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The Scottish Government
Riaghaltas na h-Alba

Marine Licence Application for Construction Projects

Version 1.0

Marine (Scotland) Act 2010

Marine Scotland, 375 Victoria Road, Aberdeen, AB11 9DB
http://www.gov.scot/Topics/marine/Licensing/marine

Acronyms

Please note the following acronyms referred to in this application form:

BPEO	Best Practicable Environmental Option
EIA	Environmental Impact Assessment
ES	Environmental Statement
MHWS	Mean High Water Springs
MMO	Marine Mammal Observer
MPA	Marine Protected Area
MS-LOT	Marine Scotland – Licensing Operations Team
PAM	Passive Acoustic Monitoring
SAC	Special Area of Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WGS84	World Geodetic System 1984

Explanatory Notes

The following numbered paragraphs correspond to the questions on the application form and are intended to assist in completing the form. These explanatory notes are specific to this application and so you are advised to read these in conjunction with the Marine Scotland Guidance for Marine Licence Applicants document.

1. Applicant Details

The person making the application who will be named as the licensee.

2. Agent Details

Any person acting under contract (or other agreement) on behalf of any party listed as the applicant and having responsibility for the control, management or physical deposit or removal of any substance(s) or object(s).

3. Payment

Indicate payment method. Cheques must be made payable to: The Scottish Government.

Marine licence applications will not be accepted unless accompanied by a cheque for the correct application fee, or if an invoice is requested, until that invoice is settled. Target timelines for determining applications do not begin until the application fee is paid.

4. Application Type

Indicate if the application is for a new construction site or an existing construction site. Provide the existing or previous consent/licence number and expiry date if applicable.

5. Project Details

(a) Give a brief description of the project (e.g. construction of a new sea outfall).

(b) Provide the total area of proposed works in square metres.

(c) Provide the proposed start date of the project. The start date will not be backdated, since to commence a project for which a licence has not been obtained will constitute an offence, which may result in appropriate legal action. A licence is normally valid for the duration of the project but not exceeding 3 years. If a project will not be completed before a marine licence lapses, it will be necessary for licence holders to re-apply for a further licence to continue any ongoing work at least 14 weeks prior to the expiry date of the licence. **Target duration for determination of a marine licence application is 14 weeks.**

(d) Provide the proposed completion date of the project.

(e) Provide the cost of the works seawards of the tidal limit of MHWS. This estimate should only cover

work taking place below the tidal level of MHWS and must take into consideration the cost of materials, labour fees etc.

(f) Describe the location of the proposed works. Include a list of the latitude and longitude co-ordinates (WGS84) of the boundary points of the proposed project. WGS84 is the World Geodetic System 1984 and the reference co-ordinate system used for marine licence applications. Co-ordinates taken from GPS equipment should be set to WGS84. Coordinates taken from recent admiralty charts will be on a WGS84 compatible datum. Ordnance survey maps do not use WGS84. In a few cases, (e.g. laying of long pipelines) it may only be practicable to supply co-ordinates for the start and end points.

Example: For positions read from charts the format should be as in the example: 55°55.555'N 002°22.222'W (WGS84). The decimal point specifies that decimals of minutes are used and the datum is stated explicitly. If seconds are used then the format should be as in the example: 55°55'44"N 2°22'11"W (WGS84).

It is important that the correct positions, in the correct format, are included with this application, as any errors will result in the application being refused or delayed.

To supplement your application, please provide photographs of the project location and submit these with your application. Please also provide a suitably scaled extract of an Ordnance Survey Map (1:2,500 scale but not more than 1:10,000) or Admiralty Chart which must be marked to indicate:

- the full extent of the works in relation to the surrounding area;
- latitude and longitude co-ordinates defining the location of the works;
- the level of MHWS;
- any adjacent SAC, SPA, SSSI, MPA, Ramsar or similar conservation area boundary.

Drawings and plans will be consulted upon. If they are subject to copyright, **it is the responsibility of the applicant to obtain necessary approvals to reproduce the documents and to submit suitably annotated copies with the application.**

Sewer outfalls, discharge pipes for industrial waste etc. The size and description of the pipe must be shown on the longitudinal sections and also details of its supports, foundations, methods of jointing and details of any tidal flaps.

