

Israel Electric Corporation Ltd. Marketing Division National Network Unit	
Edition no.: 8	Specification NPS-58 COPPER TUBULAR SOLDERLESS CABEL LUGS
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SPECIFICATION FOR COPPER TUBULAR SOLDERLESS CABEL LUGS

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1. SCOPE

1.1. Scope of supply

This specification applies to tubular, solderless, cable terminal lugs, intended for installation on cables comprising copper conductors (henceforth referred to as "cable lugs").

2. THRESHOLD CONDITIONS

Acc. to the attached documents of the supply and storage division.

3. DOCUMENTS AND SAMPLES FOR THE PROPOSAL

For the technical evaluation, the Proposer shall submit to the Israel Electric Corp. together with his proposal, three (3) copies of the following documents:

- 3.1.** Valid ISO 9001 certificate as defined in threshold conditions.
- 3.2.** Full type test reports according to IEC standard 61238 – 1.
- 3.3.** Appendix C: Completed and filled in summary of data, signed by the manufacturer.
- 3.4.** Detailed drawing. The drawings must be detailed to the fullest (including: manufacturer's part number, standard of manufacturing, dimension, tolerance, material, plating, marking etc.).
- 3.5.** Prototype approval acceptance letter – prototype approval for existing suppliers.
Existing supplier – Supplier who supplied the ordered item to the IECorp. in the last five (5) years.
- 3.6.** Reference list approving 2 years of lugs manufacturing during the last 5 years (see Appendix "E").
- 3.7.** Three samples of the proposed lugs. from each size of lugs, with the biggest screw size (d₂).

REMARKS:

- ❖ **Bidder which will not submit all the above will be disqualified.**
- ❖ **The above mentioned documents shall be in English or Hebrew. All dimensions and quantities must be in M.K.S. (Meter, Kilogram, Second) measurement units.**
- ❖ **All the technical documentation shall be presented to IEC in an organized file (hard copy). Documents not in a file or mails, CD, etc. cannot be accepted by IEC.**

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4. MANUFACTURING STANDARDS

Unless otherwise stated, the CABLE LUGS shall be designed, manufactured and tested in accordance with the requirements of the latest published recommendation of the following standards:

IEC 61238-1	Compression and Mechanical Connectors for Power Cables for Rated Voltages up to 30 kV ($U_m = 36$ kV) - PART 1: Test Methods and Requirements.
IEC 60502 - 4	Power Cables with extruded Insulation and their Accessories for rated Voltage from 1 up to 30kV.
EN 12449	Copper and copper alloys. Seamless, round tubes for general purposes.
EN 13599	Copper and copper alloys Copper plate, sheet and strip for electrical purposes (DIN 48201).
EN 13600	Copper and copper alloys. Seamless copper tubes for electrical purposes (DIN 40500 part 2).
DIN 46235-1	Cable lugs; for compression connections, cover plate type, for copper conductors.
IEC 60228	Conductors of Insulated cables.
HD 620 S1	Distribution Cables with Extruded Insulation for MV.

REMARKS:

- ❖ If the present specification contains requirements which differ from those of the above mentioned Standards, the requirements of this Specification shall take precedence.
- ❖ Standards referred to this Specification and in Supplements to this Specification are an integral part of this specification unless otherwise provided. All such Standards referred to the most current issue, including all amendments, supplements etc., as of the date of the Contract, unless otherwise indicated.
- ❖ Bidder may propose Standards as alternative for or additions to those specified herein. A copy of each proposed Standard, if any, shall be included with the proposal. The Israel Electric Corp. reserves the right to accept or to reject the proposed alternative Standards.

