

Telecom systems

This NORSOK standard is developed with broad petroleum industry participation by interested parties in the Norwegian petroleum industry and is owned by the Norwegian petroleum industry represented by OLF (The Norwegian Oil Industry Association) and TBL (Federation of Norwegian Manufacturing Industries). Please note that whilst every effort has been made to ensure the accuracy of this standard, neither OLF nor TBL or any of their members will assume liability for any use thereof. Standards Norway is responsible for the administration and publication of this standard.

Standards Norway
Strandveien 18, P.O.Box 242
N-1326 Lysaker
NORWAY

Telephone: + 47 67 83 86 00
Fax: + 47 67 83 86 01
Email: info@standard.no
Website: www.standard.no/petroleum

Copyrights reserved

Foreword	2
Introduction	2
1 Scope	3
2 Normative and informative references	3
3 Terms, definitions and abbreviations	4
3.1 Terms and definitions	4
3.2 Abbreviations	4
4 Technical requirements	4
4.1 General	4
4.2 Operational requirements	5
4.3 Safety systems	5
4.4 Uninterruptable power supply requirements	5
4.5 Muster stations	5
4.6 Network	5
4.7 Telemetry and remote control systems	6
4.8 Shut down of telecommunication systems	6
4.9 Antenna locations	6
4.10 Other requirements	7
5 Communication systems	7
5.1 Internal communication systems	7
5.2 External communication systems	8
5.3 Additional communication systems	8
6 Standardisation	9
6.1 General	9
6.2 Telemetry for shuttle tankers	9
6.3 Meteorological reporting to Det Norske Meterologiske Institutt (DNMI) or other authorities	9
6.4 Public address and alarm (PA) system	9
6.5 Loudspeakers	9
7 Telecommunication equipment locations	9
7.1 General	9
7.2 Telecom equipment room	9
7.3 Batteries for telecommunication	9
7.4 Transmitter room	10
7.5 Antenna tower	10
7.6 Helitower	10
7.7 Reception	10
7.8 Central control room (CCR)	10
7.9 Emergency control function	10
7.10 Mandatory radio equipment	10
7.11 Drilling control room	10
7.12 Cranes	11
Annex A (Informative) Regulations	12
Annex B (Normative) Data sheets for field	13

Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are as far as possible intended to replace oil company specifications and serve as references in the authorities regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with supported by OLF (The Norwegian Oil Industry Association) and TBL (Federation of Norwegian Manufacturing Industries). NORSOK standards are administered and published by Standards Norway.

Annex A is informative. Annex B forms a normative part of this NORSOK standard.

Introduction

Revision 3 of this NORSOK standard replaces revision 2 of December 2000. The telecommunication subsystems given subsystem number, but no revision status, are usually specified by company.

1 Scope

This NORSOK standard describes the basis for design and engineering of telecommunication systems, given revision status in the table below, on-board a manned offshore installation.

Subsystem	Title	Revision status
86-00	General	Rev 03 of June 2003
86-11	PA	Rev 03 of June 2003
86-12	Driller's intercom	Rev 03 of June 2003
86-21	PABX	
86-22	Multiplexer	
86-24	Office data and telephone cabling network	Rev 03 of June 2003
86-25	Platform intercom	
86-31	Radio links	
86-35	Satellite links	
86-37	Private radio networks	
86-38	Cable links	
86-39	Fibre optic links	
86-41	General radio	Rev 03 of June 2003
86-42	UHF radio and paging	Rev 03 of June 2003
86-43	Audio and video entertainment	Rev 03 of June 2003
86-51	CCTV	Rev 03 of June 2003
86-52	Meteorological observation	Rev 03 of June 2003
86-53	Marine radar	Rev 03 of June 2003
86-54	Aviation radar	
86-55	Communication recorder	
86-56	Loudspeaker surveillance	Rev 03 of June 2003
86-61	Shuttle tanker loading telemetry	
86-62	Work over telemetry	
86-63	Pipeline telemetry	
86-70	Navigational aids	
86-71	DME	
86-72	ATIS/AFTN for aviation	
86-73	Positioning	
86-81	Main distribution frame	Rev 03 of June 2003
86-82	Telecom power supply	Rev 03 of June 2003
86-83	Real time clock	Rev 03 of June 2003
86-84	Telecommunication monitoring system	Rev 03 of June 2003

2 Normative and informative references

The following standards include provisions and guidelines which, through reference in this text, constitute provisions and guidelines of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet or exceed the requirements and guidelines of the standards referenced below.

BS 6656, *Guide to prevention of inadvertent ignition of flammable atmospheres by radio-frequency radiation*

ITU-T rec.G.821, *Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an integrated services digital network (ISDN).*

NORSOK T-100, *Telecom subsystems.*

3 Terms, definitions and abbreviations

For the purposes of this NORSOK standard the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

3.1.1

shall

verbal form used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted, unless accepted by all involved parties

3.1.2

should

verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.1.3

may

verbal form used to indicate a course of action permissible within the limits of the standard

3.1.4

can

verbal form used for statements of possibility and capability, whether material, physical or casual.

