable from each other

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Conductor of stranded tin plated copper	24AWG	0.60	19 x 0.127
2.	Dielectric of foamed XLPE		3.71	
3.	Braid of bare copper wire	Wire diam 34AWG	4.4	Optical coverage nom 97%
4.	Wrapped copper/PET foil		4.55	
5.	Inner jacket of HFS 80N, black		6.15	
6.	Outer jacket of HFS 80N, black		9.8 10.2 max	

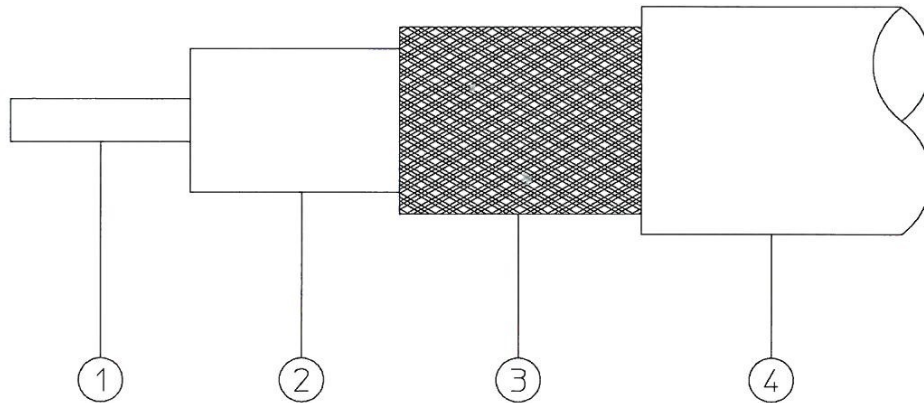
Jacket marking with meter indication in contrasting colour, intervals of 1.0 m ±0.02 m:
Habia Cable - 700041838 - YYYY-Www - batchcode - L
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING		Habia Cable	
Drawing Number 700062920	Revision No 00	Status Released	Phase Proposal for Production
Description 75 Ohms 3 kV Coax (Stranded)		Habia Inspection Plan (HIP) HIP-G-320HIP-G-320	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-06-22	Approval Date 2015-06-22

Technical Data	Values at +20° C	Unit		
Conductor Resistance	Max: 32	Ω/km		
Insulation Resistance	>1000	MΩ x km		
Test Voltage	10	KV DC		
Voltage Rating	3000	V AC		
Capacitance	68	nF / km		
Impedance	75 ± 3	Ω		
Weight	75	g / m		
Temperature Rating	-40 / +80	°C		
RoHS Compliant.				
All dimensions in mm, unless otherwise stated.				
Pos	Description	Dimension	Overall Diameter	Remarks
1.	Silver plated copper conductor	20 AWG	0.96	19 x 0.20
2.	Dielectric of solid PE, Natural		5.85	
3.	Braided screen of tin plated copper wire	0.13	6.45	Nom coverage: 96%
4.	Jacket of HFS 105 XL B, Black	0.50	7.45 nom	
Jacket marking with meter indication in contrasting colour, intervals of 1.0 m ±0.02 m: Habia Cable - 700062920 - YYYY-Www - batchcode - L YYYY-Www to be replaced with year and week of manufacture. Batchcode to be replaced with manufacturers traceability code L indicates continuous meter marking and is replaced with actual length.				

Cable construction:
Low Smoke Zero Halogen (LSZH)



HABIATRON



Drawing Number 700039341	Revision No 00	Status Released	Phase Proposal for Production
Description M/TPC 1601/1,94 - STQ 50x2		Habia Inspection Plan (HIP)	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2011-12-21	Approval Date 2011-12-21

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 16.5 (5.03)	Ω/km (Ω/1000ft)
Insulation Resistance	Min: 1500	MΩ x km
Test Voltage	5 min, 7.5	kV DC
Voltage Rating	600 / 1000	V AC
Radiation Tolerance	Max 2.4*10 ⁶	Gy
Weight	1960	g / m
Temperature Rating	Max conductor temperature, 40 years: 90	°C

RoHS Compliant.

All dimensions in mm (inch), unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Overall Diameter (Inches)
1.	Solid, tin plated copper conductor	16 AWG	1,29	0.050"
	Insulation of HFI 260, natural and marked with numbers	0,325 (0.012")	1,94	0.076"
2.	Binder, non-woven polyester	1x 50%	7,7	0.303"
3.	Binder, non-woven polyester	1x 50%	14,9	0.586"
4.	Binder, non-woven polyester	1x 50%	22,1	0.870"
5.	Binder, non-woven polyester	1x 50%	29,3	1.153"
6.	Cu/PET foil screen		29,5	1.161"
7.	Drain wire	16 AWG	1,29	0.050"
8.	Binder, non-woven polyester	1x 50%	31,0	1.220"
9.	Jacket of HFS 105 XL type B, Black	2,30 (0.090")	35.6 37.0 max	1.401" 1.456"

Jacket marking with meter indication in yellow colour, intervals of 1,0 m ±0,02 m:

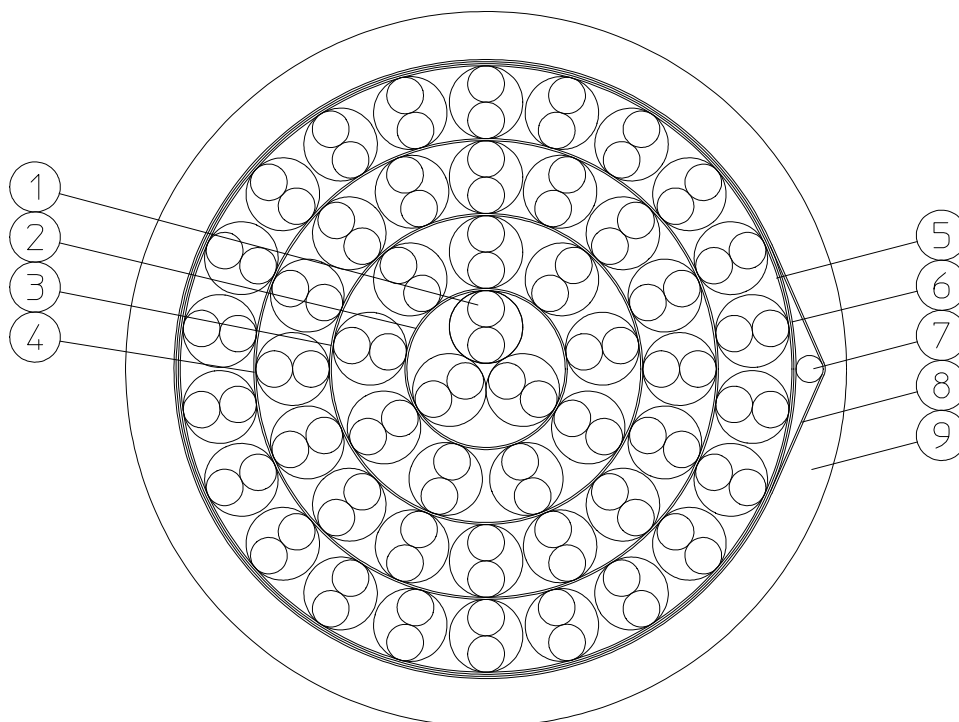
Nuclear-EQ POxxxxx Habia Cable AB 600V HFI260/HFS 105 XL type B 700039341 - YYYY-Www - batchcode - L m

YYYY-Www to be replaced with year and week of manufacture.

Batchcode to be replaced with manufacturers traceability code

L indicates continuous meter marking and is replaced with actual length.

xxxxx to be replaced by customer purchase order number



CABLE DRAWING



Drawing Number 700041837	Revision No 00	Status Released	Phase Proposal for Production
Description M/TPC 1601/1.94 - STQ 7x2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

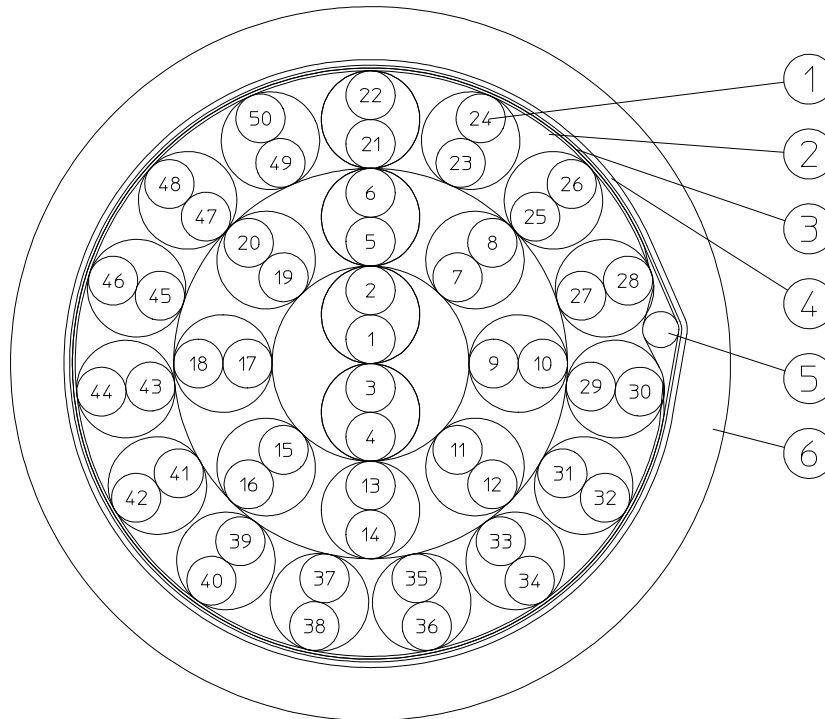
Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 16.5	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min:7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	2*10 ⁶	Gy
Weight	TBD	g / m
Temperature Rating	Insulation, 60 years: 90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin-plated copper conductor	16 AWG	1.29	Solid conductor
	Insulation of HFI 260, natural and number marked	t = 0.32	1.94	
2.	Binder, non-woven polyester			
3.	Cu/PET foil	t = 0.05		
4.	Binder, polyester foil		21.8	
5.	Tin-plated copper wire	16 AWG	1.29	Solid conductor
6.	Jacket of HFS 105 XL type B, Black	t = 1.90	25.6	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable – 300V – HFI260/HFS 105 XL type B - 700041837 - YYYY-Www - batchcode – L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.

Min bend radius, pulling: 360 mm
 Min bend radius, training: 180 mm
 Max pulling tension: 465 kg



CABLE DRAWING



Drawing Number 700041839	Revision No 00	Status Released	Phase Proposal for Production
Description B/2219 STW 20		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 55.7	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min: 7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	10 ⁹	Gy
Weight	TBD	g / m
Temperature Rating	50 years, conductor temperature: 90	°C

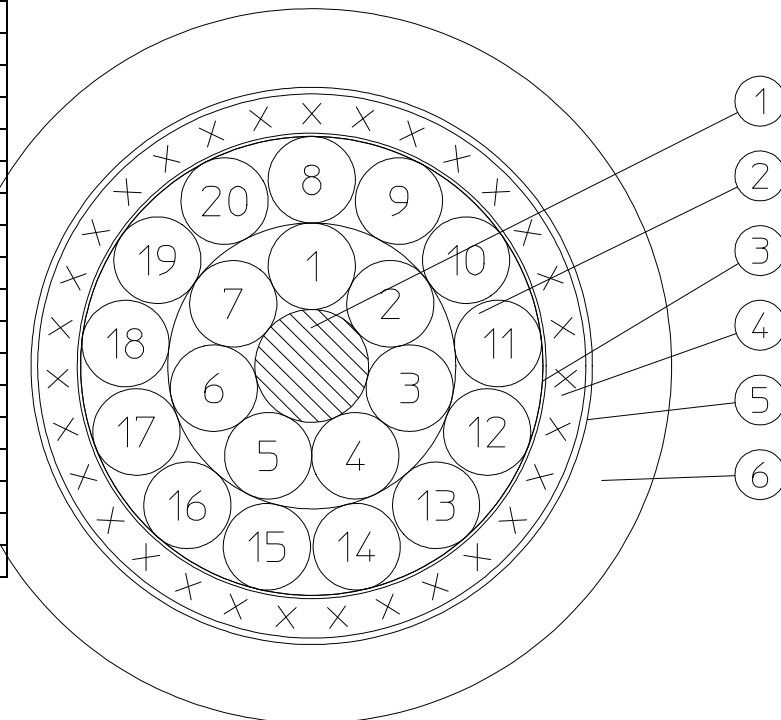
RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Filler			
2.	Tin-plated copper conductor Insulation of HFI 150	22 AWG t = 0.28	0.76 1.32	19 x 0.16
3.	Binder, Polyester			
4.	Braid of tin-plated copper	Diam: 0.127	8.3	Min 85% coverage
5.	Binder, non-woven polyester		8.5	
6.	Jacket of HFS 105 XL type B, Black	t = 1.20 mm	10.9	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:

Habia Cable - 700041839 - YYYY-Www - batchcode - L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.