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5. TECHNICAL REQUIREMENTS

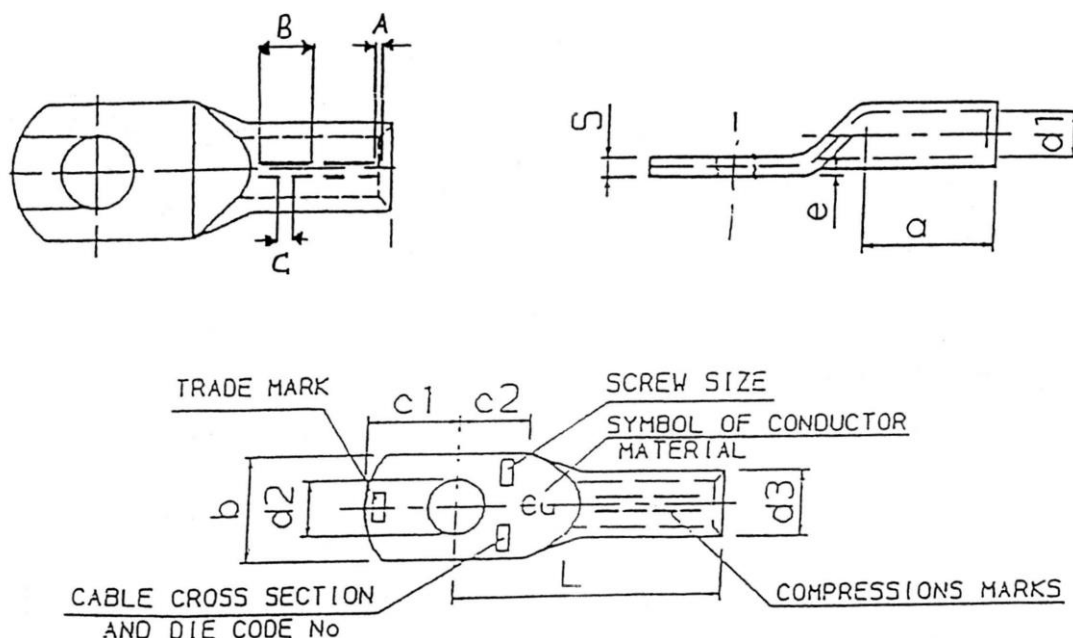
5.1. Operating Conditions of the Cables that the Lugs will be Installed on

5.1.1. Maximum rated conductor temperature: 90°C.

5.1.2. Short circuit maximum conductor temperature (for duration up to 5 sec): 250°C.

5.2. Construction

5.2.1. The relevant dimensions and marking shall be in accordance with the drawing:



5.2.2. The cable lugs shall be accordance with DIN 46235 (solderless), without inspection hole and of class "A" according to IEC 61238-1.

5.2.3. The relevant dimensions shall be in accordance with the drawings in sub-clause.

5.2.4. The cable lugs shall be made of DIN E-Cu 57, Cu-PHC(CW020A) or Cu-ETP (CW004A) copper seamless tube acc. EN 13600:

- EN H035/R200 for cable lugs up to 25mm² cross-section inclusive.
- EN H065/R250 for cable lugs up to 25mm² cross-section.

5.2.5. The cable lugs shall be suitable for installation on cable conductors manufactured according to IEC 60228 or HD 620.

5.2.6. The cable lugs shall be tin plated with at least:

- 8 µm outside the cable lugs.
- 2 µm inside the cable lug.

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5.2.7. Dimensions and compression marks:

Dimensions (in mm)

Dimensions (in mm)															
No.	IECo. Cat. No.	Cable Cross section (mm ²)	for screw	a min	b	c ₁ +0 -3	c ₂ min	d ₁	d ₂	d ₃	e ±0.5	L		s ±0.5	
								±0.3							
1	35220	10	M6	10	9	±1	10.5	8	4.5	6.4	6	0.6	27	±2	1.5
2	65441	10	M8	10	13		13	10	4.5	8.4	6	0.6	29		1.5
3	35238	16	M6	20	13		10.5	8	5.5	6.4	8.5	1	36		2.5
4	35246	16	M8	20	13		13	10	5.5	8.4	8.5	1	36		2.5
5	35253	25	M8	20	16		13	10	7	8.4	10	1	38		3
6	4233409	25	M10	20	17		15	10	7	10.5	10	1	38		3
7	4233417	25	M12	20	19		16	13	7	13	10	1	42	-2 +4	3
8	35261	35	M8	20	17		13	10	8.2	8.4	12.5	1	42		3.5
9	65565	35	M10	20	19		15	12	8.2	10.5	12.5	1	42		3.5
10	4275319	35	M12	20	21		16	13	8.2	13	12.5	1	42		3.5
11	5001876	50	M8	28	20		13	10	10	8.4	14.5	1	52		4
12	4474201	50	M10	28	22		15	12	10	10.5	14.5	1	52		4
13	35279	50	M12	28	24		16	13	10	13	14.5	1	52		4
14	35287	50	M16	28	28		19	16	10	17	14.5	1	52		4
15	35295	70	M12	28	24		16	13	11.5	13	16.5	2	55		4.5
16	65953	95	M10	35	28	±2	15	12	13.5	10.5	19	2	65	-2 +5	5
17	35311	95	M12	35	28		16	13	13.5	13	19	2	65		5
18	35303	95	M16	35	32		19	16	13.5	17	19	2	65		5
19	35329	120	M12	35	32		16	13	15.5	13	21	2	70		5.5
20	35337	150	M12	35	34		16	13	17	13	23.5	2	78		6
21	35345	150	M16	35	34		19	16	17	17	23.5	2	78		6
22	35386	185	M16	40	37		19	16	19	17	25.5	2	82		6
23	35394	240	M12	40	42		16	13	21.5	13	29	2	92		6.5
24	35410	300	M16	50	48		19	16	22.7	17	32	2	100		7

