

Appendix II – MAR-CIS and CHD overview

EMSA/NEG/28/2022

Provision of ICT Services for CHD and MAR-CIS applications

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List of Abbreviations

BE-CHEM	Behaviour of CHEMicals tools
CHD	Central Hazmat Database
EFTA	European Free Trade Association
EU	European Union
HNS	Hazardous and Noxious Substances
HNS	Hazardous and Noxious Substances
IBC	International code for the construction and equipment of ships carrying dangerous chemicals in bulk
IGC	International Code for the construction and equipment of ships carrying liquefied gasses in bulk
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organisation
IMSBC	The International Maritime Solid Bulk Cargoes Code
MAP	Maritime Applications Portal
MAP	Maritime Application Portal
MAR-CIS	MARine Chemical Information Sheets
MARPOL	The International Convention for the Prevention of Pollution from Ships
MSDS	Material Safety Datasheets
NSW	National Single Window
RFD	Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010 on reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2001/6/EC - Reporting Formalities Directive
SSN	SafeSeaNet
TPA	IBC Tripartite Agreement
VTMIS Directive	Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic information system and repealing Council Directive 93/75/EEC

List of Annexes

Annex A - CHD and MAR-CIS IMO codes and conventions elements

Annex B - System Database Design

Annex C - System Design Document

Annex D - System Requirements Specifications

Annex E - User Manual

Annex F - Interface Control Document

Annex G - Installation Configuration Manual

Annex H - MAR-CIS datasheet example

1 Introduction

The objective of this document and its Annexes is to describe the CHD and MAR-CIS application in view of providing enough business and technical information for the tenderers to prepare a bid for the procurement EMSA/NEG/28/2022. The technical specifications for the new ICT services to be procured are defined in more detail in *Appendix III - Technical requirements for the Provision of ICT services to the MAR-CIS and CHD applications* of the tender specifications.

The MAR-CIS and CHD are two applications that are integrated in EMSA's maritime application portal (MAP). The applications have different business objectives however they share common datasets and as result these were developed simultaneously under the same ICT services contract in 2016. The go-live date for the CHD web application was September 2016 and the go-live date for the MAR-CIS web application was December 2016. The MAR-CIS application for mobile devices was published in August 2017. Following the go-live, both applications were updated with additional functions and features.

2 CHD Application

2.1 Objective

The SSN Group and the SSN High Level Steering Group agreed on the development and maintenance of a central reference database, the CHD (Central Hazmat Database) for HAZMAT information that must be notified and exchanged in accordance with the VTMS Directive and the RFD directive.

The overall objective of the CHD is to:

- Improve the data quality of HAZMAT notifications to SSN,
- Minimise the administrative burden for the reporting parties when submitting the HAZMAT information to the NSW, and
- Support the MS emergency response services by providing specialised information for the response to incidents involving chemical substances.

2.2 Description and business use

The CHD database compiles the elements from the IMO codes (IGC, IMDG, IBC, IMSBC codes and MARPOL Annex I) that have to be notified and exchanged under the HAZMAT reporting obligations. The CHD can be used as both a reference and a verification tool for HAZMAT reporting:

As a reference:

- It facilitates the search for correct items. The search can be performed by using specific identifiers (code or convention, UN Number, IMO class), or by inputting the product's textual reference, how it is carried (bulk or packaged) and, when applicable, type of product (liquid, gas or solid).
- The CHD data can be integrated in the National Single Window (NSW), minimising the administrative burden through a system-to-system interface.
- For CHD items with a MAR-CIS datasheet associated, competent authorities can have access to substance specific information relevant for response to emergencies at sea involving chemical substances.

For verification:

- Competent authorities can cross-check and validate the correctness of data on dangerous and polluting goods notified to SSN by the National SSN systems.

2.3 Legal background

The CHD application has been implemented in line with Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system (as amended by the Directives 2009/17/EC and 2014/100/EU) and Directive 2010/65/EU on reporting formalities for ships arriving in and/or departing from ports of the Member States.

The list of HAZMAT items which are to be notified in accordance with the VTMISS Directive, as amended, are as follows:

(Article 3g) ‘dangerous goods’ means:

- goods classified in the IMDG Code,
- dangerous liquid substances listed in Chapter 17 of the IBC Code,
- liquefied gases listed in Chapter 19 of the IGC Code, and
- solids referred to in the IMSBC Code, Appendix 4, group B and A+B (previously Appendix B of the BC Code).

Also included are goods for the carriage of which appropriate preconditions have been laid down in accordance with paragraph 1.1.6 (previously 1.1.3) of the IBC Code or paragraph 1.1.6 of the IGC Code;

(Article 3h) ‘polluting goods’ means:

- oils as defined in Annex I to the MARPOL Convention,
- noxious liquid substances as defined in Annex II to the MARPOL Convention, and
- harmful substances as defined in Annex III to the MARPOL Convention.

2.4 Users

The CHD should serve the needs of:

- Industry stakeholders (manufacturers, shippers, freight forwarders, logistics companies) responsible for providing the Material Safety Data Sheets (MSDSs) to the ship reporting parties,
- Reporting parties (masters, ship agents, and ship operators) responsible for the completeness and accuracy of the HAZMAT information transmitted to the NSW,
- Relevant MS authorities (SSN NCAs, single window, port, maritime, security and port state control authorities) responsible for receiving, validating and processing HAZMAT information transmitted by the reporting parties,
- Emergency services of the MS responsible for providing effective response to maritime incidents to minimise loss of life, damage to property and prevention of pollution, and
- EMSA services responsible for validating the data quality of the information exchanged between MS through SSN.

2.5 Overview of CHD functionalities

This chapter presents an overview of CHD functionalities according to the following CHD user profiles:

2.5.1 CHD SSN User

- Search for HAZMAT details using specific identifiers (step-by-step) or by textual reference (keyword or number)
- For relevant substances, a link to associated MAR-CIS information/data sheet(s)
- Filter search results
- Display search results
- Export search results as PDF or XLS files
- Download the content of the CHD as PDF or XLS file
- Receive email notifications of CHD updates
- Use CHD from system-to-system interface. If the CHD is integrated in the National Single Window (NSW) the administrative burden of the reporting party can be minimised. Once the reporting party inputs an identifier (e.g. textual reference or the UN number), the NSW would automatically fill in the remaining static data elements.

2.5.2 CHD Guest

- Search for HAZMAT details using specific identifiers (step-by-step) or by textual reference (keyword or number)
- Filter search results
- Display search results
- Download the content of the CHD as PDF format
- Export search results as PDF

To see the CHD web portal, tenderers may enter the EMSA Maritime Applications Portal and use the CHD Guest user account. See below the details.

<https://portal.emsa.europa.eu/home>

User name – CHDguestuser

Password – EMSAchdguest1

2.5.3 CHD Content Administrator:

- Create, update or delete entries in the CHD
- Populate the CHD with new versions of the IMO Codes or Conventions
- Check statistics related to the visitors on site, registered users, number of searches and export of search results
- Update the content of the web application interface (About pages, Links, Tool tips, Documents etc.)
- Check and download the history of changes
- Manage versions: create/edit working version, delete and target
- Value list maintenance

2.6 CHD access

The CHD is made available to the users via:

- EMSA maritime applications portal (MAP),
- a public site, and
- system-to-system interface

2.7 CHD installation, upgrade and maintenance

The CHD is hosted at central level by EMSA, allowing MSs, reporting parties and industry stakeholders' easy access to harmonised and updated HAZMAT information.

MSs may host a copy of the CHD (e.g. in their NSWs) which needs to be updated every time that the CHD is updated. A dedicated mechanism between the central and national level has been developed for this purpose e.g. web interface and a system-to-system service.

