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The following material resulting from the investigation under the above numbers is enclosed.

Issue Date	Vol	Sec	Pages	Revised Date
	1		Appendix	
	1		Inspection Instructions	

Appendix Is Been Re Issued.

Inspections at your plant will be conducted under the supervision of LIU JIAN BIAO, UL INSPECTION CENTER GUANGZHOU, CHINA NAT'L IMPORT & EXP COM INSPCTN CORP, 66 HUA CHENG DA DAO,WEST TOWER, 17TH FL, ZHU JIANG XIN CHENG, GUANGZHOU, GUANGDONG, China, 510623., PHONE: 20-38872860, FAX: 20-3829-0799, EMAIL: ulic316@ccicgd.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.

Please review this material and report any inaccuracies to UL's Customer Service Professionals. Contact information for all of UL's global offices can be found at http://www.ul.com/global/eng/pages/corporate/contactus.

If you'd like to receive updated materials FASTER, UL offers electronic access and/or delivery of this material. For more details, contact UL's Customer Service Professionals as shown above.

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SCL File

UL INSPECTION CENTER 316

FLEXIBLE CORD (ZJCZ, ZJCZ2, ZJCZ3, ZJCZ7, ZJCZ8, ZJCZ9)

Table A - SAMPLE SELECTION GUIDE

Sample Group	Category	Cord Type	Report Date	UL	C-UL	Additional Info
1	Reserved for Future Use					
2	Reserved for Future Use					
3	Jacketed, thermoplastic cord	SJT	2013-01-10	Y	Y	
		SJTW	2013-01-10	Y	Y	
		ST	2013-01-10	Y	Y	
		SVT	2013-01-10	Y	Y	
4	Reserved for Future Use					
5	Thermoplastic, parallel cord	SPT-1	2013-01-09	Y	Y	
		SPT-1W	2013-01-11	Y	Y	
		SPT-2	2013-01-09	Y	Y	
		SPT-2W	2013-01-11	Y	Y	
		SPT-3	2013-01-09	Y	Y	
6	Reserved for Future Use					
7	Reserved for Future Use					
8	Thermoplastic, nonintegral parallel cord	NISPT-1	2013-01-09	Y	Y	
		NISPT-2	2013-01-09	Y	Y	
9	Reserved for Future Use					
10	Reserved for Future Use					
11	Reserved for Future Use					
12	Reserved for Future Use					
13	Reserved for Future Use					

FLEXIBLE CORD (ZJCZ, ZJCZ2, ZJCZ3, ZJCZ7, ZJCZ8, ZJCZ9)

INDEX TO FOOTNOTES:

* - employing Class 4, 5, 6 or 7 insulation and Class 1.5, 1.6, 1.7 or 1.8 jacket

UL 62

FLEXIBLE CORD (ZJCZ, ZJCZ7)

ELECTRIC VEHICLE CABLE (FFSO, FFSO7)

FOLLOW-UP AND INSPECTION INSTRUCTIONS

TABLE OF CONTENTS

SCOPE

A. These requirements cover Flexible Cord and Electric Vehicle Cable for use in accordance with Article 400 of the National Electrical Code as well as Types XTW and CXTW Decorative Cords; Clock Cord; Heater Cord, Types HSJOW, HSJOOW and Shaver Cord. These requirements also cover Flexible cords and Electrical Vehicle Cable for use in Canada. The Standard for Flexible Cords and Cables, UL 62, and the Standard for Wire and Cable Test Methods, UL 2556, are applicable for inspections in this category. The Authorization Page for the Procedure will note authorization for use of the Canadian UL Mark on Flexible Cord production accordingly. The descriptive sections of the Procedure will identify the Canadian Types authorized for the manufacturer, and their corresponding UL Type Designations if products meet both Canadian and U.S. requirements, or the Canadian Types authorized for the manufacturer for products that meet only Canadian Requirements. The Procedure will contain instructions that cover the generic marking, labeling and test requirements for such cords.

These instructions do not cover Hoistway Cable that is also identified in UL 62. Follow-Up Inspection requirements for Hoistway Cable are defined in the respective Follow-Up and Inspection Instructions and/or Follow-Up Service Procedures for this category. For specific Flexible Cord types covered by this FUII, refer to Table L1.

GENERAL

B. As a part of UL's follow-up inspection, it is required that a Field Representative periodically visit the factory and select, for test or examination or both, samples of production made since the last inspection visit of the products covered.

C. The Follow-Up Service Procedure covering the product is loaned to the manufacturer and constitutes the basis on which the product is judged for compliance with the applicable requirements.

GENERAL RESPONSIBILITIES OF THE MANUFACTURER AND THE FIELD REPRESENTATIVE

The Manufacturer’s and Field Representative’s general responsibilities, as part of the Follow-Up Services Procedure, are as noted in the published document titled, “UL Mark Surveillance Requirements”, and is available through UL’s secure customer portal MyHome@UL.com and/or through UL’s internet site www.UL.com. Manufacturers that do not have Internet access may obtain the current version of these requirements from their local UL Customer Service Representative or UL Field Representative.

GENERAL INSPECTION GUIDELINES

APPLICATION OF THE LISTING MARK TO THE PRODUCT

General

L1. If available, the Field Representative shall examine a minimum of ten coils or reels of Flexible Cord to assure that the application of the label to the product throughout is in compliance with the requirements of UL. If less than ten coils or reels are available, the Field Representative will examine all the available coils or reels.

L2. Flexible Cord is covered under UL's Type L Listing Service and requires the use of Type L holographic labels whose contents are identified in the Section General of the Follow-Up Service Procedure. Additional information, such as camera-ready art work and proportional dimensions for the Marks/Markings may be found by visiting UL’s website at “http://www.ul.com/marks_labels/”.

L3. The Listee's name, tradename, trademark or UL File Number which identifies the Listee, must appear on a combination label, unless the subscriber chooses to purchase standard labels from UL's Label Centers, in which case the Listee's identification is not applicable. At least one label shall be applied to the tag furnished with each coil or reel of Flexible Cord. The length represented by the label or labels shall in each case be approximately the same as the length of Flexible Cord, within ±5 percent. The Field Representative shall verify manufacturers records or markings to confirm the length.

L4. Each flexible cord shall have a durable distinctive marking throughout its entire length by means of which the Listee can be identified. This shall be accomplished by one or more of the following methods:

1. assigned combination of colored marker threads.
2. assigned file number, or
3. organization name or acceptable coding such as by trade name, trademark

L5. The above identification methods are listed in order of precedence; i.e. if the descriptive marking includes both a marker thread and a file number, the marker thread shall be used to identify the responsible organization.

Bulk Labeling Option

L6. As an alternative to applying the label and engineering markings directly on the coil or reel, the label may be applied directly to a carton containing one or more spools, provided that the carton bears all the required engineering tag markings and the label(s) covers the total length of Flexible Cord in the carton, within ±5 percent. The label on the carton shall be adjacent to the engineering markings, and preferably so located that the label will be torn when the carton is opened. This option is only permitted for shipments to Original Equipment Manufacturers (OEMs) where the cord is consumed in one location and the UL Representative can verify the presence of a Listing Mark on the carton. If the bulk shipment is sent to a distributor, who discards the original container and resells the individual reels, this cord shall not be considered Listed if the Listing Mark (label) and engineering markings are not available at an OEM's facility.

Purchasing Listing Marks

L7. Type L holographic Listing Marks for flexible cords are available in standard format containing only UL Listing Mark information at UL's Label Centers, or they may be ordered as combination labels to also include the Listee identification. Additional information on designing and ordering custom holographic labels can be found in the Hologram UL Marks section of UL's Marks and labels website at "http://www.ul.com/marks_labels/".

Surface Printing, Tag Marking and Labeling of Multi-Rated Flexible Cord

L8. Flexible Cord that is dual rated with a Recognized Component AWM style (e.g.: "SPT-2 or AWM") shall bear the UL Listing Mark on the tag, reel or carton, and only the UL Logo in the surface print legend.

