An-Najah National University Hospital
Procurement Department

مستشفى النجاح الوطني الجامعي
دائرة اللوازم والمشتريات

طرح عطاء

يعلن مستشفى النجاح الوطني الجامعي عن طرح عطاء رقم RFQ-H-11715 والخاص بتوريد **محول كهرباء خاص بمشروع مركز العلاج الإشعاعي - مستشفى النجاح الوطني الجامعي**

على الشركات المتخصصة والراغبة بالمشاركة في العطاء مراجعة دائرة اللوازم والمشتريات للحصول على نسخة من وثائق العطاء .

#	رقم العطاء	موضوع العطاء	ثمن نسخة العطاء	موعد الطرح	تاريخ الإغلاق	
					التاريخ	الساعة
1	RFQ-H-11715	توريد **محول** كهرباء خاص بمشروع مركز العلاج الإشعاعي **مستشفى النجاح الوطني الجامعي – نابلس - فلسطين**	**500 شيكل غير مستردة**	20-08-2024	19-09-2024	P.M 03:00

حسب الشروط التالية:

1. رسوم الاعلان على من يرسو عليه العطاء .
2. ثمن نسخة العطاء **500** شيكل غير مستردة .
3. كفالة دخول عطاء بقيمة (2000 دولار) ألفيْ دولار.

للاستفسار يرجى الاتصال على:

دائرة اللوازم والمشتريات في مستشفى النجاح الوطني الجامعي – البريد الالكتروني tender3@najah.edu هاتف +970-09-2331471 فاكس: +970-9-2389685 موبايل: 0592444300 .

مدير دائرة اللوازم والمشتريات

إيـــاد مكـــــاوي

دائرة المشتريات NNUH An-Najah National University Hospital Purchasing Department

التاريخ : 2024/08/20 م

عطاء رقم RFQ-H-11715

توريد محول كهرباء لمشروع مستشفى النجاح الوطني الجامعي – نابلس – فلسطين

السادة الشركات المتخصصة والراغبة بالمشاركة في العطاء المحترمين.

تحية طيبة وبعد ،،،

يعلن مستشفى النجاح الوطني الجامعي عن رغبته بطرح العطاء رقم RFQ-H-11715 " توريد محول كهرباء لمشروع مستشفى النجاح الوطني الجامعي" ، على الساده الشركات المتخصصة والراغبة في المشاركة بالعطاء التوجه إلى دائرة اللوازم والمشتريات بالمستشفى لاستلام نسخة من العطاء مع ضرورة مراعاة الشروط الآتية:

1- تلتزم الشركة المتقدمة للعطاء بتزويدنا بالسيرة الذاتية بالإضافة إلى تقديم شهادة تسجيل الشركة لدى الدوائر والوزارات المختصة وشهادة خصم مصدر سارية المفعول، ورخصة المهن.
2- على الشركة المتقدمة للعطاء الالتزام بالجداول والمواصفات المرفقة بكراسة العطاء.
3- تتم ترسية العطاء بناءً على مجموع نقاط التقييم الفني والمالي، وعليه فإن المستشفى غير ملزمة بالترسية على أقل الأسعار ودون إبداء الأسباب .
4- تكتب الأسعار بالدولار الأمريكي وشاملا لقيمة الضريبه المضافه بشكل واضح وفي المكان المخصص وحسب الجداول المرفقة بالعطاء.
5- ثمن نسخة العطاء (500 شيكل) غير مستردة تدفع في الدائرة المالية - مبنى الإدارة-الطابق الأول.
6- كفالة دخول العطاء بقيمة (2000 دولار) ألفي دولار أو ما يعادلها سارية المفعول لمدة ثلاثة شهور تأميناً نقدياً أو كفالة بنكية أو شيكاً مصدقاً، وفي حال عدم تقديم الكفالة لا ينظر في عرض السعر.
7- رسوم الاعلان بالصحف المحليه على من يرسو عليه العطاء.
8- **ضرورة أن يكون البند "موضوع العطاء" جديداً وليس مجدداً .**
9- **يتم تقديم كفالة حسن تنفيذ بنسبة 10% من قيمة الإحالة لمدة 3 شهور تأميناً نقدياً أو كفالة بنكية أو شيكاً مصدقاً وتستبدل بكفالة صيانة بنسبة 5% من قيمة الإحالة .**
10- يحدد موعد لزيارة الموقع لاحقا وبالتنسيق مع مدير دائرة المشاريع .
11- على الشركات الراغبه بالحصول على نسخة من وثائق العطاء مراجعة دائرة اللوازم والمشتريات - مستشفى النجاح الوطني الجامعي - نابلس وذلك ابتداءً من يوم الأربعاء الموافق 2024/08/21م من الساعة 10:00 صباحاً حتى الساعة 03:00 عصراً.
12- آخر موعد لتقديم عرض السعر هو يوم الخميس الموافق 2024/09/19م الساعة الثالثة عصراً 03:00 PM .
13- لأية استفسارات متعلقة بالعطاء المذكور أعلاه، يرجى التواصل مع مدير اللوازم والمشتريات بالمستشفى هاتف رقم 09.2389687 تحويلة رقم 6400، أو من خلال البريد الإلكتروني tender3@najah.edu.

