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MR. HEINZ-WILLI HAMACHER, Technik Design
NEXANS DEUTSCHLAND GMBH
BONNENBROICHER STR 2-14
41238 MOENCHENGLADBACH GERMANY

Date: 2011/05/20
Subscriber: 456861006
PartySite: 98368
File No: E338770
Project No: 10CA23800
PD No: 11M23803
Type: L
PO Number: WINDLINKS LV-RS

Subject: **Initial Production Inspection**

PLEASE NOTE: YOU ARE NOT AUTHORIZED TO SHIP ANY PRODUCTS BEARING ANY UL MARKS UNTIL THE INITIAL PRODUCTION INSPECTION HAS BEEN SUCCESSFULLY CONDUCTED BY THE UL FIELD REPRESENTATIVE.

An Initial Production Inspection (IPI) is an inspection that must be conducted prior to the first shipment of products bearing the UL Mark. This is to ensure that products being manufactured are in accordance with UL's requirements including the Follow-Up Service Procedure. After the UL Representative has verified compliance of your product(s), authorization will be granted for shipment of product(s) bearing the appropriate UL Marks as denoted in the Procedure.

Inspections at your plant will be conducted under the supervision of ROB GEUIJEN, UL INSPECTION CENTER NETHERLANDS, UL INTERNATIONAL (NETHERLANDS) B V, DELTA 1A, BUSINESS PARK, IJSSELOORD 2, ARNHEM, The Netherlands, 6825 ML., PHONE: 26-376-4950, FAX: 26-376-4960, EMAIL: rob.geuijen@nl.ul.com

Please file revised pages and illustrations in place of material of like identity. New material should be filed in its proper numerical order.

NOTE: Follow-Up Service Procedure revisions DO NOT include Cover Pages, Test Records and Conclusion Pages. Report revisions DO NOT include Authorization Pages, Indices, Section General Pages and Appendixes.

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MEL File

UL INSPECTION CENTER 522

Production Date: UNKNOWN
Contact: Mr. Heinz-Willi Hamacher
Phone: 49-2166-272#176
EMail: n/a

ADDENDUM TO TRANSMITTAL LETTER

MR. HEINZ-WILLI HAMACHER, Technik Design
NEXANS DEUTSCHLAND GMBH
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The following material resulting from the investigation under the above numbers is enclosed.

Issue

<u>Date</u>	<u>Vol</u>	<u>Sec</u>	<u>Pages</u>	<u>Revised Date</u>
2011/05/20	1	1	Add New Volume	

Follow-Up Service Procedure

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It is important to keep UL Procedures and Test Reports up-to-date as new or revised pages are received. Correct maintenance will decrease the amount of time the UL Representative spends when visiting your facility.

