




# **SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM (L-S6)**


**JKR 20300-0135-23**

**CAWANGAN KEJURUTERAAN  
ELEKTRIK**

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
	<b>CONTENTS</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: i of i</b>

SECTION	CONTENTS	ISSUE	REVISION	PAGE
<b>1.0</b>	<b>General</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>2.0</b>	<b>Design Criteria</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>3.0</b>	<b>Noise Isolation Equipment</b>	<b>1</b>	<b>0</b>	<b>2</b>
3.1	Radiator Air Discharge Silencers, Air Intake Silencers and Ventilation Air Inlet Silencers			2
3.2	Exhaust Silencers			3
3.3	Acoustic Doors			4
3.4	Wall and Ceiling Insulation			5
<b>4.0</b>	<b>Shop Drawings</b>	<b>1</b>	<b>0</b>	<b>5</b>
<b>5.0</b>	<b>Test and Calibration of Measuring and Test Instruments</b>	<b>1</b>	<b>0</b>	<b>6</b>
<b>6.0</b>	<b>Test and Test Certificates</b>	<b>1</b>	<b>0</b>	<b>6</b>
<b>7.0</b>	<b>Service and Maintenance</b>	<b>1</b>	<b>0</b>	<b>7</b>
<b>8.0</b>	<b>As-installed Drawings and Manuals</b>	<b>1</b>	<b>0</b>	<b>8</b>
<b>Appendix A</b>	<b>Schedule of Technical Data and Guarantee</b>	<b>1</b>	<b>0</b>	<b>A/1 – A6</b>
<b>Appendix B</b>	<b>Calculation Sheet for Silencer / Insulation Performance</b>	<b>1</b>	<b>0</b>	<b>B/1 – B/2</b>



	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 1 of 9</b>

## 1.0 GENERAL

This specification covers the general scope of works for the design, fabrication, delivery, erection and completion, test and commission of acoustic treatment for the generator room/building, handing over in approved working order and providing service and maintenance during the Defects Liability Period as specified thereafter for the period stated in the Conditions of Contract.

## 2.0 DESIGN CRITERIA


Unless otherwise specified in the Drawings and/or Bill of Quantities, the generator room/building shall be acoustically treated to achieve a guaranteed noise level not exceeding 65 dBA measured at one metre distance away from the generator room/building.

The design criteria shall consider the noise profiles of the generator set and the following major noise sources shall be isolated without affecting the performance and output of the generator set: -

- (a) Radiator fan noise;
- (b) Engine radiated noise;
- (c) Engine exhaust noise;
- (d) Air intake fan noise, if any; and
- (e) Ventilation fan noise, if any.

The design shall in accordance with BS 8233 – Sound Insulation and Noise Reduction for Buildings: Code of Practice.

Notwithstanding to achieve the guaranteed noise level as specified above, the design and the complete installation of the equipment shall also meet the requirements set by Jabatan Alam Sekitar (JAS). The Electrical Contractor is responsible to submit application together with design drawings and calculation sheets including relevant data sheets to JAS for approval. No work including fabrication of the silencers, acoustic doors and any other acoustic treatment shall be carried out without such application being approved by JAS. The cost incurred including all fee required for the submission and approval of the application to JAS, whether or not provided in the Bill of Quantities, is deemed to be included in the Contract.

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 2 of 9</b>

Before commencement of any work at site, a copy of such application, together with design drawings and calculation sheets including relevant data sheets, and its approval from JAS shall be submitted to the S.O.'s Representative.

### **3.0 NOISE ISOLATION EQUIPMENT**

Noise isolation shall be achieved by the following equipment. The Tenderer is required to submit acoustic test reports and all information as required in the Appendix A – Schedule of Technical Data and Guarantee and Appendix B – Calculation Sheet for Silencer/Insulation Performance for the noise isolation equipment offered together with his Tender. Failure to do so shall deem his Tender incomplete and shall cause his Tender to be rejected for consideration.

#### **3.1 RADIATOR AIR DISCHARGE SILENCERS, AIR INTAKE SILENCERS AND VENTILATION AIR INLET SILENCERS**

The silencers shall be of dissipative type and constructed of specially selected high quality materials. Outer casings of silencers shall be made of galvanised steel sheets of thickness not less than 1.2 mm. Beams shall be lock-formed and mastic filled. Tack-welded lap joints are not acceptable due to high air leakage.


