



LIST OF MATERIALS

**Approved for Use on Systems of
SARAWAK ENERGY BERHAD**

DISCLAIMER

Every effort has been made to ensure the accuracy of this document. However, in case of discrepancies, records of Asset Engineering Division are the authoritative source.

PREFACE

This list supersedes all preceding issues including revisions. Revised sheets reflecting changes in the list will be issued quarterly and should be inserted in order to keep your copy up to date.

The items shown in this publication include material and equipment for distribution facilities. Items not listed include office equipment, tools and work equipment, items of electric general plant and consumer owned wiring facilities.

In addition to items accepted on a general basis, this list also includes items accepted on a conditional basis. As one of the conditions in the acceptance of an item on a conditional basis, suppliers are required to obtain the company's concurrence prior to its use.

Any supplier/manufacturer who desire to have their items placed on the list, or any user believing an existing item should be removed from the list, or any communication calling attention to an error or omission in the list, such as a wrong catalog number, an obsolete item, etc, should address to:

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1.0 SUBSTATION EQUIPMENT

1.1 Pillar

1.1.1 7W6F Distribution Pillar

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|------------------------------|---------------------------|
| Teknix Electrical & Electronic Sdn Bhd, Kuching | - | Malaysia |
| Spanners International, S'pore / Spanners Engineering, M'sia | - | Singapore / Malaysia |
| Tamco | - | Malaysia |

1.1.2 LV 4-Way Mini Pillar (DIN)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|------------------------------|---------------------------|
| Spanners International, S'pore / Spanners Engineering, M'sia | - | Singapore / Malaysia |
| Tamco | - | Malaysia |
| Sun System Eng. Sdn Bhd, M'sia | - | Malaysia |
| Teknix Electrical & Electronic Sdn Bhd, Kuching | - | Malaysia |
| Tenaga Kenari | - | Malaysia |
| Alaf Cekal Sdn Bhd | - | Malaysia |

1.2 RMU

1.2.1 11 kV Oil RMU

(Obsolete and any new RMU shall be SF6 insulated)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|------------------------------|---------------------------|
| CG Lucy | Trident | India |
| Lucy Switchgear FZE | Trident | Dubai, UAE |
| Lucy Switchgear | Trident | U.K. |

1.2.2 11 kV SF6 RMU

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|------------------------------|---------------------------|
| ⁽¹⁾ Schneider Electric (M) Sdn Bhd, Selangor | RM6 | France & Malaysia |
| ⁽¹⁾ Note: (a) Model with rated voltage of 13.8 kV shall be supplied in order to achieve the required BIL (b) Gas tank shall be manufactured by Schneider (France) (c) Restricted to indoor substations (with enclosure) and compact substations (d) Screened type separable connectors shall be used for the connection to the cables. | | |
| ⁽²⁾ Tamco | GR1 | Malaysia |

| | | |
|--|-----------------------|-----------------------|
| (2) Note: | | |
| (a) Stainless steel gas tank and internal arc explosion valve shall be provided. | | |
| (b) Restricted to 2 models, ie. GR1-21 & GR1-31. | | |
| ⁽³⁾ Lucy Switchgear | 15.5 kV SF6 RMU Sabre | Dubai, UAE & Malaysia |
| (3) Note: | | |
| (a) Only accept 15.5 kV RMU instead of 12 kV RMU for achieving 95kV BIL. | | |
| (b) Dual ratio CT (100/50/5) shall be provided in order to cater for transformer size ranging from 200 kVA to 1500 kVA. | | |
| (c) Voltage indicator and temperature compensated pressure gauge shall be provided. | | |
| (d) For Malaysia factory, the RMU shall be manufactured by Sun Systems Engineering(SSE) under license by Lucy Switchgear | | |
| ⁽⁴⁾ Cooper Edison (Pingdingshan) Electronic Technologies Co. Ltd | RVAC | China |
| (4) Note: | | |
| (a) Approved modules are: | | |
| i. 11kV SF6 RMU, Non-Extensible (Type KKT) | | |
| ii. 11kV SF6 RMU, Extensible (Type KKT with side extension options on K panels) | | |
| iii. 11kV SF6 Ring Switch, Extensible (Type K) | | |
| iv. 11kV SF6 Switch-fuse, Extensible (Type T) | | |
| ⁽⁵⁾ EPE Switchgear Sdn Bd | EPE Series | Malaysia |
| Note: | | |
| (b) Approved modules are: | | |
| i. 12kV SF6 RMU, Load Break Switch Module | | |
| ii. 12kV SF6 RMU, Fuse Switch Module | | |
| iii. 12kV SF6 RMU, 2 x LBS + 1 FS | | |
| iv. The product can be used for both indoor and outdoor (with enclosure). | | |

1.3 Switchgear

1.3.1 11 kV AIS Switchgear

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------------|---------------------------|------------------------|
| Siemens (Partial GIS) | NX PLUS-C | Germany/China |
| ABB | Unigear ZS Series | Malaysia |
| Tamco | VHIH | Malaysia |
| Xiamen Huadian Switchgear Co Ltd | Gelpag AMS Series | China |
| Toshiba | HV12 | Malaysia |

1.3.2 33 kV GIS Switchgear

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--------------|---------------------------|------------------------|
| Siemens | 8D Series | Germany/China |
| ABB | ZX Series | Germany/ Malaysia |
| Schneider | WS Series | Germany/ Malaysia |
| Tamco | GV3 | Malaysia |

1.4 Transformer

1.4.1 11/433 kV Distribution Transformer

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|------------------------------|---------------------------|
| ABB | - | Singapore |
| Hitachi Energy Vietnam Company Limited | - | Vietnam |
| AICHI | - | Japan |
| SGB Malaysia | - | Malaysia |
| Charoenchai | - | Thailand |
| Ekarat | - | Thailand |
| Emo Ohrid | - | Yugoslavia |
| EWT | - | Malaysia |
| MTM | - | Malaysia |
| SESCO-Efacec | - | Malaysia |
| South Wales | - | U.K. |
| Thai Trafo | - | Thailand |
| Toshiba | - | Japan |
| Tirathai | - | Thailand |
| Shihlin | - | Taiwan/ Vietnam |
| B&D | - | Indonesia |
| Toshiba Transmission & Distribution Systems | - | India |
| Remarks: Standard Ratings: 1 phase – 25kVA & 50kVA (11/.250kV) 3 phase – 50kVA, 160kVA, 300kVA, 500kVA, 1000kVA, 1500kVA | | |

