

# GOOD PRACTICE GUIDELINES FOR CONTROLLING NOISE ON OFFSHORE INSTALLATIONS


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UK Noise Regulations also apply in the Offshore Energy Sector working environment

Noise Management is a big problem offshore

The Energy Institute Health and Hygiene Committee have developed new guidelines for controlling noise on Offshore Installations

The objective of this good practice guidance is to collate and promote some key principles using illustrative examples for reducing potential exposure to noise

The guidance outlines the management of noise reduction and exposure during all stages of an installation's lifecycle – **design, operation, refurbishment and maintenance** using the principles of ALARP

Implementing ALARP offshore has several constraints particularly implementing solutions on older installations

CoNAWR ACTION VALUE	NOISE	
	Daily Dose $L_{EP,d}$	Peak Noise $L_{Cpeak}$
Lower Exposure Action Value (unprotected)	80 dB(A)	135 dB(C)
Upper Exposure Action Value (unprotected)	85 dB(A)	137 dB(C)
Exposure Limit Value (protected)	87 dB(A)	140 dB(C)

← **Compliance with Noise Action and Limit Values can be difficult but not impossible**

## What is Sound ?

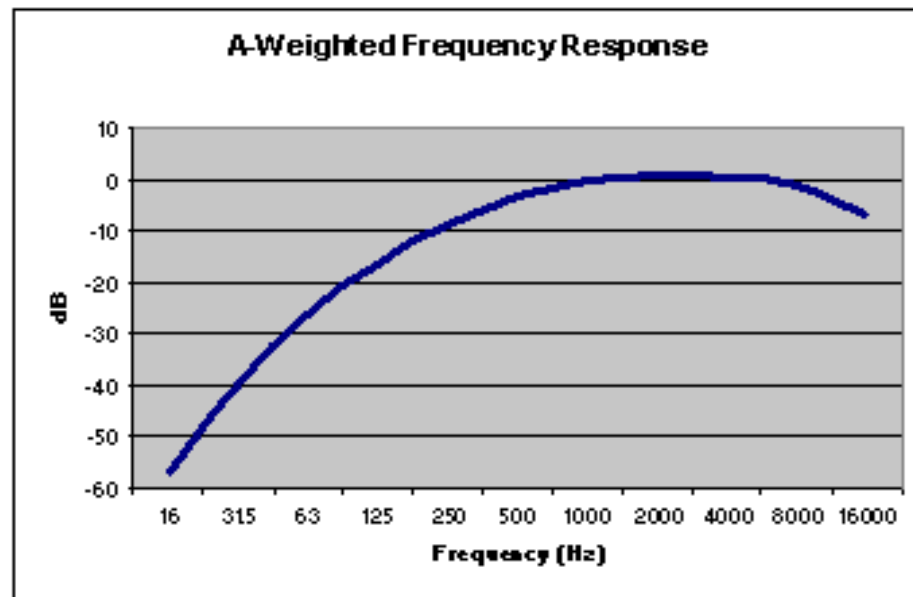
Sound is a variation and transfer of energy through vibration of air molecules which create a sound wave

## What Is Noise ?

Noise is simply any unwanted sound.

It can cause adverse effects on humans:

- Sleep disturbance
- Irritability, fatigue and lack of concentration
- Work disturbance
- Communication and Speech interference
- Hearing damage ( **NIHL** eventually)



The rate at which the air molecules oscillate backwards and forwards is called the frequency. The A-weighting curve above illustrates the ear's sensitivity to noise at different frequencies.

# Table of Offshore Noise sources and controls

**The publication includes a comprehensive list of Noisy Equipment and their Controls:. These include:**

Gas Turbine	Thrusters
Diesel Engines	Valves
Electric Motors	Flow in pipes
Gearbox vibration	Flares and Vents
Compressors	Draw-works
Pumps	Shale Shakers
Alternators	Cranes
Fans	Ventilation systems



**In practice there is a combination of noisy equipment and noisy processes taking place**

On offshore installations, high continuous noise levels principally occur in the production, wellheads, utilities and drilling areas, due to rotating machinery and flow noise .

High sound peaks principally occur when pressure relief valves are operated, but can occur with impacts such as hammering

Helicopters and Foghorns

# NOISE MANAGEMENT AT THE DESIGN STAGE

Noise designs are largely carried out by contractors but the duty holder will ultimately be responsible for noise on the installation. This chapter describes the **roles of duty holders, contractors and vendors**, and describes the processes to ensure that the resulting design is ALARP for Noise. This should be captured in the design philosophy document which requires Front End Engineering Design (FEED) and Detailed Noise Design Reports

**Reverberant Generator Room  
with Sound Reflecting Surfaces.**

Good design would have considered  
Noise Absorbing Surfaces



**Extract vent located at head height**

**This problem could have been anticipated**

# NOISE MANAGEMENT FOR OPERATIONAL INSTALLATIONS

Verifying noise compliance when the site is in Operational mode is undertaken by

## Risk Assessment:

- Area Noise Mapping and Personal Dosimetry
- Identifying high exposures and their causes
- Site Observation e.g. High pressure leaks
- Implementing a Noise Reduction Plan
- Specific noise measurement for noisy activities
- Appropriate controls including Hearing Protection

Typical Offshore Noise Levels →



Noise can be inherited or created

# NOISE MANAGEMENT DURING MAJOR ENGINEERING CHANGES

The principal is to reduce noise though new design or limit the increase in noise when more equipment is added. This chapter provides a table which addresses:

- The Type of Change, which could be:

- ❖ Simple equipment change e.g. Fan
- ❖ Addition of equipment e.g. New gas separation unit
- ❖ Duplication of system e.g. Installation of a second process train
- ❖ New system in existing area e.g. Addition of a new pump
- ❖ Major Process change e.g. Increased gas flow rates
- ❖ Reducing equipment vibration using anti vibration mounts /supports



← Anti- Vibration Supports

- Strategy Checklists – Indicating what needs to be done and how

- Challenges – Identifying obstacles that could have an impact on noise reduction

# NOISE MANAGEMENT FOR MAINTENANCE

This chapter discusses the additional requirement for noise assessment and communication with contractors, when works are carried out on the duty holder's installation, with additional tool noise. In addition, design features to facilitate lower noise during equipment maintenance are presented.