مدير دائرة اللوازم والمشتريات
إياد مكاوي

AL-NAJAH NATIONAL UNIVERSITY (NNUH)
AL-NAJAH UNIVERSITY HOSPITAL RADIOTHERAPY
INTERIOR FINISHING WORK & ELECTRO-MECHANICAL PACKAGE
SECTION (29) - MEDIUM VOLTAGE SUBSTATIONS

Item No.	DESCRIPTION	UNIT	EST. QTY	CONTRACT AMOUNTS	
				RATE (USD)	AMOUNT (USD)
	Medium Voltage Substations Design, supply, install, test and commissioning of Medium Voltage Substations ,works to be executed by a profetional Sub-contractor/Supplier for medium voltage substations, and all needed accessories to complete the job as per drawings, specifications and engineer's instructions,Price shall include factory acceptance test. Medium Voltage Substations RAD-1				
A	Design, supply, install, test and commissioning of Dry-Type Transformer 1000kVA(TR-RAD1), Ring Main Units (RMU-1), M.V. cables, L.V Distributoin Panel, L.V cables complete as shown on drawings and tender specifications, details and as per latest version of local electricity company specifications, including full coordination with electrical authority.	L.S	1		
	Medium Voltage Substations RAD-2				
B	Design, supply, install, test and commissioning of Dry-Type Transformer 1500kVA (TR-RAD2), Ring Main Units (RMU-2), M.V. cables, L.V Distributoin Panel, L.V cables complete as shown on drawings and tender specifications, details and as per latest version of local electricity company specifications, including full coordination with electrical authority.	L.S	1		
C	Supply, install , test and connect H.T Feeder power cables 36/42 KV, NA2XS (F) Y, 1X120 mm2 AL	MTR	1000		
	TOTAL CARRIED TO BILL NO. (01) - GENERAL SUMMARY				

SPECIFICATIONS RMU & Transformer Distribution Substation

Design, Supply, Installation & Operation of Medium voltage substation as indicated in BOQ , With all necessary MV and LV cables, wires, terminations kits, fixing parts , earthing system and other accessories to perform a complete job and connecting , with M.V. main ring existing in AL-NAJAH UNIVERSITY HOSPITAL NNUH – New building D , According to scope of work, specifications, drawings , requirements of Northern Electricity Distribution Company after coordinate with An-Najah university and Engineer's instructions.

Supply Installation & Operation of MV Secondary Distribution Substation

Further to your enquiry regarding the publication of the above-mentioned invitation to tender, please find enclosed the following documents, which constitute the tender dossier:

1. Supply and Erection of 11-6.6/0.4 kV Secondary Substation. These works will include the design, manufacture, supply and installation of electrical equipment at substation locations : **AL-NAJAH UNIVERSITY HOSPITAL RADIOTHERAPY** The Contractors will be required to have 10 years' experience of the supply and installation of Secondary Substation equipment.
2. Bidding will be conducted through the competitive bidding procedures and is open to Palestinian Contractors. Al-Najah University reserves the right to re-tender on International basis in the event that received bids should be found to be non compliant with the post qualification criteria or the Technical specification.
3. Bidders shall bid for all equipment to the specifications listed in this contract and must comply with the Israeli regulations.

1. Extent of the Contract

1.1 General

This tender and technical specifications cover the survey of site, design, manufacture, factory testing and inspection at manufacturer's works of the manufacturer's equipment, packing for transport, delivery to site, unloading, storage in proper condition, complete erection, precommissioning, commissioning and the maintenance period of all equipment to be supplied.

The Technical Specifications also include the required provision for all staff, installation tools, materials, temporary and permanent works, planning, supervision and co-ordination of all installation works and staff.

The Works that shall be performed and fulfilled, to its final complete form, are described in the Technical Specifications. It shall be clearly understood that the Works include every necessary detail to furnish the entire work, in a proper and effective manner, fit for purpose including any detail or item that has not been specifically mentioned or given in these Technical Specifications.

The bidders will note that at several existing substations additional works will be necessary to bring the condition of the substation equipment and civil structures to an acceptable operating status. The bidder should make site survey in order to appraise himself of the exact nature of the detail and extent of such works. The Employer will not accept any change order request on the basis of ignorance of the existing situation at the time of submission of bid offers.

1.2 Project description

Installation of 11-6.6/0.4 kV Secondary Substation

This contract project shall include the installation of 11-6.6/0.4 kV substation.

This contract project include the 33 kV and 11 kV all needed cables and accessories .

1.3 Scope of Works

1.3.1 General description of the scope

The works shall include the construction of the Following secondary substation:

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These Substation shall house the following equipment:-

- Ring main units (RMU) formed from Cable – Cable – Metering –Transformer Transformer (CCMTT), Rated current busbars: 630 A
  Rated current cable switch disconnector: 630 A
  Rated current for transformer T-off: 200 / 630 A
- Dry type transformer according to the attached list
- Medium Voltage cable, XLPE 1x50mm2, 8.7/15 KV to connect between the transformer cell in the RMU and the primary side of the transformer.
- Termination kits indoor and outdoor to perform the proper connections between the RMU and the transformer and the transformer and the main low voltage panel (MDPT). The connection to the LV panel must be done in close cooperation with the LV contractor who should supply and connect the Low voltage cables to the LV panels.

- All necessary earthing works (from the earthling busbar in the building to the RMU and transformer. The min. cross section of the earthing copper 95mm2.
- Connection between the medium voltage-metering panel (M) that contains the voltage transformers (VTs) and the low voltage metering panel (LVMP) and connection between the current transformers (CTs) in the Transformer cell in the RMU. It's advised to have such a job at factory prior to delivery.
- Installation of medium voltage fuses, ratings according to drawings and specifications
- Setting of the Voltage, current, pf, KWh and KVARh meters and train the University Engineer on the use of the software
- The work shall include all necessary accessories to finish the job, according to the Engineer's instructions.
- Cable ladders of galvanised steel with all fixing parts □ Cable ties.
- All other materials, which are necessary to perform a complete project.

1.4 Units

The SI-system (meter, Newton, second) shall be used throughout the works covered by this Specification.