1	Black
2	Brown
3	Red
4	Orange
5	Yellow
6	Green
7	Blue
8	Violet
9	Gray
10	White
11	White/Black
12	White/Brown
13	White/Red
14	White/Orange
15	White/Yellow
16	White/Green
17	White/Blue
18	White/Violet
19	White/Gray
20	White/Black/Brown

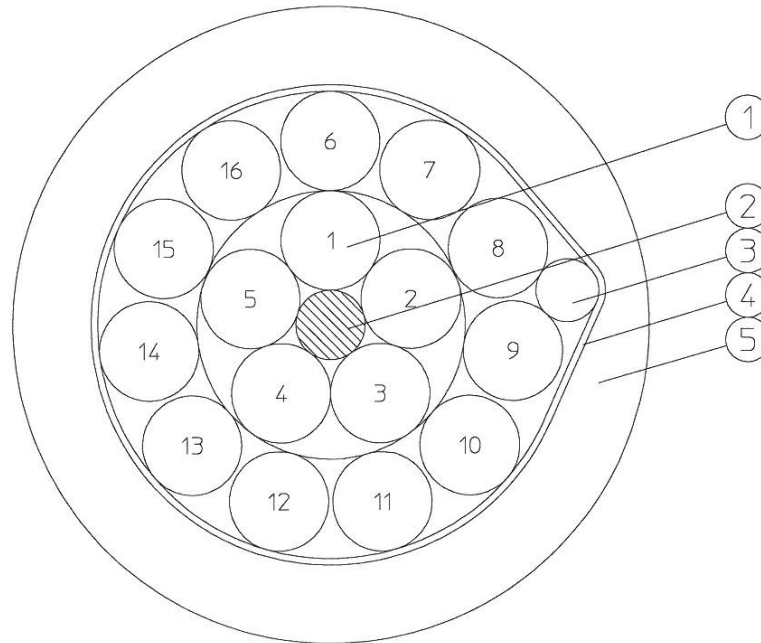


CABLE DRAWING



Article Number/Doc Number 700060292	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 2019 STW 16		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

Technical Data	Values at +20° C		Unit	
Conductor Resistance	Max: 34		Ω/km	
Insulation Resistance	Min: 1500		MΩ x km	
Test Voltage	5 Min: 7.5		KV DC	
Voltage Rating	600		V AC	
Radiation Tolerance	>10 ⁵		Gy	
Weight	Approx. 181		g / m	
Temperature Rating	Max conductor temperature (40 years): 90		°C	
Minimum Bend Radius	Fixed: 50		mm	
	Flexing: 100			
RoHS Compliant.				
All dimensions in mm, unless otherwise stated.				
Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	20 AWG T = 0.33 (.012")	0.96 (.037") 1.52 (.059")	19 x 0.203 (0.60mm ²)
2.	Filler		1.0 (.039")	
3.	Drain wire of tin plated copper	20 AWG	0.96 (.037")	19 x 0.203 (0.60mm ²)
4.	Wrapped copper / polyester foil screen		7.4 (.291")	
5.	Jacket of HFS 80 N, Black	T = 1.00 (.039")	9.4 (.370") Max: 9.8 (.385")	
Core identification:				
All cores White, numbered according to drawing.				
Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:				
Habia Cable – 600V – ZN 2019 STW 16 Non-Class 1E – FPI155/HFS80N – 700060292 – YYYY-Www – batchcode – L				
YYYY-Www to be replaced with year and week of manufacture.				
Batch code to be replaced with manufacturers traceability code				
L indicates continuous meter marking and is replaced with actual length.				



CABLE DRAWING



Article Number/Doc Number 700060290	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 1419 TW 12		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max: 10.3	Ω/km
Insulation Resistance	Min: 1500	MΩ x km
Test Voltage	5 Min: 7.5	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	>10 ⁵	Gy
Weight	Approx. 330	g / m
Temperature Rating	Max conductor temperature (40 years): 90	°C
Minimum Bend Radius	Fixed: 65	mm
	Flexing: 130	

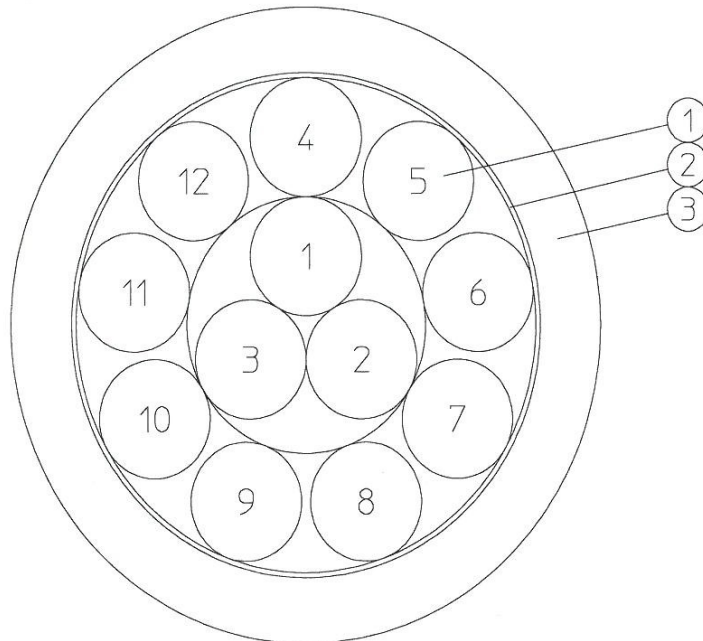
RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	14 AWG T = 0.33 (.012")	1.70 (.066") 2.36 (.092")	19 x 0.361 (1.71mm ²)
2.	Wrapped non woven polyester binder		10.0 (.393")	
3.	Jacket of HFS 80 N, Black	T = 1.30 (.051")	12.6 (.496") Max: 13.3 (.523")	

Core identification:

All cores White, numbered according to drawing.

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable – 600V – ZN 1419 TW 12 Non-Class 1E – FPI155/HFS80N – 700060290 – YYYY-Www – batchcode – L
YYYY-Www to be replaced with year and week of manufacture.
Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING

Habia Cable

Type: N 1619 STW 12

Habia inspection plan

Date of issue
1999-04-15

Drawing no
43739-032-06

Issued by
TW

Approved by
POM

Rev. no

Revised by

Revised date

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE	max 15,7 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE	100 MΩ x km
KAPACITANS / CAPACITANCE	NS nF/ km
IMPEDANS / IMPEDANCE	NS Ω
DÄMPNING / ATTENUATION	MHz NS dB/100 m
PROVSPÄNNING / TEST VOLTAGE	3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING	-40/+70 °C
DRIFTSPÄNNING / VOLTAGE RATING	AC 220 V
VIKT / WEIGHT	kg/km

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Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	H-N 1619	16 AWG	1,86/1,36	19x0,287
2	Non-woven polyesterfolie		7,9	
3	Braid of tinned copper wire	wire diam. 0,16	8,6	min cov. 85%
4	Non-woven polyesterfolie		8,8	
5	Jacket of HFS 80, yellow pressure-extruded round with dull surface.	t=1,2	11,2	

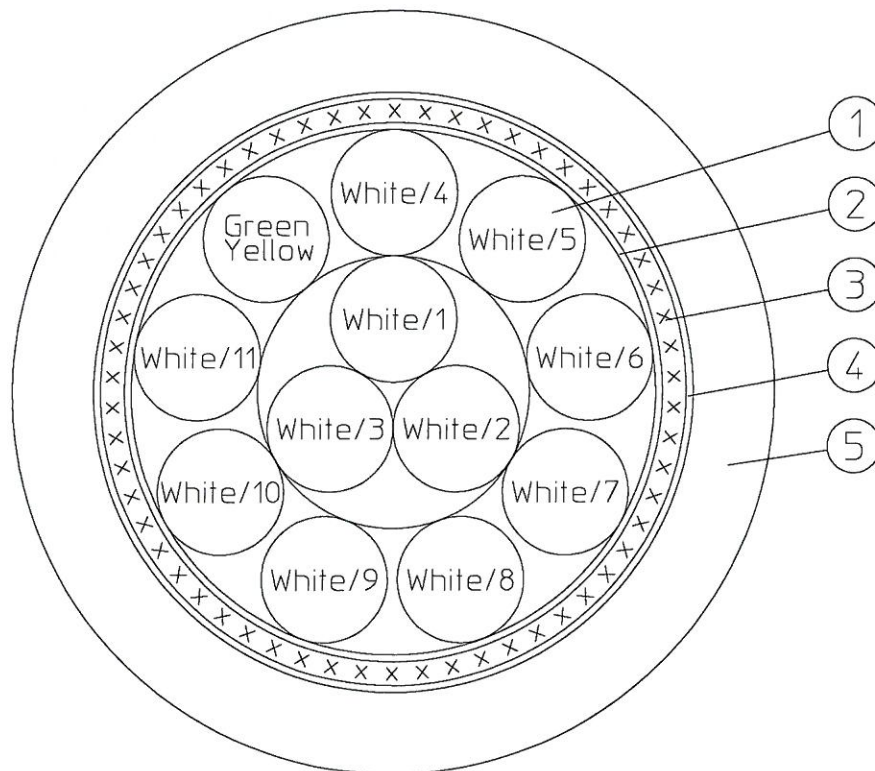
Jacket marking with metre indication. 0, 1, 2, etc

Marking between metre indication:

HABIATRON 43739-032-06 NF C 32 070 C1 - TYPE 10 B

Intervals: 1,0 ± 0,02 m

Marking colours: black



Habia Cable förbehåller sig rätten att ändra ingående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



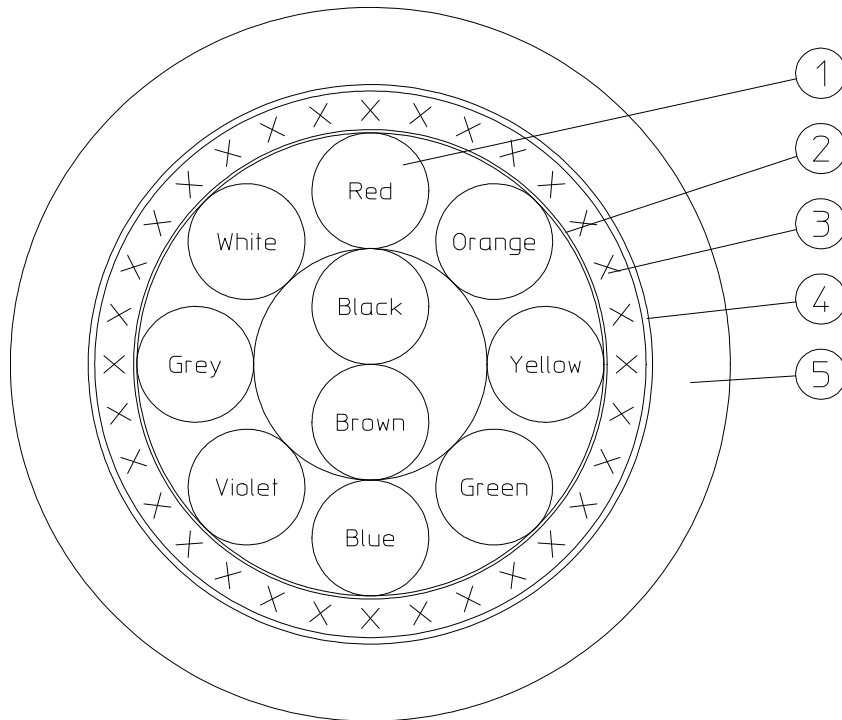
Drawing Number 700041840	Revision No 00	Status Released	Phase Proposal for Production
Description B/1819 STW 10		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 21	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min: 7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	10 ⁶	Gy
Weight	TBD	g / m
Temperature Rating	50 years, conductor temperature: 90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin-plated copper conductor Insulation of HFI 150	18 AWG t = 0.30	1.21 1.80	19 x 0.254
2.	Binder, Polyester			
3.	Braid of tin-plated copper	Diam: 0.127	8.5	Min 85% coverage
4.	Binder, non-woven polyester		8.7	
5.	Jacket of HFS 105 XL type B, Black	t = 1.20 mm	11.1	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable - 700041840 - YYYY-Www - batchcode - L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



Habia inspection plan
HIP-C-40307769

Date of issue
2006-07-03

Drawing no
603-16336-060

Description: KCB-2 STMM-K 9x 2x 0,6

Issued by
CJV

Approved by
PS

Rev. no
01

Revised by
EJ

Revised date
2007-01-11

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	Cu: nom 29, CuNi:nom 820 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE.....	>1500 MΩ x km
KAPACITANS / CAPACITANCE.....	N/A nF/ km
IMPEDANS / IMPEDANCE.....	N/A Ω
DÄMPNING / ATTENUATION.....	MHzN/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING.....	-60 / +150 °C
DRIFTSPÄNNING / VOLTAGE RATING.....	.600 V
VIKT / WEIGHT.....	approx. 185 kg/km

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Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	Copper conductor (+ leg) Insulation of PEEK	20 AWG thickness = 0,2	0,96 1,36	19 x 0,20
2	Copper nickel conductor (- leg) Insulation of PEEK	20 AWG thickness = 0,2	0,96 1,36	19 x 0,20
3	Glass yarn (HT) filler			
4	Kapton binder		9,1	
5	Braided screen of tin plated copper	wire diam 0,16	9,8	min cov 85%
6	Jacket of PEEK (amorphous), Natural	thickness = 0,45	10,7 nom	

Jacket marking:

HABIA CABLE 603-16336-060 KCB-2 STMM-K 9x2x0,6 YYYYYwWW 000 m
YYYYwWW to be replaced with year and week of manufacture (e.g. 2006w27)

Cable construction:

Radiation tolerance - 10⁹Rads TID

Core identification:

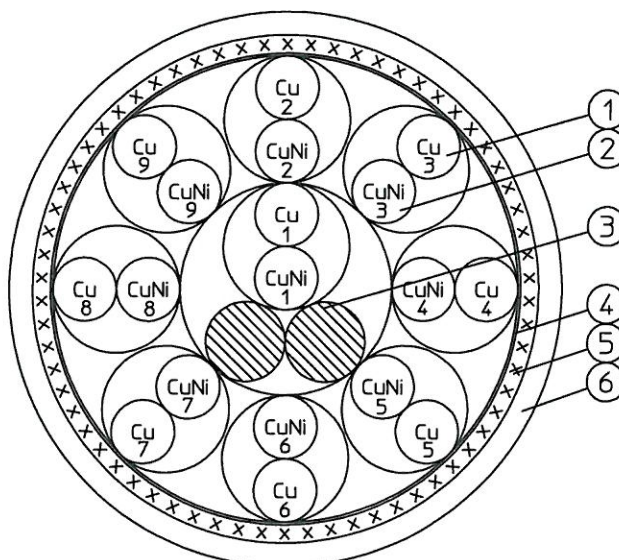
All cores marked according to drawing

Wire marking at 0.1m (4") intervals

Jacket marking at 1m (40") intervals

000m = Meter marking (e.g. 001m at first meter interval,

002m at second interval)



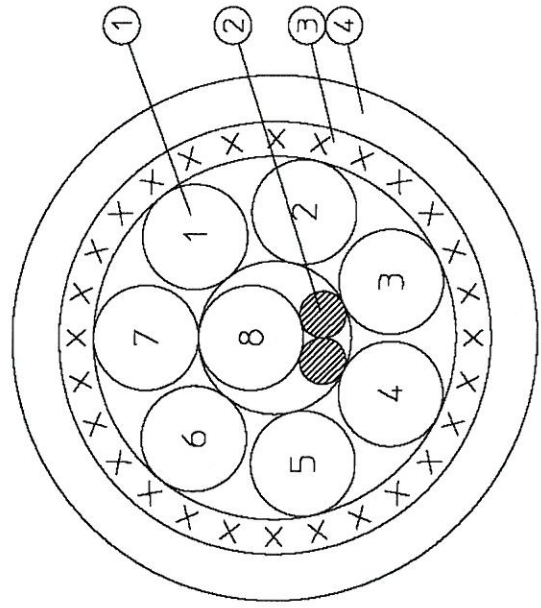
Habia Cable förbehåller sig rätten att ändra inrägande material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

Pos	Description	Dimension	Overall Diameter	Remarks	Technical Data	Values at 20° C	Unit
1.	Nickel plated copper conductor Insulation of HFI 260, Natural and numbered according to drawing	20 AWG 0,20	0,96 1,36 nom	19 x 0,20	Conductor Resistance	32,4	Ω/km
2.	Glass yarn (HT) filler		0,6		Insulation Resistance	>1500	MO x km
3.	Braided screen of nickel plated copper	32 AWG 0,60	5,6	Min coverage: 85%	Test Voltage	3	KV DC
4.	Jacket of HFI 260, Natural		6,8 nom		Voltage Rating	600	V AC
					Radiation Tolerance	10 E7	Gy
					Weight	100	g / m
					Temperature Rating	(continuous) -60 / +200 (short duration) +260	°C

Note: Kevlar strand may be included beneath screen to hold bundled cores together throughout production.