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compression marks

Cable Cross-section (mm ²)	No. of crimp. marks		A ± 1(mm)		B ± 1(mm)		C ± 1(mm)		DIE CODE
	Hyd r	Mech	Hydr	Mech	Hydr	Mech	Hydr	Mech	
10	-	2	-	*	-	*	-	*	6
16	-	2	-	2	-	5	-	6	8
25	-	2	-	2	-	5	-	6	10
35	-	2	-	2	-	5	-	6	12
50	-	3	-	2	-	5	-	4	14
70	1	3	7	2	14	5	-	4	16
95	2	4	3	3	14	5	2	3	18
120	2	4	3	3	14	5	2	3	20
150	2	4	3	3	14	5	2	3	22
185	2	5	5	4	14	5	4	2	25
240	2	-	5	-	14	-	4	-	28
300	2	-	5	-	17	-	4	-	32

6. TESTS

- 6.1.** The Israel Electric Corp. reserves the right to verify the compliance of the delivered lugs with this specification and according to Annex "B": Electrical R&D Laboratory Spec. for tests of Compression Connectors and Terminal Lugs No. S - 39/6.40
- 6.2.** Each consignment shall bear valid COA&COT of the copper.
- 6.3.** Routine test for dimensional inspection and plating inspection.
- 6.4.** In case that part or all of the electrical tests shall be failed, the IEC reserves the right to disqualify the contractor or postpone the delivery of the proposed items to the IEC until succeeding all the tests. In this case, any delay of supplying to the IEC shall be on the account and responsibility of the contractor.

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7. MARKING

The following information shall be engraved / embossed incisively on each cable lug:

- 7.1.** Cable cross section and symbol of conductor material – Cu
- 7.2.** Screw size
- 7.3.** Compressions marks
- 7.4.** Die Code No.
- 7.5.** Trade Mark (Logo)
- 7.6.** A tag containing the following information shall be attached strongly on the delivery box:
 - The IEC's order number
 - The IEC's catalog number
 - "Copper Lugs"
 - Designated cables cross section
 - Manufacturer's part number
 - Production origin
 - Date / lot number
 - Gross weight

8. PACKING

- 8.1.** The lugs shall be packed in carton boxes.
- 8.2.** The carton boxes shall be supplied in seaworthy wooden boxes, fixed on a wooden pallet appropriate for fork lifting and to be stored outdoors.
- 8.3.** The gross weight of each pallet shall not exceed 1250 kg.
- 8.4.** The cable lugs will be packed inside a cardboard box. On the box will be printed in (large letters):
 - Name of the supplier
 - Name of item
 - I.E.C item's catalogue no.
 - Catalogue no of item by supplier
 - Quantity of pcs. In the box
- 8.5.** The supplier must receive prior to production I.E.C.'s approval for packing and delivery of the items to I.E.C's stores.
- 8.6.** Each package shall be clearly marked in print (large letters) with following:
 - Manufacturer's name or Trade Mark
 - Israel Electric Corp. Catalogue no.
 - Order no.
 - Part number
- 8.7.** A Quality Control label shall be attached to each packaging.

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9. QUALITY ASSURANCE

- 9.1.** For quality system and other specific quality requirements, see Appendix A: Q-APP-04.
- 9.2.** The manufacturer shall have a Quality Management System accredited to ISO 9001:2000 standard by an authorized accreditation body, pertaining to the scope of supply.
- 9.3.** The IEC shall have the right to audit and comment to the manufacturer's Quality Assurance System regardless of whether it was previously audited by a Certifying agency or any other body.
- 9.4.** The Proposer shall submit with his proposal the following (In English):
 - Quality system Certificate.
 - Certificates that demonstrate the Bidder's compliance with the requirements specified or implied in this specification.
 - Example of an inspection & test plan and/or Quality plan which pertain to the lugs to be supplied.
 - Formal confirmation that he will conform to the requirements of Q-APP-04.
 - The bidder shall submit with his proposal the manufacturer's Quality Assurance manual.

10. QUALITY CONTROL

- 10.1.** The bidder shall submit with his proposal a manufacturer's preliminary Inspection and test Plan which is applied during the production of the lugs.
- 10.2.** The Purchaser or his duly authorized representative shall have the right to inspect and observe the production, inspection and testing of the work at any facilities where Work is performed, including those of Contractor and its subcontractors at each phase of the lug's production.

11. PROTOTYPE APPROVAL

- 11.1.** Prototype approval for new suppliers.