L9. The UL Logo shall consist of the letters "UL", in a circle or in parentheses. For multi-rated constructions, UL requires that the UL Logo in the surface print legend clearly associate the "UL" with the UL Listed cord types, and clearly separate the Listed cord types from the AWM designations. Examples of proper markings are shown below:

...SPT-2 (UL) …… AWM...
... (UL) SPT-2 18 AWG/2 C 60°C 300 V or AWM...

The tag marking for dual-rated cord shall account for all common and unique requirements for each cord type identified in the cord's surface print. As an example, for cord identified as "SPT-2 or AWM", the common engineering tag marking requirements for these two types would include the Listee's identification, conductor size, number of conductors, temperature rating, voltage rating and date of manufacture. The unique tag markings would be applicable to the AWM category and would include such items as the insulation thickness and the usage statement.

L10. Since the construction in the above example references one Listed cord type and one Recognized wire type, a UL Listing Mark is applied to the tag. In this case, a Flexible Cord Listing Mark is applied to the tag.

L11. If the Field Representative encounters marking practices not in accordance with the above guidelines, the situation shall be documented on a Variation Notice. The Field Representative shall work with the manufacturer in accordance with the "VN Handling and Processing Procedure". Should it be determined that the cord or cable is no longer eligible to bear the UL Certification Mark, all cord or cable with surface printing referencing UL shall be scrapped in accordance with L25.

Nondenominational Labels

L12. Nondenominational labels that do not contain a denomination (length) are available for Flexible Cords. When nondenominational labels are used, the Field Representative shall verify that the manufacturer is maintaining accurate records of Flexible Cord produced bearing nondenominational labels during each calendar month. The Field Representative shall have access to these records in order to determine and report nondenominational label usage.

L13. The use of nondenominational labels is an option made available only to those manufacturers whose production recording methods and controls have been evaluated by UL, and found to be an acceptable basis for service charge billing. The use of nondenominational labels is not required, and labels with the length imprinted will continue to be available. When nondenominational labels are authorized for a manufacturer, the authorization will be indicated in the Follow-Up Service Procedure and on the Subscriber Card (Account, Class and Code Section). Use of nondenominational labels may be revoked if proper controls and reporting are not maintained.

L14. The Field Representative shall inform manufacturers interested in having their record keeping facilities evaluated toward receiving authorization to use nondenominational labels to contact the Label Center.

Labeling of Cut Lengths

L15. Flexible Cord produced in-house and packaged in cut lengths by the manufacturer is labeled differently from Flexible Cord which is received on reels from another Flexible Cord manufacturer and then cut into lengths by the receiving manufacturer. The procedure indicated below shall be followed when labeling Flexible Cord which the manufacturer produces in-house and ships in cut lengths:

a. Place the Flexible Cord label covering the total length of cut lengths on the outside of the carton of cut lengths. The label shall be so located so that the label is torn when the carton is opened.

b. Prepare the usual engineering tag and place it inside the carton of cut lengths. The information required on the tag can be found under the "Tag and Reel Markings" section of UL 62.

c. At the location on the tag normally occupied by the Flexible Cord label, use the statement "See outside of carton for UL label".

As an alternative to preparing the tag for cut lengths mentioned in paragraph L15b, the manufacturer may print the required tag information onto the carton itself. The Flexible Cord label shall then be placed on the outside of the carton (see L15a), adjacent to the tag information, in a location where the label will be torn when the carton is opened.

L16. Flexible Cord that is received from another manufacturer with the intention of being cut into lengths or respooled and labeled by the receiving manufacturer shall already bear the UL Flexible Cord label. Manufacturers who receive Listed Flexible Cord from another manufacturer and cut it into lengths for resale as Listed Flexible Cord shall use Listed Processed Wire or Processed Wire Respooled labels, as authorized by their Processed Wire Follow-Up Service Procedure.

Surface Printing of Flexible Cord

L17. In addition to the surface printing requirements specified in the "Product Marking" section of UL 62, all Flexible Cord types shall bear the UL Logo in the surface print legend. For products meeting only U.S. Requirements, the letters "UL", in parenthesis "(UL)" or the UL in a circle logo, is required to appear in the surface print legend. For products meeting only Canadian Requirements, the letters "C(UL)" or the Canadian UL in a circle logo is required to appear in the legend. For products meeting both U.S. and Canadian Requirements, either the C(UL)US Logo or separate U.S. and Canadian logos are required to appear in the legend. For example:

E12345 (UL) SJT 14 AWG (2.08 mm2)/2C 105C 300V VW-1 C(UL)

or

E12345 C(UL)US SJT 14 AWG(2.08 mm2)/2C 105C 300V VW-1

are acceptable markings for products meeting both US and Canadian requirements.

Date Marking of Cord

L18. The age of the cord is derived from the marked date of manufacture, and is either applied to the tag, reel or carton or included in the surface markings of the cable through the use of ink, indent, or embossed surface print marked on the outside surface of the product as permitted in the Standard for Flexible Cords and Cables, UL 62. If the date code is printed on the surface of the cord, it shall be repeated at intervals of no greater than 40 inches (1 meter). The date may be shown in code. In no case shall the marked date be prior to the date of the 100% Production-Line testing (See Paragraph L70) of the Flexible Cord or cable.

Compounds For Use In Flexible Cord

L19. Specific compounds shall be used as insulating materials used in Decorative Cords and Wire, types SPT-1W, SPT-2W, CXTW and XTW as well as jacketing compounds for cord types with “W” in the type designation. All other constructions not bearing the "W" suffix designations are performance based, and are not subject to the requirements of the Recognized Component QMTT2 and QMTT3 Programs described below. Cords bearing the “-R” suffix such as type SPT-2-R or SJT-R shall have the insulation and jacket compound procedure described. The compound does not need to be covered under either QMTT2 or QMTT3 unless the cord type also contains the ‘W’ suffix.

Recognition Program (QMTT2) - Under the Recognition Program for Compounds (QMTT2), the manufacturer purchases Recognized compounds from an outside supplier that are Recognized under the QMTT2 category. To confirm if a compound is acceptable for the applicable cord rating(s), the Field Representative is to reference the Online Certifications Directory to confirm that the compound exists and is suitable for the specific type ratings. Products not employing a Recognized compound, if required by the Procedure, shall be held, and a Variation Notice shall be written to document the situation.

Unlisted Component Program (QMTT3) - Under the Unlisted Component Program, manufacturers have been granted authorization to formulate their own compounds. To verify if a compound is acceptable, the Field Representative shall reference a separate volume under the manufacturer's Follow-Up Service Procedure for Flexible Cord or a separate file/volume that has been issued to the manufacturer under the CCN "QMTT3" to determine if these compounds are Procedure described. Cords not manufactured using the unlisted component compound described in the Procedure shall be held and a Variation Notice shall be written to document the situation.

Procedure-described compounds - The compound used on cords marked with a "-R" suffix (such as SPT-2-R) is procedure described. Cords with a "-R" suffix that are not manufactured using the compound described in the Procedure shall be held and a Variation Notice shall be written to document the situation.

