

5.1 GENERAL SPECIFICATION

THIS CONTRACT COVERS THE MANUFACTURE, TESTING AT FACTORY, PACKING AND DELIVERY, C.I.F. KUWAIT, CLEARING CHARGES, CUSTOM AND IMPORT DUTIES AND TRANSPORT TO MINISTRY OF ELECTRICITY & WATER STORES OF **CABLE JOINTS EMPLOYING HEAT SHRINKABLE AND COLD SHRINKABLE MATERIALS ASSOCIATED WITH 11 KV, XLPE AND P.I.L.C CABLES.**

5.2 PURCHASER'S SYSTEM

THE CABLE JOINTS ARE REQUIRED TO EXTEND THE PURCHASER'S EXISTING 11 KV. POWER DISTRIBUTION SYSTEM, CHARACTERISTICS OF WHICH ARE AS FOLLOWS: -

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| A) | SYSTEM VOLTAGE | : | 11 KV |
| B) | SYSTEM HIGH VOLTAGE | : | 12 KV |
| C) | FREQUENCY | : | 50 HZ |
| D) | FAULT LEVEL (MAXIMUM) | : | 350 MVA, AT 11 KV, (500 MVA FOR 11 KV, 3-CORE 300 SQ., U/G CABLE WITH COPPER CONDUCTOR). |
| E) | MAXIMUM TIME FOR WHICH SUCH A FAULT MAY EXIST | : | 1.25 SECONDS. |
| F) | METHOD OF EARTHING | : | SOLIDLY EARTHED OR THROUGH A 10.5 OHMS RESISTANCE. |

5.3 SITE CONDITION

CLIMATIC CONDITIONS IN KUWAIT ARE RIGOROUS AND THE SUMMER SEASON DURING WHICH THE JOINTS WILL WORK UNDER CONTINUOUS MAXIMUM LOAD CONDITION IS LONG AND SHALL BE CONSIDERED TO FALL DURING THE PERIOD STARTING FROM 15TH OF APRIL TILL 15TH NOVEMBER. THE REMAINDER OF THE YEAR SHALL BE CONSIDERED AS A WINTER SEASON SINCE AUTUMN AND SPRING SEASONS ARE VERY SHORT IN KUWAIT.

THE FOLLOWING ARE PREVALENT ATMOSPHERIC CONDITIONS BASED ON OUR LATEST RECORDS: -

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| A) | MAXIMUM SUN RADIATION'S TEMPERATURE MEASURED WITH BLACK BULB THERMOMETER | : | 85 DEGREE CENTIGRADE |
| B) | HIGHEST SHADE TEMPERATURE | : | 52 DEGREE CENTIGRADE. |
| C) | AVERAGE MAXIMUM AMBIENT TEMPERATURE | : | 45 DEGREE CENTIGRADE |
| D) | LOWEST TEMPERATURE DURING WINTER | : | -6 DEGREE CENTIGRADE. |

PERIODS OF HIGH HUMIDITY ARE COMMON AND RELATIVE HUMIDITY OF 100% AT 30 DEGREE CENTIGRADE HAS BEEN RECORDED. VIOLENT SAND AND DUST STORMS OCCUR AND EVEN ON COMPARATIVELY STILL DAYS, FINE DUST IS CARRIED IN SUSPENSION IN THE ATMOSPHERE.

THE JOINTS WILL BE BURIED IN THE GROUND AT A DEPTH OF APPROXIMATELY (1) ONE MTR. WHERE THE SOIL VARIES FROM SANDY TO ROCK-LIKE GATCH COMPARED TO DRY HARD CLAY, WITH A CORRESPONDING GROUND THERMAL RESISTIVITY 'G' OF 120 DEGREE CENTIGRADE CM/WATT AND A GROUND TEMPERATURE VARYING FROM 35 DEGREE CENTIGRADE IN THE SUMMER TO 15 DEGREE CENTIGRADE IN WINTER.

THE CABLE JOINTS CALLED FOR IN THIS SPECIFICATION SHALL, THEREFORE GIVE TROUBLE-FREE SERVICE UNDER THE WORST CONDITIONS ENCOUNTERED IN KUWAIT AND SHALL CARRY THEIR RATED CURRENTS CONTINUOUSLY UNDER THE WORST TEMPERATURE CONDITIONS WHICH PREVAIL IN SUMMER AND SHALL ALSO WITHSTAND MAXIMUM FAULT CURRENT WITHOUT DAMAGE OR DETERIORATION.

THE SOIL IN KUWAIT IS VERY CORROSIVE. SULPHATE REDUCING BACTERIA IS COMMON TO ALL SOIL IN KUWAIT AREA AND AS THE SOIL IS GENERALLY RICH IN SULPHATE, THE ANAEROBIC CONDITIONS WHICH MAY ARISE IN CONTACT WITH BURIED PIPES AND CABLES FAVOURS THE DEVELOPMENT OF THESE ANAEROBIC ORGANISMS WHICH GENERATE HYDROGEN SULPHIDE AND CONSEQUENTLY RENDER THESE AREAS MOST CORROSIVE.

A TYPICAL ANALYSIS OF A SOIL SAMPLE IS AS FOLLOWS :-

-	APPEARANCE	:	WET COARSE SAND, WITH SOME CLAY.
-	PH VALUE OF WATER IN CONTACT WITH THE SAND	:	10.0
-	CALCIUM CARBONATE AS $CaCO_3$:	50.00% DRY BASIS
-	CALCIUM SULPHATE AS $CaSO_4$:	25.00% DRY BASIS
-	SILICA AS SiO_2	:	22.00% DRY BASIS
-	MAGNESIUM SULPHATE AS $MgSO_4$:	6.00% DRY BASIS
-	SODIUM CHLORIDES AS $NaCl$:	5.00% DRY BASIS
-	IRON AS Fe_2O_3	:	3.00% DRY BASIS
-	SULPHATE REDUCING BACTERIA	:	PRESENT
-	MOISTURE	:	15.00%

5.4 PRE-REQUISITE FOR SUBMISSION OF OFFERS

ALL THE FOLLOWING POINTS MUST BE SUBMITTED WITH THE OFFER, WITHOUT THE FOLLOWING POINTS THE OFFER WILL BE REJECTED AND THE TENDERER WILL NOT HAVE ANY RIGHT TO OBJECT.