Bridges over tidal waters: An elevation with longitudinal and cross-sections of the bridge to a suitable scale must show the dimensions of the spans and width of piers, etc. above and below MHWS and the maximum and minimum heights of the undersides of the superstructures above MHWS. The headroom above MHWS and the width of span of the nearest bridges, if any, above and below the site must be stated.

Tunnels under tidal waters: The longitudinal section of the tunnel must show the distances between the bed of the river or estuary and the top of the tunnels. Cross-sections must show the internal and external dimensions of the tunnel and particulars of construction. When a proposed future dredging level is known this must also be shown on all sections.

Overhead cables: Catenary must be supplied in addition to the site plan showing the minimum clearance of the cable at MHWS and the electrical clearance allowed.

(g) Indicate if the project is located within the jurisdiction of a statutory harbour authority and provide details of the statutory harbour authority where relevant.

(h) Provide a full method statement, including schedule of works and the ultimate fate of the structure.

(i) Provide assessment of the potential impacts the works may have, including interference with other uses of the sea. Please include details of areas of concern e.g designated conservation areas, such as a SAC, SPA, SSSI, MPA or Ramsar site and shellfish harvesting areas. Further guidance on designated conservation areas can be obtained from SNH at this website:

http://gateway.snh.gov.uk/sitelink/index.jsp and guidance on shellfish harvesting areas can be obtained from http://www.foodstandards.gov.scot/ with regards to the Shellfish Waters Directive (2006/113/EC) which has parameters set to protect the water quality in which edible shellfish are grown.

Applicants should also be aware of the need to pay due regard to coastal and marine archaeological matters and attention is drawn to Historic Scotland's Operational Policy Paper HP6, "Conserving the Underwater Heritage".

Any application for beach replenishment works must be cross checked as to whether the proposed site is a designated bathing water site. If so, all physical works should ideally be done outwith the Bathing Water Season (1st June to 15th September). Further guidance on the Bathing Waters Directive (2006/7/EC) can be obtained from http://apps.sepa.org.uk/bathingwaters/.

Where there are potential impacts from the works, please provide details of proposed mitigation, such as use of MMOs or PAM, in response to potential impacts.

6. Deposits and/or Removals

(a) Complete the table to indicate all permanent substances or objects to be deposited and/or removed from below MHWS. If you propose using types of substances or objects for which a specific box is not provided in the table, please describe the nature of such substances or objects in the box marked "other".

(b) Please indicate the method of delivery of any substance(s) or object(s) to be placed below MHWS.

(c) Where the proposed work involves salt marsh feeding, beach replenishment or land reclamation the description of the substances or objects must include details of its chemical quality. Where the substances or objects have not been chemically analysed, MS-LOT may request representative samples for analysis or require the applicant to arrange for analyses to be undertaken before the marine licence application can be determined.

(d) If temporary deposits are required, please provide details as with the permanent deposits above. The temporary deposit location details (Latitude and Longitude WGS84) must be added to the form, and the period of time the site will be used must be provided. If granting a licence, MS-LOT will include on the document details of any area that has been approved as a temporary deposit site.

7. Disposal of Dredged Substance(s) or Object(s) at Sea

(a) If you are proposing to dispose of any excess substance(s) or object(s) arising from the project at sea, a separate marine licence will be required (see Dredging and Sea Disposal application form). The granting of a marine licence for construction projects does not imply that a marine licence for sea disposal will also be granted as different assessment criteria are used to determine each type of application. If a separate application is being submitted for dredging and sea disposal then this must be accompanied with a BPEO report.

(b) Provide the quantity of dredged substance(s) or object(s) for sea disposal in wet tonnes.

8. Noise Monitoring

Under the Marine Strategy Regulations (2010), there is now a requirement to monitor loud, low to mid frequency (10Hz to 10kHz) impulsive noise. Activities where this type of noise is produced include seismic airguns, other geophysical surveys (<10kHz), pile driving, explosives and certain acoustic deterrent devices. Where noisy activity is being undertaken, you must complete an initial registration form for the noise registry which allows you to provide details on the proposed work. Completion of a 'close-out' form, which allows licensees to provide details of the actual dates and locations where the activities occurred, is also required within 12 weeks of the completion of the 'noisy' activity or, in the case of prolonged activities such as piling for harbour construction or wind farms, at quarterly intervals or after each phase of foundation installation.