Jacket marking

HABIA CABLE M 2019 NPC - STM 8 700002386 8C 20AWG PEEK 000m
 Jacket marking at 1m (40") intervals
 000m = Meter marking (e.g. 001m at first meter interval, 002m at second interval)



CABLE DRAWING		Status Released	Phase Production	All dimensions in mm, unless otherwise stated.	Habia Cable	
Drawing Number 700002386	Revision No 02	Description M 2019 NPC - STM 8 (4x2)			Page 1 of 1	
Cust Prod Number 6403-57000-CS-008	Customer Product Description Cable, 8 Conductor (4 pairs), 20 AWG			Created by PS	Approved by AR	
Habia Inspection Plan (HIP) HIP-C-40307769				Creation Date 2007-06-11	Approval Date 2007-06-12	

CABLE DRAWING



Article Number/Doc Number 700060289	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 1419 TW 7		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

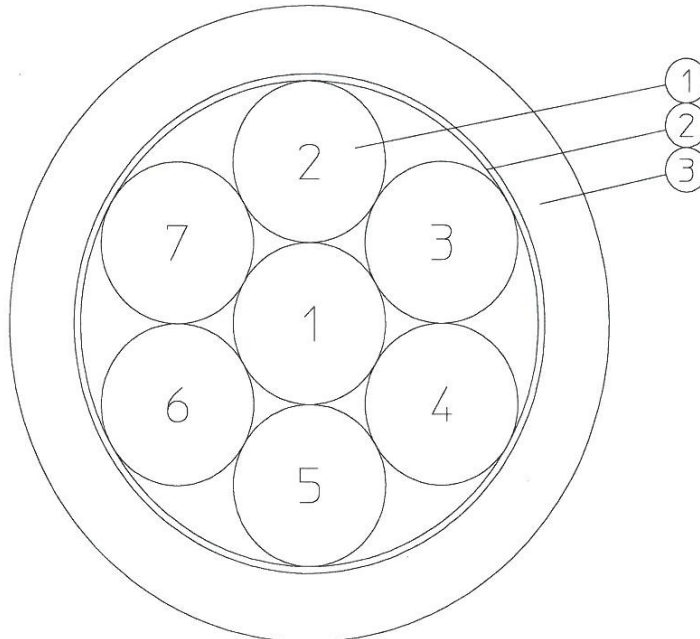
Technical Data	Values at +20° C		Unit
Conductor Resistance		Max: 10.3	Ω/km
Insulation Resistance		Min: 1500	MΩ x km
Test Voltage		5 Min: 7.5	KV DC
Voltage Rating		600	V AC
Radiation Tolerance		>10 ⁵	Gy
Weight		Approx. 197	g / m
Temperature Rating	Max conductor temperature (40 years): 90		°C
Minimum Bend Radius		Fixed: 50	mm
		Flexing: 100	

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	14 AWG T = 0.33 (.012")	1.70 (.066") 2.36 (.092")	19 x 0.361 (1.71mm ²)
2.	Wrapped non woven polyester binder		7.3 (.287")	
3.	Jacket of HFS 80 N, Black	T = 1.00 (.039")	9.3 (.366") Max: 9.7 (.381")	

Core identification:
All cores White, numbered according to drawing.

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable – 600V – ZN 1419 TW 7 Non-Class 1E – FPI155/HFS80N – 700060289 – YYYY-Www – batchcode – L
YYYY-Www to be replaced with year and week of manufacture.
Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



Drawing Number 700018999	Revision No 1	Status Released	Phase Production
Description M 2219 TPC - STI 2 - TI 7		Habia Inspection Plan (HIP) HIP-G-402	Page 1 of 1
Customer Product Number		Created by E. Österlund	Approved by H. Bertilsson
Customer Product Description		Creation Date 2009-09-29	Approval Date 2009-09-30

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 60	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	Total Integrated Dose: 10 ⁷	Gy
Weight	210	g / m
Temperature Rating	-40 / +100	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor	22 AWG	0,76	19 x 0,16
	Insulation of HFI 260		1,16	
2.	Drain wire of tin plated copper	22 AWG	0,76	19 x 0,16
3.	Wrapped aluminium polyester foil screen		2,5	
4.	Inner jacket of HFS 100, Black & numbered 1-7	0,60	3,7 nom	
5.	Wrapped non woven polyester binder		10,7	
6.	Jacket of HFS 100, Black	1,30	13,3 nom	

Core identification:

All cores Natural, numbered according to drawing.

Jacket marking in contrasting colour, intervals of 250 mm:

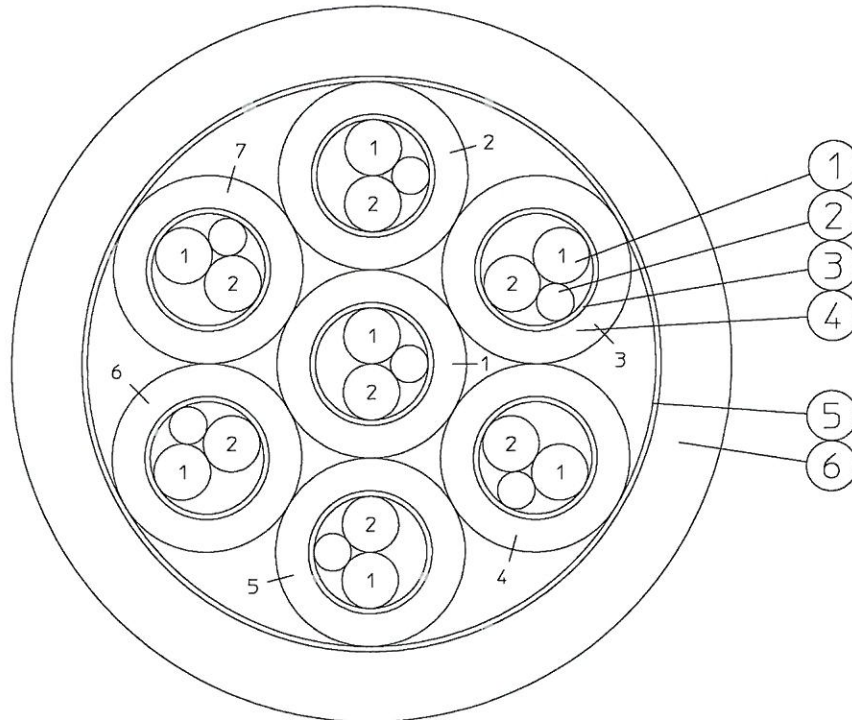
Habia Cable - 700018999 - YYYY-Www - batchcode

YYYY-Www to be replaced with year and week of manufacture Batchcode to be replaced with manufacturers traceability code

Cable construction:

Low Smoke Zero Halogen (LS0H)

Flame retardant



CABLE DRAWING



Article Number/Doc Number 700064732	Revision No 00	Status Released	Phase Proposal for Production
Description M/TPC 1601 QSTQ 7x2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description Control Cable 7 Pair x 16 AWG, 300V		Creation Date 2015-10-12	Approval Date 2015-10-12

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max: 14.7	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	300	V AC
Radiation Tolerance	TID: 2.3 x 10 ⁶	Gy
Weight	418	g / m
Temperature Rating	Max conductor temperature (60 years): +90	°C
Minimum Bend Radius	Fixed: 125	mm
	Flexing: 250	

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260 (M/TPC 1601/1,88)	16 AWG T = 0.30 (.012")	1.29 (.050") 1.88 (.074")	1 x 1.29 (.050")
2.	Wrapped polyester binder		10.2 (.401")	
3.	Inner jacket of HFS 105 XL B, Black	T = 1.30 (.051")	12.8 (.504")	
4.	Drain wire of tin plated copper	16 AWG	1.29 (.050")	1 x 1.29 (.050")
5.	Wrapped copper / polyester foil screen		13.9 (.547")	50% overlap
6.	Outer jacket of HFS 105 XL B, Black	T = 1.40 (.055")	Nom 16.7 (.657")	

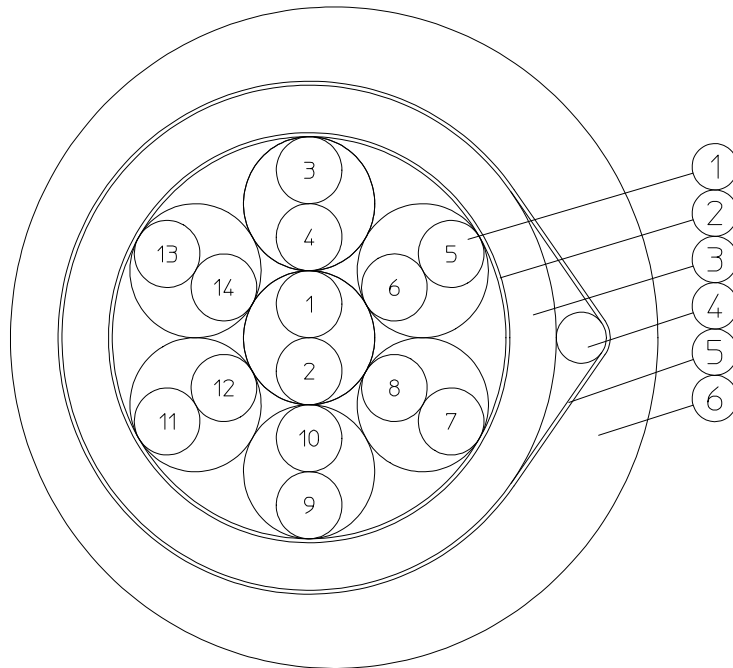
Core identification:

All cores Natural, numbered according to drawing.

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:

Habia Cable - 700064732 - YYYY-Www - batchcode - L

YYYY-Www to be replaced with year and week of manufacture Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



Drawing Number 700041836	Revision No 00	Status Released	Phase Proposal for Production
Description M/TPC 1601/1.94 - STQ 7x2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

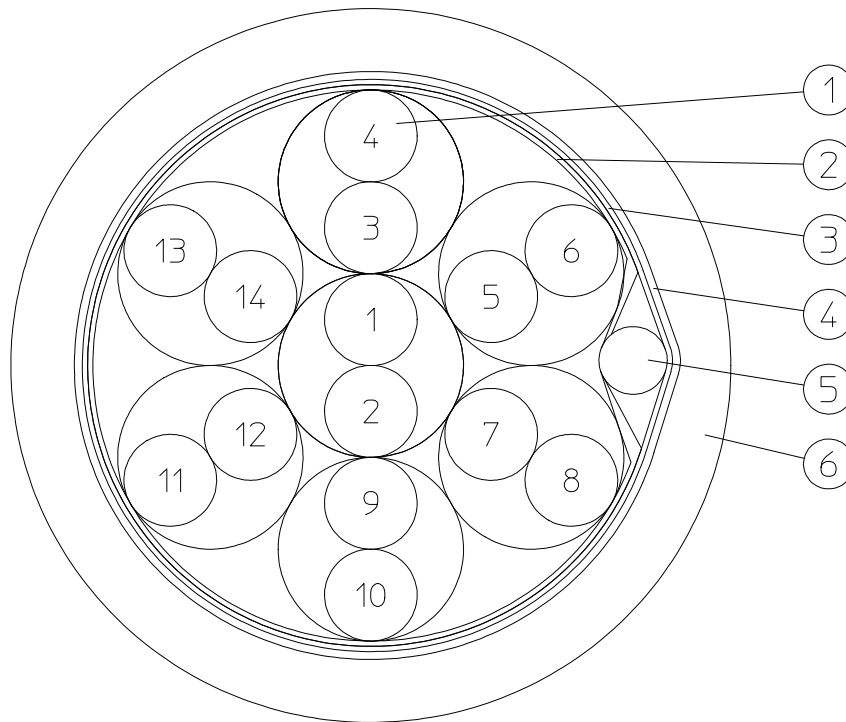
Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 16.5	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min: 7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	2*10 ⁶	Gy
Weight	330	g / m
Oxygen index	40%	ISO 4589
Temperature Rating	Insulation, 60 years: 90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin-plated copper conductor	16 AWG	1.29	Solid conductor
	Insulation of HFI 260, natural and number marked	t = 0.32	1.94	
2.	Binder, non-woven polyester			
3.	Cu/PET foil	t = 0.05		
4.	Binder, polyester foil		12.2	
5.	Tin-plated copper wire	16 AWG	1.29	Solid conductor
6.	Jacket of HFS 105 XL type B, Black	t = 1.30	14.8	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable – 300V – HFI260/HFS 105 XL type B – 700041836 – YYYY-Www – batchcode – L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.

