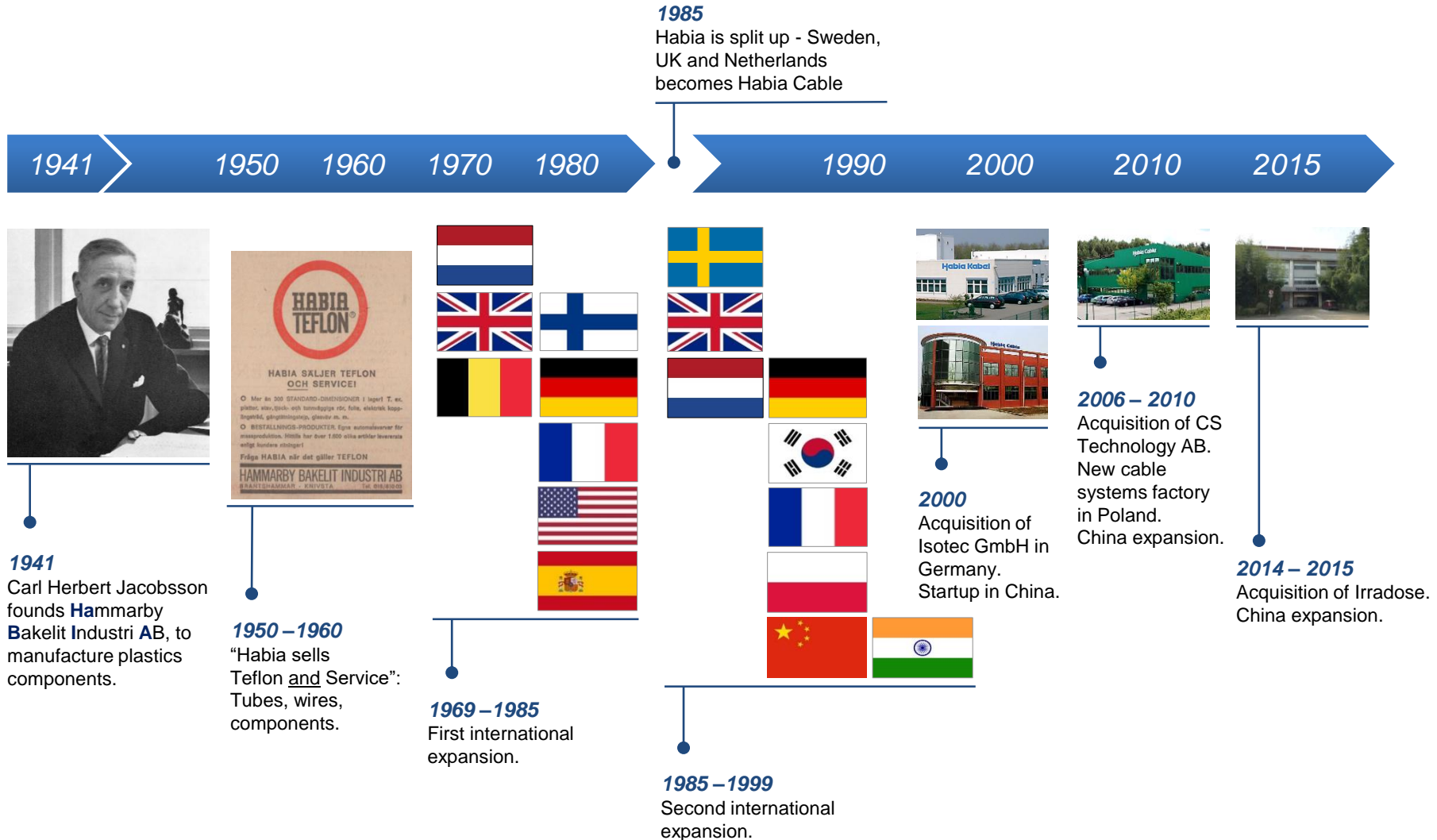


Qualification of sub-suppliers and materials

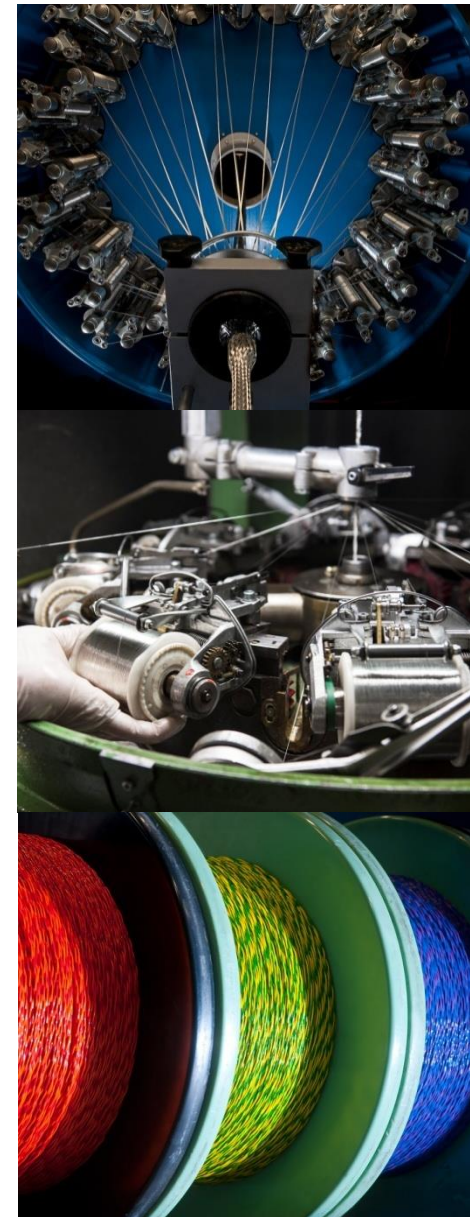
Tomas Nälsén, Habia Cable

Our history: 1941 until today



Quick facts

Business	Custom and special cables and harnesses
Business Idea	To develop, market and manufacture cable solutions for demanding applications
Year of Foundation	1941
Number of Employees	Approx 600
Turnover	Approx 83 M€
Geographical Presence	11 sales offices in Europe and Asia Sales to 50 countries
Production	5 Factories in Europe and Asia
Head Office	Stockholm, Sweden
Ownership	Industrial holding company Beijer Alma, listed on the Stockholm Stock Exchange



The disadvantage of computers...

■ 1976

TEST REPORT

Qualifying shielded electrical cable for nuclear reactor conditions. Including heat aging, irradiation and LOCA-test.

Performed on account of ASEA-ATOM, Sweden
February 1977.

10 pages

2013

ÚJV DITI 2305/80-R1

May 2013

**Qualification Test Report
for Habia Cable, Sweden —
Thermocouple Cable**

Report

Vladimír Hnát
Vít Plaček
Jan Kábrt

 ÚJV Rež, a. s.

 ÚJV Rež, a. s.

160 pages

Activation energies

■ Literature study

- Polyethylene – min 0,88eV, max 1,65 eV, avg 1,29 eV
- Neoprene – min 0,65 eV, max 1,26 eV, avg 1,00 eV