Maintenance activities introduce another type of noise exposure, not accounted for in the basic design or operation of an installation. **Personnel, often contractors, can spend significant periods exposed to noise from running plant and equipment.**

In addition, both maintenance personnel and regular crew can be exposed to noise from tools used for the maintenance tasks.

This section discusses good practice to be applied at the Planning stage, for both planned major activities and smaller ad-hoc jobs.

**A good “bridging” document between Duty Holder  
And Contractors is fundamental**





This chapter describes the principal methods of noise control and where they are best applied. The chapter includes a reference table of equipment, its typical noise levels and the expected **standard forms of noise control found offshore**, and the things to check to make sure the noise control is still effective. Controls include:

Enclosures

Cladding and Lagging

Control Valve noise

Fan Noise

Screens and Barriers

Silencers

Sound Absorption Treatment

Vibration Control

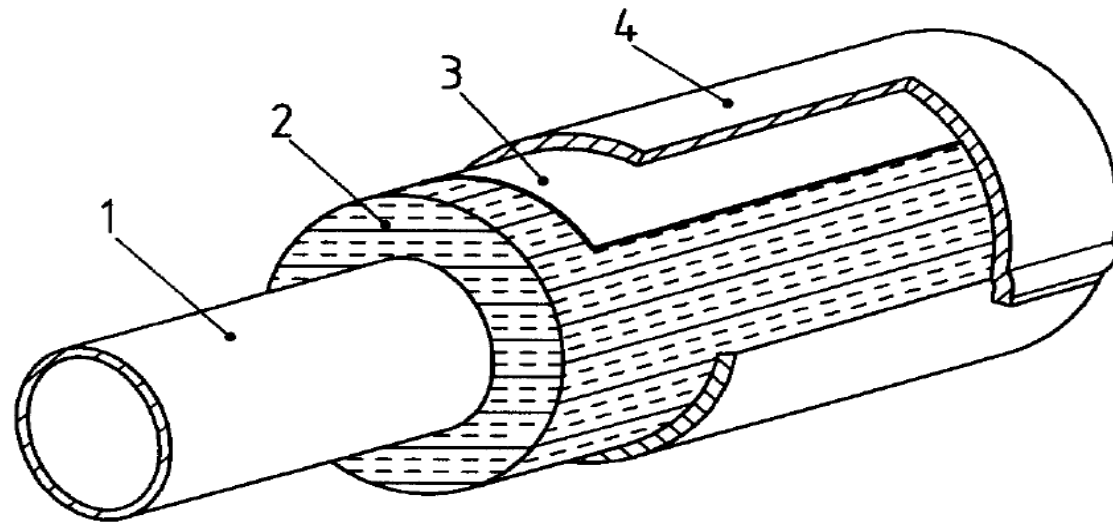
Noise Refuges

Pipework Insulation



**Noise Refuge**

Pipework insulation is a special form of noise control, used widely offshore. This chapter explains which types of pipework are noisy, the types and grades of insulation and their typical noise reductions.

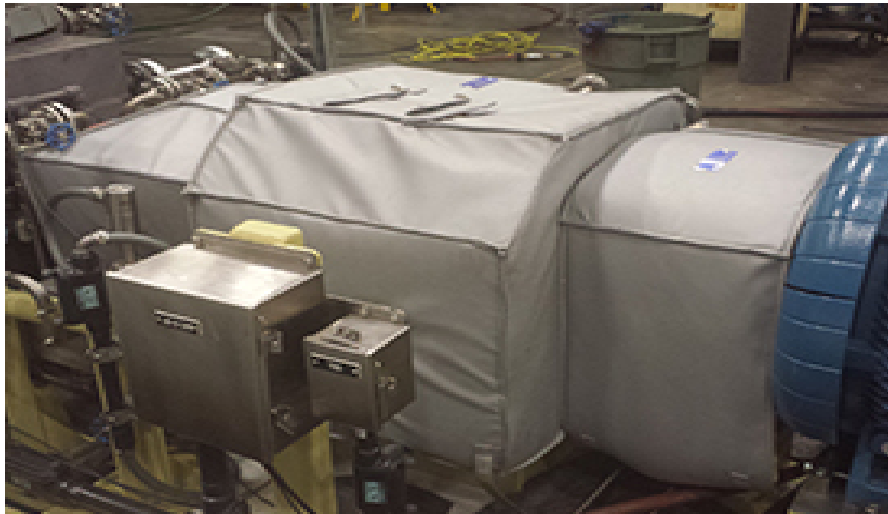


## Key

- 1 pipe
- 2 porous layer
- 3 added mass or damping layer
- 4 cladding

If equipment is found to exceed its noise specification after delivery, it can be very difficult to retrospectively quieten it. This chapter presents an approach to **equipment noise specification** and procurement; including identifying which equipment will require noise tests.

**Pre-packaged pump within an acoustic enclosure**



**← Compressor lagging**

# **Publication Soon**

# **Thanks for Listening**

