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Tarikh : 24 Mei 2019

Semua Jurutera Elektrik Penguasa Kanan Ibu Pejabat JKR Kuala Lumpur  
Semua Ketua Jurutera Elektrik Negeri  
Semua Jurutera Elektrik Kader

**PEKELILING PENGARAH KANAN CAWANGAN KEJURUTERAAN ELEKTRIK  
BIL. 4 TAHUN 2019**

**DOKUMEN SPECIFICATION FOR STAGE CURTAIN SYSTEM (L-S31)**  
(Rujukan Dokumen: CKE.LS.06.31.(00).2019)

## 1.0 TUJUAN

Surat Pekeliling ini adalah bertujuan untuk memaklumkan pemakaian Dokumen *Specification For Stage Curtain System* (L-S31) (Rujukan Dokumen: CKE.LS.06.31.(00).2019) dalam kerja-kerja elektrik yang berkaitan.

## 2.0 PENGGUNAAN

Spesifikasi ini merupakan ketentuan umum yang perlu dipatuhi di dalam proses rekabentuk dan pelaksanaan projek-projek pemasangan elektrik yang terlibat dengan pemasangan *Stage Curtain System*.

### 3.0 PENGUATKUASAAN DAN PENAFIAN

Surat pekeliling ini adalah berkuatkuasa serta merta daripada tarikh pekeliling ini ditandatangani. Penggunaan dan pemakaian spesifikasi ini adalah untuk projek-projek Kerajaan yang berada di bawah tanggungjawab dan pengurusan JKR sahaja. Oleh itu, Cawangan Kejuruteraan Elektrik tidak akan bertanggungjawab di atas sebarang penggunaan dan pemakaian bukan di bawah pengurusan JKR. Bersama-sama ini disertakan sesalinan spesifikasi untuk rujukan dan tindakan tuan sewajarnya selain ianya juga boleh dicapai melalui Laman J-PEDIA.



Ruj. Kami: ( 5 ) PKR(L)2/1/38  
Tarikh : 24 Mei 2019


Sekian, terima kasih.

**"BERKHIDMAT UNTUK NEGARA"**


Saya yang menjalankan amanah,



**(DATO' Ir. SHUIB BIN TABRI)**  
Pengarah Kanan  
Cawangan Kejuruteraan Elektrik  
Ibu Pejabat JKR Malaysia

|   |   |                                |
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|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: i of i</b>            |

| <b>SECTION</b> | <b>CONTENT</b>                                  | <b>PAGE</b>      |
|----------------|---|------------------|
| <b>1.0</b>     | <b>General</b>                                  | <b>S1/1-S1/1</b> |
|                | 1.1 Scope                                       | 1                |
|                | 1.2 Technical Particulars                       | 1                |
|                | 1.3 Guarantees                                  | 1                |
|                | 1.4 Electrical System                           | 1                |
| <b>2.0</b>     | <b>Description</b>                              | <b>S2/1-S2/1</b> |
|                | 2.1 System Description                          | 1                |
| <b>3.0</b>     | <b>Equipment</b>                                | <b>S3/1-S3/3</b> |
|                | 3.1 Motorised Centre Parting Curtain            | 1                |
|                | 3.2 Motorised Vertical Curtain                  | 1                |
|                | 3.3 Fixed Type Cyclorama Curtain                | 2                |
|                | 3.4 Top Masking Curtain                         | 2                |
|                | 3.5 Wing Border Curtain                         | 2                |
|                | 3.6 Curtain Material and Construction           | 3                |
|                | 3.7 Electric Motor and Curtain Control<br>Panel | 3                |
| <b>4.0</b>     | <b>Wiring</b>                                   | <b>S4/1-S4/1</b> |
|                | 4.1 General                                     | 1                |
|                | 4.2 Service Colour Identification               | 1                |
| <b>5.0</b>     | <b>Testing And Commissioning</b>                | <b>S5/1-S5/1</b> |
|                | 5.1 Test Instruments                            | 1                |
|                | 5.2 Test And Test Certificates                  | 1                |
| <b>6.0</b>     | <b>Service And Maintenance</b>                  | <b>S6/1</b>      |
| <b>7.0</b>     | <b>Shop Drawings And As Built Documents</b>     | <b>S7/1-S7/2</b> |
|                | 7.1 Shop Drawings                               | 1                |
|                | 7.2 As Built Documents                          | 1                |