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PAGES (in content order)	FUNCTION	HOW TO UPDATE
Authorization Page	Displays the Product Category, the type of Follow-Up Service (Type R=Reexamination / Type L=Label), the File Number and the Volume Number associated with each Applicant's, Manufacturer's and Listee's company name and address.	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Addendum to Authorization Page*	Lists the additional names and addresses of manufacturing locations, when multiple locations exist	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Listing Mark Data (LMD), Classification Mark Data (CMD) or Recognized Component Mark Data (RCMD) Pages* #	Used only for products covered under Type R Service. Displays the correct LMD, CMD, or RCMD Mark, the Control Number for Listed and Classified categories and additional information regarding minimum size, application, procurement, and any other optional markings, in addition to the UL Mark.	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Multiple Listing (ML) Correlation Sheet	Correlates product model numbers between those products made by a Manufacturer for the Basic Applicant and those supplied to another company, the Multiple Listee.	Replace, add or delete page(s) with most current "Issued" or "Revised" date.
Index*	Catalogs the contents of the Procedure by some logical means, i.e. Section Number, Report Reference Number, or Issue Date.	Replace present page by matching the UL File Number, Volume Number, Page Number and most current "Revised" date.
Appendices* # (App.)	Contains instructions for the Manufacturer and UL Representative concerning specific responsibilities and required periodic tests. May also outline tests to be conducted on samples to be forwarded to UL's facilities.	Replace present page by matching the UL File Number, Volume Number, Appendix letter (eg. App. A), Page Number and most current "Revised" date.
	Standardized Appendix Pages are the same for all manufacturers within a particular product category.	Replace present page by matching the Appendix letter (eg. App. A), Page Number and most current "Revised" date.
Follow-Up Inspection Instructions (FUII) Pages	Contains information similar to that in the Appendices. FUII Pages are issued as part of the Procedure when a UL Standard is used in conjunction with the Procedure, and are the same for all manufacturers within a particular category.	Replace present pages by matching the Page Number and most current "Issued" or "Revised" date.
Section General* # (Sec. Gen.)	Contains description, requirements, identifications and/or specifications that are common to all products covered by the entire volume and supplements the information provided in the Description Section.	Replace present page by matching the UL File Number, Volume Number, Page Number and most current "Revised" date.
Description, or Section (Sec.)	Contains the specific description of one or more products or systems. This includes written text supplemented by photographs, drawings, etc., as necessary, to define features that affect compliance with the applicable requirements.	Replace present page by matching the UL File Number, Volume Number, Section Number, Page Number and most current "Issued" date.

* The above page(s) may not appear in all UL Follow-Up Service Procedures; UL's Conformity Assessment Services staff determines their inclusion.

These pages are combined in the **Generic Inspection Instructions** for International Style Reports, identified, as example by Vol. X1, X2, etc.

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File E338770

Vol 1

Issued: 2011-05-20

Revised: 2011-05-20

FOLLOW-UP SERVICE PROCEDURE
(TYPE L)

WIND TURBINE TRAY CABLE
(ZGZN)

Manufacturer: NEXANS DEUTSCHLAND GMBH
(456861-006) BONNENBROICHER STR 2-14
41238 MOENCHENGLADBACH GERMANY

Applicant: SAME AS MANUFACTURER
(456861-006)

Listee: SAME AS MANUFACTURER
(456861-006)

This Procedure authorizes the above manufacturer to use the marking specified by Underwriters Laboratories Inc.(UL), or any authorized licensee of UL, only on products covered by this Procedure, in accordance with the applicable UL Services Agreement.

The prescribed Mark or Marking shall be used only at the above manufacturing location on such products which comply with this Procedure and any other applicable requirements.

The Procedure contains information for the use of the above named Manufacturer and representatives of Underwriters Laboratories Inc. and is not to be used for any other purpose. It is lent to the Manufacturer with the understanding that it is not to be copied, either wholly or in part, and that it will be returned to Underwriters Laboratories Inc. (UL) or any authorized licensee of UL, upon request.

This PROCEDURE, and any subsequent revision, is the property of Underwriters Laboratories Inc.(UL) and the authorized licensee of UL and is not transferable.

Underwriters Laboratories Inc.

Stephen Hewson
Senior Vice President
Global Follow-Up Service Operations

William R. Carney
Director
North American Certification Program

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<u>Type</u>	<u>Section</u>	<u>Report Date</u>
Wind Turbine Tray Cable, WTTC	1	2011-05-20

APPENDIX A

SPECIAL INSTRUCTIONS FOR WIND TURBINE TRAY CABLE

FIELD REPRESENTATIVE:

SAMPLES

Samples shall be selected in accordance with the Follow-Up and Inspection Instructions (FUII) for Power and Control Tray Cable (QPOR) per UL 1277.

TEST AT FACTORY:

The same examination and tests specified in the Follow-Up and Inspection Instructions for UL 1277 shall be followed with the following exception:

1. The Dielectric Withstand and Spark Test voltages shall be in accordance with the requirements for wires rated 1000/2000 V in the Standard for Thermoset-Insulated Wires and Cables, UL 44.

2. The insulated conductors shall meet all performance requirements for conductors rated 90°C and 600 volts. Conductors shall not be surface printed.