1.4.2 33/433 kV Distribution Transformer

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|------------------------------|---------------------------|
| ABB | - | Singapore / Australia |
| Hitachi Energy Vietnam Company Limited | - | Vietnam |
| AICHI | - | Japan |
| SGB Malaysia | - | Malaysia |
| Charoenchai | - | Thailand |
| Ekarat | - | Thailand |
| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
| MTM | - | Malaysia |
| EWT | - | Malaysia |
| Tirathai | - | Thailand |
| Shihlin | - | Taiwan |
| Toshiba Transmission & Distribution Systems | - | India |
| Remarks: Standard Ratings: 50kVA, 160kVA, 300kVA, 500kVA, 1000kVA | | |

1.4.3 33/11 kV Distribution Transformer

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| ABB | - | Australia / Singapore |
| Hitachi Energy Vietnam Company Limited | - | Vietnam |
| Charoenchai | Up to 2.5 MVA | Thailand |
| Ekarat | Up to 1 MVA | Thailand |
| MTM | - | Malaysia |
| Tirathai | - | Thailand |
| EWT | Up to 2.5 MVA | Malaysia |
| Shihlin | - | Taiwan |
| Tatung | - | Taiwan |
| Remarks: Standard Ratings: 1 MVA, 2.5 MVA, 5 MVA | | |

1.4.4 33/11 kV ONAN / ONAF Power Transformer c/w OLTC

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|---|
| ALSTOM | - | Turkey |
| ABB | - | Australia / Sweden/ Turkey/ Thailand |
| Hitachi Energy Vietnam Company Limited | - | Vietnam |
| AICHI | - | Japan |
| Daihen | - | Thailand |
| MTM | - | Malaysia |
| Tirathai | - | Thailand |
| Meidensha/Hitachi/Fuji | - | Japan |
| Mitsubishi/Toshiba | - | Japan |
| Takaoka | - | Japan |
| SGB | - | Germany |
| Efacec | - | Portugal |
| Areva | - | Turkey |
| BEST | - | Turkey |
| Hyundai | - | Korea |
| New Korea | - | Korea |
| Xian | - | China |
| Koncar | - | Croatia |
| Shihlin | - | Taiwan |
| Tatung | - | Taiwan |
| PT Elsewedy Electric | - | Indonesia |
| Remarks: Standard Ratings: 5MVA, 10/15 MVA, 20/25 MVA | | |

1.5 **Neutral Earthing Resistor (NER)**

1.5.1 11kV Neutral Earthing Resistor (NER)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-------------------------|--|-----------------------------------|
| Any Ohm Sdn. Bhd. | AO1116/ AO1108 | Malaysia |
| Pestech Sdn Bhd | RES | Malaysia |
| M.S. Resistances S.A.S. | 11kV-1600A-4 Ohm- 10 Sec/ 11kV-800A-8 Ohm-10 Sec | France |
| HEINE Resistors GmbH | EWD Series | Germany |

2.0 UNDERGROUND EQUIPMENT

2.1 Termination Kits

2.1.1 LV Termination Kit, Indoor/Outdoor

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------|--------------------------------------|-----------------------------------|
| Sucofit/Tyco | Heat Shrink | Switzerland |
| Raychem/Tyco | Heat Shrink | U.S.A./ Germany |
| Cellpack | Heat Shrink | Switzerland/ Germany |
| Nexans | Heat Shrink | Italy |
| Changyuan Group (CYG) | Heat Shrink | China |
| 3M | Heat Shrink | India |
| Hongshang Heat Shrinkable | Heat Shrink | China |
| Gala Shrink Fit | Heat Shrink | India |

2.1.2 11 kV Termination Kit, Indoor/Outdoor

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Cellpack | Hybrid Heat- Shrinkable | Switzerland/ Germany |
| Sucofit/Tyco | Heat Shrink | Switzerland |
| Raychem/Tyco | Heat Shrink | U.S.A./ Germany |
| 3M | Cold Shrink | Malaysia |
| Nexans | Heat Shrink | Italy |
| Nexans | Cold Shrink | France |
| Prysmian | Cold Shrink | France |
| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
| Changyuan Group (CYG) | Heat Shrink | China |
| Changyuan Group (CYG) | Cold Shrink | China |
| NKT HV Cables AB | Premoulded (Slip On) | Sweden |
| Behr Bircher Cellpack BBC Malaysia Sdn Bhd | Slip On (CAE) | Malaysia |

2.1.3 33 kV Termination Kit, Indoor/Outdoor

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------|--------------------------------------|-----------------------------------|
| Raychem/Tyco | Heat Shrink | U.S.A./ Germany |
| 3M | Cold Shrink | Malaysia |
| Cellpack | Hybrid Heat- Shrinkable | Switzerland/ Germany |
| Nexans | Heat Shrink | Italy |
| Prysmian | Cold Shrink | France |
| Changyuan Group (CYG) | Cold Shrink | China |
| NKT HV Cables AB | Premoulded (Slip On) | Sweden |

2.1.4 11/33 kV Straight Through and Transition Joint Kits

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--|-----------------------------------|
| Raychem/Tyco | Heat Shrink | U.S.A./ Germany |
| Cellpack | Resin/Tapping | Switzerland/ Germany |
| ⁽¹⁾ ABB Kabeldon | Resin/Tapping | Sweden |
| ⁽¹⁾ Note: Only accept ABB Kabeldon GHL 1500 two-component polyurethane based resin complete with approved type fibre box. | | |
| 3M | Cold Shrink (Premoulded with Resin)/Tape-Resin | Malaysia |
| Cellpack | Hybrid Heat- Shrinkable | Switzerland/ Germany |
| Nexans | Heat Shrink | Italy |
| ⁽²⁾ Nexans | Cold Shrink | France |
| Prysmian | Cold Shrink | France |
| ⁽³⁾ Changyuan Group (CYG) | Heat Shrink | China |
| Changyuan Group (CYG) | Cold Shrink | China |
| ⁽⁴⁾ Behr Bircher Cellpack BBC Malaysia Sdn Bhd | Slip On (CAMSV) | Malaysia |
| ^(2,3,4) Note: Only for 11kV. | | |