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S1 - 1 of 1</b>       |

## **1.0 General**

### **1.1 Scope**

- 1.1.1** This section of the specification describes and specifies requirements for the supply, delivery, installation, testing, commissioning, handing over in approved working order and maintenance during the Defects Liability Period of the whole Stage Curtain System in accordance with the Specification, Schedule of Technical Data, Important Notes to Tenderers, "Arahan Kepada Petender", Bill of Quantities, Conditions of Contract, drawings etc.

### **1.2 Technical Particulars**


- 1.2.1** Tenderers shall submit at the time of tendering all catalogues, detailed technical particulars and guarantees in respect of the equipment offered, which shall be binding. No departure from these technical particulars and guarantees shall be permitted except with the written approval of the Superintendent Officer (S.O) or S.O's Representative.

### **1.3 Guarantees**

- 1.3.1** The tenderers shall guarantee all equipment to be supplied under this contract against faulty design, materials and workmanship at the manufacturer's works within the defect liability period (DLP).

### **1.4 Electrical System**

- 1.4.1** All equipment shall be rated for operation on a 230/400 V (within the tolerance as defined in MS IEC 60038; 230/400 V, +10%, -6%), 3 phase, 4 wire, 50 Hz system with solidly earthed neutral.

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S2 - 1 of 1</b>       |

## **2.0 Description**

### **2.1 System Description**

**2.1.1** The system generally consists of (where applicable as indicated in the drawings or bill of quantities) the following components:-

2.1.1.1 Motorised centre parting curtain

2.1.1.2 Motorised vertical curtain


2.1.1.3 Fixed type cyclorama curtain

2.1.1.4 Top masking curtain

2.1.1.5 Wing border curtain

2.1.1.6 Motor panel and curtain control panel

**2.1.2** All dimensions indicated in the specification and in the relevant drawings are indicative only. The successful tenderer shall ascertain the actual dimensions on site and order the material to suit. No claim will be entertained for any variation due to the discrepancy between the dimensions mentioned above and in the drawings or the actual dimensions on site.

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S3 - 1 of 3</b>       |


### **3.0 Equipment**

#### **3.1 Motorised Centre Parting Curtain**

- 3.1.1 Centre parting curtain comprises of two sections which are suspended from the track and which open/ close from centre to off-stage.
- 3.1.2 The curtain track shall be of rigid construction and manufactured from heavy gauge steel. It shall be structurally safe to support the entire load attached to it. The minimum load capacity shall be 4kg per 300mm interval along the track.
- 3.1.3 The track shall be installed with 600mm overlap at the centre and shall be long enough to allow the gathering of the curtains fold to clear the full proscenium opening when they are fully drawn apart. Curtain shall be mounted by means of curtain tab hooks at short intervals on the curtain carriers which roll on the curtain track.
- 3.1.4 The curtain track shall comprise of basic track components such as electric motor, head pulley, return pulley, divert pulley, face fixing brackets, stud bolts, universal clips, standard runners, carrier, stop bracket etc. Runners for the track shall be of a suitable load bearing capacity and shall be spaced at suitable intervals along the length of the track.
- 3.1.5 The curtain shall be tailor made to the overall width and height of the stage with 600mm centre overlapping. The curtain shall have not less than 50% in fullness. It shall be webbed all round. The top of the curtains shall be reinforced with webbing sewn through lining and facing material and snap hooks sewn on at 300mm interval. The bottom of the curtain shall be chain weighted at around 75mm from the bottom of the curtain. The weight shall be sufficient to keep the curtain in contact with stage floor during draw motion.