CONFORMITY ASSESSMENT SERVICES DEPARTMENT:

The same examination and tests specified in the Follow-Up and Inspection Instructions for UL 1277 shall be followed.

GENERAL

PRODUCT COVERED:

Wind Turbine Tray Cable.

LISTEE'S IDENTIFICATION:

Listee's name, trade name or E338770 surface marked or indent printed on the jacket of the wire at not greater than 40 inch intervals.

FACTORY LOCATION AND IDENTIFICATION:

Location	Identification
NEXANS DEUTSCHLAND GMBH BONNENBROICHER STR 2-14 MOENCHENGLADBACH 41238 GERMANY	None

LISTING MARK COMPOSITION:



WIND TURBINE TRAY CABLE

GENERAL CONSTRUCTION:

Except as noted elsewhere in this Procedure under the heading "DESCRIPTION", the cable described in this Procedure is constructed in accordance with the requirements of the Subject 2277 Outline of Investigation for Flexible Motor Supply Cable and Wind Turbine Tray Cable.

MARKING:

On or in the Cable - The information required on the cable shall be the same as specified in the Standard for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members, UL 1277, Section 29 with the following exceptions:

1. "Wind Turbine Tray Cable" or "WTTC" in place of "Type TC".
2. "1000 volts" or "1000 V" in place of "600 V".
3. "90°C dry" or "90°C wet or dry" as applicable.
4. No NEC type letter marking shall appear on the conductors or the cable.

On the Tag, Reel, Or Carton - The information required on the tag, reel, or carton shall be the same as specified in Section 30 of UL 1277 with the exceptions stated above and the following statement:

"Wind Turbine Tray Cable for installation within a wind turbine generator in accordance with Article 336 and other applicable parts of the National Electrical Code."

DESCRIPTION

PRODUCT COVERED:

Wind Turbine Tray Cable rated 90°C Dry and 90°C Wet, 1000 V.

CONSTRUCTION DETAILS:

General - The cable covered by this report is constructed in accordance with the requirements of the Underwriters Laboratories Inc.'s Subject 2277 Outline of Investigation for Flexible Motor Supply Cable and Wind Turbine Tray Cable and as shown below.

Insulated Conductors - Unlisted conductors similar to Type XHHW-2, except employing EP Nexans Compound Material Designation AE FW 5/125. See Table 1 below for minimum average thickness and minimum thickness at any point. below.

TABLE 1

Size of conductor		mm		mils	
mm ²	AWG or kcmil	Minimum average thickness	Minimum thickness at any point	Minimum average thickness	Minimum thickness at any point
2.08 - 5.26	14 - 10 AWG	0.76	0.69	30	27
9.37 - 33.6	8 - 2	1.14	1.02	45	40
42.4 - 107	1 - 4/0	1.40	1.27	55	50
larger than 107 - 253	larger than 4/0 - 500 kcmil	1.65	1.47	65	58
larger than 253 - 507	larger than 500 - 1000	2.03	1.83	80	72
larger than 507 - 1010	larger than 1000 - 2000	2.41	2.18	95	86

Filler - Rubber, One Center Filler.

Tape - Nylon, 0.0044 mils thick, 1.9 inches wide.

Tape - PETP, 0.0019 mils thick, 1.9 inches wide, 0.6 inches lap of tape

Tape - Copper Plated Non-Woven Nylon Fabric or Aluminum Foil, 0.0058 mils thick, 1.9 inches wide, 0.5 inches lap of tape

Shield - Tinned Copper Braid

Tape - PETP, 0.0018 mils thick, 1.5 inches wide, 0.72 inches lap of tape.

Overall Jacket - Nexans compound XLEVA Material Designation LE 4679. See Table 2 below for the minimum average thickness and the minimum at any point.