2.1.5 11kV Separable connector

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| Cooper Electronic Technology Shanghai Co. | DTS*, DTB* & DT400 | China |
| Cellpack | - | Malaysia |
| Nexans - Euromold | - | Belgium |
| CYG | CJB10-630 & CJB10-200 | China |
| Raychem/Tyco | RSTI | Germany |
| NKT GmbH | - | Germany |

2.1.6 Plug In Termination for 33kV GIS

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------------|--------------------------------------|-----------------------------------|
| Pfisterer | - | Germany/Italy |
| Sudkabel | - | Germany |
| NKT GmbH | - | Germany |
| Tyco Electronics Raychem GmbH | - | Germany |

2.2 **Underground Cable**

2.2.1 LV XLPE Cable

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Central Cable (M) Bhd, Melaka. | - | Malaysia |
| Fujikura Federal Cables Sdn Bhd | - | Malaysia |
| FEC Cables (M) Sdn Bhd, Selangor | - | Malaysia |
| Olympic Cable Co. Sdn Bhd, Melaka | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| Universal Cable (S) Sdn Bhd/ Sarawak Cable Sdn Bhd | - | Malaysia |
| Wonderful Wire & Cable Bhd, Johor | - | Malaysia |
| Mitti Power Cables Sdn. Bhd, Johor | - | Malaysia |
| Leader Cable Industry Bhd | - | Malaysia |
| Tai Sin Electric Cables (M) Sdn Bhd | - | Malaysia |
| Southern Cable | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Mega Kabel Sdn Bhd | - | Malaysia |
| Master Tec Wire & Cable Sdn Bhd | - | Malaysia |
| Draka (Malaysia) Sdn. Bhd. | - | Malaysia |
| Hi-Essence Cable Sdn. Bhd. | - | Malaysia |

| | | |
|----------------------|---|----------|
| Tonn Cable Sdn. Bhd. | - | Malaysia |
|----------------------|---|----------|

2.2.2 11 kV XLPE Cable

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|--------------------------------------|-----------------------------------|
| Central Cable (M) Bhd, Melaka. | - | Malaysia |
| Federal Power Sdn Bhd, Selangor | - | Malaysia |
| Fujikura Federal Cables Sdn Bhd | - | Malaysia |
| FEC Cables (M) Sdn Bhd, Selangor | - | Malaysia |
| Leader Cable Industry Bhd, Penang | - | Malaysia |
| Olympic Cable Co. Sdn Bhd, Melaka | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Tenaga Cable Industries Sdn Bhd | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| PT VOKSEL Electric Tbk | - | Indonesia |
| Southern Cable | - | Malaysia |
| Hi-Essence Cable Sdn. Bhd. | - | Malaysia |

2.2.3 33 kV XLPE Cable

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|--------------------------------------|-----------------------------------|
| Central Cable (M) Bhd, Melaka | - | Malaysia |
| Federal Power Sdn. Bhd, Selangor | - | Malaysia |
| Fujikura Federal Cables Sdn Bhd | - | Malaysia |
| FEC Cables (M) Sdn Bhd, Selangor | - | Malaysia |
| Leader Cable Industry Bhd, Penang | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Olympic Cable Co. Sdn Bhd | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| Southern Cable | - | Malaysia |
| Tenaga Cable Industries Sdn Bhd | - | Malaysia |
| Hi-Essence Cable Sdn. Bhd. | - | Malaysia |

2.2.4 11 kV and 33 kV Submarine Cable

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| LS Cable | - | Korea |
| Sumitomo Electric Industries (SEI) | - | Japan |
| OLEX Australia Pty Ltd | - | Australia |
| SWCC Showa Cable Systems Co., Ltd | - | Japan |
| Leader Cable Industry Bhd, Penang | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Zhongtian Technology Submarine Cable Co. Ltd | - | China |
| Hengtong Optic-Electric Co. Ltd | - | China |
| LS HongQi Cable & System | - | China |
| Taihan Electric Wire Co., Ltd. | - | Korea |

2.3 Link Boxes

2.3.1 Earth Link Box up to 33kV

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| AK POWER SOLUTION | - | Australia |
| Evergrow Electrical Engineering Sdn Bhd | - | Malaysia |
| ⁽¹⁾ Team Force Engineering | - | Malaysia |
| ⁽¹⁾ Note: Approved for ground-mounted link box only. | | |
| Pfisterer | - | Italy |

3.0 OVERHEAD EQUIPMENT

3.1 ABI and Switches

3.1.1 11 kV 400A 3-Phase Outdoor ABI Switch (On Load/Off Load)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------|--------------------------------------|-----------------------------------|
| ABB | R3808D | Australia |
| Lucy Switchgear | Rapier RX | Dubai |
| S & C | Alduti Rupter | Canada |
| Lucy Switchgear | Rapier AX | Dubai |
| AB GEVEA | GEVEA | Sweden |
| S&C Electric Company | Omni-Rupter | China |
| ABB | NPS | Poland |

3.1.2 33 kV 400A 3-Phase Outdoor ABI Switch (On Load/Off Load)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| ABB | R10508D-P | Australia |
| Lucy Switchgear | Rapier RX | Dubai |
| S & C | Alduti Rupter | Canada |
| AB GEVEA | GEVEA | Sweden |
| ABB | NPS | Poland |

3.2 Conductor

3.2.1 Simalec Conductor (AAAC)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Consolidated Cable | - | Malaysia |
| Federal Power Sdn Bhd, Selangor | - | Malaysia |
| Fujikura Federal Cables Sdn Bhd | - | Malaysia |
| Tenaga Cable Industries Sdn Bhd | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| Universal Cable (S) Sdn Bhd/ Sarawak Cable Sdn Bhd | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Southern Cable | - | Malaysia |
| Leader Cable Industry Bhd, Penang | - | Malaysia |
| Central Cable (M) Bhd, Melaka | - | Malaysia |

3.2.2 HV Aerial Bundle Cable

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|--------------------------------------|-----------------------------------|
| Central Cable (M) Bhd, Melaka. | - | Malaysia |
| Federal Power Sdn Bhd, Selangor | - | Malaysia |
| Fujikura Federal Cables Sdn Bhd | - | Malaysia |
| FEC Cables (M) Sdn Bhd | - | Malaysia |
| Leader Cable Industry Bhd, Penang | - | Malaysia |
| Olympic Cable Co Sdn Bhd, Melaka | - | Malaysia |
| Tenaga Cable Industries Sdn Bhd | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Southern Cable | - | Malaysia |