1.5 Definitions

Whenever the following terms or words are found in the specifications and/or other documents, they shall have the following meaning:
"High Voltage Equipment" (HV): Mostly used for equipment provided for a maximum operating voltage higher than 36 kV (generically also used for voltages down to 1000 V).
"Medium Voltage Equipment" (MV): Equipment provided for a maximum operating voltage higher than 1000 V and up to 36 kV.
"Low Voltage Equipment" (LV): Equipment provided for operation at 1000 V or below. (For transformers the term Low Voltage Winding is used for the side with lowest rated voltage regardless of value, ref. IEC 60076)
Reference to degree of protection (IP) is according to the classification in IEC 60529

1.6 System Characteristics

The basic characteristics of the electrical systems and equipment shall be as follows:
MV Equipment 33 kV, Maximum operating voltage 36 kV, 3-phase, 50 Hz, neutral solid earthed.
MV Equipment 11 kV (also to be used for 6.6 kV net), Maximum operating voltage 12 kV, 3-phase, 50 Hz, neutral solid earthed.
MV Equipment 6.6 kV, Maximum operating voltage 7.2 kV, 3 phase 50 Hz, neutral solid earthed. Electricity Department is in the process of phasing out the old 6.6 kV system and to upgrade it to 11 kV. Therefore, all new equipment used in this network will be rated for 11 kV.
LV Equipment, 0.4 kV, Maximum operating voltage 420 V, 3-phase, 50 Hz, loaded and effectively earthed neutral system.

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RMU & Transformer Distribution Substation
RADIOTHERAPY

Item No.	Quantity	Description
A1	2	Ring Main Units (RMU), 12 KV, 630A for cable switch, 200A for Fuse Switch and metering panel with VTs, CTs , and Low voltage compartment that incorporate digital revenue (billing) meter as per specifications complete with **cable terminations, fuses** and all fixing accessories. Configuration Cable - Cable – Metering - Transformer - Transformer
A2	1	**1000 kVA, 11-6.6/0.4 kV Ground Mounted indoor Distribution Transformer, dry type (Cast-resin)** 3 phase, 50 Hz , indoor type ground mounted 1500 kVA transformer of ratio 11-6.6/0.4 kV with NAC cooling and windings connected Dyn11, impedance voltage 4%. - Copper winding LV&MV - Standard :- DIN 42523 - Insulation Class HV/LV =F/F - Temperature rise: 100/100K The works shall include all necessary jobs including MV and LV cables, terminations, cable ladders of galvanized steel…etc.
A3	1	**1500 kVA, 11-6.6/0.4 kV Ground Mounted indoor Distribution Transformer, dry type (Cast-resin)** 3 phase, 50 Hz , indoor type ground mounted 1500 kVA transformer of ratio 11-6.6/0.4 kV with NAC cooling and windings connected Dyn11, impedance voltage 4%. - Copper winding LV&MV - Standard :- DIN 42523 - Insulation Class HV/LV =F/F - Temperature rise: 100/100K The works shall include all necessary jobs including MV and LV cables, terminations, cable ladders of galvanized steel…etc.
A4	2	**Supply, install, test and connect main low tension distribution boards MDP-T, the price shall include insulated bursars, MCCB's, ACB's, cable glands, metering instrumentation, surge and over voltage protection and all needed accessories to complete the job as specified and as shown on the drawings**

Brands of transformers:
ABB, Siemens, Schneider electric , ETON or approved equal

Brands of Ring Main Unit
Siemens, Schneider Electric, ABB, or approved equal

All equipment (made and manufacturing) European origin

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2. EXTENSIBLE RING MAIN UNIT 12 kV

2.1General

This Chapter covers the manufacture, supply, installation and operation of indoor extensible Ring Main Units, associated equipment, revenue metering panels and spares.

2.2 Design

This specification applies to SF_6 for maximum system voltage 12 kV.

The switchgear shall be suitable for indoor mounting conditions with natural ventilation.

The switchgear shall be maintenance-free and all the electrical parts, including the arcing chamber and the main contacts of the switchgear, as well as the connection busbars, are to be mounted in a metal enclosure, hermetically sealed.

All the external parts of the switchgear shall be protected against corrosion. The switchgear shall be of a self-supporting construction type.

The cubicles shall be short circuit type tested by an internationally recognized test institution. The switchgear shall consist of cubicles of tropical design. The cubicles shall be metal-enclosed and shall be so designed that future extension can easily be made.
Each cubicle shall be provided with test points for capacitate voltage tester. Internal H.V. connection shall be made of copper.

2.3 Design Criterias

Design voltages and currents are given in the General Technical Specifications. The rated short circuit breaking current of each circuit breaker and the withstand fault level of the complete switchgear installation including busbars and current transformers, shall be not less than full short circuit current in 1 sec.

The rated normal current (and breaking current) of the load breakers and busbars shall not be less than the following:

Three-phase busbar, and incomers	630 Amps
Transformer feeders	200 Amps
Breaking capacity for	
- Transformer off load current 13	□ 50 A
- Capacity load 14, 15, 16	□ 35 A
Internal fault withstand for 1 sec.	25 kA

2.4 Interlocks

The Interlock shall be according to IEC 60298 par. 5.106. An additional interlock between earthing switch and cable connection cover is required.

2.5 Padlocking

Each switch disconnector and earthing switch operating handle shall be provided with a locking device via padlock. Padlock not to be included.

2.6 Earthing

A properly sized earthing busbar made of copper shall run a long the whole length of the switchgear. On each end of the earthing busbar, terminal suitable for the cable connections

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to the general earthing system shall be foreseen. For each cubicle, on the earting busbar, four holes (Ø 9 mm) shall foreseen, which shall be suitable for earthing of the cable connectors.