Reprocessed Thermoplastic Insulating/Jacketing Materials

L20. Bleeder stock is insulating or jacketing material that has already been processed through an extruder at least once. Bleeder stock used for insulating or jacketing cable shall not contain any copper or other conductive materials. Paragraphs a - c describe the only forms of bleeder stock reprocessing currently authorized by UL. It should be noted that reprocessed thermoplastic material shall not exceed twenty five percent (25%) by weight of the material being fed into the hopper, and shall be thoroughly mixed with the virgin material. Use of up to 50% reprocessed compound by weight, for cable jackets for general applications only (reference paragraph 'c' below) is permitted only if authorized in the Follow-Up Service Procedure.

a. "In-house" reprocessing, which is defined as insulation bleeder stock obtained from the manufacturer's own production, that is granulated while still hot at the extruder and then immediately put back into the hopper of the extruder. Compounds reprocessed in this manner are acceptable for any use for which the original compound is authorized.

b. "In-house" reprocessed insulation bleeder stock which is accumulated and allowed to cool is acceptable for any use for which the original compound is authorized, provided the bleeder stock is segregated by compound and continuously identifiable until reused.

c. Insulation stripped from cables is acceptable for use only as a jacketing compound on cord in which the jacket is non-integral and where no specific performance requirements are specified for the jacket (such as "weather-resistant", "oil resistant", "-R" suffix, etc.). Jackets employing reprocessed compound are intended for use only where generic requirements are specified for the jacket.

L21. Paragraphs a - c above apply only to thermoplastic insulating/jacketing materials. UL does not authorize the reprocessing of either thermoplastic elastomers (TPE) or of pure thermosets.

L22. Note that this applies to both "in-house" reprocessed compounds, and compounds that are reclaimed insulation and jacket material (herein defined as "reclaimed" compounds) sent to external reclaiming companies (or sister facilities that perform this service).

L23. Manufacturers are required to request authorization for both the use of reprocessed compound in the range of 25 to 50% by weight, and for reclaiming operations not conducted at the original manufacturing location for the reclaimed products. Special instructions placed in the Subscriber's Follow-Up Service Procedure will authorize the use of the reprocessed compound and/or the reclaiming operation.

L24. Manufacturers utilizing both in-house reprocessed and reclaimed compounds must specify the ratio of virgin and reprocessed compounds on their production records, reel tags, or other corresponding production data. In addition, reprocessed and reclaimed compounds of a particular temperature rating (e.g., "PVC 90° C") must be noted. For both types, manufacturers must specify in their production specifications the mixture ratio and temperature rating(s). Suppliers of pre-mixed reclaimed/virgin compounds must specify this same information as part of their shipping documentation.

Scrapping of Flexible Cord With a Reference to UL

L25. The following defines the various means that UL considers acceptable in order to render rejected, surface printed Flexible Cord unusable:

a. Cord cut into short lengths [maximum 10 ft. (3 m)]. These lengths are not to be disposed of in neat bundles, but rather, they are to be disposed of by means that will cause entanglement of the short lengths.

b. Cord, including coils, severely compressed or compacted.

c. Insulation stripped from the conductor.

d. Cord of various constructions randomly assembled and bailed. It is intended that all cord be removed from cartons or reels and all ties removed. The turns of cord must be sufficiently separated in the container to cause complete entanglement of the cord and thus destroy the integrity of the original coil.

e. Cord of various constructions processed as in "d" above but weighed and sent to a reclaimer. Employing this method, the manufacturer must maintain his own and copies of his reclaimer's scrap weight records for examination by the Field Representative.

f. Pouring printing ink on rejected coils, reels and lengths of cord, soaking the cord surface and thereby obliterating any reference to UL, then hardening and binding the scrap cords to each other, making the cord unusable.

L26. If the Field Representative encounters an alternate scrapping method being employed by the manufacturer which is not authorized in the Follow-Up Service Procedure, the Field Representative shall document the situation on a Variation Notice and request that the manufacturer contact UL within 15 days, to have the alternate method evaluated and, if found acceptable, included in the Procedure.

Spark Testing of UL Labeled Production

L27. Since UL 62 requires Spark Testing as a condition for labeling, Field Representatives are required to review the manufacturer's Spark Testing equipment and testing procedure during each inspection to determine compliance with the requirements specified in the "Alternative Spark Testing" section of UL 62. Review of the equipment shall include a review of calibration records and function check documentation. The misuse of Spark Testing equipment and procedures has been seen to consist of one or more of the following items:

a. Voltage below that required.

b. Sparking not done at the last operation before twisting, jacketing, packaging, or reeling for shipment.

c. Spark testers not switched on by the operator for any reason.

d. Spark testers in poor operating condition, those that have not been calibrated for voltage and sensitivity since installation in excess of one year.

e. Insufficient bead-chain spacing or missing sections of bead-chains.

f. Conductors of insulated wire not grounded at either their take-up or pay-off reel.

g. Visible/audible signals for detecting nonconformances not operating.

h. Function check not performed on a periodic basis

i. Records of function check not maintained

j. Other details not in compliance with UL requirements.

L28. Manufacturers are required to maintain in good condition, adequate and sufficient facilities and equipment for conducting the required tests. Should the Field Representative question the suitability of the Spark Testing equipment or testing procedure, the situation is to be documented on a Variation Notice and the Field Representative has the authority to withhold labeling of the product until the manufacturer institutes corrective action.

FIELD REPRESENTATIVE'S COUNTERCHECK PROGRAM

Sample Selection Requirements and Special Inspection Instructions

General

L29. At each visit to the factory the Field Representative shall be allowed to see all Flexible Cord that bears or is intended to bear the Listing Mark, and shall then select representative samples.

L30. The Follow-Up Service Procedure specifies the type or types of Flexible Cord on which the use of Listing Marks (labels) has been authorized. The Field Representative shall assure that type designations currently being UL labeled at the factory, or submitted for UL inspection, are authorized in the Follow-Up Service Procedure.

L31. The Field Representative shall examine labeled production and all production intended to be labeled for all of the construction details, dimensions, ratings and markings specified in UL 62, the Follow-Up Service Procedure description, these Follow-Up and Inspection Instructions, the Standard for Wire and Cable Test Methods, UL 2556 (see also Table L4), and shall witness the tests specified in Table L2.

L32. The Field Representative is required to inspect and report upon randomly selected samples. These samples shall not be taken from a lot which other samples have been taken during a previous inspection, unless the lot was previously rejected, has been culled (sorted) and reworked, and is resubmitted for re-inspection. The actual number of coils to be taken in individual cases may necessarily vary somewhat according to conditions, but the Field Representative shall follow the outline given in Table L4 and the instructions in the paragraphs that follow the table.

L33. The number of samples selected by the Field Representative shall be proportional to the amount of Flexible Cord available for inspection. Select one (1) sample for every 7,500 ft. (2.286 km) or less of two types (or one type if only one type and one temperature rating is available for selection) of Flexible Cord available when selected in accordance with L34, Table L1 and Sample Selection Guide, Table A of Appendix A. A minimum of three (3) samples shall be selected per type at each visit, but the maximum number of initial samples selected per type shall not exceed nine (9). Each sample shall be selected from a different coil or reel. If only one coil or reel is available, one sample shall be selected.

L34. The grouping of cord types is generally shown in Table L1. The Sample Selection Guide, Table A of Appendix A shows the cord types and groups authorized for the manufacturer. If available, the Field Representative shall select samples from different groups. If samples within one group are selected, samples of different temperature rating and options (oil, weather resistant) shall be selected.