3.2.3 LV Aerial Bundled Cable

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|--------------------------------------|-----------------------------------|
| Central Cable (M) Bhd, Melaka. | - | Malaysia |
| Federal Power Sdn Bhd, Selangor | - | Malaysia |
| Fujikura Federal Cables Sdn Bhd | - | Malaysia |
| FEC Cables (M) Sdn Bhd | - | Malaysia |
| Leader Cable Industry Bhd, Penang | - | Malaysia |
| Olympic Cable Co Sdn Bhd, Melaka | - | Malaysia |
| Tenaga Cable Industries Sdn Bhd | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Southern Cable | - | Malaysia |
| Master Tec Wire & Cable Sdn Bhd | - | Malaysia |
| Hi-Essence Cable Sdn. Bhd. | - | Malaysia |
| Tonn Cable Sdn. Bhd. | - | Malaysia |

3.2.4 LV PVC Covered Aluminium Conductor

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Central Cable (M) Bhd, Melaka. | - | Malaysia |
| Universal Cable (M) Sdn Bhd, Johor | - | Malaysia |
| Universal Cable (S) Sdn Bhd/ Sarawak Cable Sdn Bhd | - | Malaysia |
| Leader Cable Industry Sdn Bhd, Penang | - | Malaysia |
| Olympic Cable Co Sdn Bhd, Melaka | - | Malaysia |
| Tai Sin Electric Cables (M) Sdn Bhd | - | Malaysia |
| Power Cables Malaysia Sdn Bhd | - | Malaysia |
| Southern Cable | - | Malaysia |
| Master Tec Wire & Cable Sdn Bhd | - | Malaysia |
| Hi-Essence Cable Sdn. Bhd. | - | Malaysia |
| Tonn Cable Sdn. Bhd. | - | Malaysia |

3.3 **EDO or ABFI**

3.3.1 11 kV ABFI 100A 150 MVA with Arc Shortening Rod

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-------------------------|--------------------------------------|-----------------------------------|
| ABB | Series V, P/No.7502523 | Australia |
| ABB | ICX 27 kV Interchangeable | USA/China |
| Joongwon Electric Corp. | J&W 80442 | Korea |
| S&C Electric Company | Type XS | U.S.A./China |

| | | |
|--|-----------|----------|
| Gunkul Engineering Public Company Limited | FC2710012 | Thailand |
| Cooper Electronics Technologies (Shanghai) Co. Ltd | L9CAP1A | China |

3.3.2 33 kV ABFI 100A 150 MVA with Arc Shortening Rod

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|---------------------------|------------------------|
| ABB | Series V, P/No.7502520 | Australia |
| ABB | ICX 38 kV Interchangeable | USA/China |
| Joongwon Electric Corporation | J&W 80445 | Korea |
| S&C Electric Company | Type XS | U.S.A./China |
| Gunkul Engineering Public Company Limited | FC3810010 | Thailand |
| Cooper Electronics Technologies (Shanghai) Co. Ltd | L9EAP1A | China |

3.4 Insulator

3.4.1 11 kV Pin Insulator, Brown, Glazed

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|---------------------------|------------------------|
| NGK | HRAA-168N | Japan |
| ⁽¹⁾ TE Connectivity | - | China |
| ⁽²⁾ Dalian Insulator (Fujian) Co. Ltd | DK10023 | China |
| ⁽¹⁾⁽²⁾ Note: Tracking number (TP No.) is required before production and each batch of insulators shall be subjected to FAT. | | |

3.4.2 33 kV Pin Insulator, Brown, Glazed

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|---------------------------|------------------------|
| NGK | HRAA-302Q | Japan |
| ⁽¹⁾ TE Connectivity | - | China |
| ⁽²⁾ Dalian Insulator (Fujian) Co. Ltd | DK10025 | China |
| ⁽¹⁾⁽²⁾ Note: Tracking number (TP No.) is required before production and each batch of insulators shall be subjected to FAT. | | |

3.4.3 Shackle/Spool Insulator

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|------------------------------|---------------------------|
| Dalian Ceramic Technic Co Ltd | CTC | China |
| TE Connectivity | - | China |
| Fujian Hoshing Proper Electrical Porcelain Co Ltd | - | China |
| Bonle Mingqing | - | China |

3.4.4 Suspension Insulator

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|-------------------------------|---------------------------|
| ⁽¹⁾ Dalian Porcelain Insulator Works | XP-70 (52-3) | China |
| NGK | Cat.No.CA-515BB | Japan |
| NGK | Cat.No.CA-515BB & CA-515B7 | China |
| ⁽²⁾ TE Connectivity | - | China |
| ⁽³⁾ Suzhou Porcelain Insulator Works Co Ltd | - | China |
| ⁽⁴⁾ Dalian Insulator (Fujian) Co. Ltd | XP-70 | China |
| ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾ Note: Tracking number (TP No.) is required before production and each batch of insulators shall be subjected to FAT. | | |

3.4.5 Stay Insulator

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|------------------------------|---------------------------|
| Dalian Insulator Co | - | China |
| Dalian Ceramic Technic Co Ltd | - | China |
| TE Connectivity | - | China |
| Fujian Hoshing Proper Electrical Porcelain Co Ltd | - | China |
| Bonle Mingqing | - | China |

3.4.6 33 kV Pin Post Insulator (200kV BIL)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|------------------------------|---------------------------|
| NGK | - | Japan |
| ⁽¹⁾ Suzhou Porcelain Insulator Works Co. Ltd. | - | China |
| ⁽²⁾ Dalian Insulator (Fujian) Co. Ltd | - | China |
| ⁽¹⁾⁽²⁾ Note: Tracking number (TP No.) is required before production and each batch of insulators shall be subjected to FAT. | | |

3.5 Overhead Connectors

3.5.1 Aluminium PG Clamp

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| Karl Pfisterer Stuttgart | - | Germany |
| Max Hellstern GmbH | - | Germany |
| Yongjiu Electric Power Fitting Co Ltd | - | China |
| SICAME | - | China |

3.5.2 Bi-metal PG Clamp

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| Karl Pfisterer Stuttgart | - | Germany |
| Max Hellstern GmbH | - | Germany |
| Yongjiu Electric Power Fitting Co Ltd | - | China |

3.5.3 Insulation Piercing Connector

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------|--------------------------------------|-----------------------------------|
| Karl Pfisterer Stuttgart | - | Germany |
| Max Hellstern GmbH (Tyco) | - | Germany |
| ENSTO | - | Finland |
| SICAME | - | France |
| Simel (Tyco) | - | France |
| Michaud | - | France |