Internal splitters of rectangular silencer shall be constructed of galvanised steel sheets of minimum 0.7 mm thick and shall have aerodynamically designed bell-mouth entrances with tapered tail sections for minimum static pressure loss. Bull-nosed section of internal splitters must be solid-faced to prevent erosion of acoustical in-fill.

Centre pod of conical silencer shall be constructed of minimum 0.7 mm thick galvanised steel sheets and shall have aerodynamically designed FRP inlet and tall cones.

Acoustical in-fill shall be of inorganic high density bonded long stranded rock wool sufficient to obtain the specified acoustic performance and be packed under not less than 5% compression to eliminate voids due to vibration and settling. In-fill material shall be insect, vermin and moisture proof.

Silencers using lock-formed joints shall not fail structurally when subjected to a differential air pressure of 1993 Pascal inside to outside of casing.

Acoustic louver made of aluminium sheet or rain hood of galvanised steel sheet with bird mesh shall also be provided for the silencers.

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 3 of 9</b>

Junction or penetration between silencer and the walls shall be sealed with airtight with non-setting resilient caulking compound.

The silencers shall be tested in an acoustic laboratory and acoustic test report and its attenuation performance shall be submitted to the S.O.'s Representative.

### 3.2 EXHAUST SILENCERS

Exhaust silencers shall consist of a primary silencer with a secondary exhaust silencer installed in series. The silencers shall be tested in an acoustic laboratory and acoustic test report and its attenuation performance shall be submitted to the S.O.'s Representative.

The primary exhaust silencer shall be a multiple chamber reactive type designed for low frequency attenuation. The secondary exhaust silencer shall be straight-through absorptive type for mid to high frequency attenuation and to be installed in series with primary exhaust silencer.

Silencer shall be of all welded steel construction finished with high quality aluminium sheets. Acoustical in-fill shall be inorganic high density bonded long stranded rock wool capable of maximum service temperature of 650 degree Celsius.

The noise level at the exit of the exhaust system shall not exceed the noise level stated in Section 2.0 – Design Criteria above measured at one meter from the exit of the exhaust system.


All supports and hangers for the silencers and exhaust system shall be of hot dipped galvanised steel with spring isolators.

### 3.3 ACOUSTIC DOORS

Equipment and personnel doors shall be acoustical doors for effective isolation of generator room noise.

Acoustic doors shall be constructed from minimum 1.2 mm thick electro-galvanised steel sheet with acoustical in-fill of inorganic high density bonded long strand stranded rock wool sufficient to obtain the specified acoustic performance and be packed under not less than 5% compression to eliminate voids due to vibration and settling.

Acoustic door shall be of at least Sound Transmission Class (STC) 46.

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 4 of 9</b>

Acoustic door shall be tested in an acoustic laboratory in accordance with BS EN 20140-10 – Acoustic Measurement of Sound Insulation in Building and of Building Elements: Laboratory Measurement of Airborne Sound Insulation of Small Building Elements, achieving at least STC 46. Acoustic test reports shall be submitted to S.O.'s Representative.

If specified, acoustic fire rated door shall be of at least 1½ hours fire rating and of the type approved by Jabatan Bomba dan Penyelamat (JBP) Malaysia. The Tenderer shall submit a copy of approval by JBP together with his Tender. The acoustic fire rated door shall be tested in an independent laboratory-in accordance with BS EN 1634-1 – Fire Resistant Test for Doors And Shutter Assemblies, Fire Doors And Shutters, to achieve a fire rating of at least 1½ hours. Fire resistant test reports shall be made available to the S.O.'s Representative for inspection.

The acoustic door assemblies shall consist of steel frame, door-leaf perimeter seal, floor seals, cam-lift hinges, pull handle, push plate and lock-set. Door leaf cladding and all door hardware such as cam-lift hinges, pull handle, push plate and lockset shall be made of stainless steel. Door hardware and seals shall also be for minimum 1½ hours fire rating.


Cam-lift hinges used in conjunction with floor seal shall provide continuous gravity activated compression against floor when door is closed. Raised threshold will not be permitted.