Min bend radius, pulling: 205 mm
 Min bend radius, training: 105 mm
 Max pulling tension: 131 kg



CABLE DRAWING



Customer ref: 6403-57000-CS-002

Habia inspection plan
HIP-C-40307769

Date of issue
2006-10-02

Drawing no
403-07769-022

Description: M 2019 TPC - STM 5

Issued by
CJV

Approved by
PS

Rev. no
02

Revised by
EJ

Revised date
2007-06-08

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	max: 32,4 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE.....	>1500 MΩ x km
KAPACITANS / CAPACITANCE.....	N/A nF/ km
IMPEDANS / IMPEDANCE.....	N/A Ω
DÄMPNING / ATTENUATION.....	MHzN/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING.....	-60 / +200 °C
DRIFTSPÄNNING / VOLTAGE RATING.....	.600 V
VIKT / WEIGHT.....	approx. 50 kg/km

This drawing remains a property of HABIA CABLE and it is forbidden to copy, show or give it to third part or other unauthorized persons without our written permission.

Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	Tin plated copper conductor Insulation of PEEK	20 AWG (19 x 0,20) t=0,2	0,96 1,36	0.037" 0.053"
2	Filler			
3	Braid of tin plated copper	wire diam 0,10	4,2	0.165"
4	Jacket of PEEK, Natural	t=0,35 (0.014")	4,9 nom	0.192"

Jacket marking:

HABIA CABLE M 2019 TPC-STM 5 403-07769-022 5C 20AWG PEEK 000m

Cable construction:

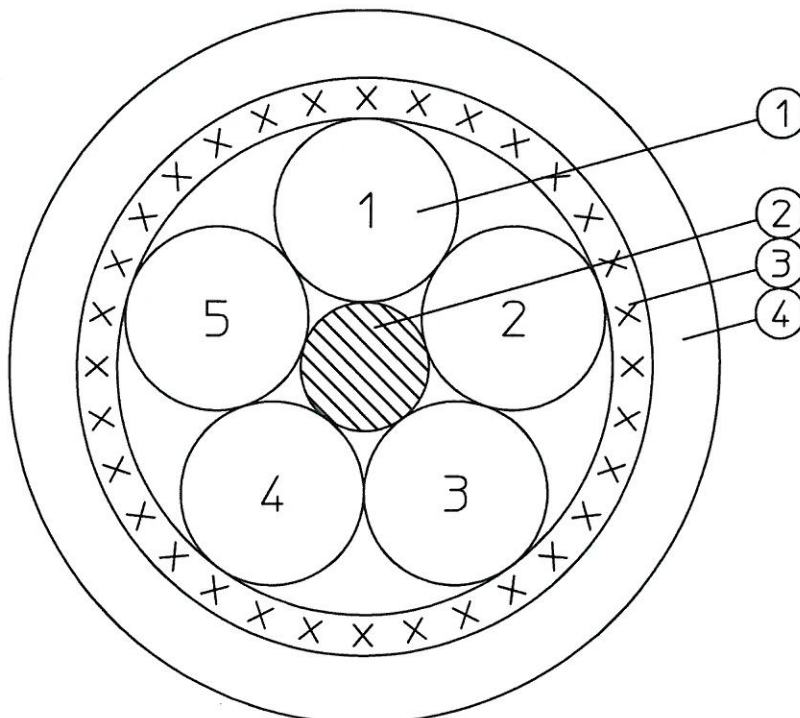
All cores natural, numbered 1-5

Wire marking at 0.1m (4") intervals

Jacket marking at 1m (40") intervals

000m = Meter marking (e.g. 001m at first meter interval, 002m at second interval)

Radiation tolerance: 10 MGy (1000 MRad)



Habia Cable förbehåller sig rätten att ändra ingående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



Type: RTFRO 4x0,75

Habia inspection plan
HIP-G-440-1

Date of issue
1983-09-30

Drawing no
43171-001-09

Issued by
POM

Approved by
HB

Rev. no
18

Revised by
LHM

Revised date
2013-09-05

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	26,7 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE.....	10 000 MΩ x km
KAPACITANS / CAPACITANCE.....	N/A nF/ km
IMPEDANS / IMPEDANCE.....	N/A Ω
DÄMPNING / ATTENUATION..... MHz	N/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	1 min 3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING.....	.95 °C
DRIFTSSPÄNNING / VOLTAGE RATING.....	300/500 V
VIKT / WEIGHT.....	102 kg/km

This drawing remains a property of HABIA CABLE and it is forbidden to copy, show or give it to third part or other unauthorized persons without our written permission.

Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	FPI 155 insulated tinned copper conductor	A=0,75 mm ² t=0,28	1,61/1,05	24x0,20
2	Filling jacket	t=0,35	4,7	
3	Tinned copper conductor as drainwire	A=0,6 mm ²	1	19x0,20
4	Braid of tinned copperwire	Wire diam 0,20	5,6	Cov 85%
5	Rip cord			
6	Jacket of FPI 155, black	t=0,4	6,4	

Jacket marking:

HABIA CABLE ZZZZZZ RTFRO 4x0,75 300/500 V - XXXX YYWW IEC 60332-1 IEC 60332-3-24

Colour: white, intervals: max 1 m

ZZZZZZ to be replaced with, when produced in Sweden: AB

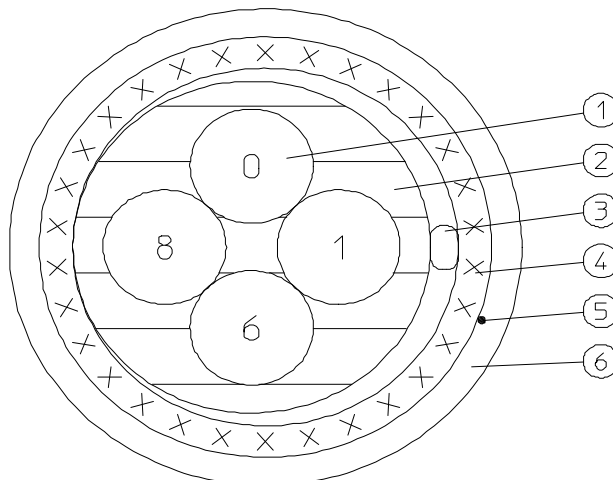
China: Changzhou plant

XXXXX to be replaced with batch no, YYWW to be replaced with year and week

Core colours:

- 0 - Black
- 1 - Brown
- 6 - Blue
- 8 - Grey

Insulated conductor and jacket can withstand up to 150°C



Habia Cable förbehåller sig rätten att ändra insgående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



Customer ref: 6403-57000-CS-001

Habia inspection plan
HIP-C-40307769

Date of issue
2006-10-02

Drawing no
403-07769-012

Description: M 1619 TPC - STM 4

Issued by
CJV

Approved by
PS

Rev. no
01

Revised by
EJ

Revised date
2006-12-18

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	max: 15,7 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE.....	>1500 MΩ x km
KAPACITANS / CAPACITANCE.....	N/A nF/ km
IMPEDANS / IMPEDANCE.....	N/A Ω
DÄMPNING / ATTENUATION.....	MHzN/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	Sparktest jacket: 10kV Impulse Dielectric withstand, 1min:3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING.....	-60 / +200 °C
DRIFTSPÄNNING / VOLTAGE RATING.....	600 V
VIKT / WEIGHT.....	approx. 75 kg/km

This drawing remains a property of HABIA CABLE and it is forbidden to copy, show or give it to third part or other unauthorized persons without our written permission.

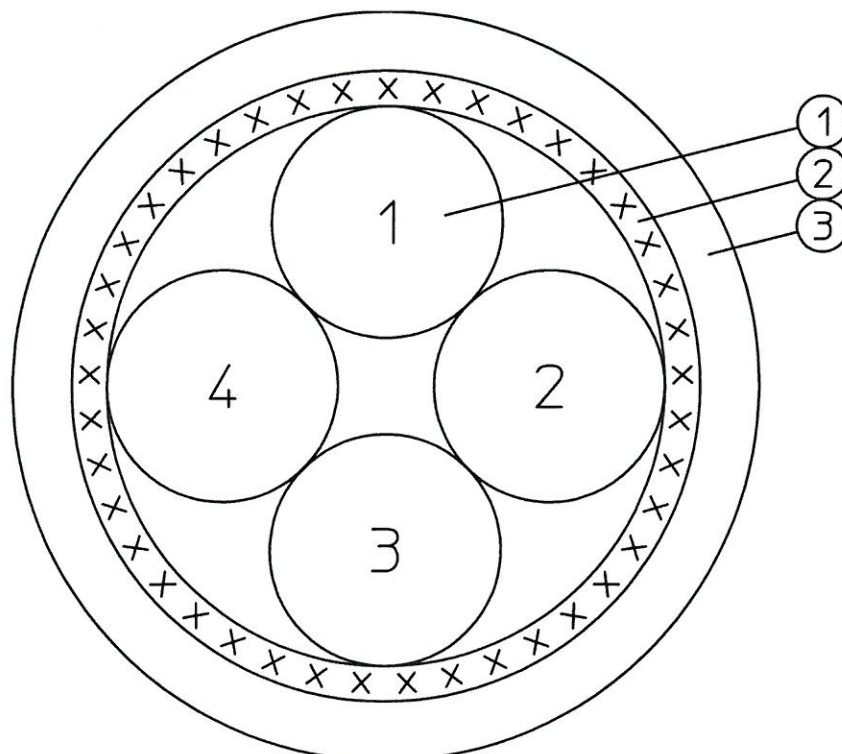
Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	Tin plated copper conductor Insulation of PEEK	16 AWG (19 x 0,29) t=0,25	1,36 1,86	0.053" 0.073"
2	Braid of tin plated copper	wire diam 0,13	5,1	0.200"
3	Jacket of PEEK, Natural	t=0,35 (0.013")	5,8 nom	0.228"

Jacket marking:

HABIA CABLE M 1619 TPC-STM 4 403-07769-012 4C 16 AWG PEEK 000m

Cable construction:

- All cores natural, numbered 1-4
- Wire marking at 0.1m (4") intervals
- Jacket marking at 1m (40") intervals
- 000m = Meter marking (e.g. 001m at first metre interval, 002m at second interval)
- Radiation tolerance: 10 MGy (1000 MRad)
- Note: no fillers allowed



Habia Cable förbehåller sig rätten att ändra ingående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING

Habia Cable

Type: N 1619 STW 4

Habia inspection plan

Date of issue
1999-04-15

Drawing no
43739-032-05

Issued by
TW

Approved by
POM

Rev. no
1

Revised by
TW

Revised date
2001-07-02

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	max 15,7 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE	100 MΩ x km
KAPACITANS / CAPACITANCE	NS nF/ km
IMPEDANS / IMPEDANCE	NS Ω
DÄMPNING / ATTENUATION..... MHz	NS dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING	-40/+70 °C
DRIFTSPÄNNING / VOLTAGE RATING	AC 220 V
VIKT / WEIGHT	kg/km

This drawing remains a property of HABIA CABLE and it is forbidden to copy, show or give it to third part or other unauthorized persons without our written permission.

Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	H-N 1619	16 AWG	1,86/1,36	19x0,287
2	Non-woven polyesterfolie		4,7	
3	Braid of tinned copper wire	wire diam. 0,13	5,3	min cov. 85%
4	Non-woven polyesterfolie		5,5	
5	Jacket of HFS 80, yellow pressure-extruded round with dull surface.		7,5	

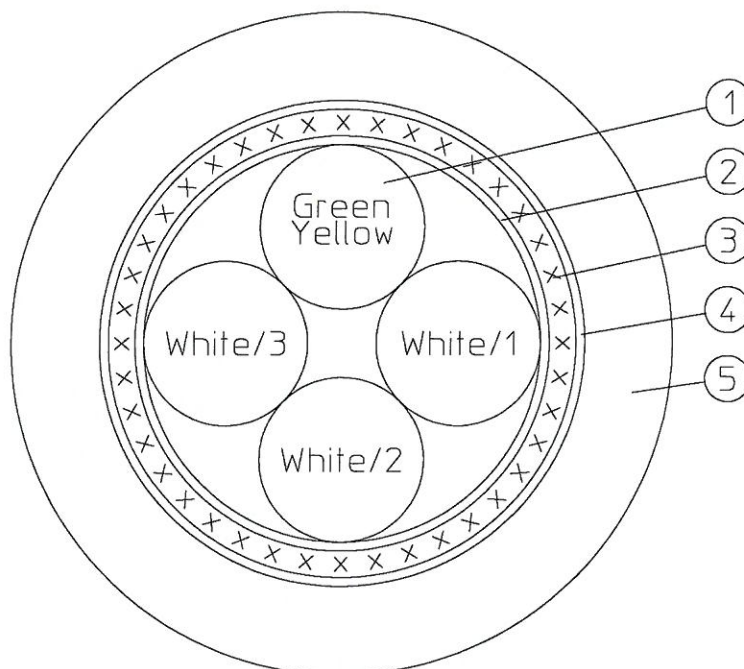
Jacket marking with metre indication. 0, 1, 2, etc

Marking between metre indication:

HABIATRON -4G1,34 - NF C 32 070 C1 - TYPE 10 B

Intervals: 1,0 ± 0,02 m

Marking colours: black



Habia Cable förbehåller sig rätten att ändra ingående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



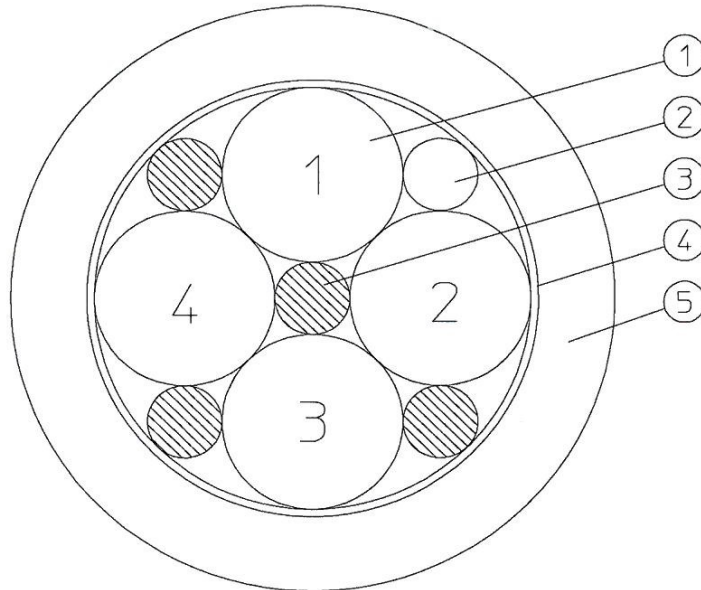
Drawing Number 700046678	Revision No 02	Status Released	Phase Production
Description M/TPC 1037 STQ 4		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by H. Bertilsson	Approved by A. Rickardsson
Customer Product Description		Creation Date 2013-04-29	Approval Date 2013-04-29

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 4.13	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min:7.5	KV DC
Voltage Rating	600	V AC
Weight	Approx 310	g / m
Temperature Rating	Max conductor temperature 40 years:90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260, natural and number	10 AWG	2.77 3.53	37x0.40
2.	Drain wire of tin plated copper conductor	14 AWG	1.70	19x0.36
3.	Filler			
4.	Screen of wrapped copper/polyester foil		8.7	Cu-side inwards
5.	Jacket of HFS 105 XL Type B, black		11.1	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable AB 600V M/TPC 1037 STQ 4 Class 1E HFI 260/HFS 105 XL Type B YYYY 700046678 L
 YYYY to be replaced with year of manufacture.
 L indicates continuous meter marking and is replaced with actual length.

