



**SAMSUNG
ENGINEERING**

ENGINEERING SPECIFICATION

SSD0023EHN

EQUIPMENT NOISE LIMITATION

REV. : 2

DATE : 2013.10.30

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1. Scope

This specification covers noise level limits, procedures for noise test and submitting equipment noise data for the equipments.

2. Codes and Related Engineering Specification

2.1 Latest version of codes referenced herein shall govern unless exceptions are noted in this specification.

EEMUA Publication No. 140 : Noise Procedure Specification
(formerly OCMA NWG-1)

EEMUA Publication No. 141 : Guide to The Use of Noise Procedure
Specification (formerly OCMA NWG-3)

EEMUA Publication No. 106 : General Specification for Silencers and
Acoustic Enclosure (formerly OCMA NWG-4)

EEMUA Publication No. 142 : Acoustic Insulation of Pipes Valves and Flanges
(formerly OCMA NWG-5)

2.2 Related Engineering Specification

SSD-0022EHN Plant Noise Control

3. Equipment Noise Specification

3.1 Sound Levels and Octave band Levels

Noise limits are expressed as sound pressure levels in octave bands and/or in overall dB(A) sound levels. Noise limits for each octave band according to overall dB(A) is shown as below;

OVERALL	CENTER BAND FREQUENCY (Hz) MAX dB -- LINEAR							
dB (A)	<u>63</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1000</u>	<u>2000</u>	<u>4000</u>	<u>8000</u>
87	98	92	87	83	79	78	78	78
85	96	90	85	81	77	76	76	76
83	94	88	83	79	75	74	74	74

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3.2 Equipment Noise Limit

<u>EQUIPMENT TYPE</u>	OVERAL	MEASURING	<u>NOTES</u>
	<u>dB(A) LIMIT</u>	<u>LOCATION(S)</u>	
Agitators	87	a	(1)
Air Cooled Exchangers	85	f	
Blowers	85	a & c (3)	(1)
Compressors	87	a	(1)
Control Valves	85	a	(2)
Ejectors	87	a	(2)
Exhaust Fans	83	d	
Fired Heaters	85	c	(1)
Gear Units	85	a	(1)
Mixers	85	a	
Motors	83	a & b	(1)
Pumps	85	a	(1)
Relief Valves	See Note 3	a	(3)
Silencers, Atmospheric Venting	85	e	(2) & (3)
Turbine	87	a	
Off-Gas Dryer	87	a	(1)
Transformer	85	a	

NOTES:

- (1) Where equipment is supplied as a package such as in the case with agitators, gear boxes, and driver; pumps and drivers; burners and forced draft fans; compressors, gear boxes, and drivers; etc., the specified noise limits apply to the complete equipment package being supplied by Vendor.
- (2) Vendor shall assume in his calculations that valves and adjacent piping will not be acoustically treated.
- (3) Vendor shall advise the sound pressure level in the octave bands and in dB(A) predicted at the specified location during design in discharge conditions.

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3.3 Measuring Location

- Location a : One meter from outside of the casing (or acoustical enclosure) of the noise source, at ear level, for operator standing at grade or on nearest platform.
- Location b : One meter from the outer edge of the fan shroud, at ear level, for an operator standing on grade or on nearest platform.
- Location c : (Includes all the following stations that apply to the particular design)
- (1) One meter from burner, at ear level, for operator standing on grade directly below equipment.
 - (2) One meter from boiler or furnace walls, at ear level, for an operator standing on grade or on nearest platform.
 - (3) One meter from any air intake to a fan, from any fan casing, or from any fan driver, at ear level, for an operator standing on grade or on nearest operating platform.
- Location d : One meter from edge of inlet shroud.
- Location e : At ear level, for an operator standing at grade or on the nearest platform but at least one meter from the silencer discharge.
- Location f : At ear level, for an operator standing at grade or on the access walkway directly below the fan.
(Ear level shall be considered as 1.5m above grade or platform.)

3.4 Fluctuating or intermittent noise

For equipment emitting fluctuating or intermittent noise, the equivalent continuous sound level, L_{eq} , over the noisiest consecutive 8 hours shall meet the specified limits. The maximum level shall not be 10 dB higher than the limit for continuous noise.

3.5 Additional Restrictions for Special Characteristics

Further restrictions shall apply when the noise of an equipment item contains impulses and tonal components. The Equipment Noise limit shall be adjusted as indicated in the following Table.

REDUCTIONS FOR SPECIAL CHARACTERISTICS

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Characteristics	Reduction
Impulsive	5 dB(A)
Tonal Components (Narrow band)	5 dB(A)

4. Information to Be Supplied by Equipment Vendor

Equipment vendor shall state noise guarantee for each item of the equipment or each train of the equipment which he is supplying to the purchaser.

4.1 Equipment Except Control Valve

Equipment vendor except control valve vendor shall complete the "EQUIPMENT NOISE LIMITATION SHEET" attached hereto and submit the sheet at the bid proposal stage and after placing purchase order.
Unless otherwise specified equipment noise limits shall be met at any position with a distance of one meter from equipment surface.

Equipment vendor shall state the following on the EQUIPMENT NOISE LIMITATION SHEET.

- 4.1.1 Expected sound pressure and sound power levels in octave bands and dB(A) of stock item (i.e., standard type equipment without silencing).
- 4.1.2 Expected sound pressure levels in octave bands and dB(A) of the equipment with silencing measures (e.g., special design or acoustical treatment, or both) to meet the specified noise limits, if these measures are required.
- 4.1.3 Additional costs for special design or acoustical treatment, or both, if these measures are required.
- 4.1.4 Guaranteed sound pressure levels in dB(A) of equipment with or without silencing which he is supplying.
- 4.1.5 Appropriate information of the equipment, such as tag number, power, rpm, and duty (e.g., heat release in furnaces)..
- 4.1.6 Details of proposed noise treating method, including noise attenuation data, effects on machine performance, etc. if silencing is required to meet the specified noise limits.