These forms can be downloaded from:
http://www.scotland.gov.uk/Topics/marine/science/MSInteractive/Themes/noise-reduction

Marine licence applications will not be accepted until this form has been completed and submitted.

9. Statutory Consenting Powers

Please describe in the answer to this question what (if any) statutory responsibilities you (or your client) have to consent any aspect of the project.

10. Scotland's National Marine Plan

Scotland's National Marine Plan has been prepared in accordance with the EU Directive 2014/89/EU, which came into force in July 2014. The Directive introduces a framework for maritime spatial planning and aims to promote the sustainable development of marine areas and the sustainable use of marine resources. It also sets out a number of minimum requirements all of which have been addressed in this plan. In doing so, and in accordance with article 5(3) of the Directive, Marine Scotland have considered a wide range of sectoral uses and activities and have determined how these different objectives are reflected and weighted in the marine plan. Land-sea interactions have also been taken into account as part of the marine planning process. Any applicant for a marine licence should consider their proposals with reference to Scotland's National Marine Plan. A copy of Scotland's National Marine Plan can be found at: http://www.gov.scot/Publications/2015/03/6517/0

Indicate whether you have considered the project with reference to Scotland's National Marine Plan and provide details of considerations made with reference to the policies, including but not limited to General Policies 7 and 13 (GEN 7 and GEN 13), that have been considered. If you have not considered the project with reference to Scotland's National Marine Plan please provide an explanation.

11. Pre-Application Consultation

Certain activities will be subject to public pre-application consultation. Activities affected will be large projects with the potential for significant impacts on the environment, local communities and other legitimate uses of the sea. The new requirement will allow those local communities, environmental groups and other interested parties to comment on a proposed development in its early stages – before an application for a marine licence is submitted. Further information can be obtained from: http://www.scotland.gov.uk/Resource/0043/00439649.pdf

If applicable, please provide your pre-application consultation report with your application.

12. Consultation (other than carried out under pre-application consultation)

Provide details of all bodies consulted and give details of any consents issued including date of issue.

13. Environmental Assessment

(a) Under the Marine Works Environmental Impact Assessment (EIA) Regulations 2007, there may be a requirement for certain projects to undergo an EIA and produce an ES. If EIA is required, MS-LOT will not determine a marine licence application until the EIA consent decision in respect of the marine licence application has been reached. Please confirm if the project falls under Annex I or II of Directive 85/337/EEC: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0092&from=EN in relation to the Marine Works (EIA) Regulations 2007.

Marine licence applications for proposals which fall under the regulations will not be accepted unless a screening opinion has been issued in relation to this.

(b) Please indicate if an EIA has been undertaken and whether it was for the marine licence application to which this application relates or for any other EIA regulator (e.g local authority). Please attach any previous ES to the application.

MS-LOT will not determine a marine licence application until the EIA consent decision in respect of any regulated activity associated with the marine licence application has been reached.

14. Associated Works

Indicate whether the application is associated with any other marine projects (e.g. land reclamation, marine/harbour construction works, dredging and sea disposal etc). If this is the case, provide reference/licence number for the related marine projects.

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It is the responsibility of the applicant to obtain any other consents or authorisations that may be required.

Under Section 54 of the Marine (Scotland) Act 2010, all information contained within and provided in support of this application will be placed on a Public Register. There are no national security grounds for application information not going on the Register under the 2010 Act.

Public Register

Do you consider that any of the information contained within or provided in support of this application should not be disclosed:

(a) for reasons of national security; YES ☐ NO ■

(b) for reasons of confidentiality of commercial or industrial information where such confidentiality is provided by law to protect a legitimate commercial interest? YES ☐ NO ■

If **YES**, to either (a) or (b), please provide full justification as to why all or part of the information you have provided should be withheld.