- A) SAMPLES TO BE PRESENTED TO MEW FOR TESTING AND/OR CHECKING AND SHALL REMAIN AT THE DISPOSAL OF MEW.
- B) THE MANUFACTURER OF THE OFFERED MATERIALS MUST HAVE ISO 9001 CERTIFICATE. OR BETTER.
- C) MATERIALS OFFERED SHOULD HAVE PASSED TEST BY AN INDEPENDENT INTERNATIONALLY APPROVED LABORATORY (ASTA / KEMA / CESI / CPRI), RELEVANT CERTIFICATE TO BE PROVIDED TO MEW ALONG WITH THE OFFER. THE TEST CERTIFICATE SHOULD COMPLY WITH MEW SPECIFICATIONS.
- D) MATERIALS OFFERED SHOULD HAVE HAD PASSED MEW MINIMUM REQUIREMENTS OF PRELIMINARY TESTING TO SATISFACTION OF MEW ENGINEER.
- E) MATERIALS OFFERED SHOULD HAVE BEEN TESTED BY USAGE IN THE MEW ELECTRICAL NETWORK FOR A PERIOD NOT LESS THAN 18 (EIGHTEEN) MONTHS.
- F) THE OFFERED CABLE JOINTS AND ACCESSORIES SHALL BE MANUFACTURED IN THE SAME YEAR OF TENDER/PURCHASE ORDER.
- G) FULLY DETAILED AND DIMENSIONED DRAWINGS FOR EACH TYPE OF JOINT SHALL BE SUBMITTED WITH THE OFFER.

- H) TECHNICAL DETAILS AND CATALOGUES OF OFFER MATERIAL SHALL BE SUBMITTED.
- I) SUPPLY RECORD OF LAST (5) FIVE YEARS WITH SPECIFIC REFERENCE OF THE CLIENT SHALL BE SUBMITTED

5.5 PACKING

ALL THE JOINTS AND JOINTING MATERIALS SHALL BE SUITABLY PACKED FOR EXTENDED STORAGE PERIOD.

TENDERERS ARE WARNED THAT THE JOINT AND ACCESSORIES ENROUTE FROM THE FACTORY TO KUWAIT IS LIABLE TO VERY ROUGH HANDLING. IT IS ESSENTIAL THAT ALL MATERIALS ARE SUITABLY PACKED AND PROTECTED. EACH PACKAGE SHALL BE MARKED WITH THE CONTRACTOR'S IDENTIFICATION MARK, THE WORD "MEW" ALONG WITH THE ORDER NUMBER AND ADDRESSED TO THE MINISTRY OF ELECTRICITY & WATER - KUWAIT. IN ADDITION, ON EACH JOINT PACKAGE, THE MEW VOCAB. NO. SHALL BE PRINTED IN BOLD LETTERS WITH A DISTINCTIVE COLOR. A PACKING LIST IS TO BE INCLUDED IN EACH PACKAGE.

5.6 DRAWINGS, SCHEDULES AND TECHNICAL INFORMATION

IT IS ESSENTIAL THAT EACH OFFER SHALL BE ACCOMPANIED BY COMPREHENSIVE SUPPORTING INFORMATION TO ENABLE THE PURCHASER TO ASSESS THE MERITS OF EACH OFFER.

THE FOLLOWING DRAWINGS AND DOCUMENTS ARE REQUIRED :-

A) DRAWING TO BE SUBMITTED WITH THE OFFER

FULLY DETAILED AND DIMENSIONED DRAWINGS FOR EACH TYPE OF JOINT SHALL BE SUBMITTED WITH THE OFFER.

EACH TYPE OF JOINT SHALL BE SHOWN ON THE DRAWING WITH ITS PLAN, ELEVATIONS AND SECTIONAL ELEVATION TO A SUITABLE SCALE. A DRAWING SHOWING ACTUAL CONNECTIONS OF THE CORES OF CABLES SPECIFIED WITH SECTIONAL PLAN AND ELEVATION MUST BE SUBMITTED. A PLAN VIEW AND SECTIONAL VIEW OF ARMOUR / SHEATH BONDING MUST ALSO BE SUBMITTED WITH THE OFFER.

THE DIMENSIONS OF THE COMPONENTS SHALL BE AS PER PURCHASERS REQUIREMENT.

- B) TECHNICAL DETAILS AND CATALOGUES OF OFFER MATERIAL SHALL BE SUBMITTED.
- C) ALL THE SCHEDULES ATTACHED MUST BE COMPLETELY FILLED IN BY THE TENDERERS. THE TENDERERS SHALL SUBMIT DETAILED LISTS OF MATERIALS AND QUANTITIES USED IN THE JOINT ON OFFER.

THE SUCCESSFUL TENDERER SHALL SUBMIT ONE SET OF JOINTING INSTRUCTIONS FOR EACH KIT. THE INSTRUCTION MUST BE IN THE ENGLISH LANGUAGE.

THE JOINT SHALL MEET THE REQUIREMENTS OF LATEST STANDARDS NAMELY IEEE 48, BSS, IEC AND GERMAN STANDARD VDE 0278. THE COMBINED SEVERE TEST CONDITIONS OF THE ABOVE SHALL BE APPLICABLE.