2.7 Cable Connection

Cable cubicle connections shall be with M16 threaded bushing 400 Amps according to DIN 47636 suitable for T- connector type Kroo TB Elastimold or RICS 5239 or 5249 RAYCHEM or similar.

Transformer cubicle connection shall be with 250 Amps bushing suitable for straight connector.

To fix the incoming cables, each cubicle shall be provided with 3 cables clamps (35-50 mm) made of insulating material.

The switchgear shall be so designed, that temporary connections by means of cable test plugs can be made and current fed via the cable feeder spouts to facilitate primary injection testing of the protective equipment, cable fault locating, and high voltage testing of the cables

2.8 Over pressure Device

The switchgear shall be provided with an over-pressure device to release gas under pressure during an internal short circuit.

2.9 Gas-leakage Indicator

The switchgear shall be provided with a gas leakage indicator or insulation level indicator.

2.10 Coupling System

If it is necessary to couple two or more swithgear units, the coupling system shall be made of T-connectors mounted on the sidewalls. The T-connectors shall be of 630 Amps type and closed by end caps.

2.11 Switch-position

The position of the switch disconnectors and earthing switches shall be indicted according to IEC 60298 par. 5. 105.

2.12 Cable cubicles

Cable cubicles shall be provided with manually operated, three pole 630 Amps, 12 kV load breaker with "ON". "OFF" and cable earthen positions fully interlocked. The load breaker should be of the fault making load breaking complete with busbars jointing materials, floor mounting pedestals, holding down bolts, circuit label and all necessary materials.
The three connectors of the cable cubicles shall be mounted horizontally to permit the phase rotation of the cables.
Cable Cubicles shall be provided with earthing switch.

2.13 Transformer Cubicle

Transformer Cubicles shall be provided with manually operated, three pole 200 Amps, 12 kV Fuse-Switch with "ON" , "OFF" and cable earthed positions fully interlocked. The load switch should be of the fault making load breaking complete with busbars jointing materials, floor mounting pedestals, holding down bolts, circuit label and all necessary materials.

3 current transformers, DIN42600 narrow type with ribs or.
Transformer Cubicles shall be provided with fuse tripping devices via striker pin.

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The HRC fuses must conform to DIN regulation for 12 kV.
Transformer Cubicles shall have two earthing possibilities – one below the fuses and one above fuses.

2.14 Metering Cubicle
Air insulated metering module 12kV, 630A, 25kA
Bushings for connection of external busbar
3 single pole voltage transformers, DIN42600 narrow type or toroidal and generally complying to IEC 60044 which applicable.

2.15 Extensibility: Through Standard bushings from left and right sides , with cable cover , or any other options.

2.16 Other accessories:-
Contractors are requested to supply and connect Termination kits for cables with T-adapters suitable to be used with offered RMU and Medium voltage fuses sets for fuse switches:
100 A for 1000 KVA transformer protection.125 A for 1500 KVA transformer protection.

2.17 Current transformers
All current transformers shall be Toroidal and generally complying to IEC 60044.
All current transformers shall have a maximum short- time current rating for one second.
The VA rating, knee point voltage and internal resistance shall match to the system short circuit ratings and the applied protection relaying. The Contractor shall be responsible to make the necessary CT calculations to prove the stability in all transient conditions.
Current transformer for measuring and metering equipment connected to it., not less **than 15 VA, Class 0.5**
11 kV: Ratio 200/5 A
Current transformers shall be installed on the fuse protection panel in order to measure the current passing through for the billing purposes.

2.18 Voltage Transformers
Three phase transformers shall have the following characteristics

Ratio $\frac{11000-6600/110}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ for 11–6.6 KV switchgears **

** The working voltage of the system is 6.6 KV and will be transferred to 11 KV in the near future.
with accuracy class 0.5 for the measuring winding and class 3P of capacity between 100 to 200 VA for the protection winding in accordance with IEC 60186.
The voltage transformers shall be connected via HV fuses. The secondary Windings shall be protected by MCB with a signaling contact.

2.19 LV Compartment

Low voltage compartment must be equipped with metering devices of digital type Current ,KW, Voltage, Pf, Freq.
KWh Meter, CL 0.2 for billing
KVAR Meter, CL 0.2 for billing
Meters must be ready for communication.
Contractors are requested to quote the applicable software for data collection.

2.20 Optional Equipment and Accessories

All the cable switchgear units must permit installation of "Switch On" and "Switch Off" device operated via remote control-24V DC.
Bidders shall advise and quote, in detail for accessories and maintenance tools and equipment that they would recommend is provided with such a switchboard installation. It is emphasized that full information must be provided as to the costs of replacement materials, such as gaskets, seals, 'O' rings, spare contacts and mechanisms, etc....

2.21 Testing

Tests shall be made in accordance with IEC 60298. Arc tests, as specified in IEC 60298 are required.

3. Lightning arresters

The lightning arresters shall be of the metal oxide gapless type, complying with IEC 600994.
For each set of three arresters one surge counter shall be installed.
The distribution type lightning arresters shall have the polymer housing and be fitted with a pressure relief device.
All arresters shall be fitted with incorrodible metal nameplates.

3.1 Tests

Lightning arresters shall comply with the testing requirement detailed in IEC 60099-4 including wet tests and any additional tests specified herein.
Copies of type test reports shall be submitted with the bid. The routine test certificates, showing compliance with the routine dry power frequency spark-over test and the standard lightning-voltage impulse sparkover acceptance test shall be submitted to the Employer immediately after testing.
Bidder shall state what routine tests are carried out to prove the effectiveness of the seals of the arresters.
Bidder shall state what tests are carried out to prove the capabilities of the arresters to withstand the effects of a multiple lightning strike.