The acoustic door shall be anti rust treated and finished externally both sides with decorative colour paints to the colours of the respective walls. The cost, whether or not provided in the Bill of Quantities, shall deem to be included in the Contract.

### 3.4 WALL AND CEILING INSULATION

In general the walls of the generator room are of 100 mm thick clay bricks walls plastered 20 mm thick both sides. If so required, the internal walls of the generator room shall be acoustically treated with sound absorption material of inorganic high density felted mineral fibre board covered with decorative facings, to achieve noise level outside the generator room not exceeding the noise levels as stated in Section 2.0 – Design Criteria above

In the case where the ceiling is not of reinforced concrete slabs, the noise insulation shall be provided, and the ceiling shall be acoustically treated with sound absorption material of inorganic high density felted mineral fibreboard, to achieve at least STC 46. The Electrical Contractor shall be responsible to verify and ensure that the ceiling and associated structures of the generator room/building able to carry the

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 5 of 9</b>

additional loading of such acoustic ceiling treatment installation for the safe intended usage of the generator room.

The sound absorption material used shall be of fire-retardant class to the requirement of and approved by JBP Malaysia.

The cost for such acoustic treatment for the walls and the ceiling, whether or not provided in the Bill of Quantities, is deemed to be included in the Contract.

#### 4.0 SHOP DRAWINGS

Two sets of shop drawings including all design calculation and data sheets for construction and/or installation of the whole acoustic treatment for the generator room shall be submitted to the S.O.'s Representative for approval. The Electrical Contractor shall prepare and submit such shop drawings, design calculation sheets and data sheets for the whole work or parts of the work together with their approval from JAS at least two weeks before the work begins. If the shop drawings/documents submitted are not acceptable by the S.O.'s Representative, the Electrical Contractor shall amend and re-submit the shop drawings/documents within two weeks from the date of return of the shop drawings.


No work including fabrication of the silencers, acoustic doors and acoustic treatment shall be carried out without the shop drawings being approved by the S.O.'s Representative.

The shop drawings shall include and show the following:

- (a) The dimensioned general arrangements, construction layouts of silencers, acoustic doors and all others necessary for the complete acoustic treatment for the generator room/building as specified in the Drawings and/or Bill of Quantities;
- (b) The dimensioned general arrangements, layouts, routes and positions of all silencers, acoustic doors and any acoustic treatments in the generator room/building;
- (c) The dimensioned layouts and positions of all holes and cut-through in the walls and floors for the silencers, acoustic doors and any acoustic treatments.

The cost of all these shop drawings, whether or not provided in the Bill of Quantities, is deemed to be included in the Contract.



	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 6 of 9</b>

## 5.0 TEST AND CALIBRATION OF MEASURING AND TEST INSTRUMENTS

All measuring and test instruments used for measuring noise level shall be of type 1 integrating octave band sound level meter complying with IEC 651/804 approved by JAS. The instruments shall be tested and calibrated by the manufacturers or accredited test and calibration laboratories for their functionality and accuracy. Test and Calibration Reports or Certificates for the measuring and test instruments issued by the test and calibration laboratory shall be valid for one year from the date of issuance. The instruments and their Test and Calibration Reports or Certificates shall be submitted to S.O.'s Representative for verification two weeks before testing of the noise level being carried out. No test shall be carried out without prior approval of the 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.'s Representative after any mechanical mishandling. Fee required for the testing and calibrating of the measuring and test instruments is deemed to be included in the Contract.

## 6.0 TEST AND TEST CERTIFICATES


After the installation work has been completed and before Certificate of Practical Completion is issued, the whole acoustic treatment installation covered under this part of the Contract shall be tested as prescribed by JAS and any other tests deem necessary by the S.O.'s Representative. In the event the installation fails to pass any of these tests, the Electrical Contractor shall take such measures as are necessary to remedy the defects and the installation shall not be considered as completed until all such tests have been passed.

Fee required for the check, test and calibration as described above is deemed to be included in the Contract.

The S.O.'s Representative reserves the right to be present at all tests and the Electrical Contractor shall give at least one-week notice in writing to the S.O.'s Representative for this purpose. In any case, no test shall be carried out without prior approval of the 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.'s Representative and JAS within one week after the completion of the testing.