3.5.4 Insulating Shroud suitable for PG Clamp

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| Karl Pfisterer Stuttgart | SP8 (Model 499-999- 200) | Germany |
| ENSTO | SP 16 | Finland |
| Wenhong Plastic Industry Sdn Bhd | - | Malaysia |
| Yongjiu Electric Power Fitting Co Ltd | - | China |

3.6 Poles

3.6.1 Concrete Pole

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| PMW Concrete Industries Sdn Bhd, Perak | - | Malaysia |
| Smart Crete Sdn Bhd, Sarawak | - | Malaysia |
| Binaan Desjaya Sdn Bhd | For LV 9 meter pole only | Malaysia |
| PMW Industries (Sarawak) Sdn Bhd | - | Malaysia |

3.6.2 Steel Poles

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Sarwaja Timur Sdn Bhd | - | Malaysia |
| KKB Engineering Bhd | - | Malaysia |
| Segenting Bersatu Sdn Bhd | - | Malaysia |
| Yixing Futao Metal Structure Unit Co Ltd | - | China |

3.7 Street Lighting and Accessories

3.7.1 SON Ballast, 70W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------------|--------------------------------------|-----------------------------------|
| Philips (M) | BSN 70W | Malaysia |
| SE Everlast Sdn Bhd | SONLL 70W (LL-Low Loss) | Malaysia |
| SOLEX | DLS 70 | Malaysia |
| Nikkon | HPS 70W | Malaysia |
| Amat Sinar Sdn Bhd | ASL 70S | Malaysia |
| Tridonic | OGLIS 70W | South Africa |
| ATCO | - | Australia |
| REFAS | RB70HS4A-P | Malaysia |
| ELT | VSI 7/22 3TG | Spain |
| Muarlite Industries Sdn Bhd | MLSL (B) 70W | Malaysia |

3.7.2 SON Ballast, 100W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| Nikkon | HPS/MH 100W | Malaysia |
| Amat Sinar Sdn Bhd | ASL 100S | Malaysia |
| ELT | VSI 10/22-3T-G | Spain |
| REFAS | RB100HS4A-PF | Malaysia |

| | | |
|-----------------------------|------------|----------|
| Muarlite Industries Sdn Bhd | SURIA 100W | Malaysia |
|-----------------------------|------------|----------|

3.7.3 SON Ballast, 150W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------------|--------------------------------------|-----------------------------------|
| SE Everlast Sdn Bhd | SONLL 150W (LL-Low Loss) | Malaysia |
| SOLEX | DLS 150 | Malaysia |
| ATCO | OSM 150.00 | Australia |
| Nikkon | HPS 150W | Malaysia |
| Philip (M) | BSN 150W | Malaysia |
| Amat Sinar Sdn Bhd | ASL 150S | Malaysia |
| Tridonic | OGLIS 150W | South Africa |
| REFAS | RB150HS4A-P | Malaysia |
| ELT | VSI 15 3TG SC | Spain |
| Muarlite Industries Sdn Bhd | MLSL (B) 150W | Malaysia |

3.7.4 SON Ballast, 250W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------------|--------------------------------------|-----------------------------------|
| Philip (M) | BSN 250W | Malaysia |
| SE Everlast Sdn Bhd | SONLL 250W (LL-Low Loss) | Malaysia |
| SOLEX | DLS 250 | Malaysia |
| Nikkon | HPS 250W | Malaysia |
| Amat Sinar Sdn Bhd | ASL 250S | Malaysia |
| Tridonic | OGLIS 250W | South Africa |
| ATCO | OG250 | Australia |
| REFAS | RB250HS4A-P | Malaysia |
| ELT | VSI 25/22 3TG | Spain |
| Muarlite Industries Sdn Bhd | SURIA 250W | Malaysia |

3.7.5 SON Lamp, 70W with Built-in Ignitor

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| OSRAM | NAV-E 70W/I | Germany |
| PHILIPS | SON-E 70W/I | China |
| EYE Iwasaki | NH 70F/I | Japan |

3.7.6 SON Lamp, 150W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| OSRAM | NAV-T 150W | Germany |
| OSRAM | NAV-T 150W | China |
| PHILIPS | SON-T 150W | China |
| EYE Iwasaki | NHT 150 | Japan |

3.7.7 SON Lamp, 250W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| OSRAM | NAV-T 250W | Germany |
| OSRAM | NAV-T 250W | China |
| PHILIPS | SON-T 250W | China |
| EYE Iwasaki | NHT 250 | Japan |

3.7.8 SON Ignitor

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------------|--------------------------------------|-----------------------------------|
| Amat Sinar Sdn Bhd | S1-2P/ASL SI-SP | Malaysia |
| BAG Turgi Electronic | Type N1 400NE | Switzerland |
| EVERLAST | SN1540C-T 70-400W | Malaysia |
| PHILIPS | SU-70400L | Belgium |
| THORN | ZRM4 5ES/B2-02 | Australia |
| REFAS by EITA Tech | FCD-G400t ₂ | Malaysia |
| NIKKON | SP9008T | Malaysia |
| ELT | AVS 400D | Spain |
| Muarlite Industries Sdn Bhd | MIG 14 (100-400W) | Malaysia |

3.7.9 SON Lantern, 70W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------------|--------------------------------------|-----------------------------------|
| Amat Sinar Sdn Bhd | ASL AL 70W ASL-C20 70W | Malaysia |
| SCHREDER | Z1 | Malaysia |
| NIKKON | S419-150/70W | Malaysia |
| Primelux Energy Sdn Bhd | CS5 | Malaysia |
| Muarlite Industries Sdn Bhd | MIL 7-70W | Malaysia |
| Gruppe Lighting Solution Sdn Bhd | Arro1 | Malaysia |

3.7.10 SON Lantern, 100W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------------|--------------------------------------|-----------------------------------|
| Amat Sinar Sdn Bhd | ASL-C22 100W | Malaysia |
| SCHREDER | Z1 | Malaysia |
| NIKKON | S419-150/100W | Malaysia |
| Muarlite Industries Sdn Bhd | MIL 10-100W | Malaysia |
| Gruppe Lighting Solution Sdn Bhd | Arro1 | Malaysia |