Table L1
Cord Groups

Group	Cord type	General construction
1.	SV, SVO, SVOO, SJ, SJO, SJOO, SJOW, SJOOW, S, SO, SOO, SOW, SOOW, SRD, EV, EVJ, HSJO, HSJOW, HSJOO, HSJOOW, HSJ, HSJ-R, HSJO-R, HSJOO-R, HSJOW-R, HSJOOW-R, SV-R, SVO-R, SVOO-R, SJ-R, SJO-R, SJOO-R, SJOW-R, SJOOW-R	Jacketed, thermoset cord
2.	SVE, SVEO, SVEOO, SJE, SJEO, SJEOO, SJEW, SJEOW, SJEOOW, SE, SEO, SEOO, SEW, SEOW, SEOOW, EVE, EVJE, SVT(TPE), SVTO(TPE), SVTOO(TPE), SJT(TPE), SJTO(TPE), SJTOO(TPE), SJTW(TPE), SJTOW(TPE), SJTOOW(TPE), ST(TPE), STO(TPE), STOO(TPE), STW(TPE), STOW(TPE), STOOW(TPE), SRDE, EVT(TPE), EVJT(TPE), SVE-R, SVEO-R, SVEOO-R, SJE-R, SJEO-R, SJEOO-R, SJEW-R, SJEOW-R, SJEOOW-R	Jacketed, thermoplastic elastomer cord
3.	SVT, SVTO, SVTOO, SJT, SJTO, SJTOO, SJTW, SJTOW, SJTOOW, ST, STO, STOO, STW, STOW, STOOW, SRDT, EVT, EVJT, SVT-R, SVTO-R, SVTOO-R, SJT-R, SJTO-R, SJTOO-R, SJTW-R, SJTOW-R, SJTOOW-R, DRT	Jacketed, thermoplastic cord
4.	TST, TPT, Shaver cord	Tinsel cords
5.	SPT-1, SPT-1-R, SPT-1W, SPT-1W-R, SPT-2, SPT-2-R, SPT-2W, SPT-2W-R, SPT-3, SPT-3-R, SRDT, clock, PXT, PXWT, XTW	Thermoplastic, parallel cord
6.	SPE-1, SPE-1-R, SPE-2, SPE-2-R, SPE-3, SPE-3-R, SPT-1(TPE), SPT-2(TPE), SPT-3(TPE), SRDE	Thermoplastic elastomer, parallel cord
7.	SP-1, SP-1-R, SP-2, SP-2-R, SP-3, SP-3-R, SRD, HPN, HPN-R	Thermoset, parallel cord
8.	NISPT-1, NISPT-2, NISPT-1-R, NISPT-2-R,	Thermoplastic, nonintegral parallel cord
9.	NISP-1, NISP-2, NISP-1-R, NISP-2-R	Thermoset, nonintegral parallel cord
10.	NISPE-1, NISPE-2, NISPT-1(TPE), NISPT-2(TPE), NISPE-1-R, NISPE-2-R,	Thermoplastic elastomer, nonintegral parallel cord
11.	TX, CXWT, CXTW,	Thermoplastic, single conductor or twisted
12.	C, PD, HPD	Thermoset, single conductor or twisted
13.	E, EO, ETT, ETP	Elevator cables

L35. Samples selected for examination shall not be less than 15 ft. (4.6 m) in length. Table L2 specifies the tests/examinations to be witnessed by the Field Representative. For the Detailed Examination, the items shown in Table L3 are to be reviewed, where applicable. Use Table L4 as a guide for acceptance or rejection of a lot based on examination results.

L36. If all of the samples examined show acceptable results, the entire lot is acceptable with respect to that item. If any sample is nonconforming, additional samples from different coils or reels shall be selected in accordance with Table L4 and inspected. The lot as a whole may be accepted or rejected in accordance with Table L4. For lots accepted, coils or reels from which acceptable results were obtained may be labeled as being acceptable. Reference is to be made to paragraphs L63 and L64 that provides additional instructions regarding how a physical properties nonconformance is to be treated. The manufacturer may then make a thorough review of the rejected lot(s) and reject all individual coils or reels which do not comply with the requirements, after which the remainder of the lot(s) may be submitted for inspection and if found to be acceptable by the Field Representative, labeled.

L37. The Field Representative shall note that all tests shown in Table L2 may not be applicable for the given Flexible Cord under inspection. The Field Representative shall reference the Construction Tables that appear in UL 62, which define the construction and test performance requirements for each Flexible Cord type. The list of tests shown in Table L2 shall be compared against the Construction Table for the Flexible Cord type under inspection to determine which tests in Table L2 are applicable. As an example, if a Type SJT Flexible Cord was selected for inspection then tests 1 – 8 and 11 of Table L2 are applicable. Test 9 (Tightness of Insulation) and Test 10 (Flexibility of Braid) do not appear in the Construction Table for Type SJT. The Field Representative shall also note that the Construction Tables contain the full spectrum of tests performed for a given Flexible Cord as part of the New Work Investigation. The Field Representative is not to witness tests that appear in the Construction Table, but which do not appear in Table L2.

TABLE L2

Tests to be Witnessed by Field Representative at Factory

1. Detailed Examination (See Table L3)
2. Jacket Resistance (to be conducted quarterly)
3. Mechanical Strength
4. Dielectric Strength Test
5. Insulation Resistance Test
6. DC Resistance of Conductor
7. Physical Properties of Insulation - Unaged
8. Physical Properties of Jacket - Unaged
9. Tightness of Insulation
10. Flexibility of Braid
11. Durability Test of Ink Printing - Unaged

TABLE L3 Detailed Examination Items
1. Conductor Size
2. Number of Conductors
3. Conductor Material/Joints
4. Conductor Dimensions
5. Conductor Strand size and lay of strands
6. Conductor Corrosion or Metal Coating
7. Maximum Length of Lay of Conductors
8. Application of Insulation
9. Insulation Thickness
10.Tearing (integral constructions only)
11.Jacket Thickness - Integral and Nonintegral
12.Overall Diameter (Round service and heater cords)
13.Web Thickness (integral constructions only)
14.Separator
15.Splices
16.Shielding
17.Individual Covering Construction
18.Fillers
19.Special Markings
20.Distinctive Marking
21.Tag Markings
22.Surface Print Markings
23.Listing Mark Application/Denomination (See Par. L2-L3, L7)
24.Manufacturer and grade designation of compounds used (cords using a QMTT2 or QMTT3 compound, cords with a "-R" suffix, or cords with specific compounds specified in Procedure Description only)

TABLE L4

Disposition of Product Based on Examination Results

Initial Number of Samples to be Taken	Number of Nonconforming Test Results	Additional Number of Samples to Retest Lot	Cumulative Number of Nonconforming Samples to Reject Lot
3	+ 0	-	-
3	++ 1,2 or 3	-	-
4	+ 0	-	-
4	1	10	1
4	++ 2,3 or 4	-	-
5	+ 0	-	-
5	1	15	2
5	++ 2,3,4 or 5	-	-
6	+ 0	-	-
6	1 or 2	20	2
6	++ 3,4,5 or 6	-	-
7	+0	-	-
7	1 or 2	25	3
7	++3,4,5,6 or 7	-	-
8	0	-	-
8	1,2 or 3	30	3
8	++4,5,6,7 or 8	-	-
9	+ 0	-	-
9	1,2 or 3	35	4
9	++4,5,6,7,8 or 9	-	-

+ - Accept without further sampling.
++ - Reject without further sampling. See Paragraph L36.

Conductors

DC Resistance of Conductor

L38. The conductivity shall be determined by means of a Kelvin bridge ohmmeter or other suitable equipment meeting the requirements as described under "apparatus" in UL 2556 for the test DC Resistance. The DC Resistance result shall be compared with the applicable table in UL 62 to determine compliance with the requirements.

Conductor Sizes

L39. The Field Representative shall determine the cross-sectional area for stranded conductors employing the sum of the measured areas of the component strands.

L40. Where all strands are nominally of the same size, the sum of the measured cross-sectional areas of component strands is found by measuring the diameters (d) of at least seven strands, in mils or millimeters (mm). The diameter shall then be averaged. For measurements in mils, the average diameter (d_{ave}) will then be squared, and then multiplied by the total number of strands.

$$\text{Cross-sectional Area (circular mils)} = [(d_{ave})^2] \text{ X number of strands}$$

For measurements in mm, the average diameter will be squared, multiplied by 0.7854 and then multiplied by the total number of strands.

$$\text{Cross-sectional Area } (mm^2) = 0.7854[(d_{ave})^2] \text{ X number of strands}$$

In the case of rope-lay stranded conductor, at least seven strands are to be taken from each group (member).

Measurements are to be made on specimens of the strand from the finished conductor using the method described in UL 2556.