The aforesaid Certificates shall also be properly bound in hard cover and titled

## 7.0 SERVICE AND MAINTENANCE

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 7 of 9</b>

During the Defects Liability Period, the Electrical Contractor shall be responsible for the service and maintenance work for the complete installation. All works shall be carried out by competent person. All labour, material, tools and parts necessary to rectify the defect due to manufacturing/installation faults shall be supplied/executed at the Electrical Contractor's cost.

The service and maintenance to be performed and defects to be rectified and making good shall include but not limited to the following: -


- (a) Replacing all items that do not meet the manufacturer's guaranteed or declared specification;
- (b) Replacing and making good all loose mechanical support linkage;
- (c) Removing and replacing all items where rust formed.
- (d) Making good any damage to roads, buildings, drains, cables, pipes, concrete areas, paved areas etc. that had not been properly made good arising out of his work.
- (e) All other works as deemed necessary by the S.O.'s Representative.

All works shall be carried out as soon as the Electrical Contractor is being informed by the S.O.'s Representative or the occupant and shall be completed within a reasonable time except under emergency situation as stipulated in the Supplementary Conditions for Electrical Work. If the Electrical Contractor fails to comply with the above requirements, the S.O.'s Representative reserves the right to engage another party to carry out the work, in which case, the Electrical Contractor shall be responsible for all the expenses incurred.

## 8.0 AS-INSTALLED DRAWINGS AND MANUALS

Within three calendar months after the practical completion of the project, one set of true to scale negative (155/115 gm/sq. ISO AO or A1 size) and four sets of prints for each of the following drawings shall be submitted: -

- (a) Site plan;
- (b) Construction of the silencers, acoustic doors and any other acoustic treatment;
- (c) Layout plans of the silencers, acoustic doors and any other acoustic treatment;

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 8 of 9</b>

- (d) All approved shop drawings.

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

JABATAN KERJA RAYA  
CAWANGAN KEJURUTERAAN ELEKTRIK  
CONTRACT NO.:  
TENDER NO.:


If the drawings submitted are not acceptable by the S.O.'s Representative, the Electrical Contractor shall amend and re-submit the drawings within two weeks from the date of return of the drawings.

If required and specified elsewhere, in addition to the aforesaid negatives and prints, as-installed drawings shall be stored in electronic media or any other media as specified. For electronic media they shall be either in floppy disks format or CD rewritable (CD-RW) optical disks format as specified which computer can easily retrieve. The software programme shall be AutoCAD of latest release. Two sets or copies in either format as specified appropriately titled and stored in container or casing shall be submitted.

In addition, four sets of the following manuals and documents for silencers, acoustic doors and any other acoustic treatment installed shall be supplied: -

- (a) Installation manual;
- (b) Operation manual;
- (c) Service and Maintenance Manual
- (d) Parts List;
- (e) Product Data and catalogue;
- (f) Product Test Certificates;
- (g) Installation Test Certificates and Approvals

Only original copies of the above manuals, catalogues and other documents will be accepted. Each of the above sets of prints together with the manuals shall be properly arranged, indexed and filed in a stiff cover ring file.


	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
		<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: 9 of 9</b>

The following particulars shall be printed on the cover of each file:

- (a) Name of project,
- (b) Tender number,
- (c) Contract number,
- (d) Name, address and telephone number of the Electrical Contractor,

The cost of all these prints and manuals is deemed to be included in the Contract.




	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: A</b>	<b>SCHEDULE OF TECHNICAL DATA AND GUARANTEE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: A/1 of 6</b>

<b>Description of Equipment</b>		<b>Air Discharge Silencer</b>		<b>Note: Use different sheet for each type of equipment offered</b>					
<b>Manufacturer</b>									
<b>Country of Manufacture</b>									
<b>Type</b>									
<b>Model No.</b>									
<b>Local Supplier</b>	<b>Name</b>								
	<b>Address</b>								
<b>Performance</b>	<b>Octave Band (Hz)</b>	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8000</b>
	<b>Absorption /Transmission Loss (dB)</b>								
	<b>Absorption / Transmission Loss (STC/dBA)</b>								
<b>Dimension (WxHxL) (mm)</b>									
<b>Thickness of Steel (mm)</b>									
<b>In fill Material</b>	<b>Type</b>								
	<b>Thickness (mm)</b>								
<b>Fire Rating (Hours)</b>									
<b>Test Certificate/Report No.</b>									