#### **3.2 Motorised Vertical Curtain**

- 3.2.1 Vertical curtain is a curtain that rose evenly by multiple vertical lift lines between each pleat with vertical fullness sewn into each panel.
- 3.2.2 The curtain track shall be of rigid construction and manufactured from heavy gauge steel and long enough to cover the full proscenium opening. It shall be structurally safe to support all the loads attached to it. The minimum load capacity shall be 7kg per 300mm interval along the track.

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S3 - 2 of 3</b>       |

3.2.3 The curtain track shall comprise of basic track components such as electric motor, pulleys, face fixing brackets, stud bolts, universal clips, carrier etc. The track shall be fabricated to suite the venue. Curtain carrier shall be of a suitable load bearing capacity and shall be spaced at suitable intervals along the length of the track.

3.2.4 The curtain shall be tailor made to the overall width and height of the stage. It shall have not less than 50% fullness horizontally and vertically. It shall be webbed all round. The curtain is raised evenly from the bottom by a series of lift lines that run through ring sewn on the seams between panels.

### **3.3 Fixed Type Cyclorama Curtain**

3.3.1 The cyclorama curtain is usually placed near the back wall and provides a surface for projecting scenery or lighting effects.

3.3.2 The border barrel shall be 48mm diameter pipe with all the necessary ceiling bracket, barrels clamp & etc. It shall be structurally safe to support all the loads attached to it.

3.3.3 Cyclorama curtain shall be tailor made. The curtain shall be webbed all along the top and provided with tie tape at 300mm interval. The side and bottom shall be hemmed.

### **3.4 Top Masking Curtain**


3.4.1 The purpose of top masking is to conceal the overhead areas of the stage house from the audience view.

3.4.2 The border barrel shall be 48mm diameter pipe with all the necessary ceiling bracket, barrels clamp & etc. It shall be structurally safe to support all the loads attached to it.

3.4.3 Top masking curtain shall be tailor made with 1200mm drop and made up with at least of 50% fullness. The curtain shall be webbed all along the top and provided with tie tape at 300mm interval. The side and bottom shall be hemmed.

### **3.5 Wing Border Curtain**

3.5.1 The purpose of wing border is to conceal the side walls of the stage house from the audience view.

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|---|---|---|
|  | <p align="center"><b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b></p> | <p><b>CKE.LS.06.31.(00).2019</b><br/><b>Date Issued: April 2019</b></p> |
|   |   | <p><b>Revision: 0</b></p>   |
|   |   | <p><b>Date: April 2019</b></p>  |
|   |   | <p><b>Page: S3 - 3 of 3</b></p>   |

3.5.2 The border barrel shall be 48mm diameter pipe with all the necessary ceiling bracket, barrels clamp & etc. It shall be structurally safe to support all the loads attached to it.

3.5.3 Wing border curtain shall be tailor made and made up with at least of 50% fullness. The curtain shall be webbed all along the top and provided with tie tape at 300mm interval. The side and bottom shall be hemmed.

### **3.6 Curtain Material and Construction**


3.6.1 The curtain material shall be of quality flame retardant velvet that complies with BS5867. The curtain density shall not less than 520 g/m<sup>2</sup>. Samples of materials of various colours for the make-up of the curtain shall be submitted for selection and written approval of the Superintendent Officer (S.O) or S.O's Representative.

### **3.7 Electric Motor, Curtain Control Panel & Operation**

3.7.1 The curtain operation shall be by means of electrically operated motor and curtain controller, complete with manual operating device. The assembly shall be completed with a hand winding facility such that in case of power failure, the curtain can be easily operated manually. The motor shall consist of gear box, cable drum, limit switch and etc. The opening and closing speed of the curtain shall be around 0.3 m/s.

3.7.2 The motorized curtain control shall be wall mounted and complete with overcurrent protection, a reversing contactor starter with thermal overload protection and no-volt release, 'open', 'close' and 'stop' push buttons, and accessories for connection to the easily adjustable limit switches. The main curtain control panel shall be located near the stage area and secondary curtain control panel shall be located at control room. The system shall allow the curtain to be closed by operating the 'close' button while it is in the opening process (and vice versa) without having to operate the 'stop' button. The contactor used shall be rated at 400V, 50Hz of category AC-4 type and with suitable current carrying capacity that complies with IEC 60947-1 and IEC 60947-4-1.