3.1.5

company

contractual responsible company

3.2 Abbreviations

AFTN	aeronautical fixed telecommunications network
ATIS	automatic terminal information service
APS	abandon platform shut down
BS	British Standard
CCR	central control room
CCTV	closed circuit television
DC	direct current
DME	distance measuring equipment
DNMI	Det Norske Meteorologiske Institutt (Norwegian Meteorological Institute)
DTMF	dual tone multi frequency
ECC	emergency control centre
GMDSS	global maritime distress and safety system
IP	Internet Protocol
ITU-T	International Telegraph and Telephone Consultative Committee
PA	public address and alarm
PABX	private automatic branch exchange
SPL	sound pressure level
UHF	ultra high frequency
VAC	volt alternating current
VDC	volt direct current
VHF	very high frequency

4 Technical requirements

4.1 General

The telecommunication systems shall provide facilities to support safety and efficient operation. This includes internal communication, telemetry systems, telecommunication networks and external communication to the operational centre onshore, to other installations and systems for marine and air activities.

In an emergency situation it is essential that those telecommunication systems required remain active, provided that their continued operation does not create additional hazards.

4.2 Operational requirements

As a minimum, there shall be facilities which enable:

- Persons in control during the emergency situation to alert all personnel and give instructions.
- Persons in charge of safety related actions, work teams, and persons trapped by the incident to communicate with each other and with the ECC.
- The ECC to communicate with onshore emergency control centre, nearby offshore installations, helicopters, ships and locations on the platform.

4.3 Safety systems

In an emergency situation, the following telecommunication systems shall be available and in operation:

- PA.
- UHF radio.
- PABX (switched telephone system).
- Mandatory and general radio.
- Communication to shore and other installations.

These systems shall be designed and installed with high degree of protection against influence from external events (e.g. fires, gas and fluid leaks, explosions etc.) to ensure continuous operations. To achieve this, the following requirements shall apply:

- The equipment room with the central equipment and batteries shall be located in the safest area on the installation.
- The room shall be provided with isolation facilities. If gas is detected in the air intake to the room, the room shall be isolated to prevent gas from entering the room.
- The systems shall operate independently in critical situations.
- There shall not be any piping for liquids going through the equipment room.
- Risk for fire in the room shall be minimised.

4.4 Uninterruptable power supply requirements

Important telecom equipment shall be DC powered from the telecom battery supply.

Telecommunication systems not made for DC-powering shall be powered from the platform uninterruptible power supply power system.

4.5 Muster stations

At least two different communication facilities shall be available at the muster stations. The main facilities being handportable radios and telephones.

Required telecommunication units at the muster station where the APS switch is located:

- Telephone (Ex).
- PA access unit (Ex).

4.6 Network

4.6.1 General

All network connected systems shall comply with the network structure, principles and services for the relevant installation.

4.6.2 Network availability

The external connections shall be designed according to:

- The evaluation of availability based on duration and frequency of interruptions as well as the number of channels and services being affected. The method specified in ITU-T rec. G.821 shall be applied. The total cost of high availability shall be balanced with the consequences of service interruptions.
- No single equipment failure shall cause a total interruption in the communication links for important operational and control functions.

4.6.3 Network synchronization

The established company network synchronization plan shall be followed.

4.7 Telemetry and remote control systems

Relaying of important remote control signals shall utilise fail safe signal transmission systems to ensure safe operations in case of malfunctions, i.e. shut down in conjunction with pipelines, offshore loading, well maintenance rigs.

4.8 Shut down of telecommunication systems

4.8.1 General

Some telecommunication systems shall be kept operational in critical situations.

4.8.2 Field equipment

Non-Ex-certified field equipment shall be shut down by the area shut down commands. In all areas, sufficient Ex-certified communication equipment shall be in operation for emergency purposes.

4.8.3 Central equipment

The central equipment that shall be kept operational in an emergency situation shall only be shut down after operation of an APS switch or by hazardous conditions in the central equipment room. The APS shut down action shall be delayed by 30 min.

It shall be possible to manually reset the timer circuit.

4.8.4 Antennas

Limitation or shut down of the maximum allowed radiated power in flammable atmospheres of radio signals to the antennas shall be according to requirements in BS 6656.

With respect to disconnection of the antennas, all passive antennas shall be considered as a cable and shall as such not be disconnected if gas is detected in the area.

4.9 Antenna locations

Antennas shall be located to obtain:

- Optimum radio frequency reception/transmission.
- Minimum exposure to damage from heat generated by mud burners, exhaust or flare booms.
- Protection from damage by operational activities, i.e. cranes.
- Minimum radio interference between different antennas.
- Personnel safety.

The antennas shall be mounted in safe area. An antenna tower shall be used as the primary location for antennas.

There shall be a protected cable route between the antenna tower and the telecommunication equipment room. The route should be optimised to have no sharp bends and be as short and direct as possible.

Satellite antennas, if used, shall be located with an unobstructed view towards the actual satellite positions.

Redundant antennas for important safety systems shall be separated from the main antennas to avoid simultaneous obstruction or mechanical damage resulting in a total loss of communication.

4.10 Other requirements

4.10.1 Radio frequency analysis

The combination of radio frequencies used shall not cause disturbing interference. A frequency interference analysis for the installation including the relevant frequencies in that area shall be used as basis for the selection and implementation of radio frequencies.

4.10.2 Temporary requirements

Temporary telecom requirements for the construction and hook-up phases shall be met, i.e. PABX, PA, data network and radio communication.

4.10.3 Spare capacity

Spare capacity and space shall be included in all parts of the telecommunication system to enable "easy to implement" and cost effective modifications and expansions being relevant in the operation period.