The CHD needs to be updated as soon as there are changes to the relevant IMO Codes and Conventions. Not keeping the database updated may have safety and legal implications, particularly when it is used by authorities for verification purposes and during incident response situations.

3 MAR-CIS Application

3.1 Objective

The MAR-CIS are datasheets of chemical substances developed by EMSA that contain relevant information for the initial phase of responding to incidents involving HNS (Hazardous and Noxious Substances). The aim is to improve Member States' preparedness to respond to chemical emergencies at sea by providing relevant information on the substances' physical and chemical properties, handling procedures and emergency spill response procedures, as well as maritime transport requirements for safe transport at sea.

3.2 Description and business use

The MAR-CIS database compiles relevant information for responding to incidents at sea involving Hazardous and Noxious Substances (HNS). The data is organised in categories and sub categories of information. It includes information from the IMO code that is shared with CHD database.

The user must accept the conditions for using MAR-CIS data. Presently it compiles information on 217 different substances. The user can search for a datasheet by name¹, by physical behaviour classes, by CAS Number and UN Number. The information is displayed and can be exported or saved as pdf. Each information field has a reference associated that describes the information source used and includes in some cases a url to the information source.

A glossary of terms used is included. Some terms in the MAR-CIS datasheets are linked to the corresponding term from the glossary.

The same MAR-CIS information can also be consulted and visualised through an application mobile device for Apple and Android devices. The applications are available at the Apple store and Google Play store. The mobile application allows offline access to MAR-CIS information when there is no internet connection. Only authorised can open the MAR-CIS application for mobile devices. The same username and password used for accessing MAR-CIS portal give access to the mobile Application.

The association between MAR-CIS and CHD is done manually through the MAR-CIS application by the MAR-CIS content administrator. The Hazmat ID and the MAR-CIS ID are used to link the two datasets.

For the MAR-CIS content administrator the entire database can be exported to an excel or csv file.

In November 2020 the BE-CHEM tool was released. It is integrated in MAR-CIS web portal and it is also available in the MAR-CIS application for mobile devices. The BE-CHEM tool can theoretically estimate the physical behaviour of chemical substances based on the input of certain physical and chemical properties of the substance. It classifies the substance in one of 13 different physical behaviour classes e.g. dissolve, floater, evaporator... The BE-CHEM tool complements the MAR-CIS information. For substances not in the MAR-CIS database, the BE-CHEM can provide an indication on the expected behaviour of the chemical once it is released to the environment.

At the end of 2020, another tool was released to support the MAR-CIS content administrator to generate advice for the information category "emergency response advice on board of vessels". Based on a combination of the hazard scenarios selection(s) and the "Physical behaviour" the system can populate the "Response actions", "In open area", "In confined spaces" and "To water" fields of the datasheet. The MAR-CIS content administrator can edit the generated text before saving it to the database.

¹ MAR-CIS datasheet name, IUPAC name, Proper shipping name (from the IMDG code), Product name (from the IBC and IGC code), Bulk cargo Shipping Name (from the IMSBC code) and other names.

3.3 Legal Background

MAR-CIS application has been developed in accordance with Regulation No 724/2004 setting a legal obligation for the Agency in the field of response to ship sourced pollution within European Union waters. Besides, the Action Plan for Hazardous and Noxious Substances (HNS) Pollution Preparedness and Response identifies the need to support Member States' preparedness to HNS incidents through the development of specialised information on chemical substances' potential fate and behaviour, associated hazards and impacts, and possible spill response options.

3.4 Users

MAR-CIS users are maritime response authorities responsible for or involved in responding to incidents involving chemical substances from EU (European Union), EFTA Member States and EU candidate/acceding coastal States. Recently, other countries part of European Neighbouring Policy (ENP) can also access MAR-CIS.

3.5 Overview of MAR-CIS functionalities

3.5.1 This chapter presents an overview of MAR-CIS functionalities according to the following MAR-CIS user profiles: MAR-CIS user

- Search for a MAR-CIS datasheet by name, UN number, CAS number and by physical behaviour.
- Filter the search results
- Display search results
- Export search results as XLS file
- Display the MAR-CIS information
- Export and share the MAR-CIS information in pdf format
- Provide feedback on a specific datasheet
- Use the BE-CHEM tool to estimate the physical behaviour of chemicals once released to water.

3.5.2 MAR-CIS content Administrator

- Create, update or delete MAR-CIS datasheets
- Export the entire MAR-CIS database in Excel: working version and online version
- Link the MAR-CIS datasheet with one or more CHD entry
- Check statistics related to the visitors on site, registered users, number of searches and export of search results
- Create, update or delete the glossary and the list of reference
- Update the content of the web application interface (About pages, Disclaimer)
- Use and the Emergency response advice tool to populate the "emergency response advice on-board of vessels"
- Modify the BE-CHEM threshold values for classifying
- Update datasheet template (associate a glossary term to the datasheet template)
- Check and download the history of changes to the database
- Gather feedback on MAR-CIS datasheets
- Manage the database: create/edit working version, delete and target version
- Value list maintenance

3.6 MAR-CIS access

The MAR-CIS information is made available to authorised users via:

- EMSA Maritime applications portal (MAP),
- Application for mobile devices.

3.7 MAR-CIS installation, upgrade and maintenance

MAR-CIS is hosted at Central level at EMSA. The database is maintained up-to-date by EMSA. Periodically (around three times per year), EMSA releases new versions of MAR-CIS database. The user of MAR-CIS application for mobile devices is also warned that a new version of the database is ready for download.

The MAR-CIS application for mobile devices is available for download at Google Play and Apple Stores.

As the MAR-CIS and CHD share datasets, the MAR-CIS database benefits from the IMO codes and Conventions updates. When these are updated in CHD the corresponding information is also updated in MAR-CIS.

4 Overview of MAR-CIS and CHD applications

The following diagram gives us a contextual overview of the CHD and MARCIS maritime applications:

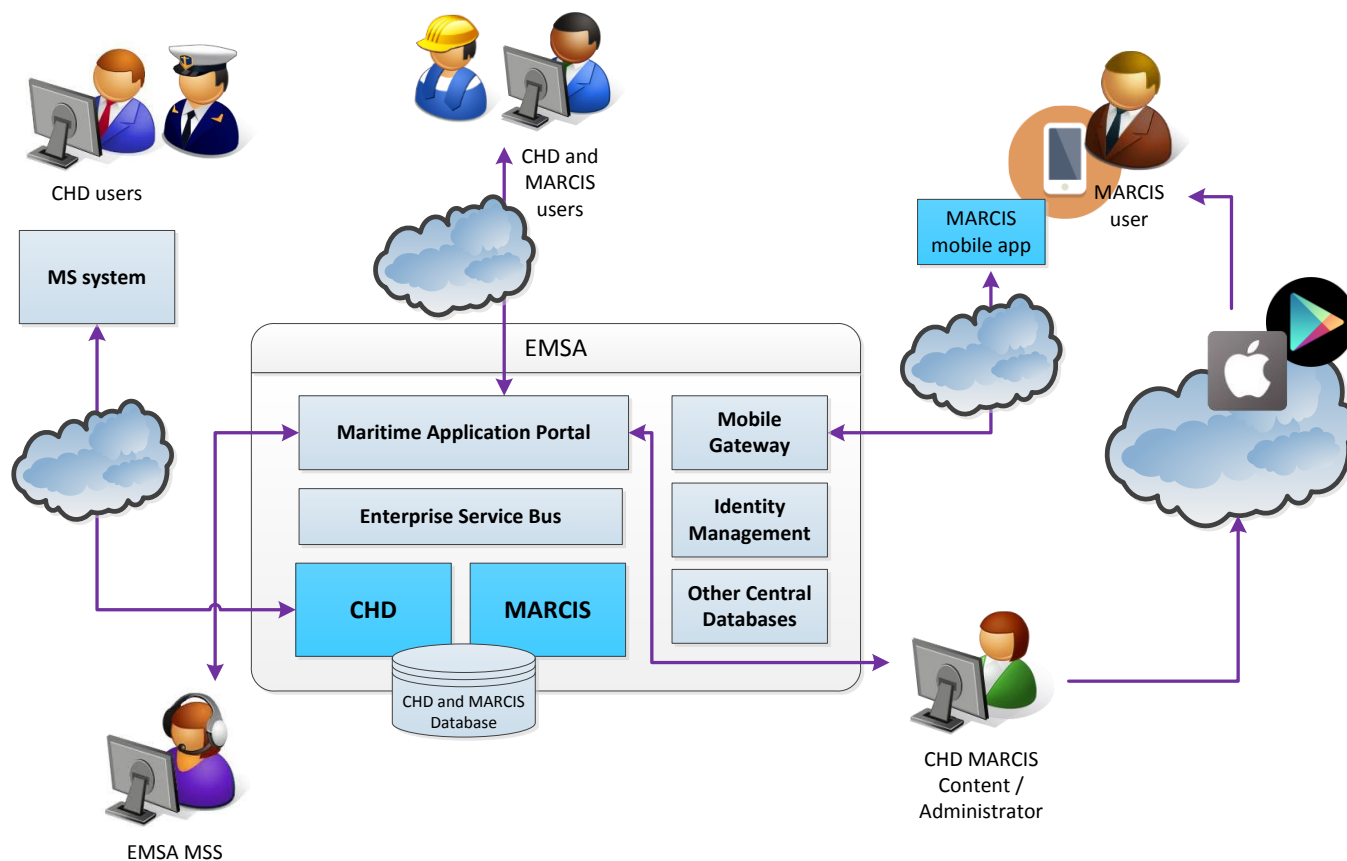


Figure 1 - CHD MARCIS context diagram

The information exchange between CHD and external systems is depicted on the left side.

At the centre (and bottom left) we can see accesses from multiple users (both CHD and MARCIS) and EMSA MSS through the EMSA Maritime Application Portal, which is the presentation layer of CHD and MARCIS databases.

On the right side it is also shown:

- Content administrators updating the CHD and MARCIS data
- MARCIS system administrators publishing new versions of the MARCIS mobile application to the cloud stores (Google Play and Apple store). After installing it, MARCIS mobile users can then interact with MARCIS application.

MAR-CIS and CHD are two distinct applications that share common data attributes from the IMO codes, see Annex A, Table 4. The MAR-CIS database has more IMO codes data attributes than the CHD database, see Annex A, Table 5. Therefore the CHD dataset also include these additional MAR-CIS data attributes from the IMO Codes. This will facilitate the updating of the data elements for MAR-CIS which originate from the IMO Codes and will ensure strict coherence between the two datasets. The Figure below summarises the datasets organisation.

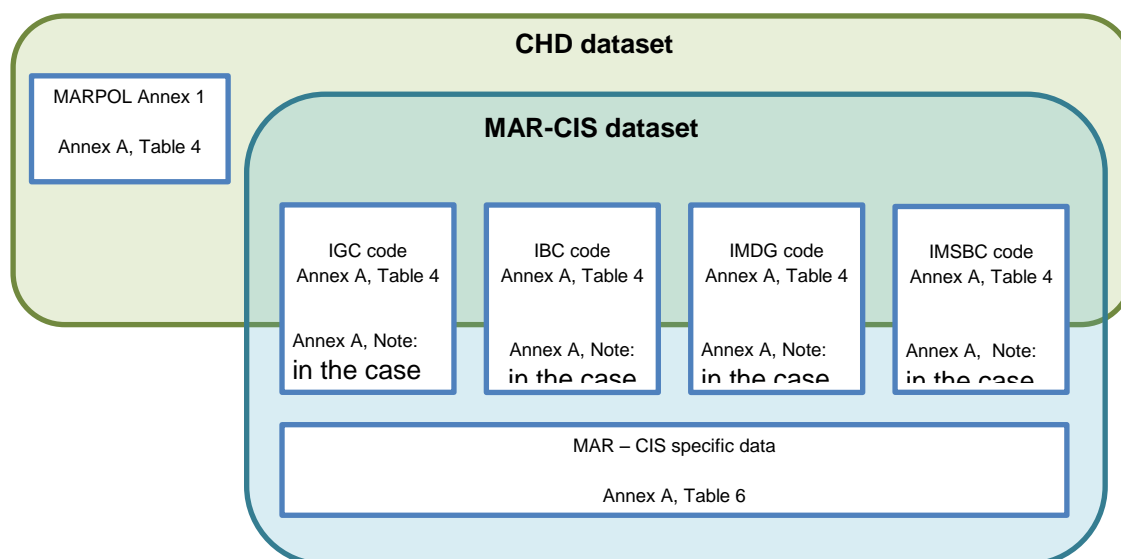


Figure 2 – CHD and MAR-CIS datasets

In terms of number of entries on each database, the CHD is substantially larger in comparison with the number of datasheets in MAR-CIS database. CHD has around 3400 entries and MAR-CIS has 217 datasheets. However each item (datasheet) in MAR-CIS has around 200 information fields, including references. CHD has only 17 per item.

One MAR-CIS datasheet can be linked to several CHD entries however only one CHD item from each IMO code (i.e. only 1 per IMO Code, i.e. IMDG, IBC, IMSBC, IGC codes). One CHD entry can be linked to two different MAR-CIS datasheets.

Certain fields from MAR-CIS and CHD datasets can have their value linked to explanatory text, a value list. The MAR-CIS and the CHD content administrator can modify the text associated.

5 Transition and Operational information

At EMSA, CHD and MARCIS are deployed in 3 environments (Test, Pre-Production and Production). The transition between the environments follows ITIL procedures adopted by EMSA and described in Appendix V – Working Procedures and Service Requirements (for Module 3).

The Pre-Production and Production environment dimensioning and architecture may differ slightly from Test environment in order to satisfy the non-functional requirements (those of e.g. type TEC or SCA) defined in section 2.1 and 3.1 of “Appendix III - Technical requirements for the Provision of ICT services to the MAR-CIS and CHD applications”.

The availability of Production environment is further ensured by disaster recovery procedures using EMSA’s Business Continuity Facility (BCF), described in more detail in the draft Framework contract, Enclosure 4 - General Terms and Conditions for Information Technology Contracts, Appendix A - System and Application Technical Landscape”.

The most recent version of CHD and MARCIS applications is v7.5.0.

The overall number of lines of code is around 60 000, divided in the following way per component:

Table 1 - Backend applications - lines of code per component as of 2018

MARCIS	18,340
CHD	13,159
Shared ²	8,730
CHD EXT	3,267
sub-total	43,496

Table 2 - Liferay - lines of code per Portlet as of 2018

CHD	5,356
MARCIS	8,002
sub-total	13,358

Table 3 - MARCIS Mobile App as of 2018

JS	1,853
HTML	488
CSS	1,189
sub-total	3,530

The source code to maintain (including database and test scripts) will be delivered to the Contractor after the signature of the contract. The information provided within this tender about the lines of source code could be different when the contract will be signed.

² Shared component that contains common functionalities and is utilized by CHD, CHD EXT and MARCIS

Annex A - CHD and MAR-CIS IMO codes and conventions elements

This Annex provides an indicative list of fields in MAR-CIS and CHD database. For more details on CHD and MAR-CIS schema, tables and data types check the *Annex B - System Database Design*

Table 4 – CHD IMO codes and conventions.