4. Cables and accessories

4.1 General

All cables accessories and materials shall be in accordance with the latest editions (including all amendments) of IEC and CENELEC HD 620 recommendations. All cables shall be suitable for operation:

- on a system with direct earthing of the transformer neutral
- under maximum load plus 10% specified for respective transformers
- in the climatic conditions prevailing at site

Only dry processes shall be used in vulcanizing and cross linking. Special precautions shall be taken to avoid ingress and spreading of moisture and development of water-treeing. The Bidder shall documents the construction measures used to achieve these requirements. The Supplier can propose an alternative treatment to prevent the possibility for treeing. No joints shall be allowed on MV sections shorter than 100 m.

4.2 MV cables

The conductor shall be constructed as follows:

- copper conductor, circular, stranded, compacted acc. to IEC Standard
- conductor screening, extruded, minimum thickness 0.3 mm • insulation of XLPE
- insulation screening, strippable, 0.3-0.6 mm
- conductive taping, swellable
- screen of copper wires and helical copper tape
- outer LDPE (low density polyethylene) sheath

The supply shall comprise a single-core stranded copper conductor, with a triple extrusion (conductor screen, insulation and insulation screen applied in a single operation), XLPE insulation, copper screen, PE (polyethylene) outer sheath, conductor cross sectional area according to maximum current, suitable for use in the distribution network. The radial water sealing shall be provided by a corrosion resistant metal or metal-polyethylene laminate. Special care in the design is required to prevent galvanic corrosion. The cable shall be

constructed to comply with IEC standards, and especially with the IEC 60502-2 recommendations standards. The screen cross section has to comply to the earth fault current level and duration.

The cables shall be capable of operating continuously at a maximum temperature of 90°C and shall be manufactured for burying unprotected in the ground but also for use indoors and outdoors unprotected or in pipes as the situation demands.

The PE sheath shall be made of medium density polyethylene compound with a minimum tensile strength of 18 N/mm2 and a minimum elongation at break of 300% when tested to IEC 60811-1-1. For the case of buried cables, a warning tape will be buried above the cable.

The warning tape shall be:

- 50 mm wide
- yellow color, non-fading in humid soil
- of non-disintegrating material when laid in humid soil.

Cable terminations and straight through joints shall be of the heat shrink or cold shrink type and will be produced for the applied MV cable type, for exterior or interior use. Only type tested design according to IEC Standard will be accepted. Routine testing according to IEC will be carried out during the factory acceptance tests.

The cable lugs and joint sleeves shall be of the compression type, selected for the applied cable and termination or joint.

4.3 Sealing and drumming

The cable shall be wound on strong non-returnable drums arranged to take around spindle of a section adequate to support the loaded cable drum during installation and handling. The drums shall be lagged with closely fitting battens that shall be securely fixed to prevent damage to the cable. Wooden drums shall be constructed of seasoned timber to prevent shrinkage of drums during shipment and subsequent storage at site. Each drum shall be clearly marked by the approved manner, including indication of direction of rolling. The ends of the cables shall be suitable sealed to prevent ingress of moisture. The end of the cable left projecting from the drum shall be securely protected against damage by mishandling during transport and storage.

4.4 Current carrying capacity and design parameters

The maximum continuous current carrying capacity and maximum permissible continues conductor temperature, and the factors for determining such rating and temperature shall be based on recommendations found in IEC 60287, subsequent amendments and all conditions prevailing on the site.

5.1 Cast-Resin Transformers (DATA SHEET)

Characteristic				
Design		Dry Type Cast Coil Distribution Transformer		
Type				
Primary Voltage	[V]	11000 ±2 x 2.5%		
	[V]	6600 ± 2 x 2.5%		
Secondary Voltage at no load	[V]	400		
Primary Insulation Level	[kV]			
Secondary Insulation Level	[kV]			
Frequency	[Hz]	50		
Vector Group		Dyn11		
Ambient Temperature –Max		50		
Rated Power	[kVA]	1000	1500	
Max. Average Temperature Rise (HV/LV)	[°C/°C]			
Environmental, Climatic, Fire class				
Temperature Class (HV/LV)				
Altitude (a.s.l.)	[m]	700		
Location		Indoor		

5.2 DRY TYPE DISTRIBUTION TRANSFORMERS

Standards		**IEC 726**		
Impedance, Uk	[%]			
No Load Loss	[W]			
Load Losses at 75	[W]			
Load Losses at 120	[W]			
Sound press. Level 1m tolerance +3 dB L_{PA}	[dB]			
Sound Power Level L_{WA}	[dB]			

Preliminary Values (IP00)

Length	[mm]			
Width	[mm]			
Height	[mm]			
Wheel Base				
Total Weight	[kg]			

Type of Design

Cooling		AN/AN
Primary Winding Conductor Material	Copper	
Secondary Winding Conductor Material	Copper	
HV side connection		Insulated plug type elbow connectors
LV side connection		Bus Bar

Standard Features/Accessories

Earthing Terminals, 4 Pcs/unit
Temperature Thermometer
Standard Rating Plate
Bi-directional rollers
Off circuit tap changer on primary winding
Off circuit tap changer on primary winding (for dual primary)

5. Cast –resin, Dry Type transformers

5.1` GENERAL AND SITE DATA

5.1.1 This specification covers the design, ratings, testing and shipping , installation and commissioning of dry-type, cast resin transformers. It is basically a performance-type specification and covers only those general aspects that are considered minimum quality and performance requirements of Al-Najah University. More detailed and specific data are contained in the drawings, data sheets, and other documents that form part of this inquiry.