5.7 TRAINING AT SITE

THE SUCCESSFUL TENDERER WILL BE REQUIRED TO PROVIDE THE SERVICE OF TWO EXPERIENCED JOINTER SUPERVISORS, FOR A PERIOD OF (1) ONE MONTH TO TRAIN MINISTRY'S JOINTERS AT SITE. THE JOINTER SUPERVISORS SHALL ARRIVE IN KUWAIT WITHIN FOUR WEEKS FROM THE DATE OF REQUEST BY THE PURCHASER. ALL TRAVEL TO KUWAIT AND RETURN, LODGING, BOARDING AND TRANSPORT EXPENSES INCURRED BY THESE JOINTER SUPERVISORS SHALL BE MET BY THE SUCCESSFUL TENDERER AND THE AMOUNTS REQUIRED FOR THIS SHALL BE INDICATED IN THE PRICE SCHEDULES.

MEW. WILL PAY NO OTHER AMOUNTS OTHER THAN THOSE STIPULATED BY THE PRICE SCHEDULE. SHOULD THE JOINTER SUPERVISOR, PROVIDED BY THE SUCCESSFUL TENDERER BE NOT TO THE SATISFACTION OF THE MEW, THEN REPLACEMENT SUPERVISORS SHALL BE PROVIDED. THE JOINTER SUPERVISORS SHOULD WORK IN ACCORDANCE WITH THE NORMAL WORKING HOURS OF THE MINISTRY. THE JOINTER SUPERVISORS MUST BE ABLE TO COMMUNICATE PROPERLY WITH THE MINISTRY JOINTERS.

THE DETAILS OF RATE SHOULD BE INCLUDED IN SCHEDULE 'D-1 & D-2'. THE MINISTRY RESERVES THE FULL RIGHT TO UTILIZE THE JOINTER SUPERVISORS SERVICES FOR THE FULL PERIOD. THE TOTAL SUPERVISORS CHARGES WILL BE CALCULATED ON THE BASIS OF WORKING PERIOD PLUS THE AIR TRAVEL EXPENSES FOR ONE JOURNEY FROM THE PLACE OF ORIGIN TO KUWAIT AND BACK PER SUPERVISOR.

5.8 TECHNICAL DESCRIPTION OF CABLE ASSOCIATED WITH JOINTS:-**A) P.I.L.C. 11 KV. CABLES**

11 KV BELTED 300 SQ. MM., 3-CORE SHAPED STRANDED COPPER OR ALUMINUM CONDUCTOR, PAPER INSULATED, LEAD COVERED STEEL WIRE ARMoured CABLE (NON-DRAINING TYPE).

B) X.L.P.E. 11 KV CABLES

THE UNDER MENTIONED 300 SQ. MM., XLPE CABLE IS IN GENERAL USE IN KUWAIT.

I	CONDUCTOR	:	300 SQ. MM., ALUMINUM COMPACT CIRCULAR STRANDED, IN ACCORDANCE WITH BS 6791(SEE NOTE BELOW), OR 300 SQ. MM., COPPER.
II	CONDUCTOR SCREEN	:	EXTRUDED SEMI-CONDUCTING COMPOUND LAYER.
III	INSULATION	:	CROSS-LINKED POLYETHYLENE IN ACCORDANCE WITH I.E.C. 502. EXTRUDED SOLID DIELECTRIC INSULATED POWER CABLE.
IV	INSULATION SCREEN	:	EXTRUDED SEMI-CONDUCTING COMPOUND LAYER.
V	METALLIC SCREEN	:	NONE (SEE NOTE BELOW).
VI	CORE ASSEMBLY	:	LONGITUDINAL APPLIED TAPE FILLERS.
VII	BEDDING	:	4 LAYERS OF SEMI-CONDUCTING TAPE.

VIII	ARMOUR	:	GALVANIZED STEEL WIRE OF 3.15 MM., DIA. (COMPRISING A TOTAL OF ABOUT 65 WIRES).
IX	OUTER SHEATH	:	RED PVC IN ACCORDANCE WITH BS 6746:TYPE 9.

NOTE:- OTHER 11 KV XLPE CABLES MAY BE USED. THE MAIN DIFFERENCE BEING THE USE OF A METALLIC CORE SCREEN AND STRANDED SECTOR SHAPED ALUMINUM CONDUCTORS.

5.9 DETAILS AND TECHNICAL REQUIREMENTS OF THE JOINTS FOR 11 KV. XLPE/XLPE AND XLPE/PILC CABLES

- A) THE JOINTS SHALL BE DESIGNED SUCH THAT THEY ARE FULLY SUITABLE FOR JOINTING THE TYPES OF CABLES AS MENTIONED IN THIS SPECIFICATION.
- CABLES ARE DIRECTLY BURIED AT A DEPTH OF APPROXIMATELY (1) ONE MTR. WITHOUT ANY SORT OF MECHANICAL PROTECTION. THE JOINTS SHALL BE OF AN APPROVED DESIGN AND SHALL BE SUITABLE IN THE CONSTRUCTION STAGE AND OPERATION TO MEET ALL THE MECHANICAL/ELECTRICAL STRESS EXPECTED UNDER THE SEVERE CLIMATIC AND SITE CONDITIONS ENCOUNTERED IN KUWAIT.
- THE JOINTING ACCESSORIES SHALL BE OF GOOD QUALITY. THE JOINTS SHALL BE AMPLY DIMENSIONED AND THE JOINTING TECHNIQUE EMPLOYED IN THE CONSTRUCTION OF THE JOINT SHALL BE A SIMPLE AND EASY JOINTING PROCESS RENDERING THE JOINT ROBUST AND SAFE.
- ALL THE COMPONENTS OF THE JOINT WHICH HAVE A COATING ON THE INSIDE (SUCH AS OUTER TUBES, INNER TUBES, BREAK-OUT), ARE TO BE SUPPLIED WITH A PAPER INSET TO PREVENT ADHESION PRIOR TO APPLICATION. ALSO, TWO SHEETS OF GREASE PROOF PAPER TO BE SUPPLIED WITH EACH JOINT TO KEEP DIRT OUT OF THE JOINT DURING CONSTRUCTION.
- THE JOINTS SHALL BE REQUIRED FOR STRAIGHT JOINTING, XLPE CABLES AND TRANSITION JOINTING BETWEEN XLPE AND PILC CABLES.
- ONLY JOINTS EMPLOYING HEAT SHRINKABLE AND COLD SHRINKABLE CONSTRUCTION WILL BE CONSIDERED. STRESS CONTROL TUBING, INSULATING TUBING AND CONDUCTIVE MOLDINGS AND TUBING SHALL COMPLY WITH RELEVANT SECTIONS OF ESI: 09-13 LATEST EDITION AND OTHER INTERNATIONAL STANDARDS INDICATED IN THIS SPECIFICATION.
- B) JOINT TYPE**
- B-1 TYPE "A", 11 KV, STRAIGHT JOINT FOR JOINTING 3-CORE, 300 SQ. MM. XLPE TO 3-CORE, 300 SQ. MM. XLPE CABLE.
- WITH AL CONDUCTOR.
 - WITH CU CONDUCTOR.
- B-2 TYPE "B", 11 KV, STRAIGHT JOINT FOR JOINTING 3-CORE, 300 SQ. MM. PILC TO 3-CORE, 300 SQ. MM. PILC CABLE.
- B-3 TYPE "C", 11 KV TRANSITION STRAIGHT JOINT FOR JOINTING 3-CORE, 300 SQ. MM. XLPE TO 3-CORE, 300 SQ. MM. PILC CABLE
- WITH AL CONDUCTOR.
 - WITH CU CONDUCTOR.