5 Communication systems

5.1 Internal communication systems

5.1.1 Public address and alarm (PA) system

The system shall distribute audio alarms, visual alarms and emergency messages, and shall be interfaced to the fire and gas system for alarm input.

The PA system shall also be used for general announcements.

No single failure in equipment or cables, nor any single external event, shall cause significant reduction of PA sound level in any area.

5.1.2 Private automatic branch exchange (PABX)

The PABX system shall provide internal and external switched telephone services.

The PABX shall be integrated in the telephone network with services and facilities as defined for the network.

Access to the public telecommunication network shall be via the PABX at the onshore operational centre.

5.1.3 Data network

A local area network shall be installed to link all data terminals, personal computers, workstations, servers and computers. The local area network shall be interfaced and connected to the company wide area network.

5.1.4 Ultra high frequency (UHF) radio and paging system

The UHF radio shall provide internal radio communication between fixed locations and hand portable radios.

The system shall have duplex talk through frequency channels and simplex channels.

Access from fixed locations shall be via fixed operator control units or radios. In addition, access via the PABX can be used.

The system shall handle emergency communication and shall be designed with high availability.

The UHF radio system shall include a pager system accessible via the telephone system.

5.1.5 Driller's intercom

On installations with drilling facilities a driller's intercom function shall be provided.

The function may be provided either by a drilling intercom system or by a UHF radio system.

5.2 External communication systems

5.2.1 Mandatory and general radio systems

Radio equipment according to mandatory regulations shall be installed.

Additional equipment shall be included to achieve an efficient and reliable operational radio communication to ships, helicopters, and other platforms. This includes radios in ECC, helitower, cranes and dedicated offices.

5.2.2 Main communication to shore/other platforms

Permanent communication links to the onshore operational centre shall be provided, either directly or via other installations. Applicable systems are:

- Radio link.
- Satellite link.
- Fibre optical cables.
- Inmarsat satellite stations may be used for backup.

5.2.3 Vessel network

In areas where ships have limited communication facilities to the onshore public network, local installation of coastal VHF and/or mobile telephone base stations connected to the onshore public network, should be installed.

5.3 Additional communication systems

5.3.1 Closed circuit television (CCTV)

A CCTV system can be used for surveillance of selected areas and operations.

5.3.2 Audio and video entertainment

The entertainment system shall provide live broadcast as well as recorded radio and television programmes and distribute them on a communal aerial system to relevant areas such as cabins, offices, workshops and public areas in the living quarter.

The inputs to the system can be received broadcast from terrestrial networks, satellite and various local sources.

5.3.3 Multiplexer

To enable effective and flexible usage of available bandwidth on external connections, a multiplexer system shall be provided.

5.3.4 Radar

A maritime surveillance radar shall be installed if required by operations.

5.3.5 Meteorological observation

This system shall provide information on current weather and sea conditions for both helicopter and maritime traffic and for operational requirements. The system shall be able to produce and transmit regular reports to The National Meteorological Institute in accordance with authority regulations.

5.3.6 Real time clock

The real time clock system may be required for uniform timekeeping and for clocking of the telecommunication network system. It shall be based on received radio or satellite signals, i.e. global positioning system (GPS).

5.3.7 Telecommunication surveillance system

For telecommunication installations, there shall be a central system for presentation of alarms to operators, i.e. the CCR operator. For installation with no specialists on telecommunication, facilities for remote diagnostics shall be available.

All telecommunication equipment shall have alarm output via a standard interface compatible with the central system for alarm collection.

5.3.8 Main distribution frames

Distribution frames shall be used for cross connection of signal wires between central equipment and field equipment. Knife edge or other quick connection terminal blocks shall be used wherever possible.

5.3.9 Navigation and positioning

Non directional beacon and DME may be required for helicopter traffic.

Other positioning systems (e.g. DARPS, Artemis, differential global positioning system) will normally be required. Future installation of such equipment shall be prepared for by reservation of locations and by installation of required utilities to those locations, i.e. power, signal cables, instrument air.

6 Standardisation

6.1 General

All interfaces and signalling between telecommunication systems shall be compatible with actual installations onboard existing shuttletankers.

The following additional standards shall be used:

6.2 Telemetry for shuttle tankers

The telemetry and voice communication system for the shuttle tankers shall be according to current standard as used on the shuttle tanker fleet.

6.3 Meteorological reporting to Det Norske Meterologiske Institutt (DNMI) or other authorities

The reporting of meteorological data shall be according to agreed common standards in content and format as stated by DNMI.

6.4 Public address and alarm (PA) system

The operators panel shall be according to NORSOK standard T-100, annex B. The number of zones may be different.

6.5 Loudspeakers

Function parameters and data for loudspeakers shall be measured and provided as stated in Annex B.

7 Telecommunication equipment locations

7.1 General

Equipment room(s), rectifier room and battery room if needed, shall not have suspended ceilings.

7.2 Telecom equipment room

The telecom equipment room should accommodate most of the telecom central equipment.

Doors on the equipment racks shall not be locked by key.

A workshop suitable for handling sensitive equipment and instruments shall be established near the telecom main equipment room. The telecom workshop may be combined with other suitable workshop for electronic equipment.

7.3 Batteries for telecommunication

To keep the voltage drop on the low voltage supply lines as low as possible, the batteries for the telecom DC power supply shall be located near the telecom equipment. Rectifiers and shutdown facilities shall be included.