	CHD IMO codes and conventions	IMO codes and conventions				
		IBC	IGC	IMDG	IMSBC	Marpol Annex 1
1	HazmatID	x	x	x	x	x
2	DG classification	x	x	x	x	x
3	Textual reference	x*	x*	x*	x*	x
4	Mode of Carriage	x	x	x	x	x
5	Type of Product carried in bulk	x	x		x	x
6	Type of liquid	x				x
7	IMO hazard class	x*		x*	x*	
8	UN number			x		
9	Packing group			x*		
10	Subsidiary risks			x*	x*	
12	Flashpoint			x		
13	Marine Pollutant			x*		
14	Pollution category	x*				
15	EmS			x*		
16	Additional information			x*		
17	Reason for record update	x	x	x	x	x
18	MAR-CIS					

*Fields which are used both for MAR-CIS and CHD

Note: in the case of IBC's TPA substances, the fields vary slightly and the main difference to the IBC is that these substances (records) have a scope of applicability to one or more countries and may have a start and end dates of applicability. Additionally these substances may be called by their official name, commercial name and therefore any search made in CHD will be based on these names or the names of their individual components.

Records of substances under IBC TPA are not linked to MAR-CIS.

Table 5 - MAR-CIS IMO codes and conventions related fields

	MAR-CIS IMO codes and conventions related fields	IBC	IGC	IMDG	IMSBC	Marpol Annex 1
1	Stowage category			x		
2	Stowage code			x		
3	Handling code			x		
4	Segregation			x		
5	Ship type	x				
6	Tank type	x				
7	Tank vents	x				
8	Gauging	x				
9	Tank environmental control	x				
10	Vapour detection	x				
11	Fire protection	x				
12	Emergency equipment	x				
13	Description				x	
14	Angle of repose				x	
15	Bulk density				x	
16	Stowage factor				x	
17	Size				x	
18	Hazards				x	
19	Stowage and segregation				x	
20	Hold cleanliness				x	
21	Weather precautions				x	
22	Loading				x	
23	Precautions				x	
24	Ventilation				x	
25	Carriage				x	
26	Discharge				x	
27	Clean-up				x	
28	Special emergency equipment to be carried				x	
29	Emergency procedures				x	
30	Emergency action in the event of fire				x	
31	Medical first aid				x	
32	Ship type (IGC)		x			
33	Independent tank type C required (IGC)		x			
34	Control of vapour space within cargo tanks (IGC)		x			
35	Vapour detection (IGC)		x			
36	Gauging (IGC)		x			

Table 6 - MAR-CIS specific data

Information	MARCIS ID	
	Reason for record update	
	Datasheet references	
Warning	Value(s)	
	Reference(s)	
Identification	Name	Value(s)
		Reference(s)
	IUPAC name	Value(s)
		Reference(s)
	MAR-CIS product name	Value(s)
		Reference(s)
	CAS number	Value(s)
		Reference(s)
	EC number	Value(s)
		Reference(s)
	Index number	Value(s)
		Reference(s)
	Other names	Value(s)
		Reference(s)
	Identification references	
Substance properties	Substance properties	Value(s)
		Reference(s)
	Class	Value(s)
		Reference(s)
	Main uses	Value(s)
		Reference(s)
	Appearance	Value(s)
		Reference(s)
	Odour	Value(s)
		Reference(s)
	Behaviour (EBCS)	Value(s)
		Reference(s)
	Substance properties references	
Fire codes	Health	Value(s)
		Reference(s)
	Flammability	Value(s)
		Reference(s)
	Instability	Value(s)
		Reference(s)
	Special Hazards	Value(s)
		Reference(s)
	Fire codes references	
GESAMP profile	A1 Bioaccumulation	Value(s)
	A2 Biodegradation	Value(s)
	B1 Acute aquatic toxicity	Value(s)
	B2 Chronic aquatic toxicity	Value(s)
	C1 Mammalian acute oral toxicity	Value(s)
	C2 Mammalian acute dermal toxicity	Value(s)
	C3 Mammalian acute inhalation toxicity	Value(s)
	D1 Skin irritation and corrosion	Value(s)
	D2 Eye irritation and corrosion	Value(s)
	D3 Long-term health effects	Value(s)
	E1 Tainting	Value(s)
	E2 Physical effects on wildlife & benthic habitats	Value(s)
	E3 Interference with coastal amenities	Value(s)
	GESAMP profile references	
Overview	Overview	
	Overview references	
CLP/GHS classification and hazard communication	GHS pictogram	Value(s)
		Reference(s)
	Signal word	Value(s)
		Reference(s)
	Hazard statements	Value(s)
		Reference(s)
	Precautionary statements	Value(s)
		Reference(s)
	Note	Value(s)
		Reference(s)
	CLP/GHS classification and hazard communication references	

Health hazards	If swallowed		Value(s)
			Reference(s)
	If inhaled		Value(s)
			Reference(s)
	Skin/eye contact		Value(s)
			Reference(s)
	Odour threshold concentration		Value(s)
Substance intrinsic hazards			Reference(s)
	Fire / explosion		Value(s)
			Reference(s)
	Fume hazards		Value(s)
			Reference(s)
	Acids		Value(s)
			Reference(s)
	Shock		Value(s)
			Reference(s)
	Oxidising agents		Value(s)
			Reference(s)
	Air		Value(s)
			Reference(s)
	Fresh/sea water		Value(s)
			Reference(s)
	Alkalis		Value(s)
			Reference(s)
	With reducing agents		Value(s)
			Reference(s)
	With other substances		Value(s)
			Reference(s)
	Combustion by-products		Value(s)
			Reference(s)
	Substance intrinsic hazards references		
Environmental hazards	Behaviour		Value(s)
			Reference(s)
	Viscosity		Value(s)
			Reference(s)
	Eco toxicity		Value(s)
Emergency health measures			Reference(s)
	Environmental hazards references		
	Symptoms		Value(s)
			Reference(s)
	First aid response	Inhalation	Value(s)
			Reference(s)
		Ingestion	Value(s)
			Reference(s)
		Skin contact	Value(s)
			Reference(s)
		Eye contact	Value(s)
			Reference(s)
	Emergency health measures references		
Emergency response measures on board of vessels	Response actions		Value(s)
			Reference(s)
	In case of leakage/spillage	In open area	Value(s)
			Reference(s)
		In confined space	Value(s)
			Reference(s)
		To water	Value(s)
			Reference(s)
	Fire fighting	Extinguishing media	Value(s)
			Reference(s)
		Fire fighting methods	Value(s)
			Reference(s)
		Personal protective equipment	Value(s)
			Reference(s)
		Decontamination of personnel on-site	Value(s)
			Reference(s)
	Exposure safety limit		PAC 1
			Value(s)