- Epoxy – min 0,48eV, max 2,85 eV, avg 1,19 eV

Activation energies

- Example
 - Value based on testing by supplier: 1,60 eV
 - LOCA testing start, completed.
 - Parallel Arrhenius ageing
 - New result: 1,20 eV
 - New LOCA testing start, completed

- Modern materials with stabilisers


Background

■ CFSI

■ Counterfeit Fraudulent and Suspect Items

■ Korea, 2012

- 7 suppliers
- Faked test certificates
- Faked supplier CoC's
- People in jail



I. Overview

History of Investigation

- **Oct. 2012**, CFSI cases were identified in Korean NPP
- **End of 2012**, Full-scope investigation of CGD quality doc. was completed
- **From Jan. 2013**, Full-scope investigation of test reports was started
 - ☞ Forged test reports were identified during the investigation of CGD quality document on Dec. 5, 2012
- **May 2013**, Forged EQ report cases were identified in SKN/SWN Unit 1,2
 - ☞ SKN Unit 2 & SWN Unit 1 were forced to shutdown on May 28, 2013
 - ☞ Investigation of domestic EQ reports was started
- **Dec. 2013**, The Board of Audit & Inspection announced the investigation result of overseas test reports
- **Feb. 2014**, Basic plan of overseas quality doc. investigation was established
 - ☞ Scope : Safety related items procured during 2008~2013 for 23 operating units