Distribution panels shall be installed in the related equipment rooms.

The rectifiers shall have alarm output to a central supervisory system when the battery charging stops unintentionally.

The battery capacity for important safety systems should be as stated in NORSOK standard T-100.

7.4 Transmitter room

High power radio transmitters, radar transmitters or other equipment requiring short antenna cables shall be located in a separate room near the antennas (antenna-tower).

7.5 Antenna tower

An antenna tower shall be provided on top of the installation for antennas for VHF and UHF mobile radio systems, radio links, radar, etc.

The tower shall be of sufficient height to obtain necessary vertical separation between antennas and to avoid obstruction from other modules or crane activities.

7.6 Helitower

The helitower shall have equipment for communication with helicopters, ships, CCR and the ECC. The room shall be equipped with:

- Fixed and handportable radios for aeronautical and maritime VHF radio.
- Access to meteorological observation data (terminal or display).

7.7 Reception

The reception function will in addition to normal offices require a PA access unit.

7.8 Central control room (CCR)

The CCR operator shall be able to communicate to operators anywhere on the installation, to ships, to other installations and to shore. The following systems shall be available in the CCR:

- Mandatory radio (GMDSS) and additional maritime VHF radio if required.
- PA access unit.
- UHF radios and/or control units.
- Telephones, ordinary and with priority access and hot-line functions.
- CCTV control unit and monitors.
- Radar display (if applicable).
- Access to the Meteorological observation system (terminal or display).
- Aeronautical VHF (if applicable).

7.9 Emergency control function

The ECC communication functions should be combined with the CCR communication equipment where possible.

Important functions for emergency control located elsewhere shall have the required communication facilities available, i.e. dispatcher's office for handling personnel evacuation.

7.10 Mandatory radio equipment

The operational units for mandatory radio equipment should be located according to the operational organisation, i.e. in the CCR. Equipment for the required backup can be in the helitower or in the reception.

7.11 Drilling control room

In the drilling control room there shall be facilities for communication to drilling related locations and CCR. The room shall have:

- PA access unit.
- Fixed UHF radios.

- Driller's intercom (if not covered by UHF).
- CCTV control unit and monitor.

7.12 Cranes

The crane operators shall be able to communicate with the CCR, ships and operators on deck. Maritime VHF, UHF radio, PA loudspeakers and telephone shall be located in the cranes.

Annex A (Informative) Regulations

The latest edition of the following regulations should be used for the design of telecommunication systems when applicable:

TELENOR Guidelines for the installation of GMDSS radio equipment on-board ships and offshore units

Norwegian Post and Telecommunications Regulatory Authority (NPT) Regulations for design, construction, and operation of Communal Aerial Systems (CAS) for distribution of broadcast signals

DNMI Meteorological Observations at Oil Fields Offshore

Norwegian Maritime Directorate (NMD) "Forskrift om installasjon og bruk av radioutstyr på flyttbare innretninger"

Norwegian Civil Aviation Authority (NCAA) Bestemmelse for Sivil Luftfart. "Forskrift om kontinentalsokkel flyging"

Annex B (Normative) Data sheets for field

Data sheets:

1. Telephone (EEx and office)
2. Loudspeakers (EEx loudspeakers indoor/outdoor, living quarter and offices)
3. Outdoor telephone hood
4. Flashing lights (PA and telephone flashing lights)

NORSOK T-001 Rev. 3, Dec. 2003	TELECOMMUNICATION TELEPHONE DATA SHEET	Made by	
		Checked by	
		Date	
		Data sheet	TDS-T01

Package no.	Doc. no.	Rev. 3	Page 1 of 1
-------------	----------	-----------	-------------

DESCRIPTION: EEx telephones for both indoor and outdoor use.			
Note: Values in brackets under requirements are recommendation/examples.			
GENERAL:	REQUIREMENTS	UNIT	MANUFACTURER DATA
GAS GROUP AND TEMP.CLASS:			
ZONE CERTIFICATION:	Zone 1		
DEGREE OF PROTECTION:	IP 56		
MATERIAL:			
COLOUR:			
MOUNTING:			
TERMINATION ENCLOSURE CERT.:	EEx e		
CABLE GLAND ENTRY:	(M20)		
DIMENSION:			
WEIGHT:			
MANUFACTURER:			
MODEL:			
P.O. NUMBER:			
SUPPLIER'S DRAWING/DOCUMENT:			
EQUIPMENT CHARACTERISTICS:			
EARTHING:			
CALL SIGNAL TYPE:	(Shrill warble tone)		
DIAL TYPE:	(Keypad)		
SIGNAL TYPE:	(DTMF or decadic)		
RECALL :	Controlled break		
ON-HOOK:			
VOLTAGE:	(to 48)	VDC	
CURRENT:	(22)	µA	
OFF-HOOK:			
VOLTAGE:	(to 48)	VDC	
CURRENT:	(min. 20)	mA	
MIN. RINGING VOLTAGE DETECTION:	(40)	VAC	
RINGING FREQUENCY:	(2 to 2,8) (8Hz sweep rate)	kHz	
RINGING SIGNAL SPL (at 1m):	(78)	dBA	
HANDSET CORD/LENGTH:	(Coiled cord, 1m)		
CONNECTION :			
OPERATION TEMP.:	-10 to +40	°C	
HUMIDITY:			
INTERFACE:			
FLASHLIGHT TRIGGERING:			
GALVANIC SEPARATION:	(Optocoupler) Yes/No		
TRIGG LEVEL OUTPUT:			

NORSOK T-001 Rev. 3, Dec. 2003	TELECOMMUNICATION LOUDSPEAKER DATA SHEET	Made by	
		Checked by	
		Date	
		Data sheet	TDS-T02

Package no.	Doc. no.	Rev. 3	Page 1 of 1
-------------	----------	-----------	-------------

DESCRIPTION: Loudspeaker for use in the PA system. EEx or non-EEx, for indoor or outdoor use.