	PAC 2	Value(s)
	PAC 3	Value(s)
		Reference(s)
	Monitoring/detection	Value(s)
		Reference(s)
Emergency response measures on board of vessels references		
Environmental protection measures	Intermediate storage	Value(s)
		Reference(s)
	Substance disposal	Value(s)
		Reference(s)
Environmental protection measures references		
Danger zones - toxic area of vapour cloud	Danger zone x1 y1	Has
		Note
	Danger zone x2 y1	Has
		Note
	Danger zone x1 y2	Has
		Note
	Danger zone x2 y2	Has
		Note
	Danger zone x1 y3	Has
		Note
	Danger zone x2 y3	Has
		Note
	Danger zone x1 axis label	
	Danger zone x2 axis label	
	Danger zone y1 axis label	
	Danger zone y2 axis label	
	Danger zone y3 axis label	
	Note	
Danger zones - toxic area of vapour cloud references		
First case history	Cause of the incident	Value(s)
		Reference(s)
	Type of cargo	Value(s)
		Reference(s)
	Year	Value(s)
		Reference(s)
	Location	Value(s)
		Reference(s)
	Response description	Value(s)
		Reference(s)
Second case history	Incident description	Value(s)
		Reference(s)
	Authority in charge for dealing with the incident	Value(s)
		Reference(s)
	First case history references	
	Cause of the incident	Value(s)
		Reference(s)
	Type of cargo	Value(s)
		Reference(s)
	Year	Value(s)
Physical and chemical properties		Reference(s)
	Location	Value(s)
		Reference(s)
	Response description	Value(s)
		Reference(s)
	Incident description	Value(s)
		Reference(s)
	Authority in charge for dealing with the incident	Value(s)
		Reference(s)
	Second case history references	
	Formula	Value(s)
		Reference(s)
	Molar mass	Value(s)
		Reference(s)
	Vapour pressure (at 20 °C)	Value(s)
		Reference(s)
	Melting point	Value(s)
		Reference(s)
	Vapour density (air=1)	Value(s)

		Reference(s)
	Boiling point	Value(s)
		Reference(s)
	Liquid surface tension (at 20 °C)	Value(s)
		Reference(s)
	Viscosity (at 20 °C)	Value(s)
		Reference(s)
	COD	Value(s)
		Reference(s)
	Density (at 20 °C)	Value(s)
		Reference(s)
	BOD	Value(s)
		Reference(s)
	Physical state (at 20 °C)	Value(s)
		Reference(s)
	Flammability limits in air	Value(s)
		Reference(s)
	Auto flammability	Value(s)
		Reference(s)
	Flash point (ABEL closed vessel)	Value(s)
		Reference(s)
	Flash point (TAG closed vessel)	Value(s)
		Reference(s)
	Decomposition temperature	Value(s)
		Reference(s)
	Partition coefficient log (octanol/water)	Value(s)
		Reference(s)
	Solubility in fresh water (at 20 °C)	Value(s)
		Reference(s)
	Physical and chemical properties references	
Solubility in sea water	Solubility in sea water 0g/kg 5°C	Value(s)
	Solubility in sea water 0g/kg 10°C	Value(s)
	Solubility in sea water 0g/kg 20°C	Value(s)
	Solubility in sea water 5g/kg 5°C	Value(s)
	Solubility in sea water 5g/kg 10°C	Value(s)
	Solubility in sea water 5g/kg 20°C	Value(s)
	Solubility in sea water 20g/kg 5°C	Value(s)
	Solubility in sea water 20g/kg 10°C	Value(s)
	Solubility in sea water 20g/kg 20°C	Value(s)
	Solubility in sea water 34g/kg 5°C	Value(s)
	Solubility in sea water 34g/kg 10°C	Value(s)
	Solubility in sea water 34g/kg 20°C	Value(s)
	Note	Value(s)
		Reference(s)
	Solubility in sea water references	

Annex B - System Database Design

Document version: 12.0

Document release date: 18/03/2021

Application version: 5.1.0

This document will be provided upon request by the potential tenderer. Please request via email to NEG282022@emsa.europa.eu.

Annex C – System (Software) Design Document

Document version: 16.0

Document release date: 18/03/2022

Application version: 5.1.0

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Annex D - System Requirements Specifications

Document version: 22.0

Document release date: 04/02/2021

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Annex E - User Manual

Document version: 15.0

Document release date: 14/05/20121

This document will be provided upon request by the potential tenderer. Please request via email to NEG282022@emsa.europa.eu.

Annex F - Interface Control Document

System Interface Guide

Document version: 10.0

Document release date: 11/02/2022

XSD version: 1.1.0

XSD release date: 14/05/2021

This document will be provided upon request by the potential tenderer. Please request via email to NEG282022@emsa.europa.eu.

Annex G - Installation Configuration Manual

Document version: 38.0

Document release date: 06/05/2022

This document will be provided upon request by the potential tenderer. Please request via email to NEG282022@emsa.europa.eu.

Annex H - MAR-CIS datasheet example



ANILINE



WARNING: - This substance is very toxic to aquatic life.
- Prevent generation of mists. ^{886, 1470}

KEY PROPERTIES

DENSITY (AT 20 °C)	1.02 g/cm ³
FLASH POINT #1 (CLOSED VESSEL)	70 °C

IDENTIFICATION

Name	Aniline
IUPAC name	Aniline ⁸⁸⁶
Proper shipping name	ANILINE ²
Product name	Aniline ⁴⁴
Other names (more on other names section)	· AMINO BENZENE · ANILIN · ANILIN · ANILINE · Aceite de anilina
Reference numbers	
UN number	1547
CAS number	62-53-3 ⁸⁸⁶
EC number	200-539-3 ⁸⁸⁶
Index number	612-008-00-7

SUBSTANCE PROPERTIES

Colourless liquid with musty fishy odour. Turns brown on exposure to air or light. Polymerizes slowly to a resinous mass on exposure to air and light. Low or very low-volatile. ^{1401, 1402, 1470}

Class	Amines, Aromatic. ¹⁴⁰¹
Main uses	Used to manufacture other chemicals, especially dyes, photographic chemicals, agricultural chemicals and others. ¹⁴⁰¹
Appearance	Colourless liquid. Turns brown on exposure to air or light. ¹⁴⁷⁰
Odour	Musty fishy odour. ¹⁴⁰¹
Behaviour (EBCS)	FD - floater / dissolver ¹

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ANILINE

FIRE CODES ¹¹⁴¹

Legend		No risk  Severe risk			
Health	Blue (Left)	0 to 4			
Flammability	Red (Top)	0 to 4			
Instability	Yellow (Right)	0 to 4			
Special Hazards	White (Bottom)	OX Oxidisers	SA Simple Asphyxiants	W Water Reactives	

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ANILINE

MARITIME TRANSPORT CODES

IMDG code (International Maritime Dangerous Goods Code) ²

IMDG Hazmat ID	IMDG_1547_9938	
UN number	1547	
Hazard class	6.1	Toxic substances
Packing group	II	Substances presenting medium danger
Emergency schedule EmS	F-A	General fire schedule
	S-A	Toxic substances
Plackard/label	 	
Stowage category	Category A	Cargo ships or passenger ships carrying a number of passengers limited to not more than 25 or to 1 passenger per 3 m of overall length, whichever is the greater number: on deck or under deck. Other passenger ships in which the limiting number of passengers transported is exceeded: on deck or under deck.
Stowage code	SW2	Clear of living quarters.
Segregation	SG35	Stow "separated from" SGG1 – acids.
Marine pollutant	P	Marine pollutant
Additional information	Colourless, oily, volatile liquid. Reacts with acids. Toxic if swallowed, by skin contact or by inhalation.	

IBC code (International Code for the construction and equipment of ships carrying dangerous chemicals in bulk) ⁴⁴

IBC Hazmat ID	IBC_0000_8519	
Marine pollution category	Y	Category Y-Substances under MARPOL Annex II
Hazards	S/P	Safety and pollution hazards
Ship type	2	Chemical tanker for products with appreciably severe environmental and safety hazards (significant preventive

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ANILINE

Ship type		measures)
Tank type	2G	Integral gravity tank
Tank vents	Cont	Controlled venting
Gauging	C	Closed gauging
Tank environmental control	No	No special requirements under this Code
Vapour detection	T	Toxic vapours
Fire protection	A	Alcohol-resistant foam or multi-purpose foam
	C	Water-spray
Emergency equipment	Yes	See note
Note	Ship shall be provided with suitable respiratory and eye protection sufficient for every person on board for emergency escape purposes, subject to the following: 1. filter-type respiratory protection is unacceptable; 2. self-contained breathing apparatus shall have at least a duration of service of 15 min; 3. emergency escape respiratory protection shall not be used for fire-fighting or cargo-handling purposes and shall be marked to that effect.	