5.1.2 Standard designs and models from bidder's manufacturing program are preferred, provided they meet the requirements of this specification, serve the intended purpose, and can be shown to have at least ten years of successful service in the field.

5.1.3 If a substantial improvement of any or all of the specified requirements expressed or implied herein is available from bidder, and this improved design offers economical advantages to Al-Najah University, this should be offered as an alternative, together with the basic proposal that conforms to this specification.

5.1.4 The transformers described in this specification are intended for continuous duty at the specified ratings under the specified ambient conditions, for 24 hours a day, 365 days a year, unless indicated otherwise.

5.1.5 Data and documentation supplied with the proposal shall enable Al-Najah University to evaluate bidder's quotation against the inquiry documents. Full descriptive information and filled-in data-sheet blanks are required as a minimum.

5.2 SITE INFORMATION

Take into considerations the following paramaters during

design and selection of equibmetns Ambient

Temperatures, Relative Humidity, Wind

5.3 SCOPE OF SUPPLY

5.3.1 This specification covers the requirements for the supply of indoor dry-type,

cast resin transformers. The transformers shall be complete, ready for installation, with all components furnished unless specifically excluded herein.

Transformers shall be suitable for installation indoors under the conditions specified in paragraph 1.6.

5.3.2 Protective enclosures to guard against contact with life parts shall be quoted only if specifically called for in the inquiry data sheets. In all other cases the transformers will be installed in locked electrical operating rooms.

5.3.3 Cable termination and connection hardware, such as stress cones and compression lugs, are part of the transformer delivery to Al-Najah University will make the necessary information available to the successful vendor for the detail design of the transformers.

5.3.4 Accessories shall be included as required for proper operation All required probes that are installed inside or on the transformers, must be included.

5.3.5 Spare parts, if required , shall be quoted separately.This quote shall form an integral part of this bid.

5.3.6 The field installation of the inquired transformers is part of this inquiry..

5.3.7 The complete vendor documentation, shall be included in the quoted transformer prices.

5.4 STANDARDS & CODES

5.4.1 Performance, testing and rating of the transformers shall conform with the latest edition of all relevant IEC publications, supplemented by narrative national specifications (or their functional equivalents) as listed below, and these specifications with all attachments.

5.4.2 STANDARDS

IEC publication 60 726 (dry-type transformers)
VDE 0532 (Transformatoren und Drosselspulen)
DIN 42523 (Gießharztransformatoren)
HD 464 S1 / A2

5.4.3 ALTERNATE STANDARDS

The proposed transformers may conform to the standards of the country of manufacture, provided these standards are based on, or comparable to the above preferred codes. Each bidder proposing other than the above preferred standards must specifically indicate the standards to which his transformers conform, and indicate all deviations (if any) from the above codes that affect performance and rating.

5.4.4 Compliance of the transformer manufacturer with the provisions of this specification does not relieve him of the responsibility of furnishing transformers and accessories of proper design, electrically and mechanically suited to meet the operating guarantees at the specified service conditions.

5.4.5 If there are, in the opinion of the bidder, any conflicts between these codes,

the data sheets, and this specification, these apparent contradictions shall be brought to the attention of Al-Najah University. The order of priority governing this contract shall be as follows:

- data sheets
- this specification
- standards & codes

5.5 DESIGN AND CONSTRUCTION

5.5.1 ELECTRICAL AND TEMPERATURE RISE DATA:

5.5.1.1 Key electrical data are indicated in the enclosed transformer data sheets, i.e. at least

- upper rated voltage and associated BIL at no load
- lower rated voltage and insulation level at no load
- impedance voltage at base load
- rated power at specified ambient temperature
- vector group

5.5.1.2 Tolerances as per IEC60 726 (+ 10 % of the total losses, □ 0.5 % of voltage ratio, and □ 10 % of impedance voltage) may be applied, if not specifically stated otherwise in the data sheets, but this fact must be clearly stated in the quotation.

5.5.1.3 Transformers covered by this inquiry shall have dielectric values as stated in IEC 60 726 table V, List 1 or List 2, i.e. the following ratings:

Rated maximum operating voltage	PF withstand voltage	BIL List 1	BIL List 2
...□ 1.1 kV	3 kV	-	-
3.6 kV	10 kV	20 kV	40 kV
7.2 kV	20 kV	40 kV	60 kV
12.0 kV	28 kV	60 kV	75 kV
17.5 kV	38 kV	75 kV	95 kV
24.0 kV	50 kV	95 kV	125 kV
36.0 kV	70 kV	145 kV	170 kV

List 1 and 2 as required in the data sheets.

5.5.1.4 Temperature rise values are limited as follows:

- Acc. to class F requirements for high and low voltage windings (measured by resistance), but not to exceed a maximum absolute

temperature of 155°C hot spot at increased ambient values.

- Acc. to class H insulation materials requirements for low voltage windings (measured by resistance), but not to exceed a maximum of 185°C hot spot at increased ambient values.

5.5.1.5 Rated power to be based on the ambient conditions specified in paragraph 1.6 . In case of installation inside protective housings, the output rating must be available with the transformer installed inside this enclosure.
Bidders are cautioned that the maximum design temperature, and not the standard or average daily temperature must be used as a design criteria.

Higher than base rated power (usually referred to **AN cooling method**) may be obtained by increased ventilation only, not by increased temperature rises. On a temporary basis, a rating of at least 35 % above rating shall be available with forced air cooling (**FAC**), if required in the data sheets.

5.5.1.6 Transformers of identical ratings and impedance voltages must be suitable for parallel operation without exceeding their rated values.

5.5.1.7 Delta-Wye connected distribution transformers are required as a rule, if not specifically called for otherwise in the data sheets. Vector groups Dyn 11 acc. to IEC 726 with fully rated neutral shall be quoted, if not indicated otherwise in the data sheets.