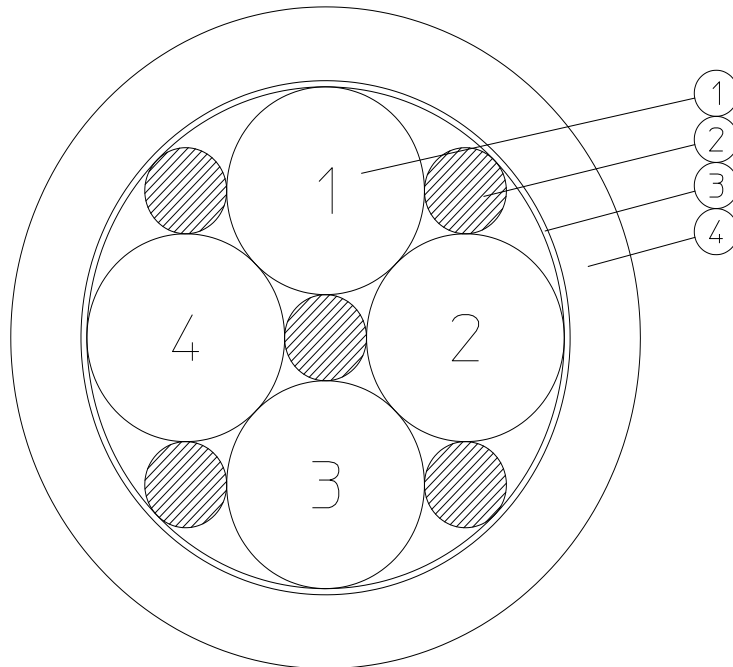


CABLE DRAWING



Article Number/Doc Number 700064733	Revision No 01	Status Released	Phase Proposal for Production
Description M/TPC 4 TQ 4		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description Power Cable 4 x 4 sqmm, 1000V		Creation Date 2015-10-14	Approval Date 2015-10-14

Technical Data	Values at +20° C		Unit	
Conductor Resistance	Max: 5.35		Ω/km	
Insulation Resistance	>1500		MΩ x km	
Test Voltage	3		KV DC	
Voltage Rating	600 / 1000		V	
Radiation Tolerance	TID: 2.3 x 10 ⁶		Gy	
Weight	236		g / m	
Temperature Rating	Max conductor temperature (60 years): +90		°C	
Minimum Bend Radius	Fixed: 80		mm	
	Flexing: 160			
RoHS Compliant.				
All dimensions in mm, unless otherwise stated.				
Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor	4mm ²	2.48 (.097")	56 x 0.30
	Insulation of HFI 260 (M/TPC 4/3,38)	T = 0.45 (.018")	3.38 (.133")	
2.	Filler		1.3 (.051")	
3.	Wrapped non woven polyester binder		8.3 (.326")	
4.	Jacket of HFS 105 XL B, Black	T = 1.40 (.055")	Nom 10.7 (.421")	
Core identification:				
All cores Natural, numbered according to drawing.				
Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:				
Habia Cable - 700064733 - YYYY-Www - batchcode - L				
YYYY-Www to be replaced with year and week of manufacture Batch code to be replaced with manufacturers traceability code				
L indicates continuous meter marking and is replaced with actual length.				



CABLE DRAWING



Article Number/Doc Number 700064731	Revision No 00	Status Released	Phase Proposal for Production
Description M/TPC 1601 STQ 2 - STQ 3		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description Instrumentation Cable 3 Pair x 16 AWG, 300V		Creation Date 2015-10-12	Approval Date 2015-10-12

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max: 14.7	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	300	V AC
Radiation Tolerance	TID: 2.3 x 10 ⁶	Gy
Weight	342	g / m
Temperature Rating	Max conductor temperature (60 years): +90	°C
Minimum Bend Radius	Fixed: 120	mm
	Flexing: 240	

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor	16 AWG	1.29 (.050")	1 x 1.29 (.050")
	Insulation of HFI 260 (M/TPC 1601/1,88)	T = 0.30 (.012")	1.88 (.074")	
2.	Drain wire of tin plated copper	16 AWG	1.29 (.050")	1 x 1.29 (.050")
3.	Wrapped copper / polyester foil screen		4.0 (.157")	50% overlap
4.	Inner jacket of HFS 105 XL B, Black	T = 0.80 (.031")	5.6 (.220")	
5.	Solid LT filler		3.0 (.118")	
6.	Wrapped polyester binder		12.1 (.476")	
7.	Drain wire of tin plated copper	16 AWG	1.29 (.050")	1 x 1.29 (.050")
8.	Wrapped copper / polyester foil screen		13.2 (.520")	50% overlap
9.	Outer jacket of HFS 105 XL B, Black	T = 1.40 (.055")	Nom 16.0 (.630")	

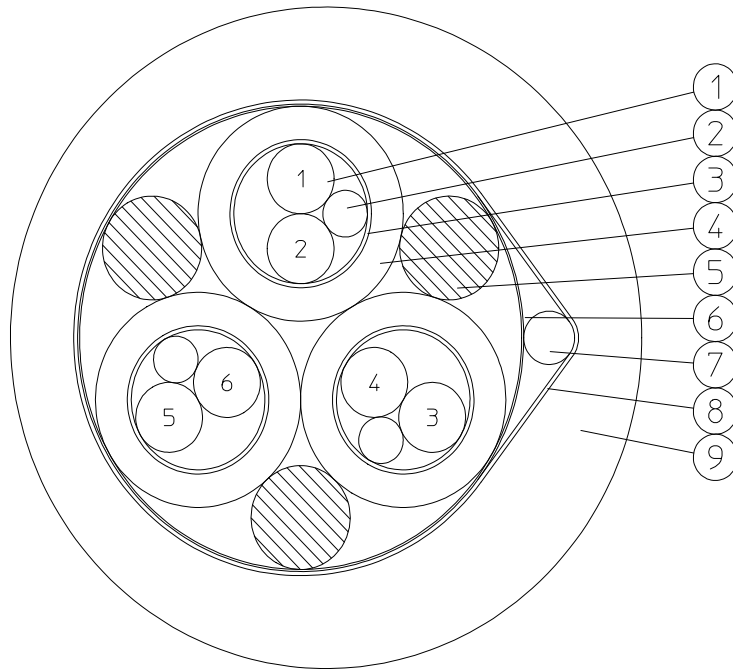
Core identification:

All cores Natural, numbered according to drawing.

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:

Habia Cable - 700064731 - YYYY-Www - batchcode - L

YYYY-Www to be replaced with year and week of manufacture Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



Customer ref: 6403-57000-CS-003

Habia inspection plan
HIP-C-40307769

Date of issue
2006-10-02

Drawing no
403-07769-032

Description: M 2019 TPC - STM 3

Issued by
CJV

Approved by
PS

Rev. no
02

Revised by
EJ

Revised date
2007-06-08

Elektriska data vid +20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	max: 32,4 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE.....	>1500 MΩ x km
KAPACITANS / CAPACITANCE.....	N/A nF/ km
IMPEDANS / IMPEDANCE.....	N/A Ω
DÄMPNING / ATTENUATION.....	MHz N/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING.....	-60 / +200 °C
DRIFTSPÄNNING / VOLTAGE RATING.....	600 V
VIKT / WEIGHT.....	approx. 35 kg/km

This drawing remains a property of HABIA CABLE and it is forbidden to copy, show or give it to third part or other unauthorized persons without our written permission.

Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam/ Overall diam. [mm]	Anm./Remarks
1	Tin plated copper conductor Insulation of PEEK	20 AWG (19 x 0,20) t=0,2	0,96 1,36	0.037" 0.053"
2	Filler			
3	Braid of tin plated copper	wire diam 0,10	3,4	0.133"
4	Jacket of PEEK, Natural	t=0,25 (0.009")	3,9 nom	0.153"

Jacket marking:

HABIA CABLE M 2019 TPC-STM3 403-07769-032 3C 20AWG PEEK 000m

Cable construction:

All cores natural, numbered 1-3

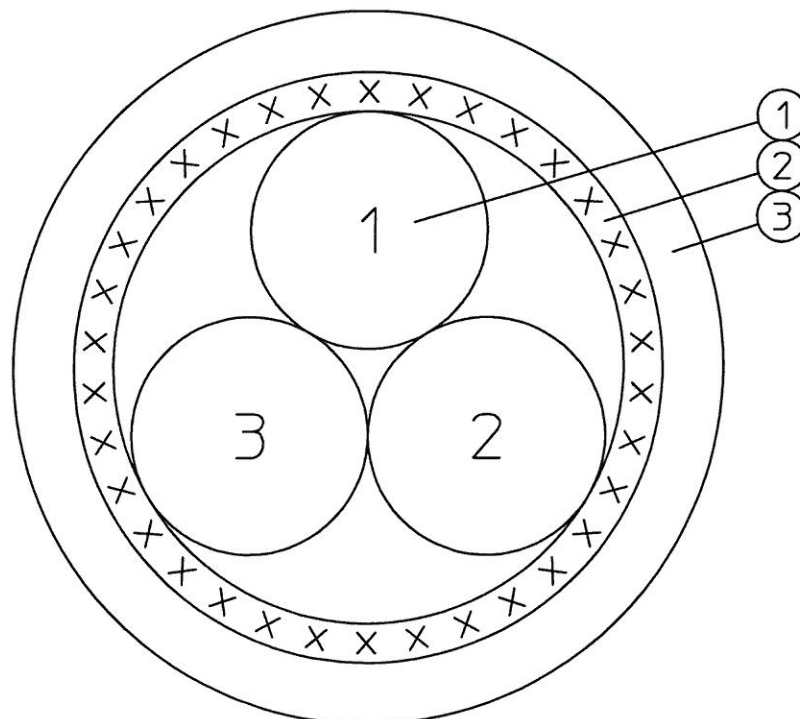
Wire marking at 0.1m (4") intervals

Jacket marking at 1m (40") intervals

000m = Meter marking (e.g. 001m at first meter interval, 002m at second interval)

Radiation tolerance: 10 MGy (1000 MRad)

Note: No fillers allowed



Habia Cable förbehåller sig rätten att ändra ingående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



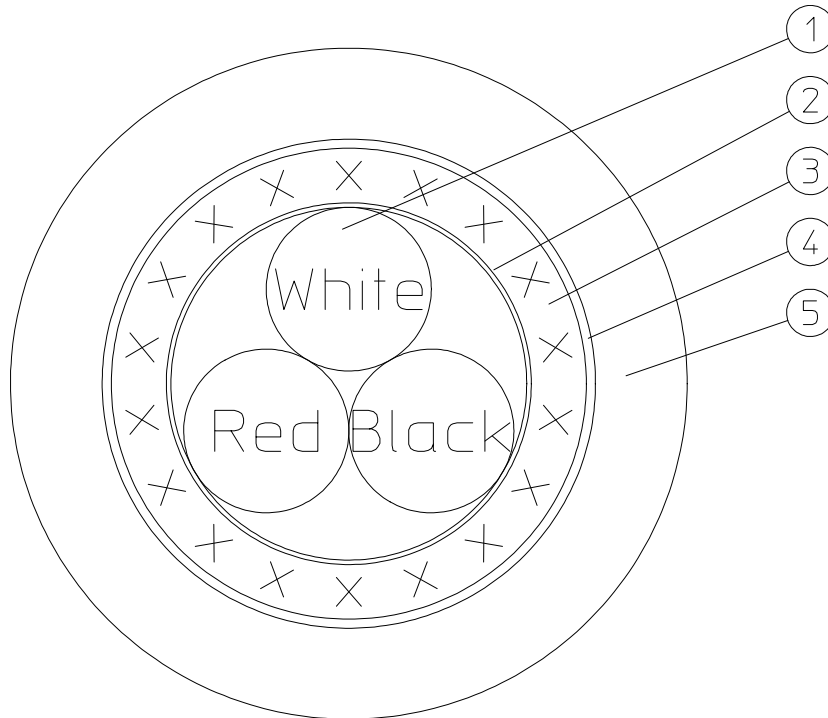
Drawing Number 700041841	Revision No 00	Status Released	Phase Proposal for Production
Description B/1819 STW 3		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C		Unit
Conductor Resistance	Max 21	Ω/km	
Insulation Resistance	Min 1500	MΩ x km	
Test Voltage	5 min: 7.5	kV DC	
Voltage Rating	600	V AC	
Radiation Tolerance	10 ⁶	Gy	
Weight	TBD	g / m	
Temperature Rating	50 years, conductor temperature: 90		°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin-plated copper conductor Insulation of HFI 150	18 AWG t = 0.30	1.21 1.80	19 x 0.254
2.	Binder, Polyester			
3.	Braid of tin-plated copper	Diam: 0.127	5.2	Min 85% coverage
4.	Binder, non-woven polyester		5.4	
5.	Jacket of HFS 105 XL type B, Black	t = 1.0 mm	7.4	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable - 700041841 - YYYY-Www - batchcode - L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