3.7.11 SON Lantern, 150W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|---|-----------------------------------|
| Amat Sinar Sdn Bhd | ASL AL 150W ASL-C22-150W ASL-C20 150W | Malaysia |
| SCHREDER | Z2 | Malaysia |
| NIKKON | S419-150W | Malaysia |
| ⁽¹⁾ THORN Lighting (Tianjin) Co Ltd | Alpha 2000 (150W) | China |
| ⁽¹⁾ Note: The THORN Street Lighting Lantern shall incorporate a detachable point for unplugging and a set of appropriate control fuse for maintenance and safety purposes. | | |
| Philips | Smartway | Malaysia |
| Primelux Energy Sdn Bhd | CS7 | Malaysia |
| Muarlite Industries Sdn Bhd | MIL 15-150W | Malaysia |
| Oversea Lighting & Electric (M) Sdn Bhd | BMS-80 150W | Malaysia |
| Gruppe Lighting Solution Sdn Bhd | Arro1 | Malaysia |
| Ekoten Sdn. Bhd. | SL020 | Malaysia |

3.7.12 SON Lantern, 250W

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|---|-----------------------------------|
| Amat Sinar Sdn Bhd | ASL AL 250W ASL-C21-250W ASL-C34 250W | Malaysia |
| SCHREDER | Z2 | Malaysia |
| NIKKON | S419-250W | Malaysia |
| ⁽¹⁾ THORN Lighting (Tianjin) Co Ltd | Alpha 2000 (250W) | China |
| ⁽¹⁾ Note: The THORN Street Lighting Lantern shall incorporate a detachable point for unplugging and a set of appropriate control fuse for maintenance and safety purposes. | | |
| Philips | Smartway | Malaysia |
| Primelux Energy Sdn Bhd | CYGNUS P2 | Malaysia |
| Muarlite Industries Sdn Bhd | MAL 16-250W | Malaysia |
| Oversea Lighting & Electric (M) Sdn Bhd | BMS-80 250W | Malaysia |
| Gruppe Lighting Solution Sdn Bhd | Arro1 | Malaysia |

3.7.13 Street Lighting Bracket

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------|--------------------------------------|-----------------------------------|
| GVE Metal Sdn Bhd, Kuching | - | Malaysia |

| | | |
|---|---|----------|
| Sarwaja Timur Sdn Bhd | - | Malaysia |
| KKB Engineering Bhd | - | Malaysia |
| Segenting Bersatu Sdn Bhd | - | Malaysia |
| Yixing Futao Metal Structure Unit Co. Ltd | - | China |

3.7.14 Street Lighting Column

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Sarwaja Timur Sdn Bhd | - | Malaysia |
| KKB Engineering Bhd | - | Malaysia |
| Lysaght Galvanised Steel Bhd | - | Malaysia |
| Galvapole Industries Sdn Bhd | - | Malaysia |
| Segenting Bersatu Sdn Bhd | - | Malaysia |
| Yixing Futao Metal Structure Unit Co. Ltd | - | China |
| Oversea Lighting & Electric (M) Sdn Bhd | - | Malaysia |

3.7.15 70W-80W LED Street Lighting

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--|-----------------------------------|
| Success Electronic & Transformer Manufacturer Sdn. Bhd. | Nikkon LEDXION S433 | Malaysia |
| Osram China Lighting Ltd. | Simplitz Mini | China |
| Oversea Lighting & Electric (M) Sdn Bhd | DURA ST90 80W | Malaysia |
| Gruppe Lighting Solution Sdn Bhd | PERCORSO II Series | Malaysia |
| ELM Lighting Sdn Bhd | LEDioc/SL-EY686-1-75W-WD LEDioc/SL-EY686-2-80W-MD | Malaysia |

3.7.16 120W-130W LED Street Lighting

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Success Electronic & Transformer Manufacturer Sdn. Bhd. | Nikkon LEDXION S433 | Malaysia |
| Osram China Lighting Ltd. | Simplitz Midi | China |
| Oversea Lighting & Electric (M) Sdn Bhd | DURA ST120 120W | Malaysia |
| Gruppe Lighting Solution Sdn Bhd | PERCORSO II Series | Malaysia |
| NexusLED Green Technology Sdn. Bhd. | SLK-120-FPN6 | Malaysia |
| ELM Lighting Sdn Bhd | LEDioc/SL-EY686-2-120W-MD | Malaysia |

3.8 Surge or Lightning Arrester

3.8.1 11 kV Lightning Arrester, 12 kV, 10 kA

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------------|------------------------------|---------------------------|
| ABB | - | Switzerland |
| Eaton Cooper Power System | - | Mexico |
| HUBBEL/OHIO BRASS | - | U.S.A./China (Wuhu) |
| ISOELECTRIC | - | Italy |
| DTR Corporation | - | Korea |
| Tridelta | - | Germany |
| Siemens Surge Arresters Ltd | 3EK8 type 120 | China |

3.8.2 33 kV Lightning Arrester, 36 kV, 10 kA

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------------------|------------------------------|---------------------------|
| ABB | - | Switzerland |
| Eaton Cooper Power System | - | Mexico |
| HUBBEL/OHIO BRASS | - | U.S.A./China (Wuhu) |
| ISOELECTRIC | - | Italy |
| DTR Corporation | - | Korea |
| Tridelta | - | Germany |
| Siemens Surge Arresters Ltd | 3EK8 type 360 | China |

3.9 Auto Recloser

3.9.1 Auto Recloser 11 kV

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|---|---------------------------|
| Whipp & Bourne Ltd | GVR 15/12 | U.K. |
| ⁽¹⁾ Schneider Electric Pty Ltd | N15 (12 kV) | Australia |
| ⁽¹⁾ Note: Formerly known as Nu-Lec Pty Ltd (Australia). | | |
| Noja Power Switchgear Pty Ltd | OSM 15-16-630-110- 200 c/w RC-10 controller | Australia |
| Cooper Electronics Technologies (Shanghai) Co. Ltd | NOVA 15i | China |
| Entec Electric & Electronic Co. Ltd | EPR-1 (Recloser) & EVRC2A-NT (Controller) | Korea |
| Switco & JinKwang Co., Ltd, | JK-REC | Korea |