TABLE 2

Thicknesses of overall jacket

Calculated diameter of round assembly under jacket or calculated length of major axis of flat assembly under jacket		Minimum average thickness		Minimum thickness at any point	
inch	mm	mils	mm	mils	mm
0 - 0.425	0 - 10.80	120	3.05	96	2.44
Over 0.425 but not over 0.700	Over 10.80 but not over 17.78	120	3.05	96	2.44
Over 0.700 but not over 1.500	Over 17.78 but not over 38.10	120	3.05	96	2.44
Over 1.500 but not over 2.500	Over 38.10 but not over 63.50	120	3.05	96	2.44
Over 2.500	Over 63.50	140	3.56	112	2.84

OPTIONAL MARKINGS:

Cables employing Nexans compound EVA Thermoset Jacket Material Designation LE 4679 may be marked "-40C" or "minus 40".

File E338770
Project 10CA23800

May 20, 2011

REPORT

on

Wind Turbine Tray Cable

NEXANS DEUTSCHLAND GMBH
MOENCHENGLADBACH
41238 GERMANY

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DESCRIPTION

PRODUCT COVERED:

Wind Turbine Tray Cable rated 90°C Dry and 90°C Wet, 1000 V.

CONSTRUCTION DETAILS:

General - The cable covered by this report is constructed in accordance with the requirements of the Underwriters Laboratories Inc.'s Subject 2277 Outline of Investigation for Flexible Motor Supply Cable and Wind Turbine Tray Cable and as shown below.

Insulated Conductors - Unlisted conductors similar to Type XHHW-2, except employing EP Nexans Compound Material Designation AE FW 5/125. See Table 1 below for minimum average thickness and minimum thickness at any point. below.

TABLE 1

Size of conductor		mm		mils	
mm ²	AWG or kcmil	Minimum average thickness	Minimum thickness at any point	Minimum average thickness	Minimum thickness at any point
2.08 - 5.26	14 - 10 AWG	0.76	0.69	30	27
9.37 - 33.6	8 - 2	1.14	1.02	45	40
42.4 - 107	1 - 4/0	1.40	1.27	55	50
larger than 107 - 253	larger than 4/0 - 500 kcmil	1.65	1.47	65	58
larger than 253 - 507	larger than 500 - 1000	2.03	1.83	80	72
larger than 507 - 1010	larger than 1000 - 2000	2.41	2.18	95	86

Filler - Rubber, One Center Filler.

Tape - Nylon, 0.0044 mils thick, 1.9 inches wide.

Tape - PETP, 0.0019 mils thick, 1.9 inches wide, 0.6 inches lap of tape

Tape - Copper Plated Non-Woven Nylon Fabric or Aluminum Foil, 0.0058 mils thick, 1.9 inches wide, 0.5 inches lap of tape

Shield - Tinned Copper Braid

Tape - PETP, 0.0018 mils thick, 1.5 inches wide, 0.72 inches lap of tape.

Overall Jacket - Nexans compound XLEVA Material Designation LE 4679. See Table 2 below for the minimum average thickness and the minimum at any point.

TABLE 2

Thicknesses of overall jacket

Calculated diameter of round assembly under jacket or calculated length of major axis of flat assembly under jacket		Minimum average thickness		Minimum thickness at any point	
inch	mm	mils	mm	mils	mm
0 - 0.425	0 - 10.80	120	3.05	96	2.44
Over 0.425 but not over 0.700	Over 10.80 but not over 17.78	120	3.05	96	2.44
Over 0.700 but not over 1.500	Over 17.78 but not over 38.10	120	3.05	96	2.44
Over 1.500 but not over 2.500	Over 38.10 but not over 63.50	120	3.05	96	2.44
Over 2.500	Over 63.50	140	3.56	112	2.84

OPTIONAL MARKINGS:

Cables employing Nexans compound EVA Thermoset Jacket Material Designation LE 4679 may be marked "-40C" or "minus 40".

TEST RECORD NO. 1

SAMPLES:

Samples of the Wind Turbine Tray Cable rated 90°C dry and 90C wet, 1000 V as indicated below and constructed as described herein, were submitted by the manufacturer for examination and test.

