

NOISE CONTROL**JGS 210-120-1-57E**

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1. SCOPE

1.1 General

This practice covers procedures for noise control engineering to be performed by process and/or system engineers, as well as noise control engineers.

It also includes noise control philosophy which shall govern all noise control activities required throughout the project.

1.2 Potential Noise Sources

Such potential noise sources as

- (1) Pumps, fans, blowers and compressors
- (2) Electric motors and steam turbines
- (3) Generators, gas turbines and hydraulic expanders
- (4) Cooling tower and air coolers
- (5) Fired heaters and boilers
- (6) Atmospheric venting and flare burners
- (7) Valves and piping
- (8) Ejectors and desuperheaters
- (9) Flow control, mixing and metering devices

will be subject to noise control design.

2. WORK PROCEDURE

2.1 Input to the Design

2.1.1 Project Noise Requirement

Noise control study is required for the purpose of investigating the following aspects of noise.

- damage to hearing of personnel
- interference with speech and work
- annoyance to the neighboring community

Each aspect will have its own target noise level in terms of noise limit as follows:

- Work Area Noise Limit (Hearing Conservation)
- Work Area Noise Limit (Speech and Work Interference)
- Environmental Noise Limit

2.1.2 Input Data

(1) Drawings and List

Table 2.1.2a lists the documents which are required to prepare input data for noise control study.

(2) Input Data

(a) Location of the Equipment (x-y-z coordinate)

For Feasibility Study or Front End Engineering stage the x-y coordinate is usually read at the geometric center of equipment group or process unit. The z coordinate is taken tentatively at height of 3 m from grade. For basic or detailed design stage the coordinates system of the equipment is available from drawings listed in Table 2.1.2a.

(b) Sound Power Level of Equipment

For Feasibility Study or Front End Engineering stage total sound power level of equipment group or process unit is determined and input in the model. Total sound power level is usually derived from the kind and area of facilities.

For basic and detailed design stage the sound power level is determined for each piece of equipment. The equipment vendor's noise data will be used, if available and realistic.

Table 2.1.2b lists the factors required for sound power level determination. These factors will be used when sound power level of equipment is not available from vendor.

TABLE-2.1.2a DOCUMENTS REQUIRED FOR NOISE STUDY

Stage of Engineering		Feasibility Study			FEED			Basic Design			Detailed Design		
Kind of Document		(1)	NA	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Purpose of Study		(1)	NA	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	General Plot Plan			●			●			●			●
	Unit Plot Plan	●			●	●	●	●	●	●	●	●	●
	Block Flow Diagram			●			●						
	Process Flow Diagram	●			●			●		●			
	Utility Flow Diagram				●			●		●			
	Utility Summary			●									
	P & I D				●			●					
	Piping Layout Drawing										●		●
	Piping Isometric Drawing							●					
	Building Drawing (incl. Materials)								●			●	
	Equipment List				●	●	●	●	●	●	●	●	●
	Driver List				●			●					
	Rotating Equipment Data Sheet							●			○	○	○
	Control Valve Data Sheet							●		●		○	○
	Equipment Outline Drawing										●		●
	Vendor Noise Data										●	●	●

(1) : Study for work area noise (hearing conservation)

(2) : Study for work area noise (speech and work interference)

(3) : Study for environmental noise

● : Information required for the study

○ : Information required for the study when vendor noise data are not available.

TABLE-2.1.2b LIST OF INPUT DATA

- (1) : Study for work area noise (hearing conservation)
 (2) : Study for work area noise (speech and work interference)
 (3) : Study for environmental noise
 NA : Not applicable
 ● : Information required for the study

Input Data		Stage of Engineering			Feasibility Study			FEED			Basic Design			Detailed Design		
		Purpose of Study			(1)	NA	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
PUMP/BLOWER/ COMPRESSOR	Type										●	●	●	●	●	●
	Size													●	●	●
	Driven power (kW)				●			●	●		●	●	●	●	●	●
	Speed (rpm)										●	●	●	●	●	●
	Flow rate (kg/hr)(m ³ /hr)										●	●	●	●	●	●
	Suction pressure (kPa)													●	●	
	Discharge pressure (kPa)													●	●	
	Differential pressure (kPa)										●	●				
DRIVER	Type										●		●	●	●	●
	Size													●	●	●
	Output power (kW)				●			●	●		●		●	●	●	●
	Speed (rpm)										●		●	●	●	●
LIQUID/GAS EXPANDER	Type										●		●	●		
	Size													●		●
	Speed (rpm)										●		●	●		
	Output power (kW)				●			●			●		●	●		●
	Flow rate (m ³ /hr)													●		
	Upstream pressure (kPa)													●		
	Upstream temperature (K)													●		
	Downstream pressure (kPa)													●		
	Downstream temperature (K)													●		
AFC	Type (FDF or IDF)										●		●	●		●
	Size										●		●	●		
	Driven power (kW)				●			●			●		●	●		●
	Speed (rpm)													●		●
COOLING TOWER	Type													●		
	Size													●		
	Number of fan										●		●	●		●
	Fan motor power (kW)				●			●			●		●	●		●
FIRED HEATER	Type				●									●		●
	Size				●			●					●	●		●
	Number of burner										●			●		
	Heat release (kW)										●			●		●
BOILER	Type										●			●		●
	Size							●			●		●	●		●
	Steam generation (t/hr)				●						●			●		●

TABLE-2.1.2b LIST OF INPUT DATA (Cont.)

- (1) : Study for work area noise (hearing conservation)
 (2) : Study for work area noise (speech and work interference)
 (3) : Study for environmental noise
 NA : Not applicable
 ● : Information required for the study

Input Data		Stage of Engineering			Feasibility Study			FEED			Basic Design			Detailed Design		
		Purpose of Study			(1)	NA	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
CONTROL VALVE	Type										●	●	●	●	●	●
	Size													●	●	
	Flow rate (kg/hr)(m ³ /hr)				●						●	●	●	●	●	●
	Upstream pressure (kPa)													●	●	
	Upstream temperature (K)													●	●	
	Downstream pressure (kPa)													●	●	
	Downstream temperature (K)													●	●	
	Differential pressure (kPa)				●						●	●	●			●
STEAM EJECTOR	Size													●		
	Steam consumption (t/hr)										●		●	●		●
	Supply steam pressure (kPa)													●		
FLOW CONTROL/ METERING DEVICES	Type										●		●	●	●	●
	Size													●	●	
	Flow rate (kg/hr)(m ³ /hr)										●		●	●	●	●
	Upstream pressure (kPa)													●	●	
	Inline temperature (K)													●	●	
	Downstream pressure (kPa)													●	●	
	Inline temperature (K)													●	●	
FLARE	Maximum firing rate (kg/hr)				●						●			●		
	Normal firing rate (kg/hr)												●	●		●
	Maximum atomizing (kg/hr)													●		
	Normal atomizing (kg/hr)													●		●
ATMOSPHERIC VENTING	Size													●		
	Flow rate (kg/hr)										●		●	●		●
	Inline pressure (kPa)													●		
	Inline temperature (K)													●		
UTILITY	Electric power generation (kW)	●		●				●								
	Instrument air production (kg/d)	●		●				●								
	Steam generation (kg/d)	●		●				●								
	Size (area) (m ²)	●		●				●								
PROCESS UNIT	Type (Name)	●		●				●								
	Size (area) (m ²)	●		●				●								
	Production capacity (kl/d)	●		●				●								
ROOM	Size										●				●	
	TL ^{*1)} of the wall (dB)	*1) Transmission loss													●	
	α ^{*2)} of the finishing materials	*2) Sound absorbing coefficient													●	