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ANILINE

GESAMP PROFILE ¹

		0	1	2	3	4	5	6
BIOACCUMULATION	A1 Bioaccumulation	0						
	A2 Biodegradation	R : Readily biodegradable						
AQUATIC TOXICITY	B1 Acute aquatic toxicity	3						
	B2 Chronic aquatic toxicity	2						
ACUTE MAMMALIAN TOXICITY	C1 Mammalian acute oral toxicity	2						
	C2 Mammalian acute dermal toxicity	2						
	C3 Mammalian acute inhalation toxicity	3						
IRRITATION, CORROSION AND LONG TERM HEALTH EFFECTS	D1 Skin irritation and corrosion	1 : Mildly irritating						
	D2 Eye irritation and corrosion	3 : Severely irritating						
	D3 Long-term health effects	C : Carcinogen Ss : Sensitising to skin T : Target organ toxicity						
INTERFERENCE WITH OTHER USES OF THE SEA	E1 Tainting	NT : Not tainting (tested)						
	E2 Physical effects on wildlife & benthic habitats	FD : Floats/Dissolves						
	E3 Interference with coastal amenities	3 : Highly objectionable / closure of amenity						

LEGEND	maximum value
	maximum value reached
	() indicative or provisional classification

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ANILINE

OVERVIEW ⁸⁸⁶

This substance is toxic if swallowed, is toxic in contact with skin, is toxic if inhaled, causes damage to organs through prolonged or repeated exposure, is very toxic to aquatic life, causes serious eye damage, is suspected of causing genetic defects, is suspected of causing cancer and may cause an allergic skin reaction.

CLP/GHS CLASSIFICATION AND HAZARD COMMUNICATION ^{886, 3793}

According to the harmonised classification and labelling (CLP00) approved by the European Union.

GHS pictogram	   			
Signal word	Danger / Warning			
Hazard statements	.Skin. Sens. 1	H317	May cause an allergic skin reaction	
	Acute Tox. 3	H301	Toxic if swallowed	
	Acute Tox. 3	H311	Toxic in contact with skin	
	Acute Tox. 3	H331	Toxic if inhaled	
	Aquatic Acute 1	H400	Very toxic to aquatic life	
	Carc. 2	H351	Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	
	Eye Dam. 1	H318	Causes serious eye damage	
	Muta. 2	H341	Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	
	STOT RE 1	H372	Causes damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	

HEALTH HAZARDS

If swallowed	Toxic. ⁸⁸⁶
If inhaled	Toxic. ⁸⁸⁶
Skin/eye contact	- Skin: Toxic. - Eyes: Damaging. ⁸⁸⁶

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ANILINE

Odour threshold concentration	0.58 to 10 ppm. The odour warning when the exposure limit value is exceeded is insufficient. ^{1470, 1471}
Toxicity	Acute toxicity: ⁸⁸⁶ LD50 - Oral - rat: 442 - 930 mg/kg bw, approx. LD50 - oral - cat: 102 mg/kg bw, LC50 - inhalation - rat: (4 h) 839 ppm (rat), LD50 - dermal - cat: 254 mg/kg bw, LD50 - dermal - rabbit: 1,540 mg/kg bw.

SUBSTANCE INTRINSIC HAZARDS

Fire / explosion	Combustible substance, poorly flammable. ¹⁴⁰²
Combustion by-products	Toxic fumes including nitrogen oxides and carbon monoxide. ¹⁴⁰¹
Fume hazards	Aniline vapour forms explosive mixtures with air. ¹⁴⁰¹
Reactivity	
· Acids	Yes ¹⁴⁷¹
· Air	Yes ¹⁴⁰¹
· With reducing agents	
· Alkalis	Yes ¹⁴⁷¹
· Shock	
· Fresh/sea water	
· Oxidising agents	Yes ¹⁴⁷¹
· With other substances	The substance can react dangerously with oxygen, aniliniumchloride (heat/impact), benzene and its derivatives, benzenediazonium-2-carboxylate, chloroepoxypropane/impact, dibenzoyl peroxide, fluoro nitrate, nitrates, nitromethan, nitrosyl perchlorate, organic nitro compounds, ozone, perchlorates, perchloric acid, perchloryl fluoride, perchromates, peroxodisulfuric acid, peroxy compounds, hydrogen peroxide/impact, alkali/alkaline earth metals, fluorine, boron trichloride, chlorosulfonic acid, acetic anhydride, metalloid halides, toluene diisocyanate, alkalies and strong bases. ^{1402, 1471}

ENVIRONMENTAL HAZARDS

Behaviour	Soluble in water. ¹⁴⁰²
Viscosity	Oily liquid. ¹⁴⁰¹
Eco toxicity	Predicted No-Effect Concentration (PNEC): PNEC aquatic (freshwater) - 1.2 µg/L, PNEC aquatic (marine water) - 120 ng/L, PNEC aquatic (STP) - 2 mg/L, PNEC aquatic (sediment - freshwater) - 153 µg/kg sediment dw,

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ANILINE

Eco toxicity

PNEC aquatic (sediment - marine water) - 15.3 µg/kg sediment dw,
 PNEC soil - 33 µg/kg soil dw,
 PNEC predators (secondary poisoning) - 2.3 g/kg food.
 Short-term toxicity to fish: LC50 (48 h) - 28.3 mg/L, LC50 (4 days) 10.6 mg/L, LC50 (7 days) 8.2 mg/L.
 Short-term toxicity to aquatic invertebrates - EC50 (48 h) 160 µg/L,
 Long-term toxicity to aquatic invertebrates - EC50 (21 days) 44 µg/L,
 Toxicity to aquatic algae and cyanobacteria - EC50 (72 h) 175 mg/L,
 Toxicity to microorganisms - EC50 (2 h) 1 - 7 mg/L.
 Sediment toxicity: LC50 (28 days) - 66.1 - 104.6 mg/kg sediment dw,
 Toxicity to terrestrial plants: EC50 (14 days) - 33 - 56 mg/kg soil dw. ⁸⁸⁶

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ANILINE

EMERGENCY HEALTH MEASURES ¹⁴⁰¹

Always consult a doctor!

Symptoms	<ul style="list-style-type: none"> - Inhalation / Ingestion: Blue lips, fingernails and skin. Headache. Dizziness. Nausea. Vomiting. Weakness. Laboured breathing. Convulsions. - Skin: EASILY ABSORBED! Redness. Further see Inhalation. - Eyes: Redness. Pain. Corneal damage. ⁸⁸⁶
First aid response	
· Inhalation	<ul style="list-style-type: none"> - Move victims to fresh air. Emergency personnel should avoid self-exposure to aniline. - Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is laboured, administer oxygen or other respiratory support. - Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
· Ingestion	<ul style="list-style-type: none"> - Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is laboured, administer oxygen or other respiratory support. - Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures. - Vomiting may be induced with syrup of Ipecac. If elapsed time since ingestion of aniline is unknown or suspected to be greater than 30 minutes, do not induce vomiting and proceed to Step - Ipecac should not be administered to children under 6 months of age. Warning: Ingestion of aniline may result in sudden onset of seizures or loss of consciousness. Syrup of Ipecac should be administered only if victims are alert, have an active gag-reflex, and show no signs of impending seizure or coma. If ANY uncertainty exists, proceed to Step. - The following dosages of Ipecac are recommended: children up to 1 year old, 10 mL (1/3 oz); children 1 to 12 years old, 15 mL (1/2 oz); adults, 30 mL (1 oz). Ambulate (walk) the victims and give large quantities of water. If vomiting has not occurred after 15 minutes, Ipecac may be readministered. Continue to ambulate and give water to the victims. If vomiting has not occurred within 15 minutes after second administration of Ipecac, administer activated charcoal. - Activated charcoal may be administered if victims are conscious and alert. Use 15 to 30 g (1/2 to 1 oz) for children, 50 to 100 g (1-3/4 to 3-1/2 oz) for adults, with 125 to 250 mL (1/2 to 1 cup) of water. - Promote excretion by administering a saline cathartic or sorbitol to conscious and alert victims. Children require 15 to 30 g (1/2 to 1 oz) of cathartic; 50 to 100 g (1-3/4 to 3-1/2 oz) is recommended for adults.
· Skin contact	<ul style="list-style-type: none"> - Remove victims from exposure. Emergency personnel should avoid self-exposure to aniline. - Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is laboured, administer oxygen or other respiratory support. - Remove contaminated clothing as soon as possible. - Wash exposed skin areas twice with soap and water.