**Note: A copy of Test Certificate/Report shall be attached together with this submission.**

.....  
Tarikh

.....  
Tandatangan & Chop


	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: A</b>	<b>SCHEDULE OF TECHNICAL DATA AND GUARANTEE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: A/2 of 6</b>

<b>Description of Equipment</b>		<b>Air Intake Silencer</b>		<b>Note: Use different sheet for each type of equipment offered</b>						
<b>Manufacturer</b>										
<b>Country of Manufacture</b>										
<b>Type</b>										
<b>Model No.</b>										
<b>Local Supplier</b>	<b>Name</b>									
	<b>Address</b>									
<b>Performance</b>	<b>Octave Band (Hz)</b>	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8000</b>	
	<b>Absorption /Transmission Loss (dB)</b>									
	<b>Absorption / Transmission Loss (STC/dBA)</b>									
<b>Dimension (WxHxL) (mm)</b>										
<b>Thickness of Steel (mm)</b>										
<b>In fill Material</b>	<b>Type</b>									
	<b>Thickness (mm)</b>									
<b>Fire Rating (Hours)</b>										
<b>Test Certificate/Report No.</b>										

**Note: A copy of Test Certificate/Report shall be attached together with this submission.**

.....  
Tarikh

.....  
Tandatangan & Chop

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: A</b>	<b>SCHEDULE OF TECHNICAL DATA AND GUARANTEE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: A/3 of 6</b>


<b>Description of Equipment</b>		<b>Primary Exhaust Silencer</b>		<b>Note: Use different sheet for each type of equipment offered</b>						
<b>Manufacturer</b>										
<b>Country of Manufacture</b>										
<b>Type</b>										
<b>Model No.</b>										
<b>Local Supplier</b>	<b>Name</b>									
	<b>Address</b>									
<b>Performance</b>	<b>Octave Band (Hz)</b>	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8000</b>	
	<b>Absorption /Transmission Loss (dB)</b>									
	<b>Absorption / Transmission Loss (STC/dBA)</b>									
<b>Dimension (WxHxL) (mm)</b>										
<b>Thickness of Steel (mm)</b>										
<b>In fill Material</b>	<b>Type</b>									
	<b>Thickness (mm)</b>									
<b>Fire Rating (Hours)</b>										
<b>Test Certificate/Report No.</b>										

**Note: A copy of Test Certificate/Report shall be attached together with this submission.**

.....  
Tarikh

.....  
Tandatangan & Chop




	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: A</b>	<b>SCHEDULE OF TECHNICAL DATA AND GUARANTEE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: A/4 of 6</b>

<b>Description of Equipment</b>		<b>Secondary Exhaust Silencer</b>		<b>Note: Use different sheet for each type of equipment offered</b>					
<b>Manufacturer</b>									
<b>Country of Manufacture</b>									
<b>Type</b>									
<b>Model No.</b>									
<b>Local Supplier</b>	<b>Name</b>								
	<b>Address</b>								
<b>Performance</b>	<b>Octave Band (Hz)</b>	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8000</b>
	<b>Absorption /Transmission Loss (dB)</b>								
	<b>Absorption / Transmission Loss (STC/dBA)</b>								
<b>Dimension (WxHxL) (mm)</b>									
<b>Thickness of Steel (mm)</b>									
<b>In fill Material</b>	<b>Type</b>								
	<b>Thickness (mm)</b>								
<b>Fire Rating (Hours)</b>									
<b>Test Certificate/Report No.</b>									

**Note: A copy of Test Certificate/Report shall be attached together with this submission.**

.....  
Tarikh

.....  
Tandatangan & Chop


	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: A</b>	<b>SCHEDULE OF TECHNICAL DATA AND GUARANTEE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: A/5 of 6</b>