New supplier – Supplier that didn't supply the ordered item to the IECorp. in the last five (5) years.

 - 11.1.1.** In a period of max four (4) months from notification of award, and before production for IEC of all ordered items, the Contractor shall manufacture one unit of each item as a prototype for the Israel Electric Corp. approval, including drawings and packing details.
 - 11.1.2.** For purposes of the Prototype approval, the manufacturer shall perform the complete type tests as required in this specification.
 - 11.1.3.** The contractor shall be responsible to conduct successfully all the necessary tests, and to deliver to the Israel Electric Corp. all the necessary required reports, in a

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manner, which will not interfere with or delay any of the time schedules, pertaining to any action or undertaking, required of the winning bidder, including, but not limited to delivery schedule. Such responsibility shall include proper and reasonable advance notifications to the Israel Electric Corp., prior to any action, required of it.

If type and special tests have already been conducted with reference to the identical equipment which is offered by the proposed and the Israel Electric Corp. approves the reports, pertaining to such tests, the Israel Electric Corp. shall have a right (but not a duty) to waive all or part of the required tests.

- 11.1.4.** The contractor shall submit to the Israel Electric Corp. 3 (three) sets of detailed drawings, materials specification for each component, Q.A. and Q.C. procedures, as required in this specification, including type test reports and QC details.

The drawings shall show the overall outside dimensions, mounting dimensions, gross weight. The Contractor shall also submit a list for all the relevant drawings for fabrication. These drawings shall be approved by the Israel Electric Corp. Each modification on the above drawings shall be approved by the Israel Electric Corp.

All data and descriptive material in the above drawings shall be in English or Hebrew. All dimensions shall be stated in metric system.

- 11.1.5.** The Israel Electric Corp. reserves the right to cancel the order for the supply of equipment if the prototype will not be approved by the Israel Electric Corp. In any case, the contractor shall not resume manufacture of the rest of the ordered equipment before receiving the Israel Electric Corporation's final approval of the prototype.

- 11.1.6.** Required schedule up to prototype approval (after notification of award) is attached in APPENDIX: "D".

- 11.2.** Prototype approval for existing suppliers.

Existing supplier – Supplier who supplied the ordered item to the IECorp. in the last five (5) years.

- 11.2.1.** Existing supplier is exempted from prototype if in the technical bid the supplier will provide to IECorp. a letter with the following data:
- The period and type of the ordered item supplied to IECorp.
 - A statement that was no any changes in the production line.

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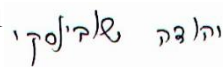

APPENDIX "A"

APPENDICES FOR CONTRACTS / ORDERS QUALITY REQUIREMENTS

Q – APP – 02/4 (03/2011)

1. GENERAL

- 1.1** In addition to the provisions of the General Conditions – Annexure "A" and without derogating from the generality there, the Quality Requirements as specified in this document constitute an integral part of the Contract between the Purchaser and the Contractor. Implementing these requirements shall not constitute any base/reason, for the Contractor to change the Contract schedule and/or price.
- 1.2** The Contractor shall make all the necessary arrangements and prepare all the required and necessary means to enable IEC's Quality Control Unit Representative (see clause 2) to review, observe, audit, inspect, test and survey the Work - at any facilities where Work or any part thereof is performed, including those of Contractor and Sub- Contractors, without any additional cost to the Purchaser or any change in the Contract schedule.
- 1.3** The Contractor shall nominate, as part of the execution of the Contract a quality engineer or a quality specialist to control and manage the quality requirements of the Contract. This person shall have the authority and responsibility with respect to all quality requirements of the Contract (including notifying the Purchaser about inspections, tests, etc.) and shall serve as Purchaser's liaison for quality matters.
- 1.4** The Contractor shall be responsible that all of the Contract's quality requirements are known, accepted and performed by its Sub- Contractors. Special attention should be given to Contractor's procurement control and its Sub- Contractor's design control, process and manufacturing control, purchasing control, nonconforming material/events control and inspection notification. Upon Purchaser's request Contractor shall submit un-priced copies of purchase orders pertaining to the Work/Contact.