Length of Lay

L41. The measurement method for Length of Lay described in UL 2556 shall be followed.

Insulation

Insulation Thickness

L42. Samples for measurement of the thickness of insulation shall not be cut more than 10 ft. (3 m) from either end of a coil or reel, shall be checked for Minimum Acceptable Average Thickness and Minimum Acceptable Thickness at Any Point, and shall comply with the requirements for both in order to be eligible for application of the Listing Mark. The methods to be employed to determine the Minimum Acceptable Average Thickness and the Minimum Acceptable Thickness at Any Point are specified under the "Insulation and Jacket materials tests, Thickness" section of UL 2556. If an optical device is used to make the measurements rather than micrometers and pin gauges, the conductor is stranded and the minimum required insulation thickness is not less than 15 mils (0.38 mm), 3 mils (0.08 mm) may be added to the calculated average thickness and measured minimum thickness at any point before determining compliance with the requirements.

L43. The difference between the words "specimen" and "sample", as used in the following two paragraphs is important. Up to three different specimens, taken from the same sample of cord, can be used to determine the acceptability of the sample. As specified in paragraph L33, and Table L4, a minimum of three samples must be taken during each visit.

L44. Measurements for the determination of Minimum Acceptable Average Thickness of insulation shall be made in accordance with UL 62 and UL 2556, on a 1 ft. (0.3 m) or longer conductor specimen taken at least one foot in from the end of the coil or reel. If the Minimum Acceptable Average Thickness is not less than the minimum value specified in UL 62, the coil or reel shall be considered to have acceptable average thickness and no additional measurements to determine the average thickness need be made. If the first specimen is less than the minimum value (nonconforming), another specimen about one foot farther in shall be taken and measured for average thickness. If this specimen does not conform, the coil or reel shall be rejected. If the second specimen is acceptable, a third specimen, at least one foot in from the other end of the coil or reel, is to be taken and measured for Minimum Acceptable Average Thickness. If this specimen does not conform, the coil or reel shall be rejected. If the third specimen is acceptable, the coil or reel is considered acceptable.

L45. The Minimum Acceptable Thickness at Any Point shall be determined in accordance with the requirements in the referenced standards. This measurement is to be made at the thinnest point of the insulation. If the thickness of the insulation at the thinnest point is not less than the minimum required, no additional measurements on other specimens from the coil need be made and the coil shall be accepted with respect to minimum at any point. If the measurement shows the insulation thickness to be more than two mils below the minimum required, no additional measurements need be made and the coil shall be rejected. If the measurement shows the thickness to be below the minimum required, but not more than two mils below, the minimum thickness shall be determined on two additional specimens, spaced about one and two ft. (0.3 m and 0.6 m) respectively, along the coil. If both of these measurements show the insulation thickness to be not less than the minimum required, the coil shall be accepted; but if either measurement shows the insulation thickness to be less than the minimum required, the coil shall be rejected.

L46. Any individual coil in which the thickness of insulation is found to be less than the minimum required value shall be rejected even though the lot as a whole from which the coil was selected may be acceptable.

Tapes, Braids, and Wraps

L47. If the fibrous covering is applied to a wire before vulcanizing, the possibility of mechanical damage to the insulation or of its flattening is increased because of the extra handling while the rubber compound is soft. Accordingly, whenever this practice is being followed, the Field Representative shall select additional stock coils for the electrical tests and shall examine the product as a whole more closely for insulation thickness.

L48. The manufacturer will advise the Field Representative as to the cotton size used in the braids or wraps under cotton before application to the wire. The manufacturer's record of cotton receipts, or other means may be necessary to establish the specifications of the braids or wraps.

L49. The requirements for picks per inch represent minimum values, and no variations below these figures are to be accepted.

L50. The Field Representative shall note carefully the saturation of inner wraps or braids, particularly of the parts in contact with the insulation.

L51. In the requirements for cotton braids a "strand" or "carrier" is considered to be the thread, or combination of several threads laid parallel, wound on a single bobbin of the braiding machine; a "thread" is considered to be one of the component parts of a strand; the term "ends" denotes the number of threads laid parallel to form a strand or carrier; the term "ply" denotes the number of component parts twisted together to form a thread, each part consisting of fibers twisted together; and "picks" per inch are the number of strands or carriers in either direction crossing a line one inch in length and parallel to the axis of the wire.

Picks Per Inch

L52. The number of picks per inch is to be determined on a sample of finished wire, without removing the braid from the sample. If the braid has been saturated, a sample of the braid before saturation but applied to the cord may be used.

L53. The instrument for measuring picks per inch consists of a sliding magnifying glass mounted on a steel plate. The plate is provided with means for holding the sample of braided wire under examination. The instrument is further provided with an indicating pointer that travels exactly one inch with the glass. Thus, the number of strands running in either direction (not both directions) and passing the pointer in its total travel of one inch can be observed readily, and this value is to be taken as the number of picks per inch. Other devices designed to be used for counting of picks may be used.

L54. From the tables entitled "Commonly Used 16-Carrier Braids” it will be noted that the following must be known in order to determine the number of required picks per inch for a given specimen; the number of strands used (i.e. whether the braid is made on a 12-, 16-, 20-, 24-, 36-, or 48- carrier braider); the number of ends per strand; and whether or not the cotton used is two-ply. The following will serve as a guide in examining a sample for these features.

Strands

L55. The number of strands is the same as the number of carriers on the braiding machine. They can be determined from a finished sample of braid by either of the following methods:

(A) If the identification consists of colored threads woven in the braid, the number of strands can be determined easily by counting the individual groups of ends between successive appearances of the colored threads and parallel to them. Twice the number so obtained will give the total number of strands (i.e. the number of carriers on the machine which made the sample under examination).

(B) If no colored threads are woven in the braid, the number of strands can be determined by cutting a small sample of the braid (about one inch long) from the wire and placing a ruler or other straight edge across this sample, at right angles to the axis of the wire. The number of strands (groups of ends) intersecting this straight line in one direction, multiplied by two, will give the total number of carriers on the machine; or the number of strands in both directions crossing this line will give the same results.

Ends

L56. The number of ends per strand or carrier can be observed easily from an examination of the braid. The threads (i.e. ends) composing an individual strand are always laid parallel and are readily visible.

Ply

L57. One thread is to be removed from the braid. By twisting this thread in the fingers, it will readily separate into two distinct component parts, if two-ply cotton is used.

Cotton Sizes

L58. There is no suitable method for determining the cotton size from the finished braid. Cotton for braiding purposes is sold on the basis of weight and it is not feasible to determine the size by a measurement of the thread diameter. It is true that there is an actual difference between the diameters of the two adjacent weights of cotton thread, for example No. 26 and No. 30; but each size will vary, in individual samples, as much as or more than the limit of accuracy of any measuring device, and it would not be practicable to attempt to distinguish between them in this manner.

Physical Properties Tests

L59. The physical properties requirements for insulation and jacket are found in the tables in UL 62 based on material type, class number and temperature rating.

L60. The Physical Properties Tests shall be made on a length of sample that have not been subjected previously to any other test. The measurements for tensile strength and elongation shall be conducted simultaneously.

L61. When physical properties tests are conducted on helically twisted (coiled) Flexible Cord, the tests shall be conducted on the straight portion of the cord and not on the coiled portion of the cord.

L62. The physical properties tests shall be conducted at a room temperature within the range of 15.0 to 35.0°C (59 to 95°F). Nonconforming test results shall not be recorded, particularly in the case of tensile strength, when tests are conducted at a room temperature not within the range of 22.0 to 28.0°C (71.6 to 82.4°F) if the manufacturer requests that retests be made within this range and provides facilities for so doing.