Background

- Kobe steel, 2018
 - Faked certificates
 - Goes all the way back to 1970's
 - More than 525 customers affected

- More information:
- Korea:
- <https://www.nrc.gov/docs/ML1415/ML14153A200.pdf>

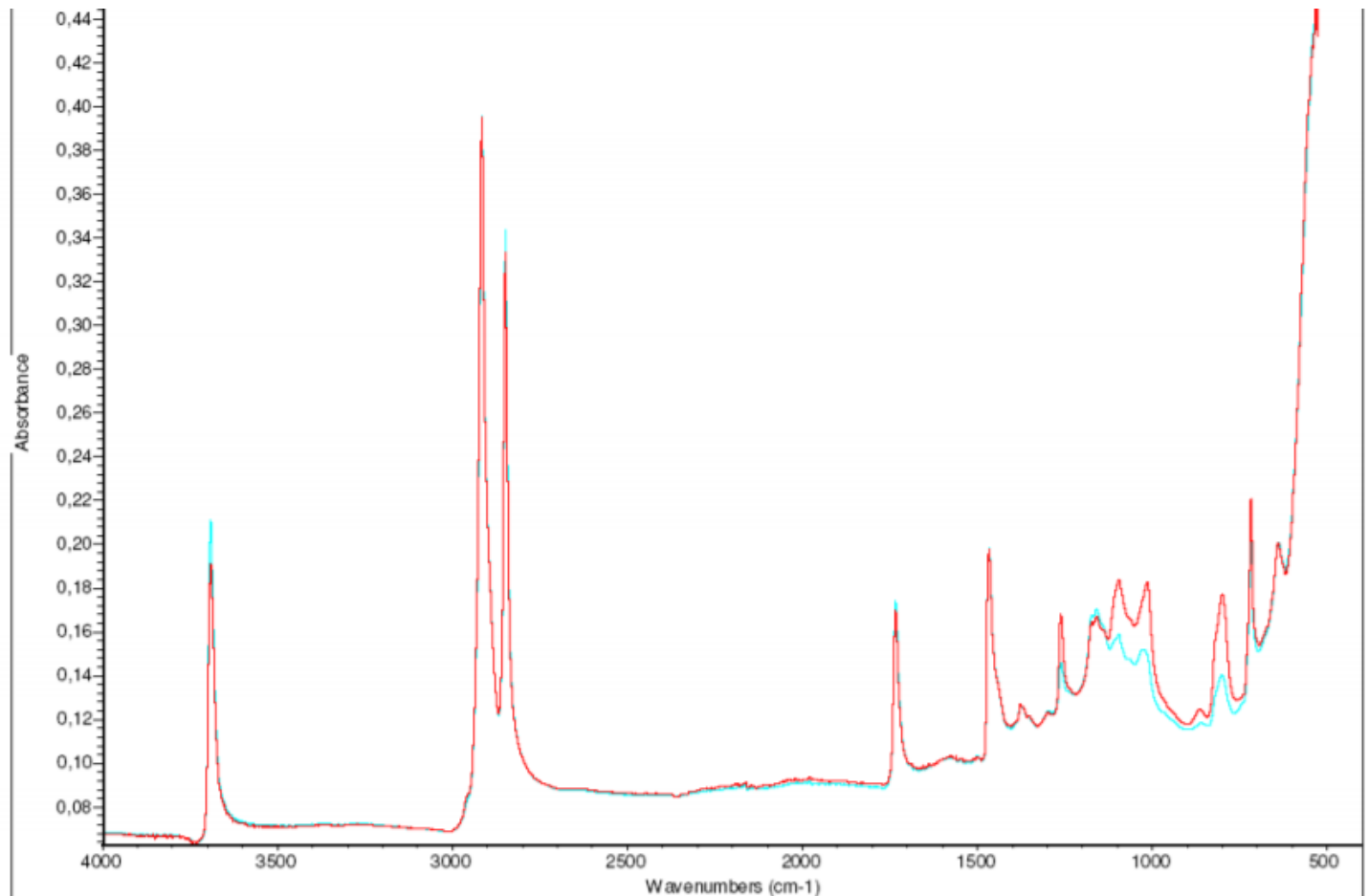
- Kobe steel:
- <https://www.nrc.gov/docs/ML1819/ML18190A466.pdf>

Same material every time...