Note *: See the overleaf page for instruction to fill in the datasheet.

Note: Values in brackets under requirements are examples.

GENERAL:	REQUIREMENTS	UNIT	MANUFACTURER DATA
GAS GROUP AND TEMP.CLASS: ZONE CERTIFICATION: DEGREE OF PROTECTION: Outdoor Indoor MATERIAL: PAINTING: COLOUR: MOUNTING: TERMINATION ENCLOSURE CERT.: CABLE GLAND ENTRY: DIMENSION: WEIGHT: MANUFACTURER: MODEL: P.O. NUMBER: SUPPLIER'S DRAWING/DOCUMENT:	(Zone 1) IP66 (IP56) (EEx e)		
EQUIPMENT CHARACTERISTICS: EARTHING: POWER TAPPING: LIVING QUARTER: OFFICES: FIELD: SPL & FREQUENCY RANGE * (Attach a SPL curve) DISPERSION * (Attach a polar diagram) : DISTORTION * (Attach a distortion curve) : OVERLOAD TEST * : OPERATION TEMP.: HUMIDITY:	 (0,005; 0,01; 0,1; 0,5; 0,7) (0,1; 0,3; 0,5; 0,7) (4,5; 6,0; 12,5; 25,0)	 W W W	
INTERFACE: NOMINAL LINE VOLTAGE:	100 Vrms-sinus	h °C	

INSTRUCTIONS FOR TDS-T02**SOUND PRESSURE LEVEL (SPL) AT DIFFERENT INPUTS / FREQUENCIES:**

SPL shall be measured on the main beam axis 1 m from the loudspeaker, either in an anechoic chamber or free field. A sinus signal at 100 V_{RMS} shall be applied to the loudspeaker.

The SPL values shall be measured for each of the following tapplings:

- Maximum rated power of loudspeaker.
- 1/2 " " "
- 1/4 " " "
- + Lowest tapping of loudspeaker (power to be stated).

SPL shall be presented on an SPL diagram as a function of frequencies from 125 Hz to 8000 Hz with a sinus signal.

A typical SPL curve is enclosed to the data sheet, see Figure B.1.

DISPERSION:

The polar diagram for the loudspeaker shall be enclosed with the datasheet in order to give information about the directivity of the loudspeaker.

The polar diagram shall present the dispersion for the following frequencies: 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz and 8000 Hz.

A typical dispersion diagram is enclosed to the data sheet see Figure B.2a and B.2b.

DISTORTION:

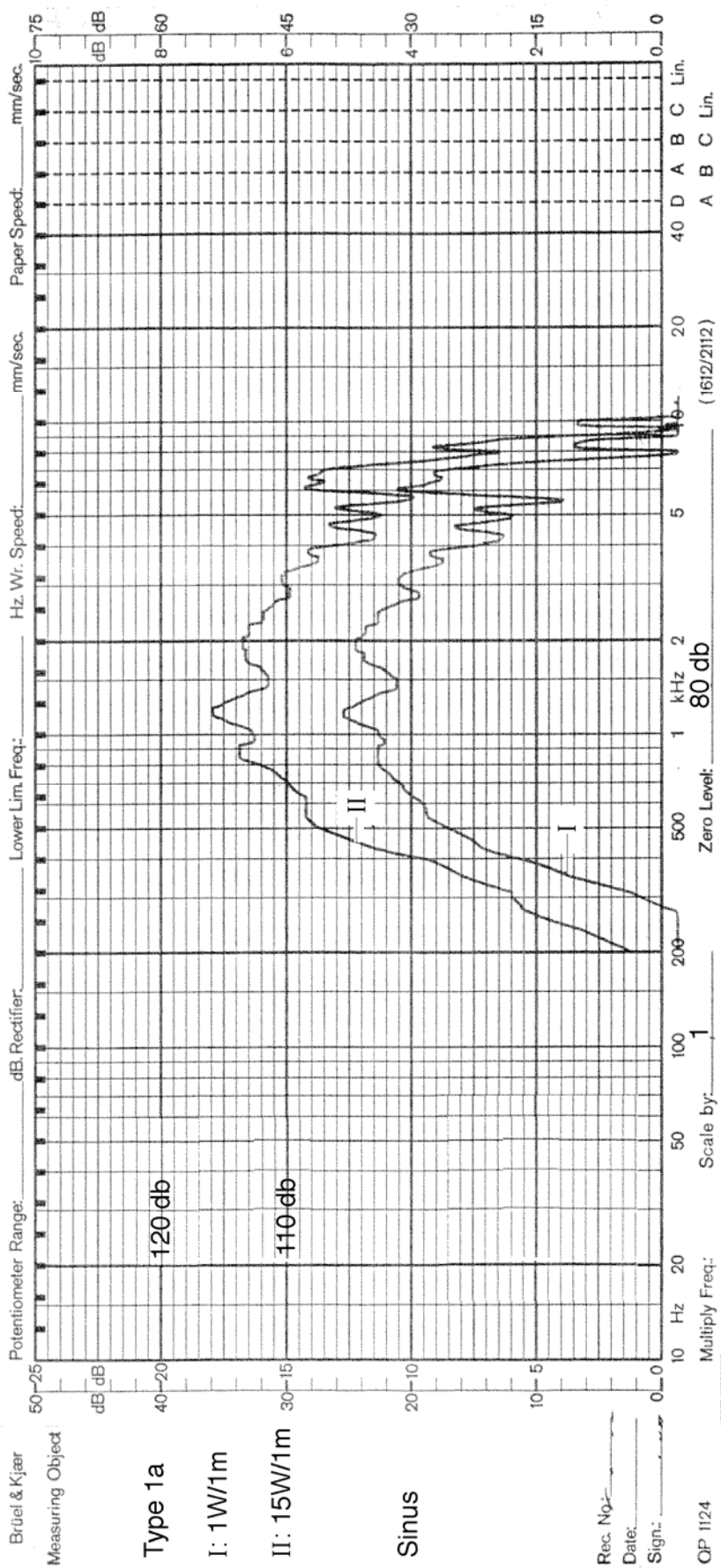
Distortion shall be presented over the complete frequency range (125 Hz to 8000 Hz) when a sinus signal of 100 V_{RMS} is applied to the maximum tapping of the loudspeaker.