<b>Description of Equipment</b>		<b>Acoustic Door</b>		<b>Note: Use different sheet for each type of equipment offered</b>						
<b>Manufacturer</b>										
<b>Country of Manufacture</b>										
<b>Type</b>										
<b>Model No.</b>										
<b>Local Supplier</b>	<b>Name</b>									
	<b>Address</b>									
<b>Performance</b>	<b>Octave Band (Hz)</b>	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8000</b>	
	<b>Absorption /Transmission Loss (dB)</b>									
	<b>Absorption / Transmission Loss (STC/dBA)</b>									
<b>Dimension (WxHxL) (mm)</b>										
<b>Thickness of Steel (mm)</b>										
<b>In fill Material</b>	<b>Type</b>									
	<b>Thickness (mm)</b>									
<b>Fire Rating (Hours)</b>										
<b>Test Certificate/Report No.</b>										

**Note: A copy of Test Certificate/Report shall be attached together with this submission.**

.....  
Tarikh

.....  
Tandatangan & Chop


	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: A</b>	<b>SCHEDULE OF TECHNICAL DATA AND GUARANTEE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: A/6 of 6</b>

Description of Equipment										Note: Use different sheet for each type of equipment offered
Manufacturer										
Country of Manufacture										
Type										
Model No.										
Local Supplier	Name									
	Address									
Performance	Octave Band (Hz)	63	125	250	500	1000	2000	4000	8000	
	Absorption /Transmission Loss (dB)									
	Absorption / Transmission Loss (STC/dBA)									
Dimension (WxHxL) (mm)										
Thickness of Steel (mm)										
In fill Material	Type									
	Thickness (mm)									
Fire Rating (Hours)										
Test Certificate/Report No.										

**Note: A copy of Test Certificate/Report shall be attached together with this submission.**

.....  
Tarikh

.....  
Tandatangan & Chop

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: B</b>	<b>CALCULATION SHEET FOR SILENCER/INSULATION PERFORMANCE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: B/1 of 2</b>

(1) **EQUIPMENT(\*):**

	<b>Air Discharge Silencer</b>		<b>Air Intake Silencer</b>
	<b>Ventilation Fan Air Inlet Silencer</b>		<b>Acoustic Door</b>
	<b>Primary Exhaust Silencer</b>		<b>Secondary Exhaust Silencer</b>
	<b>Wall Insulation</b>		<b>Ceiling Insulation</b>

*Note: (\*) insert ☒ where calculation is applicable.  
Use different sheet for each type of equipment)*

(1) **TYPE:**


(2) **MODEL:**

(3) **DIMENSION (Width x Height x Length, mm):**

(4) **WEIGHT (Kg):**

*Note: For (d) the wall attenuation, use the following data*

<b>Octave Band (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>
100 mm thick wall Attenuation (dB)	34	36	41	51	58	60
200 mm thick wall Attenuation (dB)	41	45	48	56	58	60

	<b>SPECIFICATION FOR ACOUSTIC TREATMENT FOR GENERATOR ROOM</b>	<b>L-S6</b>
		<b>Issue: 1</b>
		<b>Date: 25/04/2005</b>
<b>APPENDIX: B</b>	<b>CALCULATION SHEET FOR SILENCER/INSULATION PERFORMANCE</b>	<b>Revision: 0</b>
		<b>Date:</b>
		<b>Page: B/2 of 2</b>

**(2) PERFORMANCE:**

Octave Band (Hz)		63	125	250	500	1000	2000	4000	8000
(a)	Generator Set SPL (dB). Data shall be provided.								
(b)	Room Reverberation Noise (dB)								
(c)	Resultant SPL (dB) <b>(a) + (b)</b>								
(d)	Attenuation by Silencer / Insulation (dB)								
(e)	Resultant SPL (dB) <b>(c) – (d)</b>								
(f)	A-Scale Weighting (dB)	<b>–25</b>	<b>–16</b>	<b>–9</b>	<b>–3</b>	<b>0</b>	<b>+1</b>	<b>+1</b>	<b>–1</b>
(g)	Resultant A-Weighting (dBA) <b>(e) + (f)</b>								
		(**)							

**(\*\*) Note: The resultant A-weighting (dBA) shall not be more than 65 dBA as specified in this Specification, unless specified otherwise.**

.....  
Tarikh

.....  
Tandatangan & Chop