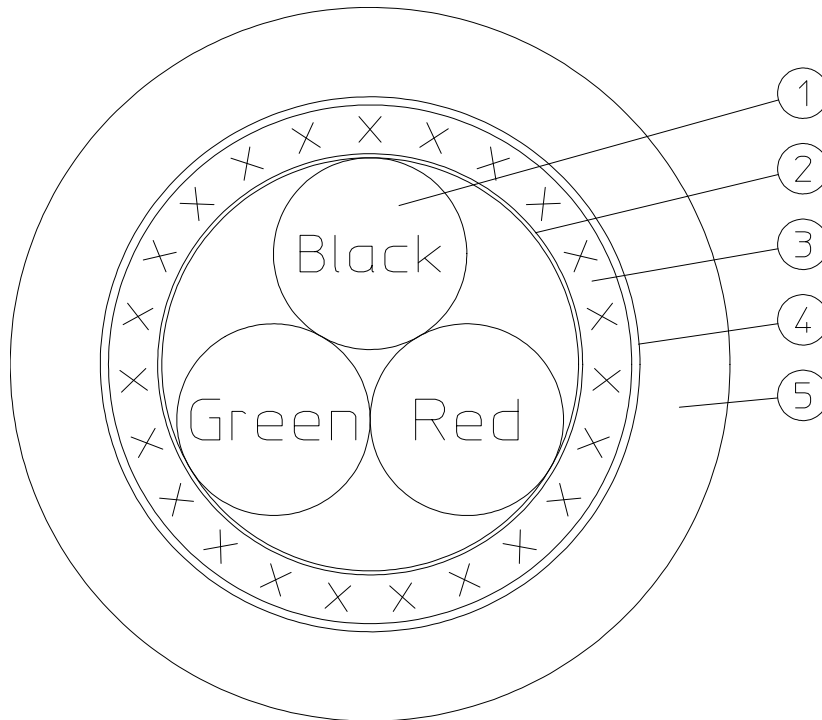
Drawing Number 700041843	Revision No 00	Status Released	Phase Proposal for Production
Description B/1419 STW 3		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 10.3	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min: 7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	10 ⁶	Gy
Weight	TBD	g / m
Temperature Rating	50 years, conductor temperature: 90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin-plated copper conductor Insulation of HFI 150	14 AWG t = 0.33	1.70 2.36	19 x 0.361
2.	Binder, Polyester			
3.	Braid of tin-plated copper	Diam: 0.127	6.4	Min 85% coverage
4.	Binder, non-woven polyester		6.6	
5.	Jacket of HFS 105 XL type B, Black	t = 1.1 mm	8.8	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable - 700041843 - YYYY-Www - batchcode - L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



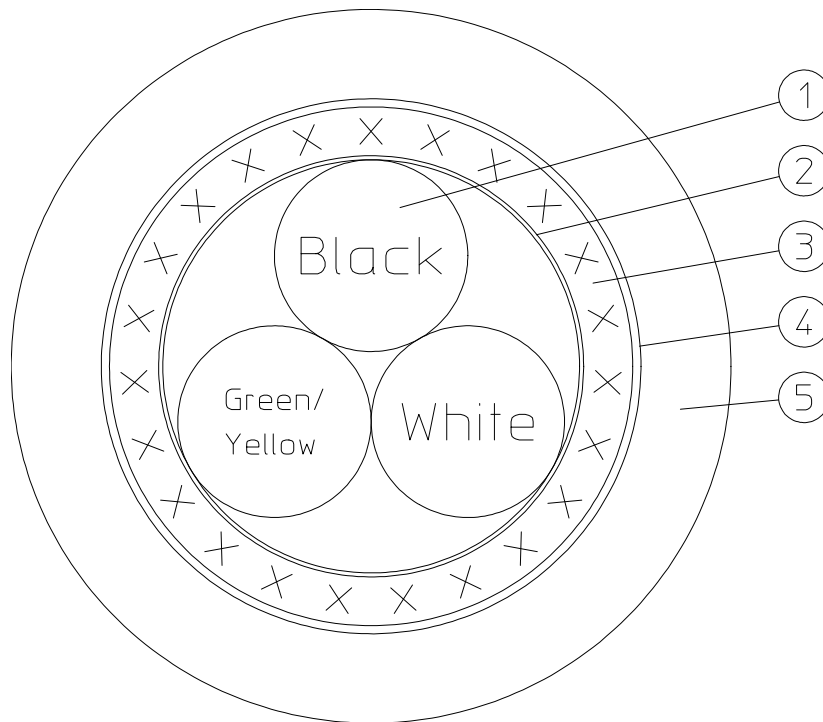
Drawing Number 700041842	Revision No 00	Status Released	Phase Proposal for Production
Description B/1419 STW 3		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 10.3	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min: 7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	10 ⁶	Gy
Weight	TBD	g / m
Temperature Rating	50 years, conductor temperature: 90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin-plated copper conductor Insulation of HFI 150	14 AWG t = 0.33	1.70 2.36	19 x 0.361
2.	Binder, Polyester			
3.	Braid of tin-plated copper	Diam: 0.127	6.4	Min 85% coverage
4.	Binder, non-woven polyester		6.6	
5.	Jacket of HFS 105 XL type B, Black	t = 1.1 mm	8.8	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable - 700041842 - YYYY-Www - batchcode - L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



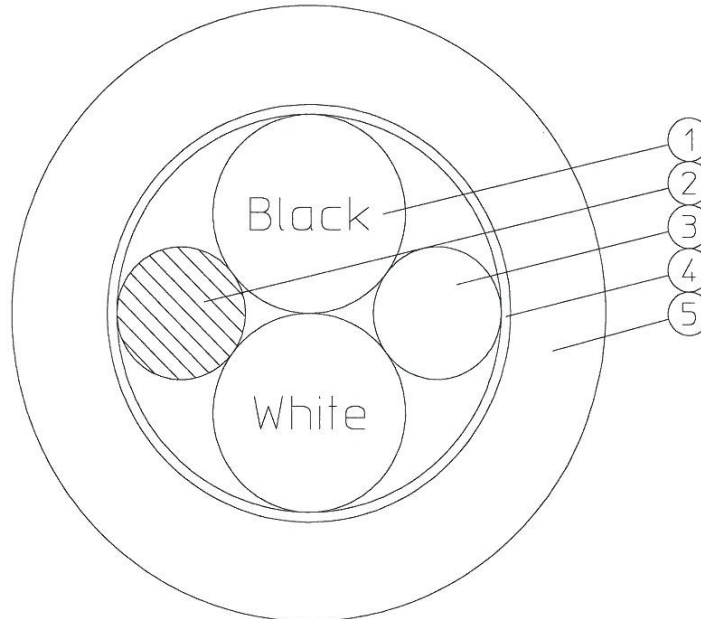
Article Number/Doc Number 700060291	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 1619 STW 2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max: 16.6	Ω/km
Insulation Resistance	Min: 1500	MΩ x km
Test Voltage	5 Min: 7.5	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	>10 ⁵	Gy
Weight	Approx. 73	g / m
Temperature Rating	Max conductor temperature (40 years): 90	°C
Minimum Bend Radius	Fixed: 30	mm
	Flexing: 60	

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	16 AWG T = 0.33 (.012")	1.36 (.053") 2.01 (.079")	19 x 0.297 (1.23mm ²)
2.	Filler		1.3 (.051")	
3.	Drain wire of tin plated copper	16 AWG	1.36 (.053")	19 x 0.297 (1.23mm ²)
4.	Wrapped copper / polyester foil screen		4.2 (.165")	
5.	Jacket of HFS 80 N, Black	T = 1.00 (.039")	6.2 (.244") Max: 6.5 (.255")	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable – 600V – ZN 1619 STW 2 Non-Class 1E – FPI155/HFS80N – 700060291 – YYYY-Www – batchcode – L
YYYY-Www to be replaced with year and week of manufacture.
Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



Article Number/Doc Number 700044382	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 1037 TW 2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

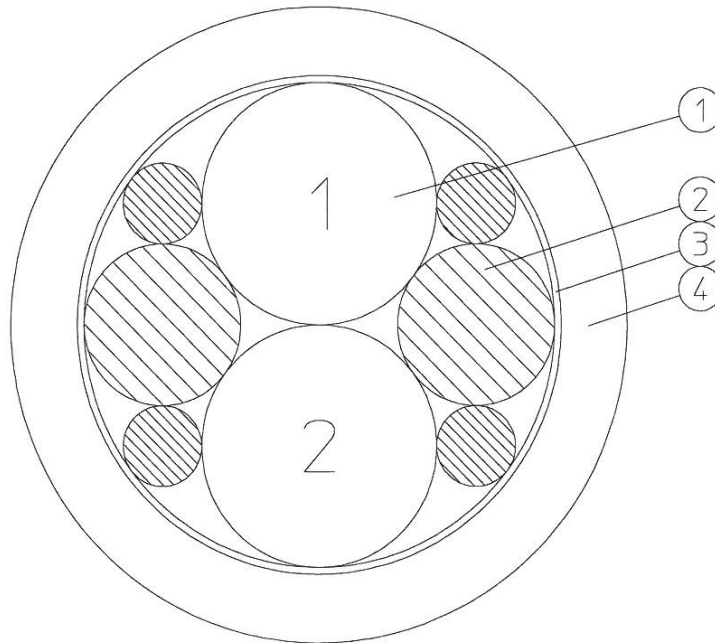
Technical Data	Values at +20° C		Unit
Conductor Resistance	Max: 4.13		Ω/km
Insulation Resistance	Min: 1500		MΩ x km
Test Voltage	5 min: 10.5		KV DC
Voltage Rating	600		V AC
Radiation Tolerance	>10 ⁵		Gy
Weight	Approx. 163		g / m
Temperature Rating	Max conductor temperature (40 years): 90		°C
Minimum Bend Radius	Fixed: 50	Flexing: 100	mm

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	10 AWG T = 0.38 (.014")	2.77 (.109") 3.53 (.138")	37 x 0.40 (4.74mm ²)
2.	Filler			
3.	Wrapped non woven polyester binder		7.3 (.287")	
4.	Jacket of HFS 80 N, Black	T = 1.00 (.039")	9.3 (.366") Max: 9.7 (.381")	

Core identification:
All cores White, numbered according to drawing.

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable – 600V – ZN 1037 TW 2 Non-Class 1E – FPI155/HFS80N – 700044382 – YYYY-Www – batchcode – L
YYYY-Www to be replaced with year and week of manufacture.
Batch code to be replaced with manufacturers traceability code
L indicates continuous meter marking and is replaced with actual length.

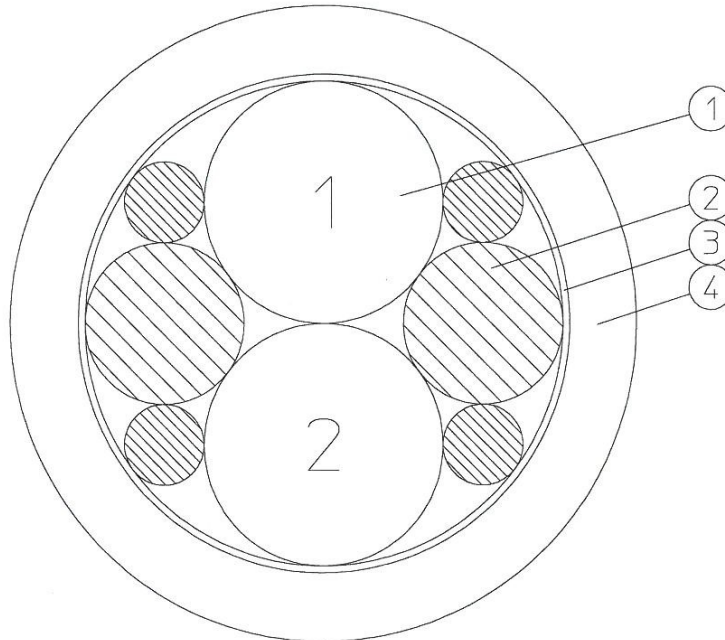


CABLE DRAWING



Article Number/Doc Number 700044385	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 6133 TW 2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

Technical Data	Values at +20° C		Unit	
Conductor Resistance		Max: 1.53	Ω/km	
Insulation Resistance		Min: 1500	MΩ x km	
Test Voltage		5 min: 10.4	KV DC	
Voltage Rating		600	V AC	
Radiation Tolerance		>10 ⁹	Gy	
Weight		Approx. 460	g / m	
Temperature Rating	Max conductor temperature (40 years): 90		°C	
Minimum Bend Radius		Fixed: 75	mm	
		Flexing: 150		
RoHS Compliant.				
All dimensions in mm, unless otherwise stated.				
Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	6 AWG T = 0.54 (.021")	5.27 (.207") 6.35 (.250")	133 x 0.36 (14mm ²)
2.	Filler			
3.	Wrapped non woven polyester binder		12.9 (.507")	
4.	Jacket of HFS 80 N, Black	T = 1.30 (.051")	15.5 (.610") Max: 16.3 (.641")	
Core identification:				
All cores White, numbered according to drawing.				
Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:				
Habia Cable – 600V – ZN 6133 TW 2 Non-Class 1E – FPI155/HFS80N – 700044385 – YYYY-Www – batchcode – L				
YYYY-Www to be replaced with year and week of manufacture.				
Batch code to be replaced with manufacturers traceability code				
L indicates continuous meter marking and is replaced with actual length.				