A typical distortion curve is enclosed to the data sheet, see Figure B. 2.

OVERLOAD TEST:

With a 150 V_{RMS} at 1000 Hz one octave pink noise signal applied to the max. power tapping of the loudspeaker, present the elapsed time which the loudspeaker survives if less than 12 h.

ALL ABOVE TESTS/MEASUREMENTS TO BE DONE WITH THE LOUDSPEAKER LINE TRANSFORMER INCLUDED



Frequency [Hz]	Distortion
125	51,4 %
250	48,1 %
400	17,6 %
450	10,0 %
500	6,9 %
800	10,0 %
1000	15,7 %
1500	11,7 %
2000	5,9 %
4000	1,9 %
8000	1,5 %

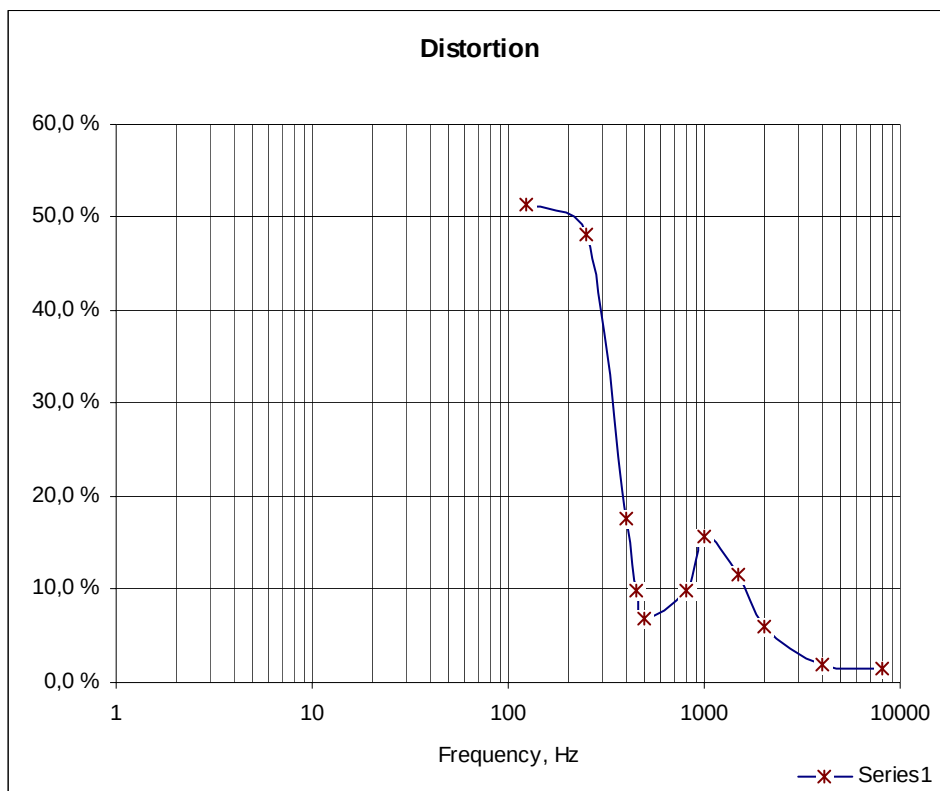


Figure B.2 – Characteristics for measuring object in Figure B.1.