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· Skin contact	- Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
· Eye contact	<ul style="list-style-type: none"> - Remove victims from exposure. Emergency personnel should avoid self- exposure to aniline. - Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is laboured, administer oxygen or other respiratory support. - If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 15 minutes. - Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

EMERGENCY RESPONSE MEASURES ON BOARD OF VESSELS ¹²⁹⁶

Response actions	<ul style="list-style-type: none"> - KEEP PERSONNEL AWAY. STAY UPWIND. ALOHA danger zones: Initial safety zone (0.2 m³ release, wind speed 3 m/s [5.83 knots]): downwind >2.5 km (1.35 nm), 90 degrees >250 m (0.13 nm). - Continuously assess the situation. - Locate the substance and track the substance spilled. Estimate/forecast trajectory and dispersion. - Determine "no go area" and cold zone as safety perimeters by checking explosive limits, O₂, CO, CO₂, VOC, H₂S air concentrations. - Define the suitable PPE. - Determine the air concentration of the substance and check against the exposure safety limits. - Consider closing the nearby amenities areas pending monitoring the concentration of the substance in the water column. - Try to stop or at least reduce leak. - Change the position of the source if possible. Transfer to another container/tank of the ship/to another ship. - Controlled release if needed.
------------------	--

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In case of leakage/spillage

· In open area	<ul style="list-style-type: none"> - If safety of the crew and responders is not compromised, avoid disposal overboard. - Absorb. - Seal off low-lying compartments. - Keep bridge and living quarters up wind. - Remove ignition sources (e.g. use non sparking tools, explosion proof, intrinsically safe equipment). - Check explosion limits. - Water spray ("water mist"): Reduce the risk of fire and explosion, by cooling down hot surfaces or putting out sparks and suppressing flame formation.
· In confined space	<ul style="list-style-type: none"> - Absorb. - Remove ignition sources (e.g. use non sparking tools, explosion proof, intrinsically safe equipment). - Ventilate. Where a ventilation system is used particular attention should be taken to prevent toxic vapours or fumes from entering occupied areas of the ship.

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ANILINE

· In confined space	- Ventilate but beware of explosive limits. If the concentration of the substance in air is above the UEL ventilation might create a temporary explosive atmosphere. - Check explosion limits. - Do not enter space without appropriate PPE (e.g. ATEX and/or toxic). Keep clear. Check atmosphere before entering. If atmosphere cannot be checked, do not enter.			
· To water	- Remove ignition sources (e.g. use non sparking tools, explosion proof, intrinsically safe equipment). - Check explosion limits.			
Fire fighting				
· Extinguishing media	Water (spray - not splash), dry extinguishing powder, carbon dioxide. Fight large fire with alcohol resistant foam or water spray. ¹⁴⁰²			
· Fire fighting methods	Cool surrounding containers with water spray. If possible, take container out of dangerous zone. Heating causes a rise in pressure, risk of bursting and explosion. Do not allow runoff to get into the sewage system. ¹⁴⁰²			
Personal protective equipment	Wear self-contained breathing apparatus and special tightly sealed suit. ¹⁴⁰²			
Decontamination of personnel on-site	Drench contaminated suit and breathing apparatus with water/detergent before removing facemask and suit. Use chemical protection suit and self contained breathing apparatus while undressing contaminated co-workers or handling contaminated equipment. Contain decontamination runoff. For equipment clean-up seek specialist advice before leaving incident. ¹¹³			
Exposure safety limit	PAC 1	PAC 2	PAC 3	¹¹²
	8.0 ppm	12 ppm	20 ppm	
Monitoring/detection	GASTEC: Aniline 181; Dräger shortterm tubes: Aniline 0.5/a and Aniline 5/a; Sensidyne 181S; or equivalent. ^{1403, 1404, 1472}			
Emergency contacts				
· Contact Point	+33 2 98 33 10 10			
· Fax	+33 2 98 44 91 38			
· E-Mail	MAR-ICE@cedre.fr			

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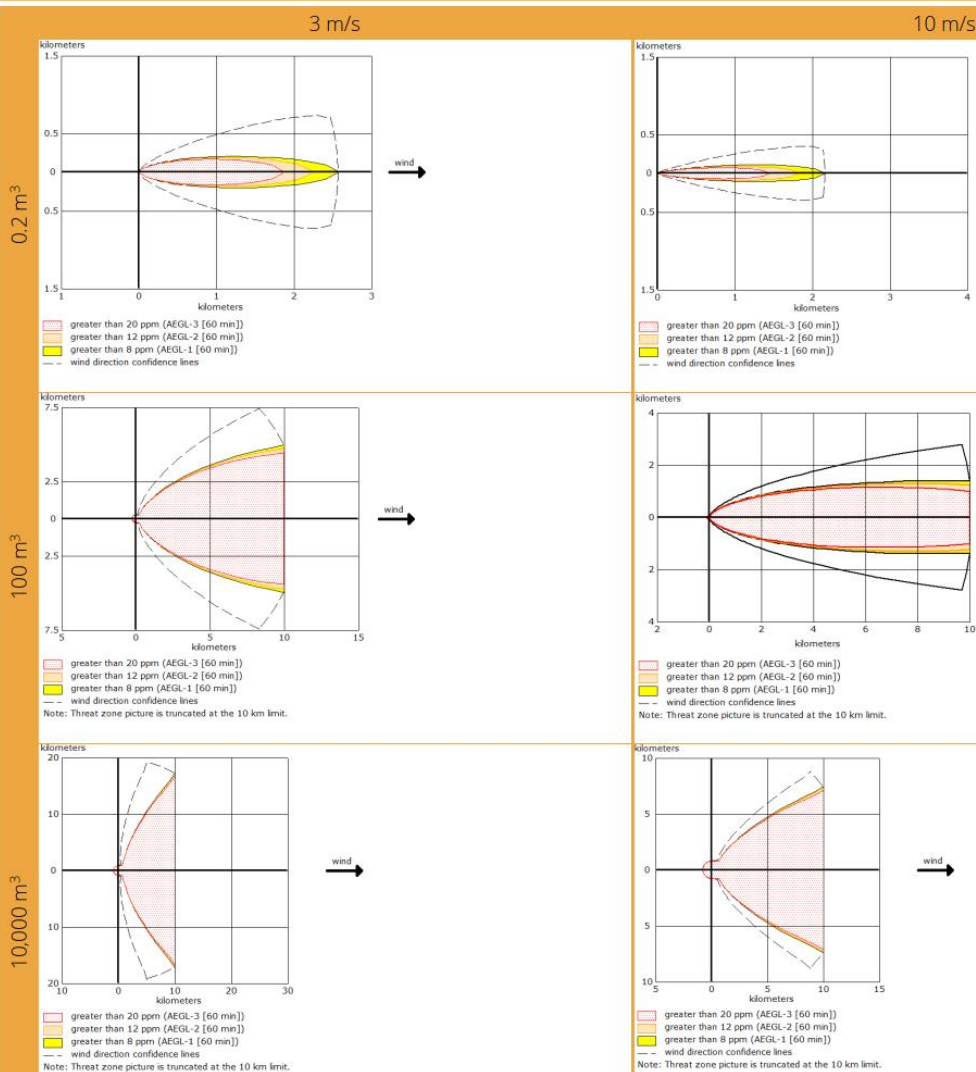
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ANILINE

DANGER ZONES - TOXIC AREA OF VAPOUR CLOUD 455



Note

The calculations were made using ALHOA version 5.4.7, Sep 2016. Substance ANILINE.