L63. If nonconforming test results occur from any one of the physical properties tests upon the first specimen taken from a coil, three additional specimens shall be taken from the same coil. If any two of these three additional specimens pass the test, the coil shall be passed with respect to physical properties. If two or more of the additional three specimens is nonconforming, the coil shall be rejected. A coil shall not be rejected nor a nonconforming test result recorded because of nonconforming results obtained for a single specimen unless the manufacturer agrees accordingly; nor shall more than four specimens be tested to be assured of nonconformance. Specimens showing mechanical damage shall not be tested.

L64. If nonconforming test results in Tensile Strength or Elongation tests are judged to be due to damage to specimens caused by adherence of the insulation to conductors when removing them, the Field Representative may permit the manufacturer to employ a different method (stretching the conductor, or slitting the insulation) for removing the conductors.

Durability Test of Ink Printing

L65. The Field Representative shall witness the Durability Test of Ink Printing during each inspection on unaged samples only as described in UL 2556.

Insulation Resistance Tests

L66. Insulation Resistance tests shall be conducted as part of the Field Representative's Countercheck Program in accordance with UL 62. When water immersion is required in the method in UL 62, the finished conductors (without an overall, nonintegral jacket) of the Flexible Cord are to be immersed in water for a minimum of two hours instead of six hours as specified. Material that is nonconforming in any test shall not be labeled.

For the Insulation Resistance tests, cord need not be cut into shipping lengths, but the length of any single coil shall not exceed 5,000 ft. (1500 m) unless otherwise stated in the Follow-Up Service Procedure. The minimum length of each coil shall be 50 ft. (15 m). A number of coils or reels may be connected together for the tests, provided the total length of conductor feet so grouped does not exceed 5,000 ft. (1500 m). If coils are connected together, the average insulation resistance for the group shall be no less than 125 percent of the values given in UL 62 for a total conductor length of 1,001 - 3,000 ft. (300 – 900 m), and no less than 150 percent of the values given in UL 62 for a total conductor length of 3,001 - 5,000 ft. (901 – 1500 m).

For the Insulation Resistance Test, the equipment may consist of a megohm bridge of suitable range and calibration and having a 100 – 500 V dc open-circuit potential.

The following formula shall be used to calculate the insulation resistance in megohms per 1000 ft., or megohms per kilometer.

$$IR = \frac{RxLxMxTCF}{1000}$$

R - Reading from megohm bridge (ohms)
L - Length of coil in feet or meters, as applicable
M - Multiplier factor from megohm bridge
TCF - Temperature Correction Factor from the applicable Standard (if necessary)

Integral Construction Parallel Cords

L67. The tearing test applies only to the flexible cord types having the outer jacket integral with the insulation, such as type SPT-2. Successive specimens are to be torn in opposite directions with respect to the extrusion direction. Any specimen need not be torn for a distance of more than one foot. The construction of the cord shall be such that the insulated conductors can be readily separated for any distance when slit at the end and intentionally torn apart. In addition, the grounding conductor shall be readily separable from the two insulated conductors so as to expose the green insulation throughout the entire length of the torn section.

MANUFACTURER'S TEST PROGRAM AND RECORDS

Manufacturers Test Records

L68. The manufacturer shall maintain a record of the tests witnessed by the Field Representative. The record shall show all data associated with the measurements and tests witnessed during the inspection visit. When recording the data, the manufacturer shall record all data for all samples as individual entries. The record of the data shall be retained at the manufacturer's location until the next inspection visit or 90 days, whichever is longer.

Periodic Lot Testing

L69. It is the manufacturers responsibility to monitor their production to ensure requirements in UL 62 are being met and maintained on all products that bear, or are intended to bear the UL label and/or 'UL' as part of the surface print. The manufacturer shall not rely solely on the data obtained by UL (ether at the test lab or performed at the manufacturers facility) to confirm compliance with the requirements in UL 62 and in their Follow-Up Service procedure.

100% Production-Line Test Program

L70. The following tests are required to be conducted by the manufacturer on 100% production in accordance with UL 62 and UL 2556. For all types of Flexible Cord, the routine production testing may be done by means of either the Spark Test at the voltage indicated in the table titled Spark Test Voltage or the application of a Dielectric Voltage-Withstand Test in accordance with the table entitled "Dielectric strength for all finished types" test in UL 62.

a. Dielectric Voltage-Withstand Test - The manufacturer is required to subject each coil or reel of Flexible Cord to the Dielectric Voltage-Withstand Test. Cord that does not conform shall not bear the Listing Mark until it has been reworked if appropriate, and re-tested with acceptable results.

b. Alternative Spark Testing and Continuity Test on Conductors - The manufacturer may elect to substitute a Spark Test for the Dielectric Voltage-Withstand Test. All the individual conductors of each cord as well as the jacket on duplex and coaxial constructions of Elevator cables types E, EO, ETT, and ETP shall be subjected to the appropriate test potential for the specific cord or cable type indicated in the table for "Spark Test Voltage" in UL 62. An insulated conductor that shows no fault ("spark free") in a production-line Spark Test is acceptable; one that shows any fault when so tested shall be reviewed, repaired if necessary, and re-tested with acceptable results before being used as any part of a product bearing the Listing Mark. The Spark Test and the Continuity Test shall be performed according to the methods described in UL 2556 and UL 62 respectively.

L71. The Field Representative shall review the manufacturer's procedure for testing the product and shall assure that all material intended for labeling is tested, that nonconforming coils or reels are segregated, repaired, and re-tested before they are labeled, and that testing equipment is calibrated. A function check shall be performed on the test equipment before use and record of the performance of the function check shall be maintained for periodic review by the Field Representative.

SAMPLE SELECTION INSTRUCTIONS FOR TESTS AT UL

General

L72. On each visit, where available from production line or in labeled stock, select samples of one or two cord types from the sample groups as outlined in Sample Selection Guide, Table A of Appendix A where the sample pickup requirements for quarterly, semi-annual and annual frequency, as applicable, have not been fulfilled for that frequency at that point of time. The Field Representative shall individually select the Follow-Up Test samples of the same type and from the same lot selected for the factory inspection (see Paragraph L33). All quarterly, semi-annual and annual stock samples that are selected for routine testing shall be forwarded to the test office identified on the subscriber card. Table L5 provides a summary of the tag identification and sample lengths needed.

L73. Stock samples shall be identified by sample tags furnished to the Field Representative for this purpose. Sample tags shall be marked with the complete identification of the cord sample, including, where applicable, such information as "VW-1", "-R", etc. Due to the large number of descriptive sections that may exist in the Procedure, it is imperative that the Procedure section be identified on the sample tag to expedite the testing of the sample at UL, along with the identification of the insulating/jacketing materials used. The specific compound manufacturer and grade designation shall be indicated for all wire types using a QMTT2 or QMTT3 compound and for all cord types with the '-R' suffix or with compounds specified in Procedure Description.

L74. The Field Representative shall be responsible for packaging and mailing these samples to the appropriate testing office. The Field Representative shall witness the preparation of any sample sets required prior to packaging by the manufacturer due to size or volume considerations. Subscribers will be invoiced (direct billed) separately for these sample shipping expenses.

L75. Samples are to be forwarded by the UL Inspection Center within five working days of the inspection visit and the package is to be marked to the attention of the "Wire and Cable Follow-Up Testing Group". The sample tag shall be marked with the sample selection period (quarterly, semi-annual or annual).

Quarterly Sample Selection

L76. If the manufacturer is still producing the same cord from the first month into the second and third months of a quarter, no additional samples will be necessary if all of the types available in the first month were sampled. However, at the start of the following quarter, a new sample shall be forwarded to the appropriate UL office for testing.