PREPARED BY	CHECKED BY	APPROVED BY
B. Ben-Akiva Q.C. UNIT QUALITY ENGINEERING	Y. Shubinsky Q.C. Dept. - North MANAGER	R. Bandel Q.C. UNIT MANAGER
DATE AND SIGNATURE: 06/03/2011 	DATE AND SIGNATURE: 06/03/2011 יו"ר חטיבת ה-Q.C. 	DATE AND SIGNATURE:  06/03/2011

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2. DEFINITIONS, CLASSIFICATIONS AND ABBREVIATIONS

- 2.1. CORRECTIVE ACTION (CA) – As defined in ISO 9000:2005.
- 2.2. QUALITY PLAN (QP) - Plan, prepared by the Contractor especially for the Contract, in accordance with ISO 10005 which covers all Contract stages.
- 2.3. INSPECTION AND TEST PLAN (ITP) – a plan, specifying all the inspections and tests for the Work throughout all Contract stages (from its initialing through design, in process inspection, type tests, product qualification, first article inspection, final inspection/s and test/s, packing, transportation and supply to the Purchaser, erection - including Site Acceptance Test and commissioning). ITP shall also specify Witness and Hold Points.
- 2.4. WITNESS POINT (WP) - a planned visit of the QCUR for purposes indicated in clause 1.2 for specific point of the ITP or Quality Plan.
- 2.5. HOLD POINT (HP) – the same as WP but with the distinction that the Contractor is not permitted to proceed with its planned activities without having received Purchaser's written approval.
- 2.6. NON CONFORMANCE (NC) - deviation from any specified Contract requirement/s and/or from any quality characteristic of the Work.
- 2.7. NON CONFORMANCE REPORT (NCR) - a report, on Contractor's numbered serial form, describing the details of a Non conformance, from its detection through disposition and corrective action(s).
- 2.8. QUALITY CHARACTERISTIC – Any identifiable property of the Work (i.e. physical ,chemical, functional, visual, technical, environmental, economical, statistical, legal etc.)
- 2.9. WORK - Scope of the Contract and the means to execute it.
- 2.10. QCUR - the Purchaser's Quality Control Unit Representative and/or any authorized representative of it.
- 2.11. SPECIAL PROCESS - Irreversible manufacturing processes or processes which require special or specific tools.

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3. QUALITY PLAN AND INSPECTION AND TEST PLAN

- 3.1 The Contractor shall prepare QP and ITP for all stages of the Contract. These plans shall be submitted to the Purchaser for approval within fourteen (14) days of initialing of the Contract by the parties. Contractor shall not amend, change or alter any part of the QP and/or ITP without the prior written approval of the Purchaser.
Note: ITP shall conform to Exhibit 'A' attached hereto or any other form approved by the Purchaser.
- 3.2 Contractor shall not commence work prior to receiving Purchaser's written approval to the QP and ITP.

4. DOCUMENTATION

- 4.1 The Contractor shall submit to the Purchaser for review, along with the QP and ITP, its quality and manufacturing/operations procedures that pertain to the Work execution. The Purchaser has the right to receive explanations with respect thereto. Contractor shall provide Purchaser with all amendments and/or updates of documentation.
- 4.2 Special documents such as process procedures and inspection/test procedures written specifically for the Contract shall be submitted to the Purchaser, for review, comment and approval in accordance with Contract until the date agreed in there, but not less than twenty-one (21) days prior to its use.
- 4.3 The Contractor shall submit to the Purchaser, for review, comment and approval (as required by the Contract) all the process qualifications and the employees certifications for special processes which pertain to the Work and are relevant to the Contract execution.
- 4.4 Supplying Work which is not manufactured by the Contractor (under Contract terms) and which he has no control over the manufacturing process, shall not derogate from Contractors responsibility to supply the Purchaser with the documentation and quality records as indicated in Articles 4 and 7.

5. INSPECTIONS AND TESTS

- 5.1 The Contractor shall have available all test and inspection equipment and/or any other means, required in Purchaser's opinion, for the execution of Work and ITP.

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5.2 If Contractor uses the services of a Sub - Contractor to carry out any test/inspection required by the Work, only inspection companies certified to EN 45004 (level A or C) are acceptable.

5.2.1 Type test, Routine Test and Sample test shall be carried out according to Contract requirements.

5.3 Any other qualification test (for mechanical equipment) shall be carried out in the presence of the QCUR, followed by all quality records. The serial manufacturing shall commence only after 1st Article/piece test have successfully carried out witnessed by the Purchaser's QCUR.

6. INSPECTION NOTIFICATION

6.1. The Contractor shall indicate each inspection/test and notify the Purchaser of it in advance. An ITP schedule (on a GANT form) shall be prepared by the Contractor, within six (6) weeks after initialing of the Contract. Indications of inspection/test dates may in any event not be less than six (6) weeks in advance. Both inspection/test notification and ITP schedule shall be reported to the Purchaser's Project Management. In addition to the above ITP schedule, Contractor shall submit to Purchaser a final notice of planned tests/inspections not less than twenty-two (22) Israeli working days in advance.

6.2. Should Contractor fails to notify the Purchaser of a planned inspection/test, as required, or in the event Contractor carries out a test/inspection without the required presence of the QCUR, Purchaser shall have the option of demanding that Contractor re-perform the test/inspection in the presence of QCUR at a time convenient to Purchaser and at no additional cost..