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4.1.7 The base from which noise data are obtained. The order of preference for obtaining the required noise data is as follows:

- (1) From test on a comparable piece of equipment in an environment remote from other noise sources (shop or fields tests), or installed in an operating plant.
- (2) From noise test data obtained by tests on similar equipment and corrected for the actual equipment size and operating conditions.
- (3) From calculation by theoretical or empirical techniques.

4.1.8 Characteristics of noise, such as narrow band noise or impulsive noise.

4.2 Control Valve

Valve vendor is requested to submit the following information to the purchaser.

4.2.1 At the Bid Proposal Stage

Vendor shall submit a list of control valves the predicted noise level of which exceeds 80dB(A).

In case of low-noise valve, vendor shall quote costs and noise levels for both conventional and low-noise valves.

Vendor shall propose and quote additional noise treatment if conventional and/or low-noise valve is expected to exceed 85dB(A). The noise treatment shall be of vendor's best recommendation.

4.2.2 After Placing Purchase Order

Within 6 weeks after receipt of the purchase order, vendor shall submit noise calculation sheet for all operating conditions viz minimum, normal, maximum throughput of all items.

5. Noise Abatement Facilities

5.1 Where stock item of equipment cannot comply with equipment noise limits, "secondary" measures will be necessary in the form of silencer and/or acoustic enclosure.

In such case the equipment vendor shall prepare silencer/acoustic enclosure data

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sheet(s) and submit these with his quotation, together with an outline drawing of the proposed silencer and/or enclosure, for purchaser's approval.

When silencers or acoustic enclosures are required for noise reduction they shall conform to EEMUA (The Engineering Equipment and Materials Users Association) Publication No.106.

Purchaser reserves the right to choose the proposed improvement method.

5.2 The vendor shall, in designing noise abatement devices, take the following into consideration:

- Proven method
(must have two years of successful operation at a minimum of two location)
- Realistic and easy arrangement at site
- Less prevention for maintenance and operation
- Safety, safe working conditions and emergencies

6. GUARANTEE AND REMEDIAL WORK

6.1 Corrective action shall be taken at no cost to the purchaser if the equipment fails to meet guaranteed noise level. The corrective measures shall have purchaser's approval.

6.2 In above case, the requirements described in paragraph 5.1 and 5.2 will also govern.

6.3 Where requested by the purchaser, a noise guarantee acceptance test shall be performed by the vendor. In this case, charges for testing, and any increase in the quoted price because of noise specifications, shall be shown as separate items in the vendor's quotation.

6.4 The procedure of noise test will comply with EEMUA Publication No.140. No allowance shall be made for the reproducibility of the test method.

EQUIPMENT NOISE LIMITATION SHEET

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(A) EQUIPMENT DESIGN DATA

ITEM No.	_____	EQUIPMENT TYPE	_____
DUTY or POWER	_____	SPEED	_____
DESIGN CAPACITY	_____	SIZE	_____

(B) ESTIMATED SOUND PRESSURE LEVEL (Corrected for Background Noise)

Sound Pressure Level dB re. 2×10^{-5} Pa		Additional Cost UNIT ()	Over-all dB (A)	Octave Band Center Frequency (Hz)							
				63	125	250	500	1k	2k	4k	8k
Noise Limit		-									
STOCK ITEM	Equipment	-									
	Gear Box	-									
	Driver	-									
	Total	-									
SPECIAL DESIGN or ACOUSTICAL TREATMENT	Equipment										
	Gear Box										
	Driver										
	Total										

Show additional cost for special design or acoustical treatment, or both.

Description of silencing.

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Characteristics of the noise

Narrow band noise state

☐ YES

☐ NO

Impulsive noise state

☐ YES

☐ NO

The noise data are obtained

☐ from test of a comparable equipment

☐ from test on similar equipment

☐ from calculation by theoretical or empirical techniques

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(C) ESTIMATED SOUND POWER LEVEL

Sound Power Level dB re. 10^{-12} Watts		Over-all dB(A)	Octave Band Center Frequency (Hz)							
			63	125	250	500	1K	2K	4K	8K
STOCK ITEM	Equipment									
	Gear Box									
	Driver									
	Total									

(D) GUARANTEED SOUND PRESSURE LEVEL

Sound Pressure Level dB re. 2×10^{-5} Pa		Over-all dB(A)	Octave Band Center Frequency (Hz)							
			63	125	250	500	1K	2K	4K	8K
Guarantees for ☐ Stock Item ☐ Special Design ☐ Acoustical Treatment	Equipment									
	Gear Box									
	Driver									
	Total									

VENDOR NAME _____ SIGNATURE _____ DATE ____/____/____

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7. REVISION HITORY

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0	1997.07.29		First issue
1	2010.10.29		- Team name and document no. changed by reorganization i) Planning and Piping Design -> Engineering Technology Team ii) SES H-131E -> SSD0022EHN - Team: Engineering Technology Team - Written: J.Y. Park - Checked: D.W. Kim, Y.B. Kim - Approved: J.H. Ahn
2	2013.10.29	p. 1	- Document format updated - Reference document number updated; H-130E -> SSD0022EHN - Team: Engineering Technology Team - Written: J.Y. Park - Checked: D.W. Kim - Approved: J.H. Ahn