C) DIMENSIONS OF THE COMPONENTS

THE DIMENSIONS OF THE COMPONENTS SHALL BE AS PER PURCHASERS REQUIREMENTS. HOWEVER THE LENGTHS FOR THE CANISTER SHALL BE AS FOLLOWS.

C-1	TYPE "A" JOINTS	- 1400-MM.
C-2	TYPE "B" JOINTS	- 1500 MM.
C-3	TYPE "C" JOINTS	- 1500 MM.

THE CORROSION PROTECTION TUBE SHALL BE IN THREE PIECES WITH ADEQUATE LENGTH TO COVER THE ABOVE.

D) CROSSED CORE JOINTS

IN ORDER TO OBTAIN THE CORRECT PHASING THE CORES MAY BE CROSSED AND JOINTED. THE JOINTS TYPE "A" AND "C" SHALL BE SUITABLE FOR CROSSED CORES.

E) ARMOUR/SHEATH EARTH BONDING

AN APPROVED BONDING SYSTEM BETWEEN ARMOUR/ARMOUR ON TYPE "A" JOINTS SHEATH / SHEATH ON TYPE B JOINTS OR ARMOUR/SHEATH ON TYPE "C" JOINTS SHALL BE PROVIDED WITH ADEQUATE THERMAL CAPACITY TO WITHSTAND THE SYSTEM'S FAULT CURRENTS.

THE ARMOUR BONDING SHALL HAVE A CONDUCTANCE OF AT LEAST THE SAME VALUE AS THAT OF AN EQUAL LENGTH OF THE COMPLETE ARMOUR OF THE CABLE AS DEFINED IN BSS 6343. THE METHOD OF CONNECTING THE ARMOUR EARTH BONDING TO THE LEAD SHEATH IN TYPE "B" AND "C" JOINTS MUST BE PLUMBED. FOR TYPE "A" AND TYPE "C" JOINTS, THE METHOD OF CONNECTING THE BOND TO THE XLPE ARMOUR WIRES SHALL BE BY TENSION TYPE STRAPS SIMILAR TO HEPWORTH BONDING SYSTEM. ARMOUR CLAMP RINGS WILL ALSO BE ACCEPTED. WORM DRIVE CLIPS WILL NOT BE ACCEPTED.

F) CONDUCTOR FITTINGS

THE CONDUCTOR FITTING FOR THE JOINT TYPES "A", "B" AND "C" SHALL BE COMPRESSION FERRULES FOR BOTH ALUMINUM AND COPPER CONDUCTORS AND AS DETAILED HERE UNDER.

F-1 ALUMINUM CONDUCTOR

THE COMPRESSION FERRULES SHALL BE SIMILAR TO B.I.C.C. BAP 300 ASL OR CEMBRE MTMAD – 300/1. THE COMPRESSION TOOL USED TO INDENT THE FERRULES WILL BE B.I.C.C. G14H HEAD WITH FP10 FOOT PUMP EMPLOYING DIE NO. P300D, OR CEMBRE RHU 130 COMPRESSION TOOL WITH CRIMPING DIE SET AU-130-140, MUA-DIES, PS-130 & AC-130P.

F-2 COPPER CONDUCTORS

THE COMPRESSION FERRULES SHALL BE SIMILAR TO B.I.C.C. BTH-300 CS (OLD REF. YCS 300T). THE COMPRESSION TOOLS USED TO INDENT THE FERRULES WILL BE B.I.C.C G14H HEAD WITH FP10 FOOT PUMP NO. P300D OR CEMBRE MT 315S-TD (COMPRESSION FERRULE) WITH RUH 130 C COMPRESSION TOOL WITH ME 60-C DIE.

SHOULD THE TENDERER OFFER ANY OTHER MAKES OF FERRULES, THEN THESE WILL BE APPROVED ONLY IF THEY CAN SATISFACTORILY BE INDENTED WITH THE COMPRESSION TOOL AND DIE NO. INDICATED ABOVE. AN APPROVED TEST CERTIFICATE IS ALSO REQUIRED FOR THESE FERRULES.

G) JOINT MATERIALS

G-1 GENERAL

THE COMPLETED JOINT SHALL BE SUFFICIENTLY STRONG, REASONABLY IMPACT RESISTANT AND FULLY SUITABLE FOR THE CLIMATIC CONDITIONS OF KUWAIT. A WRITTEN GUARANTEE TO THIS EFFECT FROM THE MANUFACTURER MUST BE SUBMITTED BY THE SUCCESSFUL TENDERER ON ISSUE OF PURCHASE ORDER BY MEW.