3.9.2 Auto Recloser 33 kV

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--|-----------------------------------|
| ⁽¹⁾ Schneider Electric Pty Ltd | N38 (38 kV) | Australia |
| ⁽¹⁾ Note: Formerly known as Nu-Lec Pty Ltd (Australia). | | |
| Whipp & Bourne Ltd | GVR 38/8 | U.K. |
| Noja Power Switchgear Pty Ltd | OSM 38-12.5-630 c/w RC-10 controller | Australia |
| Cooper Electronics Technologies (Shanghai) Co. Ltd | NOVA 38i recloser with Form 6 / FXD Controller | China |
| Entec Electric & Electronic Co. Ltd | EPR-3 (Recloser) & EVRC2A-NT (Controller) | Korea |
| Switco & JinKwang Co., Ltd, | JK-REC | Korea |

3.10 Overhead Assemblies

3.10.1 Stay Wire (7/8 SWG)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Southern Wire Sdn Bhd | - | Malaysia |
| Bonisa Resources Sdn Bhd | - | Malaysia |
| Hebei Qitong Metals Products Co., Ltd. | | China |

3.11 Overhead Assemblies

3.11.1 11kV Load Break Switches

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| Quanzhou Welldone Electric Co. Ltd. | FLWWD-12/T630-20 | China |
| Switco & JinKwang Co., Ltd. | JK-REC | Korea |
| CYG Electric Co., Ltd. | CYZW32-12 | China |

4.0 MISCELLANEOUS EQUIPMENT

4.1 Cable Connectors

4.1.1 Copper Cable Connectors, Crimping Type

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| Conway Terminals Manufacturer Sdn Bhd | - | Malaysia |
| Supreme & Company, West Bengal | - | India |
| Utilux | - | Australia |

| | | |
|---------------------------------------|---|-----------|
| Cembre | - | Italy |
| Cabac | - | Australia |
| Simel (Tyco) | - | France |
| Yongjiu Electric Power Fitting Co Ltd | - | China |

4.1.2 Aluminium and Bi-metallic Connectors

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|--------------------------------------|-----------------------------------|
| Mosdorfer CCL System Ltd | - | England |
| Utilux | - | Australia |
| Cembre | - | Italy |
| Conway Terminals Manufacturer Sdn Bhd | - | Malaysia |
| Simel (Tyco) | - | France |
| Cabac | - | Australia |
| Yongjiu Electric Power Fitting Co Ltd | - | China |

4.2 Pipes

4.2.1 HDPE Pipe

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--------------------------------|--------------------------------------|-----------------------------------|
| Weidasar Sdn Bhd | - | Malaysia |
| Resintech Plastics (M) Sdn Bhd | - | Malaysia |
| Polyflow Pipes Sdn Bhd | - | Malaysia |
| Polyflow Teguh Sdn Bhd | - | Malaysia |
| Cew Sin Plastic Pipe Sdn Bhd | - | Malaysia |
| Dura-Mine Sdn Bhd | - | Malaysia |

4.3 Earthing Accessories

4.3.1 Earthing Rod – 16 mm x 1830 mm (5/8” x 6’)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Juan Kuang Electrical Accessories Manufacturer Sdn Bhd | - | Malaysia |
| ⁽¹⁾ TAIPLY Industries Sdn Bhd | - | Malaysia |
| ⁽¹⁾ Note: Both ends of the rod shall be threaded with one end tapered. | | |
| ERICO | - | USA |
| Furse | - | USA |
| Jinhua City Lightning Protection Equipment Manufacturer | - | China |
| LYTECH | - | Singapore |

| | | |
|--|-----------------|----------|
| Lever E&E | STB | Malaysia |
| Raychem RPG Private Limited | RET-07 | India |
| AXIS Electrical Components (India) Pvt. Ltd. | AXIS-CBR Series | India |

4.4 Fuses

4.4.1 Single Pole House Service Cutout with/without HRC Fuse

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------------|--|-----------------------------------|
| Lucy Switchgear | 2286AL & ME60A HRC Fuse (60A) 2286AK & ME100A HRC Fuse (100A) | U.K. |
| WT Henley Ltd/SICAME | Series 7 Type IIa (60A) Series 7 Type IIb (100A) | U.K. |
| Lucy Switchgear | MK4 60A & 100A | China |
| Cooper Busmann | 6080SP & 100SP | China |
| WT Henley Ltd/ SICAME (or SM-CI) | Series 7 Type IIa (60A) Series 7 Type IIb (100A) | China |
| Lawson Lucy India Pvt. Ltd. | ME63A & MF100A | India |

4.4.2 Fuse link/Cartridge fuse for Service Cut Out

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|--------------------------------------|-----------------------------------|
| Lucy Switchgear | 2286AL, ME60A & ME100A | U.K. |
| WT Henley Ltd | Series 7 Type II | U.K. |
| Lawson | ME/MF 60/100A | U.K. |
| Cooper Bussmann | KR85 & LR85 | India |
| Conway Terminals Manufacturer Sdn Bhd | FK-FRH (up to 60A) | Malaysia |

4.4.3 100A Neutral Link (5-Way Connector Box)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------------------|--------------------------------------|-----------------------------------|
| Lucy Switchgear | List MLNS | India/China |
| WT Henley Ltd/SICAME | Type II - 54347 | U.K. |
| Cooper Busmann | Neutral-HS | China |
| WT Henley Ltd/ SICAME (or SM-CI) | Type II - 54347 | China |

4.4.4 250A Outdoor Dividing Box/MCCB Cabinet

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| Lucy Switchgear | List 14018A/ 11515 | U.K. |

| | | |
|--|---|----------|
| Powertech Engineering | - | Malaysia |
| Tenaga Kenari Sdn Bhd | - | Malaysia |
| LBF | - | Malaysia |
| Ching Hai Switchboard Manufacturer Sdn. Bhd. | - | Malaysia |
| Note: Approved MCCB are: Fuji Electric (China): Model BW250RAG L&T Electrical & Automation (India): Model DN2 LS Industrial System (Korea): Model ABH 203c | | |

4.4.5 400A Outdoor Dividing Box/MCCB Cabinet

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|------------------------------|---------------------------|
| Lucy Switchgear | List No.14022/ 9212 | U.K. |
| Powertech Engineering | - | Malaysia |
| Tenaga Kenari Sdn Bhd | - | Malaysia |
| LBF | - | Malaysia |
| Ching Hai Switchboard Manufacturer Sdn. Bhd. | - | Malaysia |
| Note: Approved MCCB are: Fuji Electric (China): Model BW400RAG L&T Electrical & Automation (India): Model DN3 LS Industrial System (Korea): Model ABH 403c | | |