5.5.1.8 Primary off-load tapping links (or equivalent means) shall be designed for plus/minus 2 x 2.5 % of rated voltage, and for full primary current on all tap positions.

5.5.1.9 Primary off-load tapping links (or equivalent means) shall be designed for double wound transformer (11/6.6 KV)

5.6 CORE ASSEMBLY

5.6.1 Only cold-rolled, grain-oriented silicone iron of the low-loss type, insulated on both sides, is acceptable as core material.

5.6.2 Limbs and yokes shall preferably be shaped and assembled with a minimum use of steel bolts. Laminations should be joined, compressed and braced to minimise stray losses and noise.

5.6.3 The assembled core shall be braced in suitable steel frames that make up the base frame and the lifting facilities for the complete transformer. Suitably dimensioned lifting, guying and pulling eyes shall be provided for easy moving of the unit. The base frame shall have either skids or relocatable wheels for installation of a pad or rail foundation.

5.6.4 The core assembly shall enable the removal of the coils in the field, if this should become necessary.

5.6.5 The entire core assembly shall be paint for corrosion protection according to site climate conditions before the coils are mounted.

5.7 COILS & INSULATION

5.7.1 The high and low voltage windings shall be copper. Individual coils shall be connected together by pressing. Each HV winding shall be encapsulated under vacuum and at elevated temperature in cast resin to form rigid coils which completely seal out the environment.

The layers of low voltage copper sheet windings are insulated with prepreg. Low voltage winding should be glued and cured . The coil should be resistant to heat and the axial short- circuit forces should be reduced considerably.

5.7.2 The high voltage windings shall have insulation materials conforming to class B or F requirements, the low voltage windings shall be insulated with class F or H materials.

5.7.3 Dielectric strength of the insulation materials shall conform the BIL values listed in the data sheets. Additionally, no measurable partial discharges (less than 5 pico Coulomb) shall occur up to twice the rated voltage of each winding for voltages up to 36 kV.

5.7.4 The complete encapsulation shall be impervious to moisture and common industrial contaminants. The insulation material used shall be selfextinguishing if ignited by direct flame or arc. No toxic gases shall form during heating and/or burning. When subjected to a continuos bolted shortcircuit on the LV terminals, the transformer shall not explode or expel molten material. Authorised test certificates from official testing laboratories shall be made available upon request to validate these requirements.

5.7.5 The ageing properties of the insulation materials shall be sufficiently high for the life expectancies of these transformers .

5.7.6 Coil assemblies shall be acoustically insulated from each other and from the core/base frame to obtain noise values comparable to those emitted by oilfilled transformers.

5.8 CONNECTIONS

5.8.1 Incoming cables for high as well as for low voltage shall be able to be connected either from above or below.

5.8.2 Primary delta connections of windings shall be made with insulated jumpers.

5.8.3 If primary grounding switches are specified in the data sheets as safeguards, integrally mounted make-proof grounding switches shall be employed directly at the transformers.

5.8.4 Low voltage connections shall be copper bus stubs, enabling cable or busbar connection from either above or below.

5.8.5 All terminals must be clearly and permanently marked acc. to 60 076-4, i.e. the upper voltage side is marked 1W, 1V, 1U, the lower voltage side is marked 2W, 2V, 2U, 2N. Other markings require the approval of Al-Najah University.(For double primary transformer , 11KV side tape changer must indicated by 1 while 6.6 KV must be recognized by 2)

5.8.6 The type and number of cables to be used for primary connection is indicated on the data sheet for each transformer. In general, however, only one conductor per phase will be used on the upper voltage side.

5.8.7 The low voltage connections will be by bus duct, if not indicated otherwise on the data sheet. If cables are specified, the type and cross-section of all conductors will be indicated as well. There shall be sufficient space available to terminate the outgoing conductors specified.

5.8.8 If several parallel cables per phase are listed in the data sheets, bidder is to include the necessary space for their connection.

5.8.9 The transformer base shall have corrosion-proof ground connection bolts, suitably and conspicuously marked, at two opposite points.

5.9 PROTECTIVE HOUSING & FANS

5.9.1 If outdoor installation is specified in the data sheets, the transformer shall be housed in protective enclosures suitable for the ambient conditions listed in paragraph 1.6 and providing complete protection against accidental contact with live parts. Minimum type of protection is IP23, i.e. completely enclosed and protected against drip water.

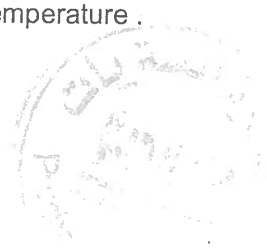
5.9.2 For indoor installation in accessible areas, enclosures in type of protection IP20 shall be used when specified in the data sheets.

5.9.3 If AN/AF cooling is specified, the enclosures must have sufficient louvers to guarantee sufficient air-flow through the enclosure.

5.11 ACCESSORIES

5.11.1 The transformers shall be equipped with all accessories deemed necessary for proper operation by the manufacturer, plus the ones specified in the data sheets. Additional available accessories shall be quoted as options.

5.11.2 As a minimum, each transformer shall have solid-state winding temperature monitoring elements installed in the low voltage windings. These temperature probes shall initiate an alarm before the max. winding temperature is approached and shall open a trip contact at the hot spot temperature .



5.11.3 If AN/AF cooling is specified, additional sets of temperature probes and a 30 min. time-delay relay must be installed for fan control. These sensors shall activate the fan controls and switch off the fan(s) time delayed after the winding temperature has fallen again. Warning and tripping signals shall be available . All auxiliary devices required for automatic and manual fan control shall be included with the transformer.
Manual fan control shall be possible from the transformer location, overriding the automatic control.