THE SUPPLIER MUST ALSO SUBMIT FULL TECHNICAL DETAILS OF MATERIALS USED IN THE JOINTS IN RESPECT OF MECHANICAL AND ELECTRICAL PROPERTIES AND ALL OTHER RELEVANT INFORMATION TO ENABLE THE PURCHASER TO ASSESS THE SUITABILITY OF THE JOINT.

PARTICULAR ATTENTION OF THE MANUFACTURER IS DRAWN TO THE FACT THAT THE MATERIAL OF THE JOINT/BOX SHALL BE CHOSEN SUCH THAT THE BOX/SHELL WILL BE EASILY HANDLED AND SAFELY STORED.

ALL TUBING'S AND MOULDED PARTS MUST BE MARKED CLEARLY WITH MANUFACTURERS NAME, PART NUMBER & QA BATCH NUMBER. ONLY MATERIALS SUPPLIED BY AN ISO 9001 OR BETTER-CERTIFIED MANUFACTURER WILL BE ACCEPTABLE.

IN ORDER TO ASSESS THE RELIABILITY OF THE COMPONENTS OF THE JOINTS THE TENDERERS ARE REQUESTED TO FURNISH THE FOLLOWING DETAILS.

A) STRESS CONTROL TUBING.

- 1) THE NAME AND ADDRESS OF THE MANUFACTURER OF THE STRESS CONTROL TUBING.
- 2) TECHNICAL DETAILS OF THE STRESS CONTROL TUBE EXPLAINING HOW THE MANUFACTURER HAS DERIVED THE CORRECT ELECTRICAL PROPERTIES OF THE TUBING VOLUME RESISTIVITY, PERMITTIVITY AND IMPEDANCE.
- 3) MANUFACTURER MUST SUPPLY THE PROOF OF ACCELERATED LABORATORY AND LONG TERM FIELD USAGE TO CONFIRM THE RETENTION OF THE PROPERTIES WITHIN PERMISSIBLE LIMITS UNDER VARIATIONS OF TEMPERATURE AND THERMAL AGING.
- 4) THE RECOMMENDED LENGTHS OF THE STRESS CONTROL TUBING FOR DIFFERENT VOLTAGE RATINGS OF CABLES.

- 5) THE QUALITY ASSURANCE PLAN OF THE MANUFACTURER AND HIS CONFIRMATION THAT THE STRESS CONTROL TUBING SUPPLIED FULLY MEETS THE QUALITY ASSURANCE PLAN. THIS IS TO BE SUPPORTED WITH ROUTINE TEST CERTIFICATES FOR THE PARTICULAR BATCH OF TUBE SUPPLIED WITH THE JOINTS.

B) NON TRACKING EROSION AND WEATHER RESISTANT INSULATING TUBING AND MOULDED PARTS.

- 1) THE NAME AND ADDRESS OF THE MANUFACTURER OF THE COMPONENT (TUBING MOULDED PARTS).
- 2) THE QUALITY ASSURANCE PLAN OF THE MANUFACTURER AND THEIR CONFIRMATION THAT THE COMPONENT (TUBING MOULDED PARTS) SUPPLIED FULLY MEETS THE QUALITY ASSURANCE PLAN. THIS IS TO BE SUPPORTED WITH ROUTINE TEST CERTIFICATES FOR THE PARTICULAR BATCH.
- 3) MANUFACTURER MUST SUPPLY PROOF OF ACCELERATED LABORATORY AND LONG TERM FIELD USAGE TO CONFIRM THE ADEQUACY AND THE RETENTION OF THE NON TRACKING, EROSION AND WEATHER RESISTANT PROPERTIES WITHIN PERMISSIBLE LIMITS. THIS MUST BE AS PER RELEVANT STANDARDS.

G-2 JOINT INSULATING MATERIALS

THE INSULATING MATERIALS OF THE JOINT TYPES "A" AND "C" SHALL BE EITHER HEAT SHRINKABLE OR COLD SHRINKABLE MATERIAL.

FULL TECHNICAL DETAILS, MANUFACTURER'S LITERATURE AND TEST RESULTS OF INSULATING MATERIALS SHALL BE SUBMITTED WITH THE OFFER. THE HEAT SHRINKABLE PRODUCTS USED IN THE JOINT SHALL BE EITHER EXTRUDED OR MOULDED CROSS-LINKED POLYMERIC NON-TRACKING INSULATING MATERIAL, SUITABLE FOR USE WITH P.I.L.C. CABLES TO BS 6480 AND X.L.P.E. CABLES TO I.E.C. 502. SUITABLE MEANS OF PREVENTING THE INGRESS OF MOISTURE INTO THE LAYERS OF THE FERRULE INSULATION SHALL BE PROVIDED.

5.10 OTHER JOINTING MATERIALS

- A) THE JOINT KIT SHALL CONTAIN ALL THE NECESSARY MATERIALS AND ACCESSORIES TO COMPLETE THE JOINT.

B) THE MAIN JOINT KIT WILL ALSO CONTAIN THE FOLLOWING ITEMS SUFFICIENT TO COMPLETE THE JOINT.

- B-1 ONE BOX OF TISSUES NO LESS THAN 30 NOS. FOR CLEANING PURPOSE.
- B-2 100 ML. OF SUITABLE CLEANING AGENT OR EQUIVALENT CLEANING TISSUES FOR XLPE INSULATION.
- B-3 ALUMINUM OXIDE STRIP OR SIMILAR ABRASIVE STRIP.

B-4 PROTECTIVE 20 MM. WIDE COTTON TAPE SIMILAR TO B.I.C.C. 0515.

- C) WHERE THE JOINT CONTAINS PLUMBING METAL, IT SHALL BE TO BRITISH STANDARD GRADE "D" AND SUPPLIED IN APPROXIMATELY 500 GMS. STICKS. EACH STICK SHALL BE INDELIBLY BRANDED "MEW".
- D) THE MATERIALS SUPPLIED FOR INSULATING AND OTHER PURPOSES SHALL BE TO THE BEST OF THEIR KIND TO SUIT THE APPLICATION AND SHALL SATISFY THE REQUIREMENTS OF LATEST INTERNATIONAL STANDARDS NAMELY IEEE 48, BRITISH STANDARD SPECIFICATION, IEC AND GERMAN STANDARD VDE 0278.