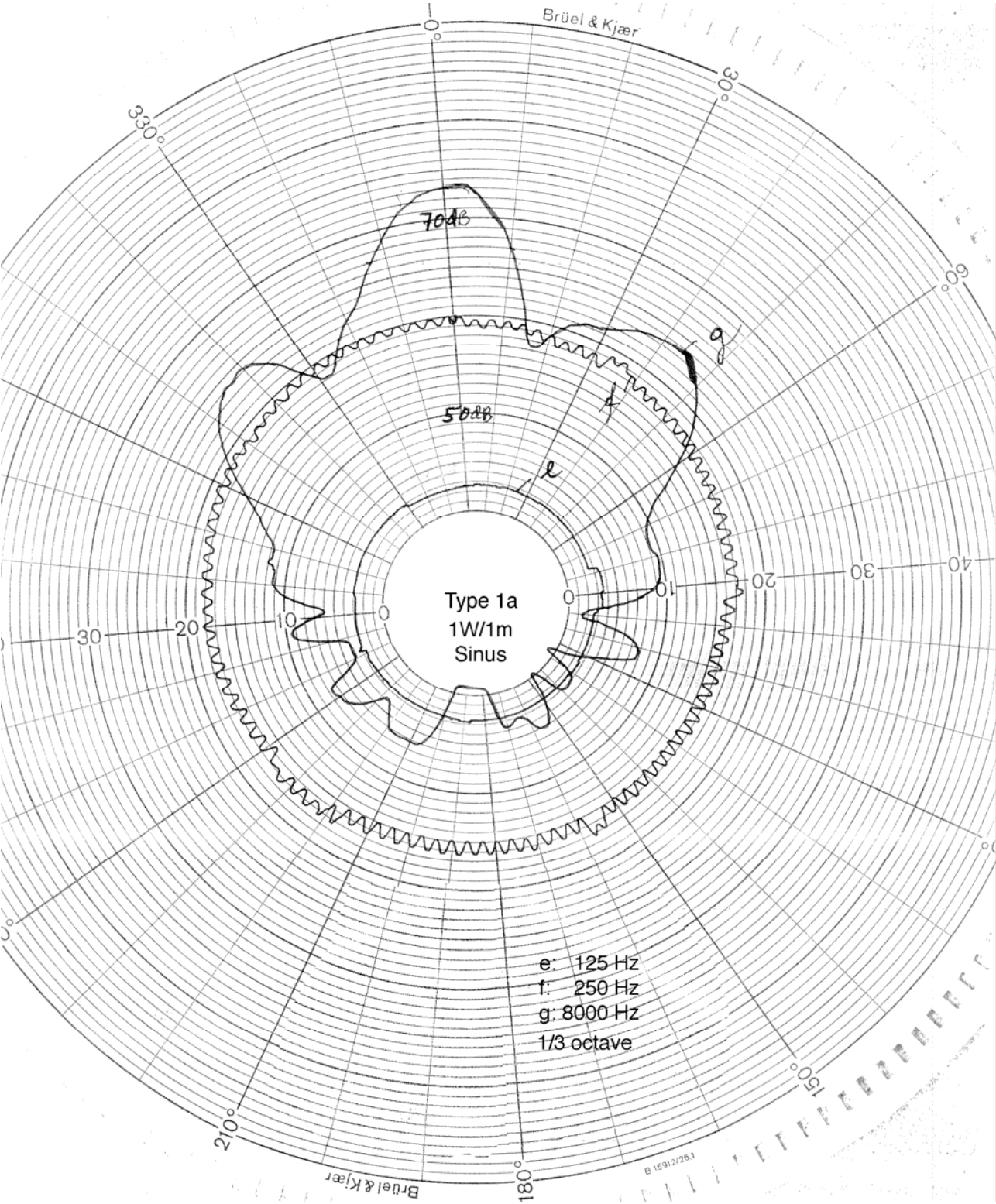


Figure B.3a – Typical polar diagram for 125 Hz, 250 Hz and 8000 Hz

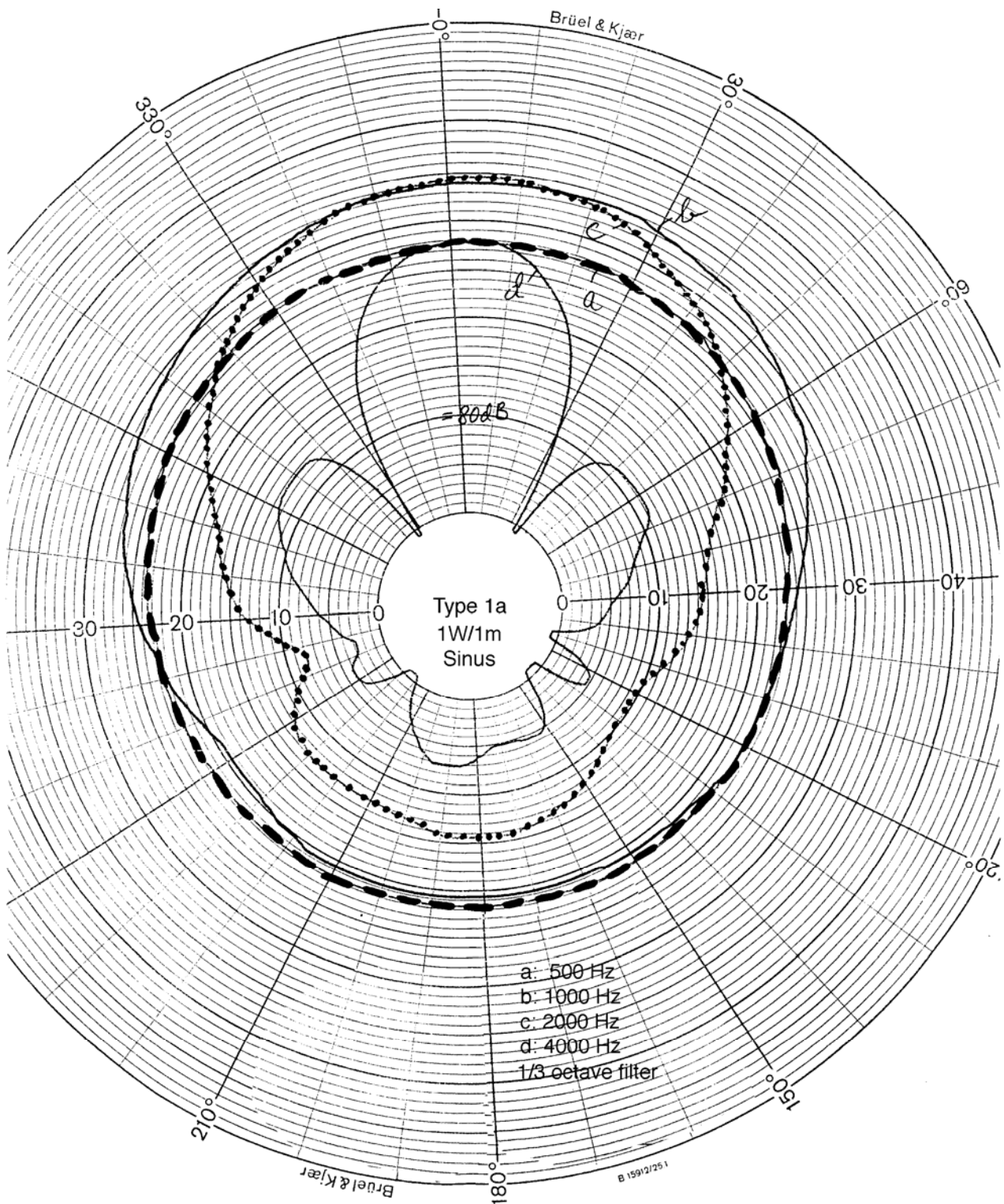


Figure B.3b – Typical polar diagram for (500 Hz, 1000 Hz, 2000 Hz and 4000 Hz)

Figure B.3 – Typical polar diagrams

NORSOK T-001 Rev. 3, Dec. 2003	TELECOMMUNICATION OUTDOOR TELEPHONE HOOD DATA SHEET	Made by	
		Checked by	
		Date	
		Data sheet	TDS-T03

Package no.	Doc. no.	Rev. 3	Page 1 of 1
-------------	----------	-----------	-------------

DESCRIPTION: Telephone hood for outdoor use in corrosive environment. The sound absorbent material shall be non flammable.

Note: Values in brackets under requirements are recommendations/examples.

GENERAL:	REQUIREMENTS	UNIT	MANUFACTURER DATA
MATERIAL: OUTER CASTING: INNER LINNING: SOUND ABSORBANT: PAINTING: COLOUR: MOUNTING: DIMENSION: WEIGHT: MANUFACTURER: MODEL: P.O. NUMBER: SUPPLIER'S DRAWING/DOCUMENT:	(Non-corrosive) (Orange) Wallmounted		
EQUIPMENT CHARACTERISTICS			
MIN. NOISE REDUCTION (0,5 to 5 kHz):	10	dB	
SHELF:	Yes		
MINIMUM INNER SPACE:	Height - 0,8 m Width - 0,6 m		
INSTRUMENT FIXING METHOD:	(Fixing plate)		

NORSOK T-001 Rev. 3, Dec. 2003	TELECOMMUNICATION FLASHING LIGHT DATA SHEET	Made by	