9/C, 12 AWG Type WTTC cable employing Unlisted conductors similar to Type XHHW-2, except employing EP Nexans Compound Material Designation AE FW 5/125.

Filler - Rubber, One Center Filler.

Tape - Nylon, 0.0044 mils thick, 1.9 inches wide.

Tape - PETP, 0.0019 mils thick, 1.9 inches wide, 0.6 inches lap of tape

Tape - Copper Plated Non-Woven Nylon Fabric or Aluminum Foil, 0.0058 mils thick, 1.9 inches wide, 0.5 inches lap of tape

Shield - Tinned Copper Braid

Tape - PETP, 0.0018 mils thick, 1.5 inches wide, 0.72 inches lap of tape.

Overall Jacket - Nexans compound XLEVA Material Designation LE 4679.

The above cable construction was used for test purposes and considered representative of full size range for Type WTTC using EP thermoset-insulated conductors rated 90°C dry, 90°C wet, and employing overall Nexans EVA jacket compound LE 4679. The following optional ratings apply: -40°C.

GENERAL:

Test results relate only to the items tested.

The following tests were conducted.

TEST
Detailed Examination Of Jacketed Cable
Conductor Corrosion
Physical Properties of Insulation
Insulation Resistance Long Term in Water, 90C
Capacitance and Relative Permittivity and Stability Factor
Horizontal Flame/FT2
Deformation Test, Insulation
Cold Bend, Insulation
Crushing Test
Impact Resistance Test
Physical Properties Of Jacket
Deformation Test Of Jacket
Cold Bend Test Of Complete Cable
Cold-Impact Test, Complete Cable
Durability of Ink Printing
Vertical Tray Flame Test - UL Exposure
Dielectric Voltage-Withstand (6000 V per UL 44)

The test methods and results of the above tests have been reviewed and found in accordance with the requirements in the Outline of Investigation Subject 2277 and Standard UL 1277.

The complete test data is provided as a supplement to this Test Record.

Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in the standards noted below and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

Outline or Standard	Title	Edition or Publication Date	Revision Date
Subject 2277	Outline of Investigation for Flexible Motor Supply Cable and Wind Turbine Tray Cable	Issue No. 3 Dated 08/16/2010	- -
UL 1277	Electrical Power and Control Tray Cables with Optional Optical-Fiber Members	5 th Edition Dated 04/21/2010	- -
UL 1685	Vertical-Tray Fire-Propagation And Smoke-Release Test For Electrical And Optical-Fiber Cables	3 rd Edition Dated 12/05/2007	07/27/2010

CONCLUSION

Samples of the products covered by this Report have been found to comply with the requirements covering the category and the products are found to comply with UL's applicable requirements. The description and test result in this Report are only applicable to the sample(s) investigated by UL and does not signify the product(s) described as being covered under UL's Follow-Up Service Program. When covered under UL's Follow-Up Service Program, the manufacturer is authorized to use the UL Listing Mark on such products which comply with UL's Follow-Up Service Procedure and any other application requirements of Underwriters Laboratories Inc. The Listing Mark of Underwriters Laboratories Inc. on the product, or the UL symbol on the product and the Listing Mark on the smallest unit container in which the product is packaged, is the only method to identify products investigated by UL to published requirements and manufactured under UL's Listing and Follow-Up Service.

This Report is intended solely for the use of UL and the Applicant for establishment of UL certification coverage of the product under UL's Follow-Up Service. Any use of the Report other than to indicate that the sample(s) of the product covered by the Report has been found to comply with UL's applicable requirements is not authorized and renders the Report null and void. UL shall not incur any obligation or liability for any loss, expense, or punitive damages, arising out of or in connection with the use or reliance upon the contents of this Report to anyone other than the Applicant as provided in the agreement between UL and Applicant. Any use or reference to UL's name or certification mark(s) by anyone other than the Applicant in accordance with the agreement is prohibited without the express written approval of UL. Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

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