5.11 FOR CABLE JOINT EMPLOYING COLD SHRINKABLE MATERIALS THE FOLLOWING TO BE ADHERED TO IN ADDITION TO THE ABOVE

- A) ALL THE COLD APPLIED COMPONENTS OF JOINT SHALL BE SILICONE BASED RUBBERS AND SHALL COMPLY WITH APPROPRIATE ELECTRICAL PERFORMANCE STANDARDS.
- B) THE TERM COLD SHRINK APPLIES TO MATERIALS, WHICH ARE CAPABLE OF SHRINKING WITHOUT RAISING THE TEMPERATURE ABOVE THE AMBIENT FOR THE MATERIALS OF ITS IMMEDIATE SURROUNDING.
- C) THE COLD APPLIED TUBES AND MOULDS SHALL SHRINK TO A PRE-DETERMINED SIZE. UPON RECOVERY JOINT BODIES SHALL SEAL THE ELECTRICAL CONNECTION AGAINST MOISTURE WITHOUT ANY ADDITIONAL COATING OR SEALOUT, THE COATING SEALANT OR COATING EXCLUDES ANY LUBRICANT USED TO FACILITATE THE APPLICATION OF THE JOINT BODY.
- D) THE TENDERER SHALL SUBMIT WITH HIS OFFER THAT THE JOINTS HAS BEEN TYPE TESTED GENERALLY TO BS 788, VDE 0278 AND EQUIVALENT INTERNATIONAL STANDARDS.
- E) COPY OF THE RELEVANT STANDARD AND THE TEST PROCEDURE SPECIFIED SHALL BE SUBMITTED WITH THE OFFER IN ADDITION TO THE COPY OF TYPE TEST CERTIFICATE ISSUED BY AN INTERNATIONALLY RECOGNIZED TESTING LABORATORY (ASTA/KEMA/CESI/CPRI).
- F) TENDERER SHALL SUBMIT WITH THEIR OFFER EVIDENCE THAT THEIR PROPOSED TECHNIQUE HAS BEEN EXTENSIVELY USED BY AN ESTABLISHED ELECTRICITY SUPPLY AUTHORITY. SUPPLY RECORD OF LAST (5) FIVE YEARS WITH SPECIFIC REFERENCE OF THE CLIENT SHALL BE SUBMITTED.
- G) TENDERER SHALL SUBMIT AS PART OF HIS OFFER KIT CONTENTS FOR EACH TYPE OF JOINTS OFFERED GIVING DETAILS SUCH AS LENGTH OF TUBING, THICKNESS BEFORE AND AFTER RECOVERY.
- H) EACH JOINT SHOULD BE SUPPLIED COMPLETE WITH ALL ACCESSORIES, CARDBOARD CARTON WITH THE TYPE OF JOINT, VOCAB NUMBER, NAME OF MANUFACTURER CLEARLY INDICATED ON LABEL. KIT CONTENTS WITH JOINTING INSTRUCTION FULLY ILLUSTRATED WITH SKETCH SHALL ALSO BE SUPPLIED.
- I) THE THREE CORE CABLE UNDERGROUND STRAIGHT THROUGH JOINT SHALL BE OF OUTER COLD SHRINK TUBE ENCAPSULATED TYPE USING COLD APPLIED STRESS AND INSULATION COMPONENTS FOR THE RE-INSULATION OF THE CONNECTOR AND STRESS CONTROL OF THE SEMI-CONDUCTING SCREEN REMOVAL POSITION OF POLYMERIC INSULATED CABLES.
- J) THE JOINT SHALL BE SUPPLIED COMPLETE WITH ARMOUR BONDS, CONNECTING FERRULES, CORE INSULATION / SCREENING / STRESS CONTROL COMPONENTS EARTH SCREEN CONTINUITY AND OUTER PROTECTION COLD SHRINK ONLY.

- K) ALL JOINTING FERRULES /CONNECTORS SHALL BE SUITABLE FOR HIGH VOLTAGE APPLICATION (REFER CLAUSE 2.9F).
- L) **THE OVERALL LENGTH OF THE CANISTER OF EACH TYPE OF JOINT SHALL BE AS FOLLOWS :-**
- L-1 TYPE "A" JOINT – 1400 MM
- L-2 TYPE "C" JOINT – 1500 MM
- M) THE COLD APPLIED RE-INSULATION AND SCREENING COMPONENTS SHALL WITHSTAND THE NORMAL OPERATING TEMPERATURE OF CONDUCTOR I.E.: 90° C AND SHALL NOT BE EFFECTED BY THE TEMPERATURE VARIATION RESULTING FROM CYCLIC LOADING OF THE CABLE OR FROM SHORT CIRCUIT.
- N) THE ARMOUR CONTINUITY SHALL BE PROVIDED BY MEANS OF A GALVANIZED STEEL CASE WITH CONTACT TO BE ACHIEVED BY THE USE OF PROPER GLANDS (REFER CLAUSE 5.9E).
- O) THE OUTER PROTECTION SHALL BE COLD SHRINK TUBES. THE OUTER JACKET SHALL PROVIDE MECHANICAL PROTECTION.

5.12 THE TENDERER SHALL STATE IN THE RELEVANT SCHEDULE, THE TOTAL QUANTITY OF JOINTING MATERIALS TO BE SUPPLIED FOR EACH JOINT.

FOR THE FOLLOWING ITEMS: WIPERS, CLEANING AGENT, ABRASIVE STRIPS, PROTECTIVE COTTON TAPES AND OTHER INSULATING OR SCREENING TAPES, AN EXTRA 20% OF OVER AND ABOVE THE ACTUAL QUANTITY WILL BE SUPPLIED TO ALLOW FOR WASTAGE. THE ADDITIONAL MATERIAL WILL BE INCLUDED IN THE MAIN JOINT KIT.