Source, ALHOA modelling software, version 5.4.6 (<https://www.epa.gov/comeo/aloha-software>).

Maximum predicted impacted area is 10 km.

Site data:

Location, Lat. 50°0'N Lon.10°0'W (elevat, 0 m)
Single storied building, unsheltered surroundings
Time, 16 March 2016, 12:00 GMT

Direct source:

Storage at ambient temperature
0.2 m³, 100 m³ or 10,000 m³, instantaneous source, 0 meters height

Atmospheric data:

Wind speed: 3 or 10 m/s, from 180° at 10 m height
Ground roughness is open water
Clear cloud cover
Air temperature: 20 °C
Stability class: D (neutral), no inversion height
Humidity: 50 %

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ANILINE

FIRST CASE HISTORY ^{6, 7}

Cause of the incident	Fire broke out during adverse weather in a freight container with sodium drums, which probably were inappropriately stowed.
Type of cargo	Close to 1,000 t of chemicals, including 1,430 barrels of sodium and 10 containers of flammable, toxic and/ or corrosive chemicals loaded on deck. There were 300 barrels of butanol, orthocresol, cyclohexane, aniline, butacrylate, and phthalic anhydride bags in five cargo holds.
Year	1987
Location	Off the coast of Spanish Finistère.
Incident description	On a voyage from Antwerp to Shanghai, the cargo of the Panamanian container ship Cason caught fire off the coast of Spanish Finistère, 1987 December 5. Cason first sent a distress message, and one hour later reported that the fire was out of control and that the ship was being abandoned. During the evacuation, 23 of her 31 crew died. Cason carried several different types of chemicals. But the fire probably started in one of the 11 containers of altogether 1430 drums of 126 tons of sodium.
Response description	A tug tried to salvage Cason, but adverse weather and the fire on board stopped the operation, and Cason went aground 100 m from the shore. It was only after grounding that the full diversity of the cargo became known. Part of the cargo on deck was being unloaded (orthocresol and formaldehyde) when a series of explosions occurred. A response team had started to unload orthocresol and formaldehyde drums. But bad weather stopped this work and caused more of the sodium drums to break and catch fire. Soon, the whole ship was on fire. Sodium drums that had fallen into the water were also burning. The fire could be seen far away at sea. 15,000 people within a 5-km-radius were evacuated in 300 buses overnight. Once the danger of explosion was ruled out, quality control of air, water and marine organisms was carried out in order to evaluate the possible threat to the public and the environment in the affected area. The results showed moderate levels of air and water contamination. Continuing bad weather conditions facilitated the dispersion and neutralization of the chemicals spilled. Seven days after the initial fire, it was possible to enter the stranded wreck again. The cargo could successively be recovered from Cason and from the shores. The operation was delayed several times because of the weather and technical difficulties. After three weeks the recovery of dangerous goods was regarded as completed. Analyses of marine organisms (mussels, barnacles and octopuses) showed no bioaccumulation of aniline and orthocresol. Comments on Response: The cargo of sodium made the whole operation very complex and dangerous. The great hazard of sodium made it impossible to carry out efficient response work before all the sodium had disappeared through reaction with water. Adverse weather, however, prevented response work also afterwards. Recovery of dangerous goods stowed under deck was difficult and delayed the operation.
Authority in charge for dealing with the incident	Not reported.

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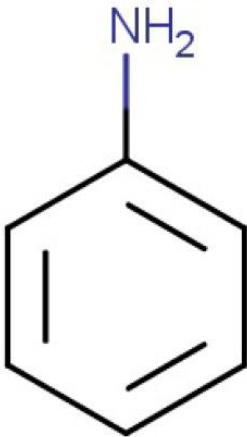
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ANILINE

PHYSICAL AND CHEMICAL PROPERTIES*

Structure				886
Formula	C ₆ H ₇ N ⁸⁸⁶			
Molar mass	93.13 g/mol ¹⁴⁰²	Vapour pressure (at 20 °C)	0.4 hPa ⁸⁸⁶	
Melting point	-6.2 °C ⁸⁸⁶	Vapour density (air=1)	3.22 ¹⁴⁰²	
Boiling point	184.4 °C ⁸⁸⁶	Liquid surface tension (at 20 °C)	0.0455 N/m ¹¹⁸¹	
Viscosity (at 20 °C)	1.62 - 4.35 mPa s ⁸⁸⁶	BOD	150%, 5 days ¹¹⁸¹	
Density (at 20 °C)	1.02 g/cm ³ ¹⁴⁰²	Flammability limits in air	1.2 / 11 vol.% [48 / 425 g/m ³] ¹⁴⁰²	
Physical state (at 20 °C)	Liquid ⁸⁸⁶	Flash point #1 (closed vessel)	70 °C ¹⁴⁷¹	
Auto flammability	630 °C ⁸⁸⁶	Decomposition temperature	> 190 °C ¹⁴⁷⁰	
Partition coefficient log (octanol/water)	0.91 (25 °C and pH 7.5) ⁸⁸⁶	Solubility in fresh water (at 20 °C)	35 g/L ⁸⁸⁶	

* Physical and chemical properties parameters of the substances may vary depending on the content of impurities. The values given here are only an indication.

SOLUBILITY IN SEA WATER ⁹⁰

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ANILINE

Solubility in sea water	Temperature (°C)	5	10	20
	Salinity (g/kg)			
	0	39.1 g/L ±9.08 %	38.8 g/L ±9.73 %	35.3 g/L ±1.81 %
	5	38.1 g/L ±12.8 %	39.1 g/L ±3.50 %	37.2 g/L ±8.58 %
	20	35.8 g/L ±5.77 %	39.0 g/L ±10.6 %	34.7 g/L ±10.3 %
	34	32.6 g/L ±8.42 %	35.3 g/L ±2.54 %	32.1 g/L ±9.34 %

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ANILINE

OTHER NAMES ^{10, 886}

1. AMINO BENSEEN	2. ANILIIN
3. ANILIN	4. ANILINE
5. Aceite de anilina	6. Amidobenzen
7. Amidobenzenè	8. Amidobenzol
9. Amino benzene	10. Aminobenceno
11. Aminobenzen	12. Aminobenzene
13. Aminobenzenè	14. Aminobenzol
15. Aminophen	16. Anilina
17. Aniline Oil	18. Anilinoel
19. Anilinum	20. Anilinöl
21. Benzene amine	22. Benzeneamine
23. Benzidam	24. Benzolamin
25. Blue oil	26. CI 7600
27. Cyanol	28. FENÜÜLAMIIN
29. Fenilamina	30. Huile d'aniline
31. Krystallin	32. Kyanol
33. Phenylamin	34. Phenylamine
35. Phénylamin	36. Red oil
37. Rotoel	38. Rotöl

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ANILINE

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