CABLE DRAWING



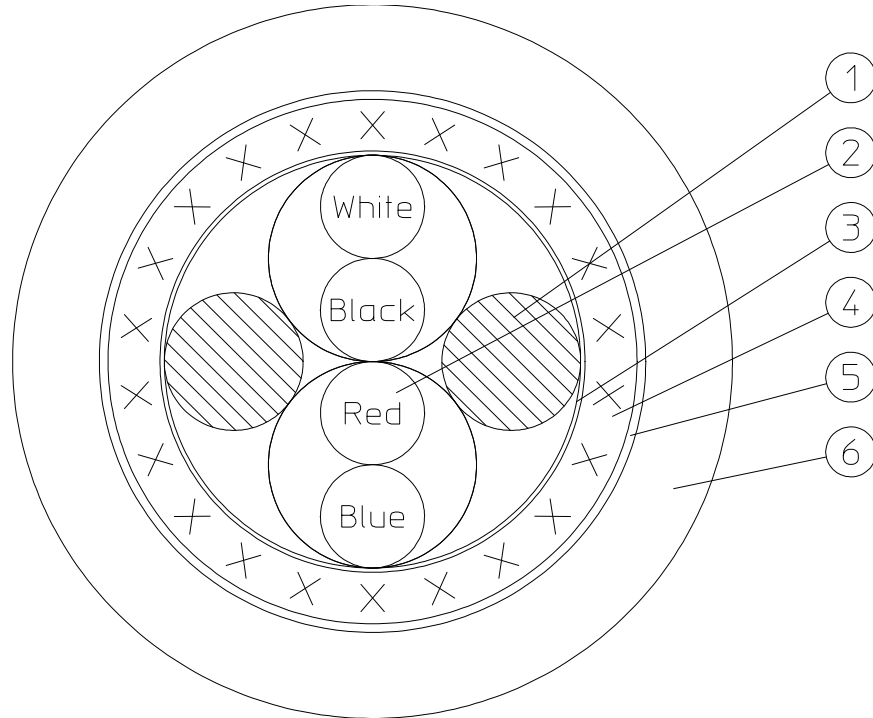
Drawing Number 700041844	Revision No 00	Status Released	Phase Proposal for Production
Description B/2219 STW 2x2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by T. Nälsén	Approved by T. Nälsén
Customer Product Description		Creation Date 2012-05-13	Approval Date 2012-05-13

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max 55.7	Ω/km
Insulation Resistance	Min 1500	MΩ x km
Test Voltage	5 min: 7.5	kV DC
Voltage Rating	600	V AC
Radiation Tolerance	10 ⁶	Gy
Weight	TBD	g / m
Temperature Rating	50 years, conductor temperature: 90	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Filler			
2.	Tin-plated copper conductor Insulation of HFI 150	22 AWG t = 0.28	0.76 1.32	19 x 0.16
3.	Binder, Polyester			
4.	Braid of tin-plated copper	Diam: 0.127	6.1	Min 85% coverage
5.	Binder, non-woven polyester		6.1	
6.	Jacket of HFS 105 XL type B, Black	t = 1.0 mm	8.3	

Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:
Habia Cable - 700041844 - YYYY-Www - batchcode - L m
 YYYY-Www to be replaced with year and week of manufacture.
 Batch code to be replaced with manufacturers traceability code
 L indicates continuous meter marking and is replaced with actual length.



CABLE DRAWING



Article Number/Doc Number 700062145	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 3007 STI 2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-05-18	Approval Date 2015-05-18

Technical Data	Values at +20° C	Unit
Conductor Resistance	Max: 372	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	Total Integrated Dose: 2x 10 ⁵	Gy
Weight	12	g / m
Temperature Rating	20,000 hrs: -40 / +90	°C
Core Current Rating	Max: 2	Amps at 40°C ambient air temp.
Minimum Bend Radius	Fixed: 15	mm
	Flexing: 30	
	Dynamic: 60	

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260 (ZN 3007)	30 AWG	0.30 0.75	7 x 0.10
2.	Soft, HT filler			
3.	Wrapped polyester binder		1.7	
4.	Lapped screen of tin plated copper wire	38 AWG	1.9	Min coverage: 85%
5.	Wrapped non woven polyester binder		2.1	
6.	Jacket of HFS 100, Black	T = 0.30	2.7 nom	

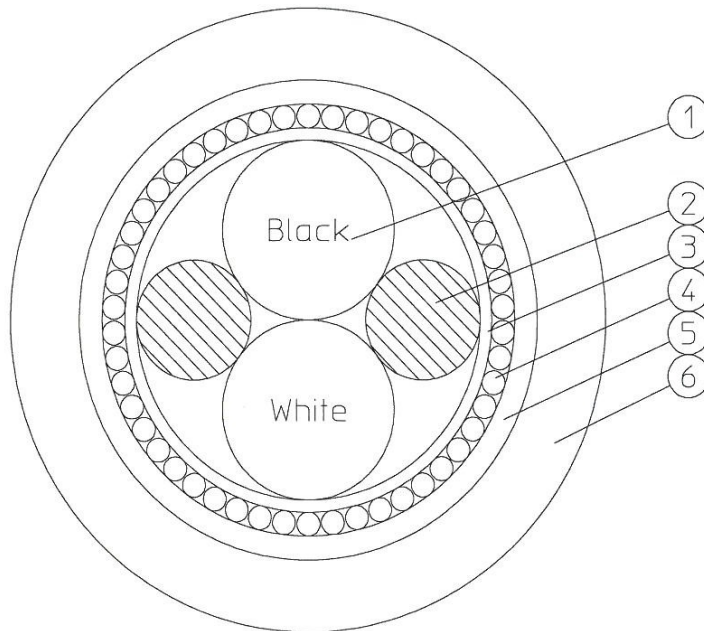
Core identification:

All cores Natural, numbered according to drawing.

Jacket marking in contrasting colour, intervals of 250 mm:

Habia Cable - 700062145 - YYYY-Www - batchcode

YYYY-Www to be replaced with year and week of manufacture Batchcode to be replaced with manufacturers traceability code



CABLE DRAWING



Drawing Number 700023893	Revision No 02	Status Released	Phase Production
Description M 2807 TPC - STI 2 (Al/Pr)		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by H. Bertilsson	Approved by T. Wärefors
Customer Product Description		Creation Date 2010-02-04	Approval Date 2010-02-04

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 259	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	Total Integrated Dose: 10 ⁷	Gy
Weight	Approx. 7	g / m
Temperature Rating	-40 / +100	°C

RoHS Compliant.
All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260	28 AWG	0,38 0,78	7 x 0,13
2.	Drain wire of tin plated copper	28 AWG	0,38	7 x 0,13
3.	Wrapped aluminium polyester foil screen		1,7	
4.	Jacket of HFS 100, Black	0,30	2,3 nom	

Core identification:

All cores Natural, numbered according to drawing.

Jacket marking in contrasting colour, intervals of 250 mm:

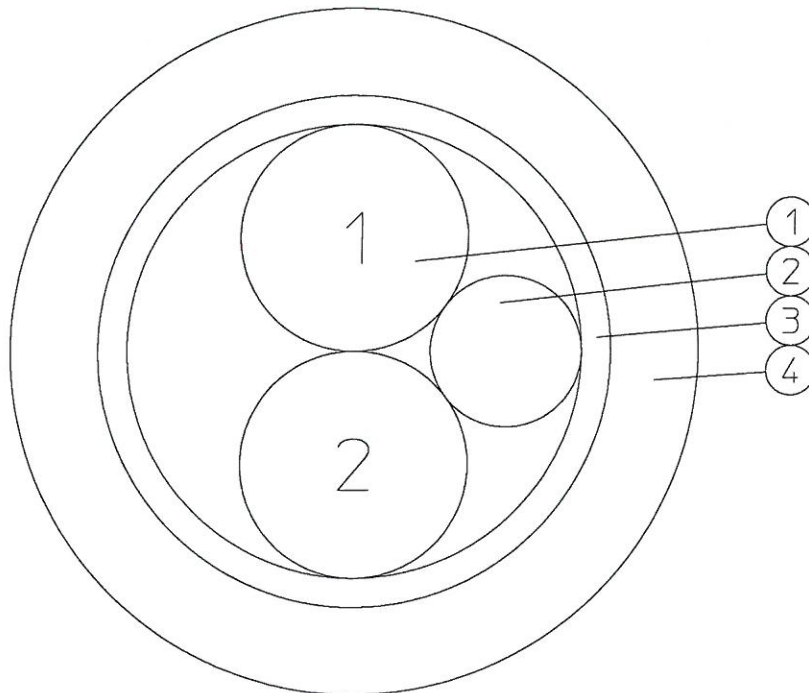
Habia Cable - 700023893 - YYYY-Www - batchcode

YYYY-Www to be replaced with year and week of manufacture Batchcode to be replaced with manufacturers traceability code

Cable construction:

Low Smoke Zero Halogen (LS0H)

Flame retardant



CABLE DRAWING



Drawing Number 700018998	Revision No 0	Status Released	Phase Production
Description M 2219 TPC - STI 2 (A/Pr)		Habia Inspection Plan (HIP) HIP-G-402	Page 1 of 1
Customer Product Number		Created by E. Österlund	Approved by H. Bertilsson
Customer Product Description		Creation Date 2009-09-29	Approval Date 2009-09-30

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 60	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	Total Integrated Dose: 10 ⁷	Gy
Weight	21	g / m
Temperature Rating	-40 / +100	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260	22 AWG	0,76 1,16	19 x 0,16
2.	Drain wire of tin plated copper	22 AWG	0,76	19 x 0,16
3.	Wrapped aluminium polyester foil screen		2,5	
4.	Jacket of HFS 100, Black	0,60	3,7 nom	

Core identification:

All cores Natural, numbered according to drawing.

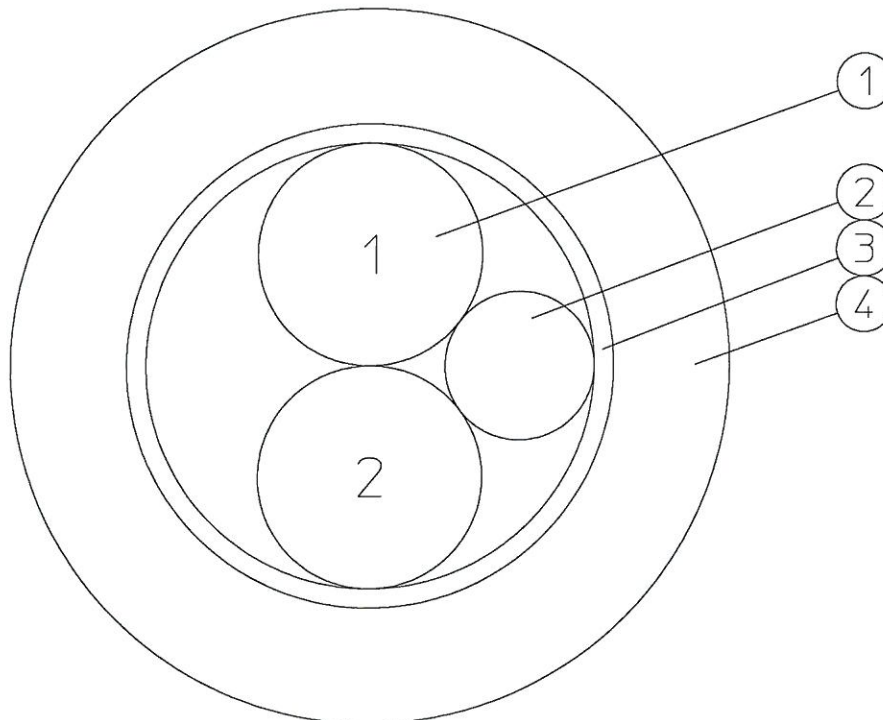
Jacket marking in contrasting colour, intervals of 250 mm:

Habia Cable - 700018998 - YYYY-Www - batchcode

YYYY-Www to be replaced with year and week of manufacture Batchcode to be replaced with manufacturers traceability code

Cable construction:

Low Smoke Zero Halogen (LS0H)
Flame retardant



CABLE DRAWING



Customer ref: 64003-57000-CS-004

Habia inspection plan
HIP-C-40307769

Date of issue
2006-10-02

Drawing no
403-07769-042

Description: KCB-2 STMM-K 2x 2019

Issued by
CJV

Approved by
ASH

Rev. no
03

Revised by
PS

Revised date
2007-01-12

Elektriska data vid +20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE.....	Cu: 29 / CuNi: 820 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE.....	>1500 MΩ x km
KAPACITANS / CAPACITANCE.....	N/A nF/ km
IMPEDANS / IMPEDANCE.....	N/A Ω
DÄMPNING / ATTENUATION.....	MHzN/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE.....	Sparktest jacket 8 kV impulse Dielectric withstand, 1min 3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING.....	-60 / +200 °C
DRIFTSPÄNNING / VOLTAGE RATING.....	600 V
VIKT / WEIGHT.....	approx. 25 kg/km

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Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	Cu conductor (+ leg) Insulation of PEEK	20 AWG (19 x 0,20) t=0,2	0,96 1,36	0.037" 0.053"
2	CuNi conductor (- leg) Insulation of PEEK	20 AWG (19 x 0,20) t=0,2	0,96 1,36	0.037" 0.053"
3	Braid of tin plated copper	wire diam 0,10	3,2	0.125"
4	Jacket of PEEK, Natural	t=0,25 (0.009")	3,7 nom	0.145"

Jacket marking:

HABIA CABLE KCB-2 STMM-K 2x 2019 403-07769-042 2C 20AWG PEEK 000m

Cable construction:

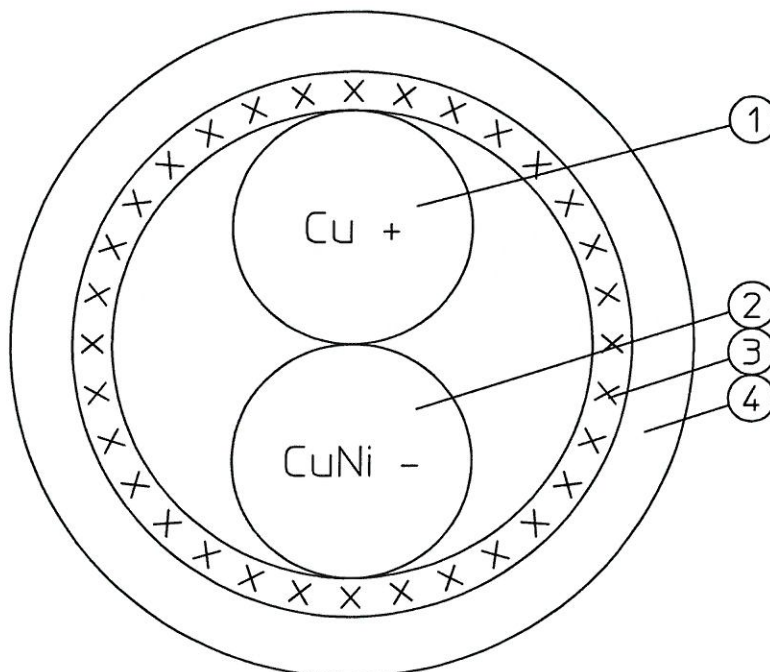
All cores marked according to drawing

Wire marking at 0.1m (4") intervals

Jacket marking at 1m (40") intervals

000m = Meter marking (e.g. 001m at first meter interval, 002m at second interval)

Radiation tolerance: 10 MGy (1000 MRad)



Habia Cable förbehåller sig rätten att ändra inrägande material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



Drawing Number 700020212	Revision No 0	Status Released	Phase Production
Description M 2019 TPC - STI 2 (AI/Pr)		Habia Inspection Plan (HIP) HIP-G-402	Page 1 of 1
Customer Product Number		Created by E. Österlund	Approved by H. Bertilsson
Customer Product Description		Creation Date 2009-09-30	Approval Date 2009-09-30

Technical Data	Values at +20°C	Unit
Conductor Resistance	Max: 35	Ω/km
Insulation Resistance	>1500	MΩ x km
Test Voltage	3	KV DC
Voltage Rating	600	V AC
Radiation Tolerance	Total Integrated Dose: 10 ⁷	Gy
Weight	35	g / m
Temperature Rating	-40 / +100	°C

All dimensions in mm, unless otherwise stated.

Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of HFI 260	20 AWG	0,96 1,36	19 x 0,20
2.	Drain wire of tin plated copper	20 AWG	0,96	19 x 0,20
3.	Wrapped aluminium polyester foil screen		2,9	
4.	Jacket of HFS 100, Black	1,00	4,9 nom	

Core identification:

All cores Natural, numbered according to drawing.

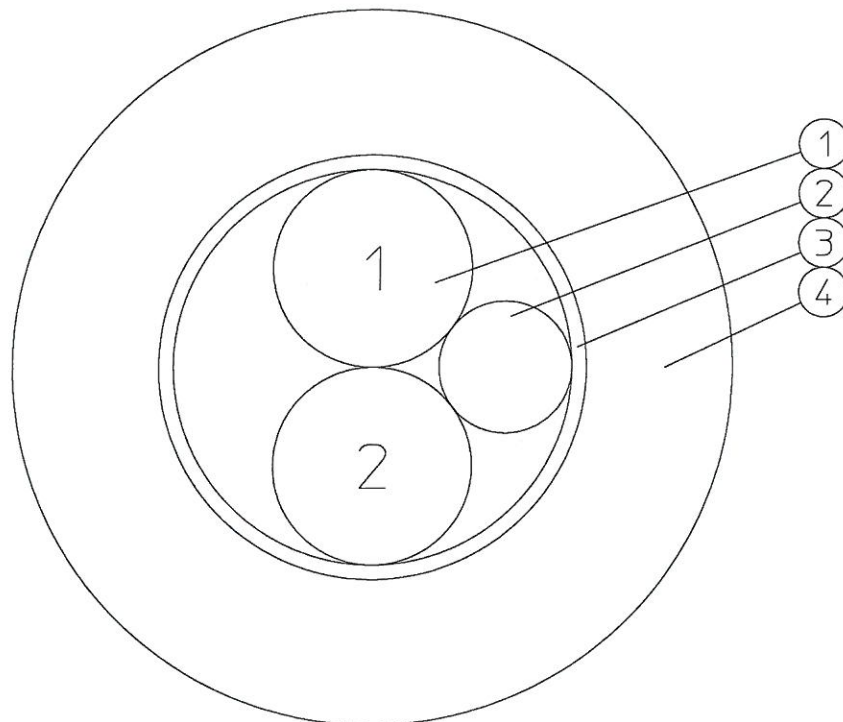
Jacket marking in contrasting colour, intervals of 250 mm:

Habia Cable - 700020212 - YYYY-Www - batchcode

YYYY-Www to be replaced with year and week of manufacture Batchcode to be replaced with manufacturers traceability code

Cable construction:

Low Smoke Zero Halogen (LS0H)
Flame retardant



CABLE DRAWING

Habia Cable

Description: IEC JX-1 STDI-U 2x 1601

Habia inspection plan

Date of issue
2006-02-13

Drawing no
603-16067-010

Issued by
CJV

Approved by
ASH

Rev. no
1

Revised by
PS

Revised date
2006-08-31

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE	FE: 102 / Const: 386 Ω/km
ISOLATIONSRESISTANS / INSULATION RESISTANCE	>1500 MΩ x km
KAPACITANS / CAPACITANCE	N/A nF/ km
IMPEDANS / IMPEDANCE	N/A Ω
DÄMPNING / ATTENUATION	MHz N/A dB/100 m
PROVSPÄNNING / TEST VOLTAGE	3 kV DC
DRIFTSTEMPERATUR / TEMPERATURE RATING	-40 / +100 °C
DRIFTSPÄNNING / VOLTAGE RATING	600 V
VIKT / WEIGHT	approx. 50 kg/km

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Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	Iron (FE) conductor	16 AWG (1,20 sqmm)	1,29	1 x 1,29
2	Insulation of HFI 140	thickness = 0,25	1,79	
3	Solid filler		1,3	
4	Constantan conductor	16 AWG (1,20 sqmm)	1,29	1 x 1,29
5	Braid of tin plated copper	wire diam 0,10	4,0	min cov 85%
6	Jacket of HFS 100	thickness =0,6	5,2 nom	

Radiation tolerance:

10⁶Gy

Flame retardant:

IEC 60332-1

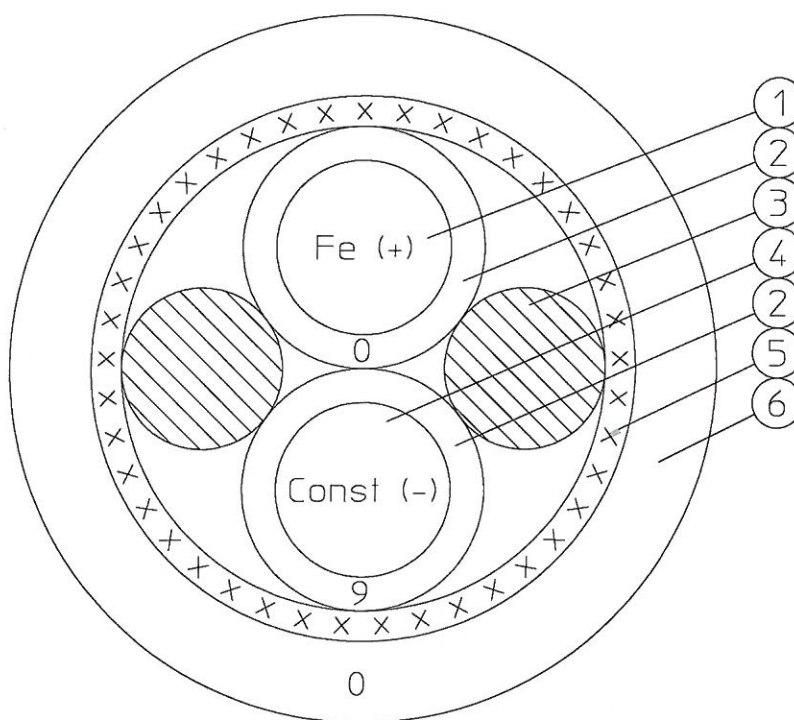
Halogen free:

IEC 60754-2

Colour code:

0 - Black

9 - White



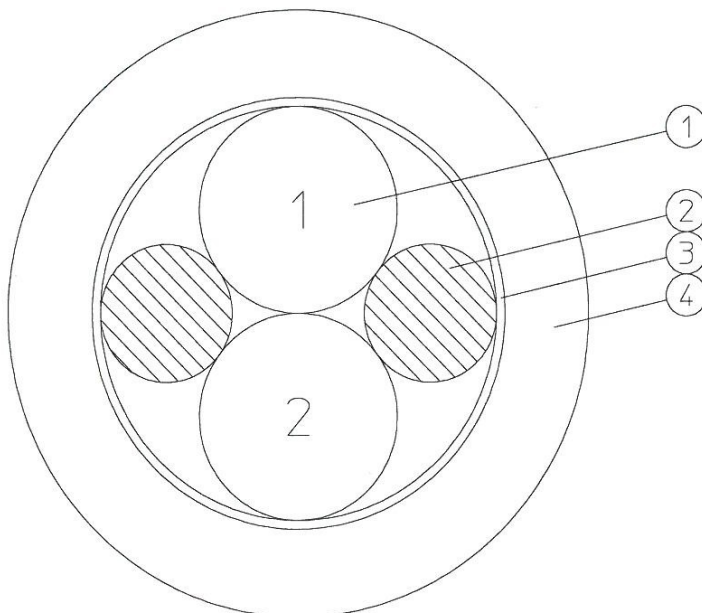
Habia Cable förbehåller sig rätten att ändra ingående material till annat likvärdigt material utan att meddela kund. Habia Cable reserves the right to change any material, dimensions or parameters without notice.

CABLE DRAWING



Article Number/Doc Number 700044376	Revision No 00	Status Released	Phase Proposal for Production
Description ZN 1419 TW 2		Habia Inspection Plan (HIP) HIP-G-420	Page 1 of 1
Customer Product Number		Created by C. Vestey	Approved by C. Vestey
Customer Product Description		Creation Date 2015-02-13	Approval Date 2015-02-13

Technical Data	Values at +20° C	Unit		
Conductor Resistance	Max: 10.3	Ω/km		
Insulation Resistance	Min: 1500	MΩ x km		
Test Voltage	5 Min: 7.5	KV DC		
Voltage Rating	600	V AC		
Radiation Tolerance	>10 ⁵	Gy		
Weight	Approx. 72	g / m		
Temperature Rating	Max conductor temperature (40 years): 90	°C		
Minimum Bend Radius	Fixed: 35	mm		
	Flexing: 70			
RoHS Compliant.				
All dimensions in mm, unless otherwise stated.				
Pos	Description	Dimension	Overall Diameter	Remarks
1.	Tin plated copper conductor Insulation of FPI 155, White & numbered	14 AWG T = 0.33 (.012")	1.70 (.066") 2.36 (.092")	19 x 0.361 (1.71mm ²)
2.	Filler		1.6 (.062")	
3.	Wrapped non woven polyester binder		4.9 (.192")	
4.	Jacket of HFS 80 N, Black	T = 1.00 (.039")	6.9 (.271") Max: 7.4 (.291")	
Core identification:				
All cores White, numbered according to drawing.				
Jacket marking with meter indication in contrasting colour, intervals of 1,0 m ±0,02 m:				
Habia Cable – 600V – ZN 1419 TW 2 Non-Class 1E – FPI155/HFS80N – 700044376 – YYYY-Www – batchcode – L				
YYYY-Www to be replaced with year and week of manufacture.				
Batch code to be replaced with manufacturers traceability code				
L indicates continuous meter marking and is replaced with actual length.				



CABLE DRAWING

Habia Cable

Customer ref: 64003-57000-CS-005
Description: M/TPC 2665/10,9

Habia inspection plan

Date of issue
2004-07-06

Drawing no
403-07769-051

Issued by
CJV

Approved by
AE

Rev. no
2

Revised by
EJ

Revised date
2004-09-30

Elektriska data vid + 20 °C / Electrical data at +20 °C (nom. data)

1 (1)

LEDARRESISTANS / CONDUCTOR RESISTANCE max: 0,600 Ω/km
 ISOLATIONSRESISTANS / INSULATION RESISTANCE >1500 MΩ x km
 KAPACITANS / CAPACITANCE N/A nF/ km
 IMPEDANS / IMPEDANCE N/A Ω
 DÄMPNING / ATTENUATION MHz N/A dB/100 m
 PROVSPÄNNING / TEST VOLTAGE Sparktest 5 kV AC or 8 kV Impulse
 DRIFTSTEMPERATUR / TEMPERATURE RATING -60 / +200 °C
 DRIFTSPÄNNING / VOLTAGE RATING 600 V
 VIKT / WEIGHT approx. 350 kg/km

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Pos	Beskrivning/Description	Dimensioner/Dimensions	Ytterdiam./ Overall diam. [mm]	Anm./Remarks
1	Tin plated copper conductor	2 AWG (665 x 0,25)	8,4	0.330"
2	Insulation of HFI 260(PEEK), natural	0,62	9,65	
3	Jacket of HFI 260 (PEEK), Natural	t=0,62 (0.049")	10,9 nom	0.429"

Wire marking:

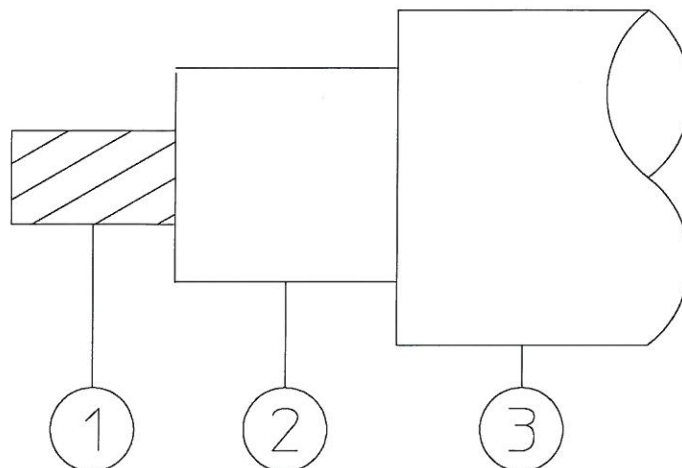
HABIA CABLE M/TPC 2665/10,9 403-07769-051 1C 2AWG HFI 260 PEEK 000m

Cable construction:

Wire marking at 1m (40") intervals

000m = Meter marking (e.g. 001m at first meter interval, 002m at second interval)

Radiation tolerance: 10 MGy (1000 MRad)



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