Table L5

Summary of Sample Selection

	Selection period					
Cord type	Quarterly		Semi-annually		Annually	
	Sample Tag Identification	Sample length, ft. (m)	Sample Tag Identification	Sample length, ft. (m)	Sample Tag Identification	Sample length, ft. (m)
Heater cord, Type HPN	Regular Quarterly Countercheck Testing	85 (27)	--	--	Regular Annual Countercheck Testing	15 (4.5)
All cords per Table L1, other than Type HPN	Regular Quarterly Countercheck Testing	70 (23)	--	--	Regular Annual Countercheck Testing	15 (4.5)
Cords with "-R" suffix+	Quarterly ID tests	5 (1.5)	Semi-annual Abrasion test	20 (6)	--	--
	Quarterly crush and detailed exam tests	20 (6)	Semi-annual Flexing test	40 (12)	--	--
Cords with Suffix "W", and all Electric Vehicle Cables	Quarterly Permittivity and Stability Factor	60 (19)	--	--	Annual Weather resistance test	10 (3)
FT4	--	--	--	--	Annual FT4 Flame Test	Per L86

+ - refer to L78, L79, L81, L82, L83

L77. Once per quarter, the Field Representative shall select and forward to the appropriate UL office one sample from each group (if available) inspected in accordance with L35. The Field Representative should attempt to select different colors whenever possible. The sample lengths are to be as follows:

a. Heater Cord, Type HPN - 85 ft. (27 m)
b. All other types of cords - 70 ft. (23 m)

Note: if discrete lengths are selected, each length shall be at least 3 ft. (1 m).

The samples should be appropriately identified and the reverse side of the sample tag shall note "For Regular Quarterly Countercheck Testing".

L78. In addition, once per quarter, the Field Representative shall select and forward one 5-foot (1.5 m) sample of any wire construction marked with the suffix '-R'. The reverse side of the sample tag shall be marked "for quarterly ID tests".

L79. In addition, once per quarter, the Field Representative shall select and forward one 20-foot (6 m)sample of any wire construction marked with the suffix '-R'. The reverse side of the sample tag shall be marked "for quarterly crush and detailed examination tests".

L80. In addition, once per quarter, the Field Representative shall select and forward cords which are marked with the suffix "W" and Electric Vehicle cables. Insulated conductors (samples free of any jacket or other covering over the insulation) are to be selected. The length of the insulated conductor samples shall be 60 ft. (19 m) in one continuous length. The samples shall be appropriately identified, and the reverse side of the sample tag (shall note the following information

a. "For Quarterly Permittivity and Stability Factor Tests.

b. The suffix designation "W" for cords with "W" suffix.

c. The compound used for the conductor insulation

Semi-annual Sample Selection

L81. Semi-annually, the Field Representative shall select one 20 ft. (6 m) sample of a parallel (integral or non-integral types) and shielded wire construction marked with the suffix '-R'. Non-shielded, round cords do not need to be selected. The reverse side of the sample tag shall be marked "for semi-annual abrasion test".

L82. In addition, semi-annually the Field Representative shall select one 40-foot (12 m) sample of any wire construction marked with the suffix '-R'. The reverse side of the sample tag shall be marked "for semi-annual flexing test".

L83. If the same construction is selected for the flexing test as well as for the abrasion test, the sample length shall be 60 ft. (19 m) and the reverse side of the sample tag shall be marked "for semi-annual flexing and abrasion test".

Annual Sample Selection

L84. Once per year (but not necessarily the first quarter), the Field Representative shall select and forward one sample from each group (if available) inspected in accordance with L35 to the appropriate UL test Office. The length of the sample shall be 15 ft. (4.5 m). The sample shall be appropriately identified, and the reverse side of sample tag shall note "For Regular Annual Countercheck Testing".

L85. Weather Resistance Test – Once per year (but not necessarily the first quarter), select and forward one sample of cord or wire with the "W" suffix designation such as Type CXTW, SPT-2W, SJTW or SEOOW; or any Electric Vehicle Cables such as Types EVJ, EVJT, EVE, EVT, EV, EVJE to the appropriate UL test Office. The length of the sample shall be 10 ft. (3 m). The sample shall be appropriately identified, and the reverse side of sample tag shall note "For Annual Weather Resistance Test".

L86. FT4 Flame Test - Once per year (but not necessarily the first quarter), the Field Representative shall select the samples described below for the performance of the FT4 Flame Tests.

Any cable type marked "FT4" - Select one sample of any cable construction. The sample should be as close as possible to 0.5 inch in diameter. This sample shall be subjected to the Vertical tray flame test (Method 2 – FT4) in UL 2556. The sample shall be appropriately identified and the sample tag shall note "For Annual FT4 Flame Test". The length of the sample is to be determined using the following formulas and the information in Tables L6 and L7:

For Cable Smaller Than 13 mm (0.5 in) in Diameter (Use Table L6)

Overall Length of Cable before Grouping into bundles:	English	Metric
	$L_{ft} = 8(N)(B)$	$L_m = 2.438(N)(B)$

N = Number of Bundles in a Tray
B = Number of Cables in a Bundle
L_{ft} = Length in feet
L_m = Length in meters

For Cable 13 mm (0.5 in) in Diameter or Larger (Use Table L7)

Overall Length of Cable before Grouping into bundles:	English	Metric
	$L_{ft} = 8(N)$	$L_m = 2.438(N)$

N = Number of Cables in a Tray
L_{ft} = Length in feet
L_m = Length in meters

TABLE L6

TRAY LOADING FOR CIRCULAR CABLES
SMALLER THAN 13 mm (0.5 In) IN DIAMETER

Cable Diameter, mm (in)		Number of Cables in Each Bundle	Number of Bundles in Tray
From	But Less Than		
0	3 (0.12)	19	13
3 (0.12)	5 (0.20)	19	8
5 (0.20)	6 (0.24)	7	9
6 (0.24)	9 (0.35)	3	10
9 (0.35)	11 (0.43)	3	8
11 (0.43)	13 (0.51)	3	7

TABLE L7

TRAY LOADING FOR CIRCULAR CABLES
13 mm (0.5 In.) IN DIAMETER AND LARGER

Cable Diameter, mm (in)		Number of Cables in Tray
From	But Less Than	
13 (0.51)	15 (0.59)	11
15 (0.59)	19 (0.75)	9
19 (0.75)	21 (0.83)	8
21 (0.83)	26 (1.0)	7
26 (1.0)	28 (1.1)	6
28 (1.1)	39 (1.5)	5
39 (1.5)	52 (2.0)	4
52 (2.0)	73 (2.9)	3
73 (2.9)	120 (4.7)	2

INSTRUCTIONS FOR FOLLOW-UP TESTS AT UL

L87. When received at UL, the samples are to be subjected to the applicable examination and tests, at the frequency indicated, as shown in Table L8. Tests/examinations shall be performed in accordance with the requirements in UL 62 and UL 2556, this FUII, and any additional requirements contained in the Procedure. In addition, samples marked with the "-R' suffix are to be subjected to the additional tests shown in Table L9. When the examinations and tests are completed, the results are reported to the applicant and manufacturer in writing. If nonconforming test results are reported, UL will require a written response from the subscriber that documents their investigation of the nonconformance and the corrective actions taken to prevent recurrence. If the subscriber so requests, a portion of the sample will be sent to the subscriber for their review.

