# Data Item Description

**Equipment Noise and Vibration Testing**

**DID E073-6**

Pr epar ed by: Vancouver Shi pyar ds Co. Ltd.

50 Pe mber ton Ave.

Nor th Van couver , BC, Canada, V 7 P 2R 2 T el : ( 604) 988 - 3111

F ax: ( 604) 984 - 1636

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## PURPOSE

The purpose of this DID is to describe the requirements for the Equipment Noise Level Testing.

## REFERENCES

ISO 11200 series: Acoustics -- Noise emitted by machinery and equipment -- Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and at other specified positions

## PREPARATION INSTRUCTIONS

## This Data Item shall comply with the general format, content, and preparation instructions set out in Part 1 (Introduction) of Schedule D1 (SOW) and Part 1 of Schedule D2 (SDRL).

## The reports must be presented, including text, graphs, and supporting calculations. All input data must be provided electronically with the results (see Deliverables).

## CONTENT AND FORMAT

## See format on following pages.

## DELIVERABLES

## One (1) digital package including text, drawings, tabulated results of analysis and all supporting data used in the development of this DID must be provided.

|  |  |
| --- | --- |
| Supplier: |  |
| Equipment (list of): |  |

Noise source equipment size (L x W x H): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m

Vibration source equipment foundation (L x W): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m

Vibration source equipment mass: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kg

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| Supplier Data –airborne noise level limits – to be filled by the Supplier | | | | | | | | | | |
| Item tag and description | Sound Pressure Level (SPL) in dB (re. 20 µPa) at 1.0 m distance free field condition | | | | | | | | | |
| dB(A) | Octave Band Centre Frequency, Hz | | | | | | | | |
| **31.5** | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | **8000** |
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Narrow band component, Yes □ No □ Frequency / Octave band: Hz\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Method of the Noise Level Test: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Supplier Data – vibration level limits – to be filled by the Supplier | | | | | | | | | | |
| Item tag and description | Vibration Levels, La in dB (re. 10 µm/s2) note 1 | | | | | | | | | |
| Isolation mounts  (yes/no) | Octave Band Centre Frequency, Hz | | | | | | | | |
| **31.5** | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | **8000** |
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*Note 1 – The vibration levels shall be as measured at the structural supports. For vibration isolated machinery the vibration shall be measured on the top of the vibration isolators.*

1. **Air borne noise measurement**

For measurements of free field sound pressure levels at specified positions, the standards in the **ISO 11200** series should be used. Alternatively, specific product standards based on these main standards may be used. When the machine is installed in a room, the noise level will be higher than in a free field. The standards stipulate corrections for the reflected noise caused by the room, so that free field values can be calculated **ISO 11201** with engineering grade of accuracy is recommended.

Noise data should be provided as:

**> Preferable:** sound pressure level (SPL) in dB relative to 20 µPa, measured at 1.0 m distance in free field condition.

**> Alternative:** sound power level (SWL) in dB relative to 1 pW.

**> Other:** Other noise measurement system that is convertible to SPL. The conditions of measurement need to be specified.

1. **Vibration measurement**

Vibration from the machinery supports will always be transmitted to adjacent areas and radiate noise, i.e. structure borne noise. In work areas, structure borne noise may usually be neglected compared to air transmitted noise. There are exceptions, however, and especially in living quarters and control rooms the structure borne noise level should be evaluated.

The input data for analysis of structure borne noise from machinery shall be given as vibration level at the supports. For vibration isolated machinery the vibration shall be measured on the top of the vibration isolators. The vibration level in these positions is for medium and high frequencies independent of the stiffness of the deck, and is easy to control by measurements. The mean value of the vibration level of all the supports points should be given in octave bands from 31.5 to 8000 Hz.

Vibration data should be provided as:

**> Preferable:** acceleration level dB relative to 10 µm/s2 (10 µm/s2 10-6 is approximately equal to 1 µg (9, 81 x 10-6 m/s2)).

**> Other:** Other vibration measurement system that is convertible to acceleration levels. The place of measurement need to be specified.

For a machine that is fastened directly to the deck, the vibration level at the support points will depend on the stiffness and other details of the deck and support points. Vibration shall be measured at the carrying frames as near as possible to the machine support points. The mean value of vibration on the supports shall be given, as specified above. These data are only valuable if the details of the deck, frames and supports, in which the measurements are taken, are described in detail.

*\* In general all vibration generating equipment intended for continuous operation should be mounted on vibration isolation mounts. A single stage of standard marine grade vibration isolation mounts is considered adequate for all equipment. The design details of the vibration isolation system and the technical specification of the vibration isolators shall be presented to the Purchaser for approval.*

*As a recommendation, all isolation mounted systems should be evaluated for mount loading and six degree of freedom resonance avoidance. In cases where the entire equipment skid is mounted on vibration isolators, and the flexible connections to fixed pipes and ducts are supplied by others, if required, the Supplier may request information for the flexible connections from the Purchaser.*