		Checked by	
		Date	
		Data sheet	TDS-T04
Package no.	Doc. no.	Rev. 3	Page 1 of 1
DESCRIPTION: Flashing light for PA and Telephone			
Note: Values in brackets under requirements are recommendation/examples.			
GENERAL:	REQUIREMENTS	UNIT	MANUFACTURER DATA
GAS GROUP AND TEMP.CLASS:			
ZONE CERTIFICATION:	Zone 1		
DEGREE OF PROTECTION:	IP 66		
MATERIAL:			
PAINTING:			
COLOUR:			
MOUNTING:			
TERMINATION ENCLOSURE CERT.:	EEx e		
NUMBER OF CABLE ENTRIES:			
- TELEPHONE:	3		
- PA:			
CABLE GLAND ENTRY:			
DIMENSION:			
WEIGHT:			
MANUFACTURER:			
MODEL:			
P.O. NUMBER:			
SUPPLIER'S DRAWING/DOCUMENT:			
EQUIPMENT CHARACTERISTICS:			
EARTHING:			
FLASHING ENERGY:	>10	Joule	
FLASHING RATE:	1	Hz	
COLOUR:			
- TELEPHONE:	GREEN		
- PA:	YELLOW 56665		
VISUAL COVERAGE:	360 x 180 hemispherical	degree	
OPERATION TEMP.:	-10 to +40	°C	
HUMIDITY:			
INTERFACE:			
POWER CONSUMPTION:			
- TELEPHONE:			
- PA:	(40 to 60)	VDC	
OPERATION VOLTAGE:	(185 to 265)	VAC	
TRIGGER VOLTAGE:			
- PA (AT OPER. VOLT. 230 VAC):	40	VDC	
- TELEPHONE:	(50 to 80)	VAC	
TRIGGER CURRENT:			
- TELEPHONE:			
- PA:			
START UP CURRENT:			
NOMINAL CURRENT:			
GALVANIC SEPARATION	YES/NO		