1. Applicant Details

Title: Redacted Initials: Redacted Surname: Redacted

Trading Title (if appropriate): N/A

Address: Estates Department, University of St Andrews, Woodburn Place, St Andrews, Fife, KY1 8LA

Name of contact (if different): N/A

Telephone No. (inc. dialing code): Redacted

Email: Redacted

Statutory Harbour Authority? YES ☐ NO ■

If **YES**, please provide a list of the latitude and longitude co-ordinates (WGS84) of the boundary points of the area of harbour jurisdiction using Appendix 01 Additional Co-ordinates form if necessary.

2. Agent Details (if any)

Title: Redacted Initials: Redacted Surname: Redacted

Trading Title (if appropriate):

Address: Ramboll Environment and Health UK Ltd,
5th Floor, 7 Castle Street,
Edinburgh, EH2 3AH

Name of contact (if different): N/A

Telephone No. (inc. dialing code): Redacted

Email: Redacted

3. Payment

Enclosed Cheque ■ Invoice ☐

Contact and address to send invoice to:

Applicant ☐ Agent ☐ Other ☐

If **OTHER**, please provide contact details:

Title: Initials: Surname:

Address:

Email:

WARNING

It is an offence under the Act under which this application is made to fail to disclose information or to provide false or misleading information.

Target duration for determination is 14 weeks. Please note that missing or erroneous information in your application and complications resulting from consultation may result in the application being refused or delayed.

Marine licence applications will not be accepted unless accompanied by a cheque for the correct application fee, or if an invoice is requested, until that invoice is settled. Target timelines for determining applications do not begin until the application fee is paid.

Declaration

I declare to the best of my knowledge and belief that the information given in this form and related papers is true.

Signature Redacted Date 19/12/18

Name in BLOCK LETTERS Redacted

Application Check List

Please check that you provide all relevant information in support of your application, including but not limited to the following:

- Completed and signed application form ☑
- Project Drawings ☑
- Maps/Charts ☑
- Co-ordinates of the boundary points of the area of harbour jurisdiction (if you are a statutory harbour authority) ☐
- Method Statement ☑
- Photographs of the location of the project ☑
- Additional information e.g. consultation correspondence (if applicable) ☑
- Noise Registry – Initial Registration Form (if applicable) ☐
- Pre-application Report (if applicable) ☐
- Environmental Statement (if applicable) ☐
- Payment (if paying by cheque) ☑

4. Application Type

Is this application for a new construction site or an existing construction site:

New Site ☒ Existing Site ☐

If an **EXISTING SITE**, please provide the consent/licence number and expiry date:

Consent/Licence Number	Expiry Date
N/A	

5. Project Details

(a) Brief description of the project (e.g. construction of a new sea outfall):

The project will comprise repairs to the existing North Motray Sea Wall, Guardbridge, Fife which forms the boundary between the former Guardbridge paper mill (currently being redeveloped by the University of St Andrews) and the Motray Water. The works will be undertaken in three phases, commencing in May 2019. The phases are illustrated on the attached drawing prepared by GVA. The working period each year will be between the beginning of May and the end of September to mitigate the presence of migrating birds in the Eden Estuary during the winter months,

(b) Total area of the proposed works (in square metres):

260 m^2

(c) Proposed start date **(Target duration for determination of a marine licence application is 14 weeks):**

06/05/2019

(d) Proposed completion date:

30/09/2021

(e) Cost of the works seawards of the tidal limit of MHWS:

£ <£750,000 (cost of entire project)

(f) Location:

The North Motray Sea Wall forms the boundary between the former Guardbridge Paper Mill to the south and the Motray Water to the north. Coordinates for the western and south eastern extent of the wall repairs are provided overleaf. A drawing indicating the location of the sea wall in relation to the surrounding area is presented as Figure 1 which is appended to the Environmental Impact Report (EIR).