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|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S4 - 1 of 1</b>       |


#### **4.0 Wiring**

##### **4.1 General**

- 4.1.1 General system of wiring, conduits, trunking, cable tray or cable ladder, wiring accessories etc. shall be referred to the latest JKR Specification for Low Voltage Internal Electrical Installation (L-S1).

##### **4.2 Service Colour Identification**

- 4.2.1 All conduits and trunking for the system shall be clearly identified and distinguished from other services.
- 4.2.2 Trunking for stage curtain system shall be identified using black "STAGE CURTAIN/LIGHTING" letterings over white background. The letterings shall have a minimum height of 15 mm but need not exceed 50 mm, and at an interval not more than 1000 mm. All letterings shall be clearly legible, and to the satisfaction of the S.O or S.O's Representative.
- 4.2.3 Colour bands for conduits identification shall be as specified in the latest JKR Specification for Low Voltage Internal Electrical Installation (L-S1) or as approved by the S.O or S.O's Representative.

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S5 - 1 of 1</b>       |

## **5.0 Testing And Commissioning**

### **5.1 Test Instruments**

5.1.1 All measuring and test instruments used for testing and commissioning of the installations shall be regularly tested and calibrated by the manufacturers or accredited calibration laboratories for their functionality and accuracy. Test and Calibration Reports or Certificates for the measuring and test instruments issued by the calibration laboratory shall be valid for two (2) years from the date of issuance.

5.1.2 The instruments and their Test and Calibration Reports or Certificates shall be submitted to S.O or S.O's Representative for verification two (2) weeks before testing of the installations being carried out. No test on the installations shall be carried out without prior approval of the S.O or S.O's Representative. Notwithstanding the validity of the aforesaid Reports or Certificates the measuring and test instruments shall be re-calibrated if so required by the S.O or S.O's Representative after any mechanical or electrical mishandling. Fee required for the testing and calibrating of the measuring and test instruments is deemed to be included in the Contract.

### **5.2 Test and Test Certificates**


5.2.1 After the installation work has been completed and before Certificate of Practical Completion is issued, the whole system shall be tested for compliance and performance as follows:-

5.2.1.1 Cables shall be tested for continuity;

5.2.1.2 Functional test to indicate correct operation and performance of all equipment; and


5.2.1.3 Any other tests which may be needed to demonstrate the satisfactory function of the system

5.2.2 The S.O or S.O's Representative reserves the right to be present at all tests and the Contractor shall give at least one (1) week notice in writing to the S.O or S.O's Representative for this purpose. In any case, no test shall be carried out without prior approval of the S.O or S.O's Representative. Copies of all the test certificates together with As-Installed Drawings properly bound and titled shall be submitted to the S.O or S.O's Representative within one (1) week after the completion of the testing.

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S6 - 1 of 1</b>       |

## **6.0 Service and Maintenance**

- 6.1** During the Defects Liability Period, the Contractor shall be responsible for the service and maintenance work of the complete installation. All works shall be carried out by skilled person. All labour, material, tools and parts necessary to rectify the defect due to manufacturing/installation faults shall be supplied/executed at the Contractor's cost.
- 6.2** The service and maintenance to be performed and defects to be rectified and making good shall include but not limited to the following:-
- 6.2.1** Repairs and replacement of all equipment and accessories that become faulty due to manufacturing and installation defects whether it is under the manufacturer's warranty or not;
  - 6.2.2** Replacement and making goods of all wiring and accessories;
  - 6.2.3** Making good any damage to roads, buildings, drains, cables, pipes, concrete areas, paved areas etc. which had not been properly made good arising out of his work; and
  - 6.2.4** All other works deemed as necessary by the S.O or S.O's Representative.
- 6.3** All works shall be carried out as soon as the Contractor is being informed by the S.O or S.O's Representative or the occupant, and shall be completed within a reasonable time except under emergency situation. If the Contractor fails to comply with the above requirements, the S.O or S.O's Representative reserves the right to engage another party to carry out the work, in which case, the Contractor shall be responsible for all the expenses incurred.