TABLE L8

Test Program At UL

Item No.	Test Frequency	Item for Inspection/Test
1.	Q	Detailed Examination as required when any test 2 – 22 below does not comply.
2.	Q	Standard Arcing Test[1]
3.	Q	Flex Arcing Test[1]
4.	Q	Permittivity Test[2, 3]
5.	Q	Stability Factor[2, 3]
6.	Q	Physical Properties of Insulation - Unaged and After Aging
7.	Q	Physical Properties of Jacket - Unaged and After Aging
8.	Q	Flexing of Nylon Jacket
9.	A	Tightness of Insulation[4]
10.	A	Deformation[5]
11.	Q	Mechanical Strength[6]
12.	Q	VW-1 and FT1 Flame Test[7]
13.	Q	Horizontal-Specimen Flame Test/FT2 Test[8]
14.	A	Cold Bend
15.	A	Jacket Resistance[9]
16.	A	AC Leakage Current[10]
17.	A	Conductor Corrosion[11]
18.	A	Weather Resistance[2, 3]
19.	Q	Oil Resistance Test of Insulation[12]
20.	Q	Oil Resistance Test of Jacket[13]
21.	A	Durability of Ink Printing
22.	A	FT4 Flame test[3, 14]
A = Annually Q = Quarterly		

Notes to Table L8:

1. Conducted on Types HPN and HPN-R only.
2. Conducted on cable types with a "W" suffix and all Electric Vehicle Cables types, and with sample tag marked ""For Annual Weather Resistance Test".
3. These tests are not conducted on Regular Annual Sample. Separate samples are selected for these tests
4. Conducted on Types CXTW, CXWT, and all cord types in Cord Group #5, 6 and 7 as outlined in Table L1
5. Not conducted on cables employing thermoset compounds.
6. Conducted on round jacketed cord, 17 or 18 AWG, 2 or 3 conductors; except heater cords or dryer and range cords.
7. VW-1 test conducted on cords marked "VW-1". FT1 test conducted on cords marked "FT1"
8. Conducted on cords marked "FT2".
9. Conducted on Types EO, ETP, ETT, and all cord types in Cord Group # 1, 2, 3, 8, 9 and 10 as outlined in Table L1
10. Low leakage cables only.
11. Conducted on cable with bare copper conductors only.
12. Conducted on cables with an "OO" suffix designation, and Types HPN and HPN-R.
13. Conducted on cables with an "O" or "OO" suffix designation, Elevator Cables types EO, ETT and ETP, and all Electric Vehicle Cables types.
14. Conducted on cables marked "FT4" and with sample tag marked "For Annual FT4 Flame Test".

Table L9

Additional test program at UL for cords with a "-R" suffix

Item number	Test Frequency	Item for Inspection/Test
1	Q	Detailed Examination
2	Q	Crush test
3	SA	Abrasion test (shielded or parallel constructions only)
4	SA	Flexing test
5	Q	ID tests (PVC – IR, TGA; thermoset – IR, TGA, DSC) - Scan shall be compared to the reference scan obtained during the original investigation. The spectra obtained shall indicate the same composition as those recorded in the original investigation.
Q – quarterly, SA - semiannually		
Note: The tests, with Item numbers 1, 2 and 5, shown in Table L9 are not conducted on Regular Quarterly Countercheck Samples. Separate samples are selected for these tests – see Table L5.		

PROGRAM FOR MONITORING NONCONFORMANCE WITH REQUIREMENTS

General

L88. A conformance monitoring program is in effect for the flexible cord category. It is UL's intention to work with its subscribers towards a mutually agreeable resolution of nonconformances encountered under the various elements of the Follow-Up Program for flexible cord. As part of the conformance monitoring program, a history of all UL testing results will be kept on record for each manufacturer.

L89. Nonconformances of significant importance will be characterized as a "significant nonconformances". Significant nonconformances can result for samples selected at the flexible cord manufacturing location. Significant nonconformances can also result from samples selected at the Cord Set/Power Supply Cord manufacturer, at the end-user location, or in the retail market. The samples selected at locations outside of the UL 62 manufacturing location will be subjected to the tests described in Table L10.

Table L10

Tests conducted on samples selected at cord set, power supply cord or end-product manufacturer; or retail outlet
1. Detailed Examination
2. DC Conductor Resistance
3. Physical Properties before and after air-oven aging, insulation and jacket, as applicable
4. VW-1, FT1 and/or FT2 flame test, as applicable

Program for Reconciling Significant Nonconformances

L90. A significant nonconformance in any test, regardless of where the sample was selected, will result in a hold on all production at the UL 62 manufacturing location. The Field Representative will take control of all labels. To release the hold, the UL 62 manufacturer must submit a root cause analysis and corrective action plan that specifically addresses the nonconformance. The manufacturer must also submit a sample representative of the failed cord type manufactured after the corrective action was put in place. This sample will be subjected to a complete test program in accordance with UL 62.

L91. Once compliant results are obtained and the corrective action plan verified, the hold will be released and the labels may be returned to the control of the manufacturer. UL will institute an increased monitoring program so that the Field Representative can verify that the corrective action plan is in place and is being effectively implemented. Sampling will increase to include an additional four (4) samples selected at either the UL 62 manufacturer, the original equipment manufacturers (OEMs) location or the marketplace.

L92. If a significant nonconformance is from a VW-1 or FT1 test only, the following two options are available. Should there be another significant nonconformance in association with the VW-1 or FT1 test, these options will not be available.

1. Perform a complete New Work Test program on a cord, but perform VW-1/FT1 test first. If the VW-1/FT1 passes, the manufacturer may go back into production awaiting complete New Work Test results. Should a significant nonconformance be encountered during the New Work testing, it will count as an additional (2nd) significant nonconformance for the manufacturer and appropriate action will be initiated.

2. Allow manufacturer to stay in production for all cords as long as they are not marked VW-1 or FT1. The field representative will maintain control of the labels until either the procedure is revised to prohibit the VW-1/FT1 marking or until testing has shown that the VW-1/FT1 rating can be used.

L93. For other significant nonconformances only, the material/family of cord types that incurred the failure will be placed on hold. Other types may continue to be produced. The field representative will maintain control of the labels until a New Work Project has been completed on the type with the significant nonconformance.

L94. On a one-time basis, a UL 62 manufacturer can remove the penalty associated with the one significant nonconformance by implementing an in-house quality program. The quality program will be reviewed and approved by UL, and be generally documented in the Follow-Up Service Procedure (e.g. Section General). Part of the quality program will require the test equipment necessary to determine compliance with the Detailed Examination/Construction Review, DC Conductor Resistance, Physical Properties before and after air-oven aging on insulation and jacket (as applicable) and VW-1/FT1 and FT2 flame tests (as applicable).

This equipment includes:
Tensile and elongation testing machine
Air-circulating ovens
Flame chamber
A four terminal measuring device such as a Kelvin bridge and
Instruments required for performing the detailed examination of the cord.

L95. All test equipment must meet the requirements in UL 62 and UL 2556. The equipment must be calibrated on an annual basis and verified by UL staff. UL staff will evaluate and audit the manufacturers quality program utilizing the test equipment annually.

L96. To obtain samples at the OEM, the UL 62 manufacturers are required to make all shipping records available to the UL Field Representatives. These records shall indicate the location, quantity and date of all labeled UL 62 product shipped from the manufacturing location.

L97. A second significant nonconformance obtained within two (2) years of the date that the corrective action was implemented will result in all production being placed on hold. The UL Field Representative will take control of the UL labels. For the manufacturer to ship products with UL markings, the UL Field Representative will select a sample from each lot and send it to a UL lab for testing. If the sample is found to be in compliance, the lot will be released along with the appropriate number of labels. Nonconforming lots will be scrapped under the witness of a Field Representative. Culling of the lot to separate conforming samples from nonconforming samples is not acceptable.

L98. After six (6) months on the lot-by-lot inspection and testing, the manufacturer will be returned to the normal Follow-Up Service level with the following exceptions:

- Sampling will remain at an increased level as described in L91 and
- Depending upon the production controls that were implemented, Increased Monitoring may remain in effect until the effectiveness of corrective actions are verified

L99. After two (2) years without significant noncompliance, a manufacturer will be returned to normal inspection schedule and sample selection. If however, a third significant nonconformance is obtained within two (2) years from the date that the corrective action was initially implemented, it will result in withdrawal of the manufacturer and applicant from all UL 62 files for a period of at least one (1) year.

OEM Program

L100. After the first nonconformance by the UL 62 manufacturer, additional samples may be selected from OEMs such as appliance manufacturers or from the marketplace. The testing described in Table L10 will be conducted on these samples. A significant nonconformance found during the testing of these samples will be counted against the UL 62 manufacturer.