7. QUALITY RECORDS

7.1. The Quality Records stipulated in this clause shall be, either in Hebrew, in dual/multi-language form with English, in English only, or if not available translated to English by Contractor.

7.2. Contractor shall submit to the Purchaser copy of the quality records documenting the inspections, tests or other quality operations of the Work, as indicated in the ITP, QP and the Contract. All quality records of skipped or missed WP and/or HP shall be submitted to Purchaser immediately after their generation.

7.3. All Test and Inspection Certificates/ Reports of materials, operations and or inspection/test, purchased or carried out for the Work and/or required by the applicable Standards, shall be submitted to the Purchaser immediately following their generation. These Certificates/Reports shall be original, in accordance with

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EN 10204:2004-3.1, containing actual measured values, signed and attested by Contractor. For any other document type, Contractor has to get Purchaser permission in advance.

- 7.4. Contractor shall make available to Purchaser upon its request, for review and comment, at Purchaser's premises or other mutually agreed place (in Israel), the quality records of any - Type test, Routine test, Qualification test, First Article Inspection/Test, Process qualification, Special process and/or any other inspection/test/examination required by Purchaser, after initialing of the Contract, to evaluate the Work (at all stages) regardless of the QP and the ITP.
- 7.5. Submission of the documents and quality records, regarding the Equipment to which the documents relate, to Purchaser, as specified in Articles 4 and 7, shall be a condition, precedent to shipment by Contractor and payment by Purchaser.
- 7.6. Quality records of inspections/tests and/or of process control and process evaluation pertaining to a Work such as shelf item, standard Equipment and/ or already completed Equipment to be supplied to Purchaser between 30 to 120 days after execution of the Contract, shall be immediately submitted to the Purchaser or at least 60 days prior to packing for shipment, respectively.

8. HANDLING OF NONCONFORMANCES AND CORRECTIVE ACTIONS

- 8.1. It is Purchaser's policy to reject Work and/or Goods that do not conform to all contractual requirements, unless acceptance is in the best interests of Purchaser. Acceptance of nonconforming Work or Goods is the sole prerogative of Purchaser.
- 8.2. It is the Contractor's obligation to report to Purchaser about any nonconforming item/event which pertain to the Work and are relevant to Contract execution.
- 8.3. If the Contractor fails to report about a non conformance on time, Purchaser may request Contractor to dismantle the nonconforming Work (to witness the NC) with no additional cost. The documentation and quality records concerning this NC shall be immediately submitted to the Purchaser.
- 8.4. Each NC should be followed by corrective action/s (CA). A NC which is not followed by CA shall be rejected.
- 8.5. Deviating from 8.4 can cause stoppage of the Work and its rejection till the proper CA is taken by the Contractor.

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EXHIBIT A

I&T Plan FORM

CONTRACTOR'S: NAME, I&T PLAN TITLE, THE PRODUCT INSPECTED/TESTED, and DOCUMENT IDENTITY & APPROVAL.										
PURCHASER'S: NAME AND PROJECT'S NAME AND LOCATION.										
No	THE INSPECTION TEST	C	APPLICABLE DCUMENTS	WP/HP OR OTHER	INSPECTED / TESTED BY				THE REPORT / CERTIFICATE AND ITS REF. STD/ PROCEDURE	REMARKS
					SUB- CONT./ SUPP	CONTR- ACTOR	PURCH- ASER	OTHER		
APPROVAL BY THE CONTRACTOR'S QUALITY ASSURANCE/CONTROL				NOMENCLATURE:						

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APPENDIX "B" - Electrical R&D Laboratory Spec.



Israel Electric Corp. Ltd.
Strategic Resources Group
Planning Development & Technology Division



ELECTRICAL R&D LABORATORY

SPECIFICATION FOR TESTS OF COMPRESSION AND MECHANICAL CONNECTORS AND TERMINAL LUGS FOR POWER CABLES WITH COPPER OR ALUMINIUM CONDUCTORS

This specification supersedes specification S – 39/6.40 rev.no.4

S - 39/6.40

HAIFA, January 2007


**Israel Electric Corporation Ltd.
Marketing Division
National Network Unit**

Edition no.:8

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**Specification NPS-58
COPPER TUBULAR SOLDERLESS
CABEL LUGS**

		<div>ISRAEL ELECTRIC CORP. LTD STRATEGIC RESOURCES GROUP PLANNING DEVELOPMENT & TECHNOLOGY DIVISION ELECTRICAL R & D LAB</div> <div></div>
SPEC. NO	S-39/6.40	
ISSUE	5	
PAGE NO.	1	
NO. OF PAGES	6	
		SUBJECT: Specification for tests of compression and mechanical connectors and terminal lugs for power cables with copper or aluminium conductors

1. General

1.1 Scope

This specification applies to technical evaluation tests and acceptance tests of non-tension compression and mechanical connectors (henceforth: connectors) and terminal lugs (henceforth: lugs) for use on copper or aluminium conductors of power cables for rated voltage up to 36 kV.