6. NAMEPLATES

6.1 Nameplates shall be attached permanently to the transformer where they can be read from the ground.

6.2 Nameplate information as called for by IEC 60 726 is required. This includes

- kind of transformer
- applicable specifications
- manufacturer's name
- serial number
- year of manufacture
- number of phases
- rated power
- rated frequency
- rated voltages
- rated currents
- Value of basic insulation level
- Vector group
- impedance voltage at rated current
- type of cooling
- total mass
- Climate, environment and fire behaviour

6.3 Additional information, either on the same or on an additional nameplate, is required as follows:

- graphic representation of winding connections and terminal designations
- design ambient temperature, if other than standard
- no load and load losses
- purchase order and/or project identification
- tag number

7. CORROSION PROTECTION

7.1 Surface preparation and painting of transformers and enclosures must be suitable for the environmental conditions stated in paragraph 1.6. No significant corrosion of any painted surface may occur during the initial operating period , provided the paint job remains mechanically undamaged.

7.2 Colour of final coat shall be manufacturer's standard if not specifically sated otherwise in the data sheets

8. INSPECTION & TESTING

8.1 All transformers are subject to inspection during their manufacture. Routine testing of each transformer shall be according to the specified standards in the order .

8.2 Al-Najah University Engineer personnel shall have unrestricted access to manufacturer's facilities during normal working hours while this contract is active. Authorised representatives of Al-Najah University Engineer shall be informed, upon request, about work progress, and shall receive all pertinent documentation about test procedures and results. The contractor shall carry out all expenses including air flight and accommodation.

8.3 As a minimum, the following routine tests according to IEC 60 726 shall be performed on each transformer prior to dispatch:

- measurement of winding resistance
- measurement of voltage ratio and phase relationship
- measurement of impedance voltage
- measurement of load losses
- measurement of no-load loss and current
- power frequency withstand voltage test
- induced overvoltage withstand test
- Partial discharge measurement (less than 5 pC at two times rated voltage)

Test reports of these tests shall be made available to Al-Najah Universityat no extra cost.

8.4 Type and special tests, if specified in the data sheets, shall be performed acc. to IEC-60 726:

- temperature rise test
- lightning impulse test, full wave (chopped wave if specified)
- Short circuit withstand test
- noise level test

These special tests shall be quoted optionally as witness tests with Al-Najah University Engineer personnel present..

8.5 Acceptance by Al-Najah University Engineer 's representative of any transformer shall not relieve the manufacturer from any of his performance guarantees, or from any of his other obligations resulting from this contract.

9. ENGINEERING DATA

Technical descriptions, data sheets, catalogues and other material submitted with the quotation must enable the Al-Najah University Engineer to thoroughly evaluate the proposal as to its compliance with the inquiry specifications.

9.1 MINIMUM REQUIREMENTS

- detailed summary of exceptions to inquiry specification
- completed inquiry data sheets
- brochures & catalogues for standard transformers, containing basic electrical & physical data
- listing of accessories included in bid
- applicable design specifications
- tests included
- prose descriptions of special-design transformers
- main outline & connection dimensions
- shipping weights & dimensions

9.2 APPROVAL DATA

The following information and data must be submitted to the engineer for approval prior to manufacturing of the transformers:

- certified outline & connection dimensions
- updated, completed data sheets of Al-Najah University Engineer
- testing schedule
- painting specification

10. VENDOR DOCUMENTATION

The transformers supplied under this contract shall be documented to the extent as to allow Al-Najah University Engineer, as well as the operator, to fully understand the product, its theory of operation, its application and performance. Furthermore it must enable the Al-Najah University Engineer to efficiently communicate with the manufacturer about all aspects of operating, maintaining and servicing the transformers.

Minimum requirements:-

10.1 Certified dimensional drawings including complete type numbers, main electrical data, weights, dimensions and location of all major parts, cable and bus duct connection details, project and purchase order data. Typical drawings are not acceptable for this purpose, nor are drawings that show more than one type of transformer on the same sheet.

10.2 Circuit diagrams showing all auxiliary devices and their connections .

10.3 Installation, Operating & Maintenance manuals covering all aspects of these headings for proper and safe procedures.

11. PACKING & SHIPPING

11.1 The type of packing to be used must be suitable for all commonly used means of transportation from manufacturer's location to the installation site, as stated in paragraph 1.6 of this specification. If not indicated otherwise in the contract, all transformers shall be thoroughly prepared for export and crated for shipment via ocean freight. Methods of shipment to be employed are subject to Al- Najah University approval.

11.2 If shipment by other means, e.g. collective shipment by containerised freight, is required, this will be indicated in the contract documents.

11.3 Export packing methods used shall also be suitable for extended storage at the jobsite under covered shelter and under the environmental conditions listed in paragraph 1.6.

If this storage period is expected to exceed 6 monthsAl-Najah University will notify bidder and arrange for possible additional protection and intermediate inspections by manufacturer's personnel.

11.4 Transformers shall be shipped completely assembled whenever possible. Jobsite assemblies shall be kept at an absolute minimum. Parts detached for shipment must be clearly marked and shipped together with the transformers. Clear and logic instructions for reassembly must accompany the shipment of such partially dismantled transformers.

11.5 Marking of shipping containers is subject to Al-Najah University approval and guidelines for special marking must be followed meticulously to ensure positive identification at the jobsite.

12. With Contract

Latest issues of the drawing shall be supplied under the contract; if no modifications are applicable to the drawings supplied with the Bid, this shall be confirmed in writing under the contract and further drawings need not be supplied.
Rating and diagram plate drawing shall be supplied. A
copy of latest version of related IEC.