Latitude and Longitude co-ordinates (WGS84) defining the extent of the project (continue on Appendix 01 Additional Co-ordinates form if necessary):

Latitude										Longitude										
5	6	°	2	2	.	0	2	5	' N		-	2	°	5	3	.	4	9	8	' W
5	6	°	2	1	.	9	2	9	' N		-	2	°	5	3	.	3	2	8	' W
5	6	°	2	1	.	9	1	3	' N		-	2	°	5	3	.	3	3	9	' W
		°			.				' N				°			.				' W
		°			.				' N				°			.				' W
		°			.				' N				°			.				' W
		°			.				' N				°			.				' W
		°			.				' N				°			.				' W
		°			.				' N				°			.				' W
		°			.				' N				°			.				' W

(g) Is the project located within the jurisdiction of a statutory harbour authority?

YES ☐ NO ■

If **YES**, please specify statutory harbour authority:

N/A

(h) Method statement including schedule of work (continue on separate sheet if necessary):

At the time of preparing this application, the contract for the construction works was in the process of being tendered and the contractor remains to be confirmed.
A draft Method Statement for the repairs to the North Motray Sea Wall has been prepared by Concrete Repairs Limited (CRL). CRL was appointed to carry out the repair works to the East Sea Wall in 2017 and 2018 under Marine License Number 06556/17/0 and was consulted for advice regarding the expected methodology.

The works will be completed in three phases between the beginning of May and the end of September in 2019, 2020 and 2021 due to the ecological designations associated with the adjacent estuary.

Updated Method Statements and a confirmed Work Schedule can be provided following contractor appointment if required.

(i) Potential impacts the works may have (including details of areas of concern e.g designated conservation and shellfish harvesting areas) and proposed mitigation in response to potential impacts (continue on separate sheet if necessary):

Environmental impacts of the proposed construction works are considered in the appended Environmental Impact Report (EIR).

6. Deposits and/or Removals

(a) **Permanent** substance(s) or object(s) to be deposited and/or removed from below MHWS (continue on a separate sheet if necessary):

	Deposits		Removals	
Type of Deposit/Removal	Description	Quantity & Dimensions (metric)	Description	Quantity & Dimensions (metric)
Steel/Iron	Relevant quantities of all materials are included in Section 4 of the EIR.	No.		No.
		Dimensions		Dimensions
		Weight (kg/tonnes)		Weight (kg/tonnes)
Timber		No.		No.
		Dimensions		Dimensions
		Weight (kg/tonnes)		Weight (kg/tonnes)
Concrete		No.		No.
		Dimensions		Dimensions
		Weight (kg/tonnes)		Weight (kg/tonnes)
Plastic/Synthetic		m^2		m^2
Clay (< 0.004 mm)		Volume (m^3)		Volume (m^3)
		Weight (kg/tonnes)		Weight (kg/tonnes)
Silt (0.004 ≤ Silt < 0.063 mm)		Volume (m^3)		Volume (m^3)
		Weight (kg/tonnes)		Weight (kg/tonnes)
Sand (0.063 ≤ Sand < 2.0 mm)		Volume (m^3)		Volume (m^3)
		Weight (kg/tonnes)		Weight (kg/tonnes)
Gravel (2.00 ≤ Gravel < 64.0 mm)		Volume (m^3)		Volume (m^3)
		Weight (kg/tonnes)		Weight (kg/tonnes)
Cobbles (64.0 ≤ Cobbles < 256.0 mm)		Volume (m^3)		Volume (m^3)
		Weight (kg/tonnes)		Weight (kg/tonnes)
Boulders (≥ 256.0 mm)		Volume (m^3)		Volume (m^3)
		Weight (kg/tonnes)		Weight (kg/tonnes)

Pipe		Length (m) External Diameter (cm/m)		Length (m) External Diameter (cm/m)
Other (please describe below):				

(b) Method of delivery of substance(s) or object(s):

Substances will be delivered via road and will be placed below MWHS at low tide.

Note: All materials to be placed and removed as part of the wall repairs are listed in Section 4.1 of the EIR.