The connectors and lugs are of class A as identified in to IEC standard 61238-1.

1.2 Object

The objective of this specification is to establish the extent, the method and the criteria for technical evaluation/acceptance tests intended to assure compliance of the connectors or lugs with the I.E.C. technical requirements.

1.3 Applicable standards and specifications



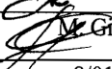
The connectors or lugs will be tested according to the requirements of this specification, taking into consideration the recommendations and requirements of the latest edition of the following standards:

1.3.1 I.E.C. Specification No. NPS-56 for Non-Tension, Copper Compression Connectors Up To 1 kV.

1.3.2 I.E.C. Specification No. NPS-58 for Tubular Solderless Cable Lugs.

1.3.3 I.E.C. Specification No. NPS-59 for Non-Tension Medium Voltage Copper Compression Connectors.

1.3.4 I.E.C. Specification No. NPS-60 for Non-Tension Medium Voltage Aluminium Through Connectors.

Prepared: Name / Signature	 L. Dubovoy				
Prepared: Name / Signature	A. Yeger  R. Hida				
Approved: Name / Signature	 M. Grivelberg				
Date:	8/01/2007				

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- 1.3.5 I.E.C. Specification No. NPS-92/3 for Tinned Aluminium Cable Lugs.
- 1.3.6 I.E.C. Specification No. NPS-217 for Bimetallic Medium Voltage Non-Tension Compression Joints.
- 1.3.7 International standard IEC 61238-1: "Compression and mechanical connectors for power cables with copper or aluminium conductors. Part 1: Test methods and requirements".
- 1.3.8 Israel standard ISO 9001 (identical to international standard ISO 9001:2000 third edition) – Quality management systems – Requirements".

2. Tests procedure

The tests will be performed according to the technical evaluation program tests or to the acceptance program tests (in case of order) as specified further on, and according to the decision of Electrical R&D Laboratory of I.E.C.

2.1 Technical evaluation/prototype approval program test


The tests according to this program shall be performed according with I.E.C Specifications No. NPS-56, NPS-58, NPS-59, NPS-60, NPS-92/3 and NPS-217.

The test will be performed according to the following procedure:

2.1.1 Manufacturer documents inspection

The Bidder shall submit all the documents as specified in para. 6 of I.E.C Specifications No. NPS-56, NPS-58, NPS-59 and NPS-217, para. 3 of I.E.C Specification No. NPS-60 and para. 2 of I.E.C Specification No. NPS-92/3.

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2.1.2 Marking inspection

Each connector or lug shall be marked according to para.4 of I.E.C Specifications No. NPS-56, NPS-58, NPS-59, NPS-217, and according to para.7 of I.E.C Specifications No. NPS-60 and NPS-92/3, respectively to its type.

2.1.3 Dimension test

The dimension of each connector or lug shall be according to para. 8 of I.E.C Specifications No. NPS-56, NPS-58, NPS-59, NPS-217, para.5.2.7 of I.E.C Specification No. NPS-60 and para.4.8 of I.E.C Specifications No. NPS-92/3, respectively to its type.

2.1.4 Tests on the connectors / lugs


The tests on the connectors or lugs have been selected from those listed in standard IEC standard 61238-1.

In general, tests are made on one type of connector/conductor combination.

However, when a connector covers a range of cross sections, it is permitted to accept it if satisfactory results are obtained on the smallest and largest cross sections.

The tests shall be carried out according to Table no.1 of this specification.

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2.2 Acceptance program (in case of order)

The tests shall be performed on samples randomly taken from a batch of either connectors or lugs according with I.E.C Specifications No. NPS-56, NPS-58, NPS-59, NPS-60, NPS-92/3 and NPS-217.

The test will be performed according to the following procedure:

2.2.1 Manufacturer documents inspection

Each order shall be accompanied by the tests report, which approves that the connectors / lugs had successfully passed the technical evaluation tests made by I.E.C. Electrical R&D Laboratory.

2.2.2 Marking inspection

Marking inspection according to para. 2.1.2 of this specification.


2.2.3 Dimension test

Dimension test according to para. 2.1.3 of this specification.

2.2.4 Tests on connectors / lugs

The tests shall be carried out according to Table no.1 of this specification.

