MANUAL

NOISE CONTROL
(AMENDMENTS/SUPPLEMENTS TO ISO 15664)

DEP 31.10.00.31-Gen.

May 2004

DESIGN AND ENGINEERING PRACTICE

PREFACE

DEPs (Design and Engineering Practice) publications reflect the views, at the time of publication, of:

Shell Global Solutions International B.V. (Shell GSI)

and

Shell International Exploration and Production B.V. (SIEP)

and

Shell International Chemicals B.V. (SIC)

and

other Service Companies.

They are based on the experience acquired during their involvement with the design, construction, operation and maintenance of processing units and facilities, and they are supplemented with the experience of Group Operating companies. Where appropriate they are based on, or reference is made to, international, regional, national and industry standards.

The objective is to set the recommended standard for good design and engineering practice applied by Group companies operating an oil refinery, gas handling installation, chemical plant, oil and gas production facility, or any other such facility, and thereby to achieve maximum technical and economic benefit from standardization.

The information set forth in these publications is provided to users for their consideration and decision to implement. This is of particular importance where DEPs may not cover every requirement or diversity of condition at each locality. The system of DEPs is expected to be sufficiently flexible to allow individual operating companies to adapt the information set forth in DEPs to their own environment and requirements.

When Contractors or Manufacturers/Suppliers use DEPs they shall be solely responsible for the quality of work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the Principal will expect them to follow those design and engineering practices which will achieve the same level of integrity as reflected in the DEPs. If in doubt, the Contractor or Manufacturer/Supplier shall, without detracting from his own responsibility, consult the Principal or its technical advisor.

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2) Other parties who are authorized to use DEPs subject to appropriate contractual arrangements (whether as part of a Service Agreement or otherwise).

3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) or 2) which requires that tenders for projects, materials supplied or - generally - work performed on behalf of the said users comply with the relevant standards.

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All administrative queries should be directed to the DEP Administrator in Shell GSI.

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PART I INTRODUCTION

1.1 SCOPE

This DEP defines the procedures for noise control of plant and equipment. It specifies how to derive maximum allowable noise levels for equipment.

This DEP applies both to the design and construction of new plants and to the modification of existing plants.

This DEP shall be used in conjunction with the referenced standards, which form an integral part of this DEP. Where conflict arises, the requirements of this DEP shall take preference.

This DEP is not considered suitable for reference in requisitions of individual equipment. The actual noise limits for the equipment under consideration shall be specified in the equipment requisitions under guidance of the appropriate noise control engineer.

This DEP is a revision of the DEP of the same number dated December 1998; a summary of the main changes is given in (1.4).

Part II of this DEP is now written as amendments/supplements to ISO 15664, First edition 2001. This ISO standard originates in essence from the previous edition of this DEP.

Part II of this DEP is presented in the form of amendments and supplements to ISO 15664 and uses the same clause numbering. Clauses of ISO 15664 that are not amended by this DEP shall apply as written.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI and SIEP, the distribution of this DEP is confined to companies forming part of the Royal Dutch/Shell Group or managed by a Group company.

This DEP is intended for use in oil refineries, chemical plants, gas plants, exploration and production facilities and supply/marketing installations. When DEPs are applied, a Management of Change (MOC) process should be implemented. This is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements may be more stringent than in this DEP the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable as regards safety, environmental, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned with the object of obtaining agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

The **Contractor** is the party which carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party which manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party which initiates the project and ultimately pays for its design and construction. The Principal will generally specify the technical requirements. The Principal may also include an agent or consultant, authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

1.4 CHANGES SINCE PREVIOUS EDITION

The previous edition of this DEP was dated December 1998. Meanwhile, ISO 15664 has been developed, largely based on the DEP. This version of the DEP is written as amendments/supplements to ISO 15664, First edition 2001, to reflect specific Group requirements.

1.5 COMMENTS ON THIS DEP

Comments on this DEP may be sent to the DEP Administrator at web address: standards@shell.com. Shell staff may also post comments on this DEP on the Surface Global Network (SGN) under the Standards/DEP 31.10.00.31-Gen. folder. The DEP Administrator and DEP Author monitor these folders on a regular basis.

PART II AMENDMENTS/SUPPLEMENTS TO ISO 15664

3 TERMS AND DEFINITIONS

3.1 General terms

3.1.1 end-user

*Wherever **end-user** is written, the DEP term **Principal** shall be read.*

Add: The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

3.1.2 contractor

Add: The Principal may undertake all or part of the duties of the Contractor.

4. GENERAL REQUIREMENTS

Add to last paragraph:

Principal and Contractor shall agree as to which party is responsible for what action item.

5. GENERAL NOISE LIMITS (IMMISSION REQUIREMENTS)

5.1 In-plant noise

5.1.2 Absolute work area noise limit

Add: The absolute work area noise limit shall be 115 dB(A), unless otherwise specified.

5.1.3 Work area noise limit

Add: The work area noise limit shall be 85 dB(A), unless otherwise specified.

5.1.4 Restricted area

Add to action item (A3): However, attempts shall be made to reduce the level below 90 dB(A).