5.13 TYPE TESTS ON JOINTS AND JOINTING MATERIALS

- A) THE RESULTS OF MECHANICAL, ELECTRICAL, CHEMICAL AND OTHER TYPE TESTS CARRIED OUT BY THE MANUFACTURER FOR JOINT TYPES "A" AND "C" MUST BE SUBMITTED WITH THE OFFER. TYPE TEST CERTIFICATES CARRIED OUT AT AN INDEPENDENT INTERNATIONALLY APPROVED LABORATORY (ASTA/KEMA/CESI/CPRI) SHALL BE SUBMITTED AND THE TEST SHALL BE AS PER TEST PROCEDURE SPECIFIED BY THE TESTING AUTHORITY. THIS MUST INCLUDE THE FOLLOWING :
- | | | | |
|-----|---|-----------------------------|-----------------------------|
| A-1 | IMPACT TEST | | |
| A-2 | AC WITHSTAND VOLTAGE TEST | (1 MINUTE DRY - 28 KV) | AS PER VDE 0278 |
| A-3 | AC WITHSTAND VOLTAGE TEST | (1 MINUTE IN RAIN - 28 KV) | AS PER VDE 0278 |
| A-4 | PARTIAL DISCHARGE | | AS PER VDE 0278 |
| A-5 | LIGHTNING IMPULSE WITHSTAND | (BIL DRY - 95 KV) | AS PER IEC PUBLICATION 71-1 |
| A-6 | LOAD CYCLING 63 CYCLES 5 H/3 H TO RATED CABLE TEMP +50° C | | AS PER VDE 0278 |
| A-7 | HUMIDITY WITHSTAND (100 HRS IN SATURATED AIR) | | AS PER VDE 0278 |
| A-8 | DC VOLTAGE WITHSTAND (30 MINUTES AT 48 KV) | | AS PER VDE 0278 |

A-9 SHORT CIRCUIT
WITHSTAND

AS PER VDE 0278

FURTHER MORE IF THERE IS A CHANGE IN THE DESIGN OF THE MATERIAL ORIGINALLY OFFERED OR SUPPLIED EARLIER TO MEW, THEN NEW TYPE TEST CERTIFICATE FROM KEMA/ASTA/CESI /CPRI MUST BE SUPPLIED.

IDENTIFICATION OF KIT AS REQUIRED IN VDE 0278 AND OTHER RELEVANT SPECIFICATION SHALL BE PROVIDED.

THE ACCESSORIES SHALL CARRY THE MANUFACTURERS MARK OF ORIGIN AND THE FOLLOWING MUST BE INCLUDED

- I MARK OF ORIGIN.
- II CABLE FITTING SYMBOL.
- III RATED VOLTAGE.
- IV CONDUCTOR CROSS-SECTION RANGE.
- V IF STORAGE LIFE IS LIMITED THE STATEMENT “ USE BEFORE “ SHALL BE MADE.

- B) VISUAL AND DIMENSIONAL CHECKS ON SELECTED SAMPLES OF EACH BATCH OF JOINTS (NOT LESS THAN ONE JOINT OF EACH 50 JOINTS).
- C) TESTS SHOULD BE CARRIED OUT ON SAMPLES OF PLUMBING MATERIAL SELECTED FROM EACH BATCH (BUT NOT LESS THAN ONE SAMPLE OF EACH 400 STICKS AND ONE SAMPLE OF EACH 100 CONTAINERS).
- D) AS MANY TESTS AS IN THE OPTION OF THE PURCHASER'S REPRESENTATIVE AS POSSIBLE SHALL BE ARRANGED TOGETHER. THREE COPIES OF THE RECORDS OF ALL TESTS SHALL BE FURNISHED TO THE PURCHASER.

NOTE:

- 1) TESTS (B) TO (D) WILL BE WITNESSED BY OUR INSPECTORS AND ONLY UPON THEIR APPROVAL, SHOULD THE MATERIALS BE SHIPPED.
- 2) OFFERS SHALL BE ACCOMPANIED BY TYPE TEST CERTIFICATES AS STIPULATED IN 5.13 (A) ABOVE.
- 3) PRODUCT TESTING HAS RELEVANCE ONLY WHEN THE PRODUCT AS GENERALLY SUPPLIED BY THE MANUFACTURER IS TESTED AND NOT "SPECIALLY ASSEMBLED FOR TESTING" BY THE MANUFACTURER. IN CASE THE MANUFACTURER IS ARRANGING THE SUPPLY OF COMPONENTS FROM MORE THAN ONE SOURCE, THE TEST REPORT MUST REVEAL THE SOURCE OF SUPPLY OF THE COMPONENT IN THE KIT THAT WAS TESTED.
- 4) THE TIME FOR CARRYING OUT ANY REQUIRED TESTS OR CHECKS SHALL NOT DELAY THE DELIVERY SCHEDULES.

5.14 LICENSE

WHERE THE CONTRACTED MATERIALS ARE TO BE MANUFACTURED BY A COMPANY, WHO HAS A LICENSE FROM ANOTHER COMPANY, THE TENDERER SHOULD GET FROM HIS COMPANY WHO OWNS THE DESIGN, AN ASSURANCE ADDRESSED TO THE PURCHASER CONFIRMING THE SAFETY OF THE USED DESIGN. AT THE SAME TIME, THE OWNERS OF THE DESIGN ARE TO CONFIRM THAT THE PRODUCED MATERIALS TO BE IN GOOD CONDITION AND IN ACCORDANCE WITH THEIR DESIGN AND TO THE PURCHASER'S SPECIFICATION. IF THE JOINTS OFFERED ARE DESIGNED BY THE MANUFACTURER HIMSELF, THIS MUST BE CONFIRMED IN THE OFFER.

5.15 DELIVERY

JOINTS AND JOINTING MATERIALS SHALL BE DELIVERED INTO THE MINISTRY OF ELECTRICITY & WATER CENTRAL STORES AT SABHAN.