- How to ensure we use same material as once qualified?
- Samples saved from each qualification performed
 - Fingerprint taken and saved in material database
- Several methods combined
 - Single method not available, need to use more than one.

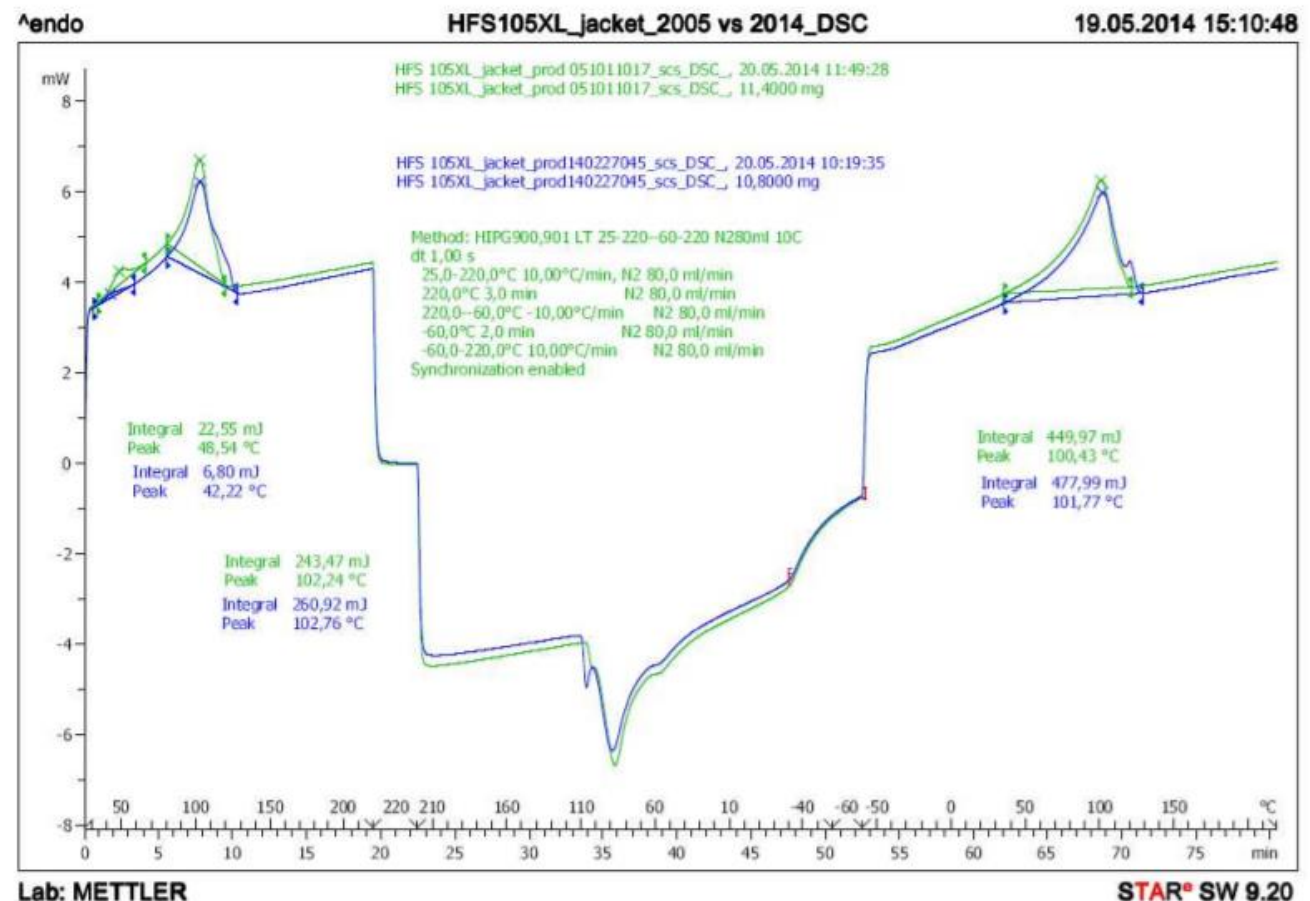
FTIR

Comparison between qualified material and supplied material



DSC

- Comparison between qualified material and supplied material



Traceability certificates

Purchase specifications

- Certificates from our suppliers, indicating values
- Purchase specifications

Habia Batch no: 000000246382

Habia Batch no: 000000246382

Besteller/ Purchaser/ Commettant:

HABIA CABLE Schweden

TIERPSVAEGEN 8
81575 SOEDERFORS

Fax: 0046 293 30061

Abnahmeprüfzeugnis EN 10 204/3.1

Inspection - Certificate 3.1 / Certificat de réception 3.1

Notice for changes of product

If product is being changed from last order or planned to be changed we require as early notice as possible, preferably 1 years notice. This includes any change that can impact the properties of the finished product.

Inspection and testing

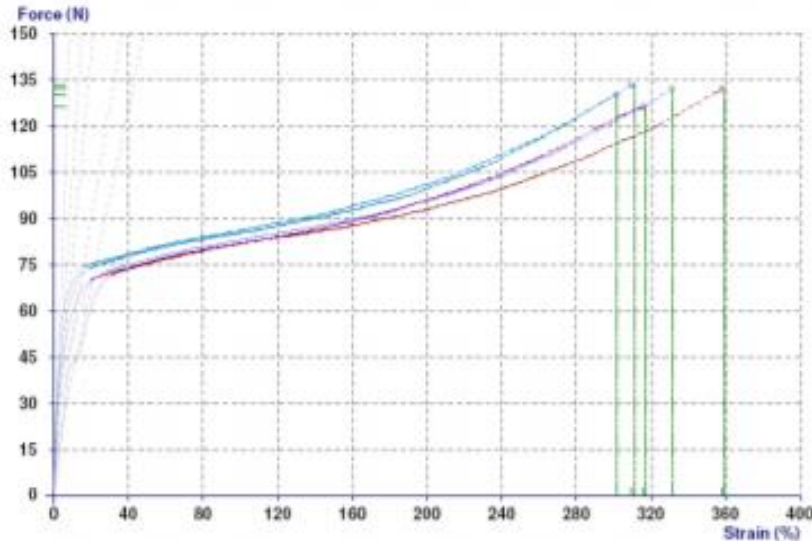
All inspection and testing shall be made at the place of, and by the manufacturer, after final processing of finished product.

Documentation

Test report to be delivered together with the goods.

Tensile testing / ageing

- Tensile testing and 1 week accelerated ageing
 - All nuclear products
- Values to conform to internal specification



Supplier Assessments

- Every year, regardless of importance of supplier
 - Self assessment, e.g. QA/environment certificates

- IT companies
 - E.g. supplier of old document handling system
 - "We don't work with these things" – regarding ISO 9001.

Supplier audits

- Critical suppliers
- IFS – Important For Safety (IAEA)
- 2-5 year interval, depending on result
- E.g. Insulation, jacket, conductors, stabilisers

Audit criteria: ISO9001:2015, applicable parts of ASME NQA-1-2012, Environmental policy

Summary of results:

The Quality Management System of xxxxxxxxxx plc is certified to ISO9001:2015 by DQS Inc. The certificate is valid until 2021-05-03. Copies of the certificates are attached to this report.

From the evidence noticed during the audit, the physical environment, the quality assurance procedures and the quality records that verify that procedures are implemented and maintained, the overall impression was very good.

The Quality Management system is well implemented, maintained and fit for the scope of providing the product.

No Non-Conformance (NC) or Observation (OBS) were noticed during the audit.

The audit notations can be found under section 2 in this report.

The Quality Management System at xxxxxxxx plant, at the above location, is approved for the above product until 2021-11-02. *

Safety Culture

- Not personnel safety!
- How to respond
 - If something is not looking right
 - If there are questions that can't be solved during night shifts etc.
 - STAR – Stop, Think, Act, Review
- Safety first to ensure good quality!!

ANY
QUESTIONS
?