Add section 5.1.5:

5.1.5 Indoor locations

The following noise limits shall apply in indoor locations in order to keep any disturbance of conversations and normal working, caused by equipment, within acceptable proportions:

Area description	Maximum allowable sound pressure level dB(A)
• Areas in workshops and machinery buildings where communication is required. • Workshops for light maintenance	70
• Workshop offices. • Control rooms, not continuously manned • Computer rooms	60
• Control rooms, continuously manned. • Open plan offices. • Social rooms, changing rooms, wash places and toilets	50
• Offices and conference rooms.	45
• Personnel accommodation (bedrooms, private cabins, etc.).	40

NOTE : Noise that does not stem from equipment but is produced by users of the various areas need not be considered.

5.2 Environmental noise

Add to action item (A7): If the environmental noise limit is specified in terms of sound pressure level instead of sound power level, the reasons for doing so shall be documented.

Delete: NOTE There are many ……. restrictions.

6. EQUIPMENT NOISE LIMITS (EMISSION REQUIREMENTS)

6.3 Sound pressure limit for equipment

6.3.3 Equipment emitting intermittent or fluctuating noise

Add: Where the equipment emits an intermittent or fluctuating noise, the equivalent continuous sound level, Leq, over the noisiest consecutive 8-hour period shall not exceed the equipment limits specified in 6.3.2. The maximum instantaneous level shall not be more than 10 dB(A) higher than the limit for continuous noise.

For intermittent noise, the equivalents of 85 dB(A) over 8 hours are:

Equipment actually operating hours	Maximum sound pressure level when equipment in operation dB(A)
8	85
4	88
2	91
1	94

provided that no significant noise (i.e. above 75 dB(A)) is emitted for the remaining time in the 8-hour period.

6.3.5 Additional restrictions on tonal or impulsive noise

Replace text by: Further restrictions shall apply when the noise of an equipment item contains tonal and/or impulsive components. The equipment noise limit shall be reduced by 5 dB(A) for such equipment.

6.4 Equipment noise datasheets

Replace (3rd paragraph): An equipment noise data sheet ….. limit, or both. *By:* The model sheet data/requisition DEP 31.10.00.94-Gen. shall be used to specify either a maximum sound pressure level at any location 1 m from the equipment surface or a maximum sound power level, or both.

Add to item e): Data/requisition sheets DEP 31.10.00.95-Gen. and DEP 31.10.00.96-Gen. shall be used.

6.5 Equipment selection

Replace last sentence of (A15) by: Generally, preference shall be given to equipment of low noise emission by design.

8. PROJECT CONTROL

8.2 Engineering phase reports

Add to (A19): This report shall be referred to as the NOISE ALLOCATION REPORT.

Add to (A20): This report shall be referred to as the NOISE CONTROL REPORT.

Add to (A21): Unless agreed otherwise, the format of Annex G shall be used for the Noise Allocation Report. Hence, Annex G shall be considered 'mandatory'.
Unless agreed otherwise, the format of Annex H shall be used for the Noise Control Report, whereby all boxes in the column 'Required' are ticked. Hence, Annex H shall be considered 'mandatory'.

8.4 Acceptance test

Add: Responsibility of the Contractor for meeting the specified noise limits shall not end until measurement and evaluation by an independent acoustic consultant have shown that limits are not exceeded. The results of this test shall be presented in a 'Noise Verification Report'. Contracting out the test and the preparation of the report to this independent consultant shall form part of the Contractor's scope of work.

Add to (A24): This report shall be referred to as the NOISE VERIFICATION REPORT. Unless agreed otherwise, the format of Annex I shall be used for the Noise Verification Report, whereby all boxes in the column 'Required' are ticked. Hence, Annex I shall be considered 'mandatory'.

8.5 Remedial action

Add to (A25): Unless agreed otherwise, corrective actions shall be the responsibility of the Contractor.

Annex D NOISE ASPECTS OF SPECIFIC EQUIPMENT

This annex shall be considered normative, not informative.

D.2 Safety/relief valves

Replace: The noise from safety/relief valves *By:* The noise from safety/relief valves and emergency depressuring valves

D.3 Piping

Replace in 3rd paragraph: ISO 15665 *by:* DEP 31.46.00.31-Gen.

D.5 Flares

D.5.1 Elevated flares under emergency conditions

Add to first paragraph: If the stack is provided with a derrick structure, including a platform for coupling/uncoupling segments of the retractable stack, the noise limit applies to this platform.

PART III REFERENCES

In this DEP, reference is made to the following publications:

NOTES: 1. Unless specifically designated by date, the latest edition of each publication shall be used, together with any amendments/supplements/revisions thereto.

2. The DEPs and most referenced external standards are available to Shell users on the SWW (Shell Wide Web) at http://sww.shell.com/standards.

SHELL STANDARDS

Acoustic insulation for piping	DEP 31.46.00.31-Gen.

DATA/REQUISITION SHEETS:

Data/requisition sheet for equipment noise limitation	DEP 31.10.00.94-Gen.
Data/requisition sheet for vent/blow-down/air-flow/in-line silencers	DEP 31.10.00.95-Gen.
Data/requisition sheet for rotating equipment acoustic enclosures	DEP 31.10.00.96-Gen.

INTERNATIONAL STANDARDS

Acoustics – Noise control design procedures for open plant	ISO 15664:2001

Issued by:
International Organisation for Standardisation
1, Rue de Varembé
CH-1211 Geneva 20
Switzerland

Copies can also be obtained from national standards organisations.

PART IV BIBLIOGRAPHY

NOTE: The following document is for information only and does not form an integral part of this DEP:

Noise Guide - Shell Safety Committee