THE DELIVERY OF MATERIALS SHALL BE AS MENTIONED IN THE SCHEDULE OF DELIVERY. (SCHEDULE "C-1 & C-2"). TENDERERS ARE REMINDED WHEN FILLING SCHEDULES OF DELIVERY TO NOTE THE PENALTY CLAUSE FOR LATE DELIVERY AS GIVEN IN TENDER CONDITION.

5.16 GUARANTEE

THE TENDERER SHALL GUARANTEE THE JOINTS FOR A PERIOD OF TWELVE (12) CALENDAR MONTHS AFTER DELIVERY OF THE LAST CONSIGNMENT.

ALL MATERIALS AND EQUIPMENT'S SHALL COMPLY AS A MINIMUM WITH:-

- A) THE LATEST RELEVANT RECOMMENDATIONS OF THE INTERNATIONAL ELECTRO-TECHNICAL COMMISSION (I.E.C.) AND OTHER INTERNATIONAL STANDARDS INDICATED IN THIS SPECIFICATION.
- B) THIS APPLIES TO QUALITY OF MATERIAL AND TESTING, ETC., IF STANDARDS AS MENTIONED ABOVE CONTRADICT WITH THIS TENDER SPECIFICATIONS, THEN THE REQUIREMENTS OF THIS SPECIFICATION SHALL APPLY.

5.17 LETTER OF CAPACITY

THE TENDERER MUST SUBMIT WITH HIS OFFER SATISFACTORY EVIDENCE THAT THE MANUFACTURER WHOSE JOINTS HE IS OFFERING HAS MANUFACTURED AND SUPPLIED PREVIOUSLY TO OTHER CLIENTS SIMILAR TYPES OF JOINTS AND OF ABOUT THE SAME QUANTITY AS MENTIONED IN THIS TENDER DOCUMENT OVER A PERIOD OF NOT LESS THAN FIVE YEARS.

5.18 SAMPLE WITH OFFER

EACH TENDERER SHALL SUBMIT WITH HIS OFFER FREE OF CHARGE NON-RETURNABLE ONE COMPLETE JOINT OF EACH TYPE WITH ALL ACCESSORIES AND JOINTING INSTRUCTIONS.

5.19 FINAL SAMPLE

THE SUCCESSFUL TENDERER SHALL SUBMIT WITHIN ONE MONTH FROM THE DATE OF PURCHASE ORDER, ONE COMPLETE SAMPLE OF EACH TYPE OF JOINT, COMPLETE WITH ALL ACCESSORIES. ANY MODIFICATIONS REQUIRED BY MEW. AFTER CARRYING OUT TEST ON SAMPLE JOINT SHALL BE INCORPORATED. ONLY AFTER THIS FINAL SAMPLE IS APPROVED, SHOULD THE MANUFACTURE OF JOINTS COMMENCE.

5.20 TENDER ANALYSIS

THE MATERIALS IN THIS SPECIFICATION FOR THE SUPPLY OF 11 KV CABLE JOINTS EMPLOYING HEAT SHRINKABLE AND COLD SHRINKABLE MATERIALS ARE GROUPED ON THE BASIS OF JOINTING TECHNIQUE TO BE APPLIED. THE MATERIALS IN EACH GROUP ARE NOT SUB-DIVIDABLE . THE TENDERER MUST FURNISH THE OFFER FOR THE COMPLETE ITEMS OF THE INDIVIDUAL GROUP. THE TENDER WILL BE ANALYZED ON THE BASIS OF OFFER OF COMPLETE MATERIALS OF EACH GROUP.

5.21	Terms of Payment	2.21 شروط الدفع
	Confirming the delivery of the material in full and in good condition to MEW stores, the payment can be released against an invoice from the supplier	في حال إثبات تسليم جميع المواد لمخازن وزارة الكهرباء والماء بحالة جيدة تقوم الوزارة بدفع الفاتورة المقدمة من قبل المورد.
	a) payment on completion of supply of materials:	الدفع في حالة التسليم النهائي للمواد :
	On completion of supply of materials in the stores and accepted by MEW Engineer an invoice in triplicate shall be submitted to MEW for payment of the price schedule 'E'.	عند التسليم النهائي للمواد بالمخازن وبعد الموافقة عليها من قبل المهندس المسئول من وزارة الكهرباء والماء تقوم الشركة بتقديم شهادة دفع من ثلاث نسخ لوزارة الكهرباء والماء وتقوم الوزارة بدفع قيمة الشهادة المقدمة لجدول الأسعار (E) .
	Bank guarantee shall be released on completion of '1' Year guarantee period.	سوف يتم الإفراج عن الكفالة البنكية بعد انتهاء فترة الضمان (سنة واحدة) .
5.22	MANUFACTURERS REQUIREMENTS:	
	The contractors supply equipment only from manufacturers who has the following :	
A	THE MANUFACTURER MUST HAVE ISO 9001 CERTIFICATE. OR BETTER.	
B	MANUFACTURER'S MATERIALS SHOULD HAVE PASSED TEST BY AN INDEPENDENT INTERNATIONALLY APPROVED LABORATORY (ASTA / KEMA / CESI / cpri), RELEVANT CERTIFICATE TO BE PROVIDED TO MEW ALONG WITH THE OFFER. THE TEST CERTIFICATE SHOULD COMPLY WITH MEW SPECIFICATIONS	
C	MATCHING THE TECHNICAL SPECIFICATIONS WHICH ARE SHOWN IN SECTION NO.6.	
5.22.1	A	The contractor must submit a certificate from the manufacturer along with his offer stating commitment to the quantity and duration required to execute the subjected contract with manufacturers commitment to manufacture and supply.
	B	The offer, which is submitted without certificate from manufacturer, shall be rejected.
5.22.2	The priority in this tender should be for the local national product according to article no. 62 from CAPT public tender Law No. 49 of 2016 (And it's adjustments according to law no. (74) for the year 2019).	