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3. The acceptance criteria

- 3.1 The test certificates supplied by the manufacturer shall meet the relevant requirements of this specification; otherwise the batch shall be rejected or delayed until the required documents are supplied.
- 3.2 Each sample shall meet the demands of material verification, marking inspection and dimension test (see Table no. 1), otherwise the batch will be rejected.
- 3.3 If only one sample does not satisfy one or more of the requirements of the electrical test, the test will be repeated once more on the same number of samples (6) which is pointed at Table no. 1 of this specification.
All six new samples shall satisfy the requirements; otherwise the batch will be rejected.
- 3.4 If more then one sample out of the six (6) samples does not satisfy one or more of the requirements of the electrical test, no re-test is permitted and the batch will be rejected.
All samples shall satisfy the requirement of the mechanical test (no slipping during tensile test), otherwise the batch will be rejected

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		SUBJECT: Specification for tests of compression and mechanical connectors and terminal lugs for power cables with copper or aluminium conductors

Table No. 1 - Survey of tests on connector / lug and number of samples to be tested

Test according to Para. of the Standard	Para. of IEC 61238-1	No. of Samples	
		Technical evaluation program	Acceptance program
1. Material verification	*	1	1
2. Marking inspection	**	3	3
3. Dimension test	***	3	3
4. Electrical tests	6	6	6
5. Mechanical test	7	3	3
Total No. of samples (+ spare) :		10	10(+6)

* See para. 3 of I.E.C Specifications No. NPS-56, NPS-58, NPS-59 and NPS-217, para.5 of I.E.C Specifications No. NPS-60 and para.4 of I.E.C Specifications No. NPS-92/3.

** See para. 2.1.2 of this specification.

*** See para. 2.1.3 of this specification.

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APPENDIX "C" - SUMMARY OF DATA

Bidder's name: _____

Bidder's phone no.: _____

Bidder's fax: _____

Bidder's E-mail: _____

Manufacturer's name and address: _____

Manufacturer's E-mail: _____

Manufacturing country: _____

Manufacturer's signature: _____

Manufacturer's signature: _____

	(Insert all data in this column)
1. IEC. Cat. No	
2. Manufacturer's part number	
3. Standard that the cable lugs are complied with	
4. The copper pipe material will be Cu-PHC (E-Cu 57) or Cu-ETP (yes/no)	
5. The thickness of tin plating will be at least 8μ (yes/no)	
6. Is it of class "A" according to IEC 61238-1 (yes/no)	
7. Material condition acc. EN 13600 (F xx) / (R xxx)	
8. The cable lugs will be embossed in accordance with the compression marks detailed in the drawing (clause 5.2.1) of this specification (yes/no)	
9. The offered cable lugs will be in accordance with the dimensions detailed in the drawing (clause 5.2.1) of this specification if "no", please specify the exceptions. (yes/no)	
10. All the documents required in clauses 3 and 9 are attached(yes/no)	

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	(Insert all data in this column)
<p>11. <u>Prototype approval</u></p> <p>11.1 Will the Contractor submit to Israel Electric Corp, for the Prototype approval, the following:</p> <p>samples test reports drawings QC</p> <p align="right">(yes/no)</p>	
<p>11.2 Is the schedule up to the prototype approval attached? </p> <p align="right">(Yes/No)</p>	

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APPENDIX "D" - Schedule up to prototype approval (after notification of award)

Remarks:

1. Starting point is the date on which a binding contractual obligation has been created, as specified in the invitation to submit proposal.
2. One month before performance of the type tests the contractor shall submit the final test schedule.
3. The period of time for the delivery approval from the starting point as indicated above will not take more than 4 months

No.	STAGE	Week															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Submitting of: Test plan: - The name of the performer laboratory and address (country, city, etc.) - A list of tests - Plain and schedule of the type test																
2	Israel Electric Corp. approval of the above documents after clarifications																
3	Execution and submission of the type test report for the proposed item																
4	Submitting of prototype																
5	Final prototype approval by IEC																

Signature: _____

Date: _____

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APPENDIX "E" - STATEMENT OF MANUFACTURING EXPERIENCE

I, _____ (Enter name), do hereby state the following:

1. I am a position holder at _____ ("The factory") occupying the position of _____ (Enter job title and description, i.e. partner, production manager, sales manager, etc.)
2. I have been occupying this position since _____ (Enter date).
3. I give this statement in regards to I.E.C Tender number _____ ("The Tender").
4. The facts/details given in this statement have been checked and verified by me.
5. _____ (The factory) has experience in production of L.V Cable lugs Lot NO _____ requested in this Tender at the time of Tender proposal submission and for at least _____ years prior to submission.

Signature

Date