4.4.6 LV HRC Fuse Link, Type JP, 40A to 400A

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------------------------|-------------------------------|---------------------------|
| Cooper Bussmann | MJ30-8 & MJ30-7 | U.K. |
| Conway Terminals Manufacturer Sdn Bhd | FNJ & FMJ | Malaysia |
| Lawson Fuse Ltd | - | U.K. |
| Yueqing Senyu Fuses Co., Ltd. | 83J (Previously known as JPU) | China |
| Eaton Power Quality Private Limited | MJ30 Series & PJ30-7 Series | India |
| Lawson Lucy India Pvt. Ltd. | - | India |

4.4.7 LV DIN Fuse Link, 63A, 100A and 200A

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|-----------------|------------------------------|-------------------------------|
| Cooper Bussmann | NH 000 / NH 00 NH 2 | U.K./India |
| JEAN MULLER | NH 00 NH 2 | Germany Slovenia France |
| SIBA | NH 00 NH 2 | Germany |

4.4.8 Type K Fuse Link, 11 kV, 5A to 100A

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|------------------------|--------------------------------------|-----------------------------------|
| Cooper Bussmann | 15KBR | U.K./India |
| ABB | Type K | Australia |
| Cable & Power Supplies | FL8K | South Africa |
| Hawker Siddeley | Type K | U.K. |
| S & C Electric Company | Type K Positrol | U.S.A. |

4.4.9 Type K Fuse Link, 33 kV, 1A to 100A

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|------------------------|--------------------------------------|-----------------------------------|
| Cooper Bussmann | 46KBR | U.K./India |
| ABB | Type K | Australia |
| Brush & Switchgear | Type K | U.K. |
| Cable & Power Supplies | FL16K | South Africa |
| Hawker Siddeley | Type K | U.K. |
| S & C Electric Company | Type K Positrol | U.S.A. |

4.4.10 11 kV Din Fuse Link (Air Type) 16A to 160A

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|----------------------|--------------------------------------|-----------------------------------|
| SIBA | Air Type | Germany |
| Electricas SA (Mesa) | Fusarc CF 12 | Spain |
| Cooper Bussmann | 12TDLSJ | U.K./India |
| Cooper Xian | 12TDLSJ | China |
| ABB | CEF | Poland |
| Inter Teknik | S1A series, S68A series, S9A series | Turkey |

4.4.11 Insulated Pole Mounted Cut Out Fuse

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---|--------------------------------------|-----------------------------------|
| Zhejiang SMICO Electric Power Equipment Co., Ltd. | SMF-1 APDM400 | China |
| Lucy Switchgear | MPC 400 | UK |
| SM-CI Electrical Equipment | SM-CI 400A | China |

4.5 Insulating oil

4.5.1 Transformer Oil

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|--------------------------------------|-----------------------------------|
| Nynas | NYTRO Gemini X | Sweden |

| | | |
|--|--|----------|
| (1) SHELL | Shell Diala S4 ZX-I | Malaysia |
| (1) Note: Base oil in Qatar, branded in Hong Kong | | |
| (2) Hyrax Oil Sdn Bhd | HYPERTRANS HR | Malaysia |
| (2) Note: Sample test maybe required for purchase made by SESCO or delivery under turnkey project. | | |
| Ergon | Hyvolt II and Hyvolt III | U.S.A |
| Sinopec Lubricant Co. Ltd | SINOPEC Super Insulated Transformer Oil I-10°C | China |
| Petro-Canada Lubricants Inc | Luminol TR-i (Type II Inhibited) | Canada |

4.6 Earth Fault Indicator

4.6.1 Earth Fault Indicator for Underground Cables

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|---------------------------|------------------------|
| (1) Elektro-Mechanik GmbH | EASI-R/EASI-A | Germany |
| Schneider | Flair 279 | France |
| Nortroll AS | CableTroll 23XX | Norway |
| Horstmann GmbH | Earth Zero | Germany |
| (1) Kries-Energietechnik GmbH & Co. KG | IKI-10light-W | Germany |
| (1) Xiamen Four-Faith Smart Power Technology Co., Ltd | DYO-FF | China |
| (1) Note: EFI with remote sensing capability | | |

4.6.2 Earth Fault Indicator for Overhead Line

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|---------------------------|------------------------|
| Schneider | Flite 110 SA | France |
| Nortroll AS | LineTroll LT110Eur | Norway |
| Elektro-Mechanik GmbH | FLA3 | Germany |
| (1) Beijing InHand Networks Technology Co., Ltd | JYL-IH-C | China |
| (1) Note: LFI with remote sensing capability | | |

4.7 Battery Charger

4.7.1 Battery Charger

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|---------------------|---|-----------------------------------|
| AEG | - | Singapore |
| Nimac | - | Malaysia |
| Berkat Insaf | - | Malaysia |
| PMI Elektrik | - | Turkey |
| STATRON | Single Phase: BDS Series Three Phase: BDTE Series | Malaysia |

4.8 Safety Glove

4.8.1 Safety Gloves Size 0 (1kV)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| W.H. Salisbury & Co | 5-14B CL 0 T1 14" BLK | U.S.A |
| VOLTGARD / NORTH | E-014B | U.S.A |
| G.B. Industries Sdn Bhd | Novax | Malaysia |
| Ansell Industrial & Specialty Gloves Malaysia Sdn Bhd | - | Malaysia |
| Regeltex | - | France |

4.8.2 Safety Gloves Size 2 (20kV)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| W.H. Salisbury & Co | - | U.S.A |
| VOLTGARD / NORTH | - | U.S.A |
| G.B. Industries Sdn Bhd | Novax | Malaysia |
| Ansell Industrial & Specialty Gloves Malaysia Sdn Bhd | - | Malaysia |
| Regeltex | - | France |

4.8.3 Safety Gloves Size 4 (36.5kV)

| Manufacturer | Type/Catalogue/ Model No. | Country of Manufacture |
|--|--------------------------------------|-----------------------------------|
| W.H. Salisbury & Co | 40-16B CL 4 T1 16" BLK | U.S.A |
| VOLTGARD / NORTH | E-416B | U.S.A |
| G.B. Industries Sdn Bhd | Novax | Malaysia |
| Ansell Industrial & Specialty Gloves Malaysia Sdn Bhd | - | Malaysia |
| Regeltex | - | France |