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|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S7 - 1 of 2</b>       |

## **7.0 Shop Drawings And As Built Documents**

### **7.1 Shop Drawings**

**7.1.1** Two (2) sets of prints of shop drawings for construction and/or installation shall be submitted to the S.O or S.O's Representative for approval. The Contractor shall prepare and submit shop drawings for the whole work or parts of the work at least two (2) weeks before the work begins. If the shop drawings submitted are not acceptable by the S.O or S.O's Representative, the Contractor shall amend and re-submit the shop drawings within two weeks from the date of return of the shop drawings. No work shall be carried out without the shop drawings being approved by the S.O or S.O's Representative.

**7.1.2** The shop drawings shall include and show the following:-

- 7.1.2.1** Co-ordinated dimensioned general arrangements, layouts and positions of accessories, equipment racks and all others necessary for the complete installation;
- 7.1.2.2** Schematic line diagrams of the installation;
- 7.1.2.3** The dimensioned general arrangements, layouts and routes of final circuits;
- 7.1.2.4** The dimensioned general arrangements, layouts, routes and positions of all lateral and vertical mains and/or sub-mains;
- 7.1.2.5** The dimensioned layouts and positions of all holes and cut-through in the walls and floors for the lateral and vertical mains and/or sub-mains; and
- 7.1.2.6** Co-ordinated routes for all cables laid external of the building;


**7.1.3** The cost of all these shop drawings is deemed to be included in the Contract.

### **7.2 As Built Documents**

**7.2.1** As built document shall consist of but not limited to the as installed drawings, manuals, certificates, catalogues, inventories and parts lists.

**7.2.2** The as installed drawings shall comprise of:-

- 7.2.2.1** Site plan;
- 7.2.2.2** External cable routes;

|   |   |                                |
|---|---|--------------------------------|
|  | <b>SPECIFICATION FOR STAGE<br/>CURTAIN SYSTEM<br/>(L-S31)</b> | <b>CKE.LS.06.31.(00).2019</b>  |
|   |   | <b>Date Issued: April 2019</b> |
|   |   | <b>Revision: 0</b>             |
|   |   | <b>Date: April 2019</b>        |
|   |   | <b>Page: S7 - 2 of 2</b>       |

7.2.2.3 Internal layout plans; and

7.2.2.4 Schematic diagrams.

7.2.3 These drawings shall be labelled at the lower right hand corner with the Electrical Contractor's name and address, date of commissioning, scale, drawing number (the drawing number to be obtained from the S.O or S.O's Representative), title and following particulars: -

JABATAN KERJA RAYA  
CAWANGAN KEJURUTERAAN ELEKTRIK  
CONTRACT NO.:

7.2.4 If the drawings submitted are not according to the actual installation at site and/or not acceptable to the S.O or S.O's Representative, the Contractor shall amend and re-submit the drawings within two (2) weeks from the date of return of the drawings to the satisfaction of the S.O or S.O's Representative.

7.2.5 Manual and documents for the installation shall be supplied. It shall comprise of:-

7.2.5.1 Installation manual;

7.2.5.2 Operation manual;

7.2.5.3 Service and maintenance manual;

7.2.5.4 Inventories and parts list;

7.2.5.5 Product data and catalogue;

7.2.5.6 Product test certificates; and

7.2.5.7 Installation test results.

7.2.6 Each of the as built documents shall be bound together with hard cover and submitted in minimum four (4) sets upon issuance of Certificate of Practical Completion of the project.

7.2.7 In addition, one (1) set of the as installed drawing shall be submitted in the form of tracing/original document, and two (2) sets in CD ROM.

7.2.8 The cost of all these prints, manuals, tools etc. whether or not provided in the Bill of Quantities, is deemed to be included in the Contract.