(c) For work involving salt marsh feeding, beach replenishment or land reclamation please provide the following information relating to the substance(s) or object(s) to be deposited:

Quantity (tonnes):

tonnes

Nature of substance(s) or object(s) (e.g. sand, silt, gravel etc.):

Source (if sea dredged state location of origin)

Particle size:

Have the substance(s) or object(s) been chemically analysed? **YES** ☐ **NO** ☐
If YES, please include the analysis data with your application

(d) **Temporary** substance(s) or object(s) to be deposited below MHWS (continue on a separate sheet if necessary):

Type of Deposit	**Description**	**Quantity & Dimensions** (metric)
Steel/Iron	Relevant quantities of all temporary materials are provided in Section 4 of the EIR.	No.
		Dimensions
		Weight (kg/tonnes)
Timber	Relevant quantities of all temporary materials are provided in Section 4 of the EIR.	No.
		Dimensions
		Weight (kg/tonnes)

Concrete		No. Dimensions Weight (kg/tonnes)
Plastic/Synthetic		m^2
Clay (< 0.004 mm)		Volume (m^3) Weight (kg/tonnes)
Silt (0.004 ≤ Silt < 0.063 mm)		Volume (m^3) Weight (kg/tonnes)
Sand (0.063 ≤ Sand < 2.0 mm)		Volume (m^3) Weight (kg/tonnes)
Gravel (2.00 ≤ Gravel < 64.0 mm)		Volume (m^3) Weight (kg/tonnes)
Cobbles (64.0 ≤ Cobbles < 256.0 mm)		Volume (m^3) Weight (kg/tonnes)
Boulders (≥ 256.0 mm)		Volume (m^3) Weight (kg/tonnes)
Pipe		Length (m) External Diameter (cm/m)
Other (please describe below):		

7. Disposal of Dredged Substance(s) or Object(s) at Sea

(a) Do you intend to apply for a marine licence for sea disposal of dredged substance(s) or object(s) as part of the project? YES ☐ NO ■

If **YES**, please specify nature of substance(s) or object(s) (e.g sand, gravel, silt, clay, rock etc.):

N/A

(b) Quantity of substance(s) or object(s) (wet tonnes):

wet tonnes

A separate marine licence application will be required to be submitted for sea disposal.

8. Noise Monitoring

Will loud, low to mid frequency (10Hz to 10kHz) impulsive noise be produced by the project? YES ☐ NO ■

If **YES**, which please indicate the noise generating activities and sound frequencies:

Noise Generating Activity	Sound Frequency (Hertz)
Use of Explosives	
Use of Accoustic Deterrent Devices	
Piling	
Other (please describe below):	

If you have ticked **YES**, please complete the Noise Registry – Initial Registration form located at: http://www.scotland.gov.uk/Topics/marine/science/MSInteractive/Themes/noise-reduction

Marine licence applications will not be accepted until this form has been completed and submitted.

9. Statutory Consenting Powers

Do you, or (if appropriate) your client, have statutory powers to consent any aspect of this project?

No

10. Scotland's National Marine Plan

Have you considered the application with reference to Scotland's National Marine Plan? YES ■ NO ☐

If **YES**, provide details of considerations made with reference to the policies, including but not limited to General Policies 7 and 13 (GEN 7 and GEN 13), that have been considered:

The Application has been considered with reference to the following General Policies of Scotland's National Marine Plan:

GEN 5 Climate change
GEN 7 Landscape/seascape
GEN 8 Coastal Process and flooding
GEN 9 Natural heritage
GEN 13 Noise

Further relevant details are provided in the EIR.

If **NO**, please provide an explanation of why you haven't considered the National Marine Plan?

N/A

11. Pre-Application Consultation

Is the application subject to pre-application consultation, under The Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013? YES ☐ NO ■

If **YES,** please indicate the date of the public notice for the pre-application consultation event and the type of consultation event held (a copy of the public notice must be supplied with this application):

Event Type	Date

12. Consultation

List all bodies you have consulted and provide copies of correspondence:

N/A

13. Environmental Assessment

(a) Does the project fall under Annex I or II of the EIA Directive?

Annex I ☐ Annex II ☐ Neither ■

If **ANNEX I or ANNEX II**, please provide the screening opinion issued to you in relation to the project.

(b) Has an EIA been undertaken:

for the marine licence application to which this application relates YES ☐ NO ■
for any other EIA regulator (e.g local authority) YES ☐ NO ■

14. Associated Works

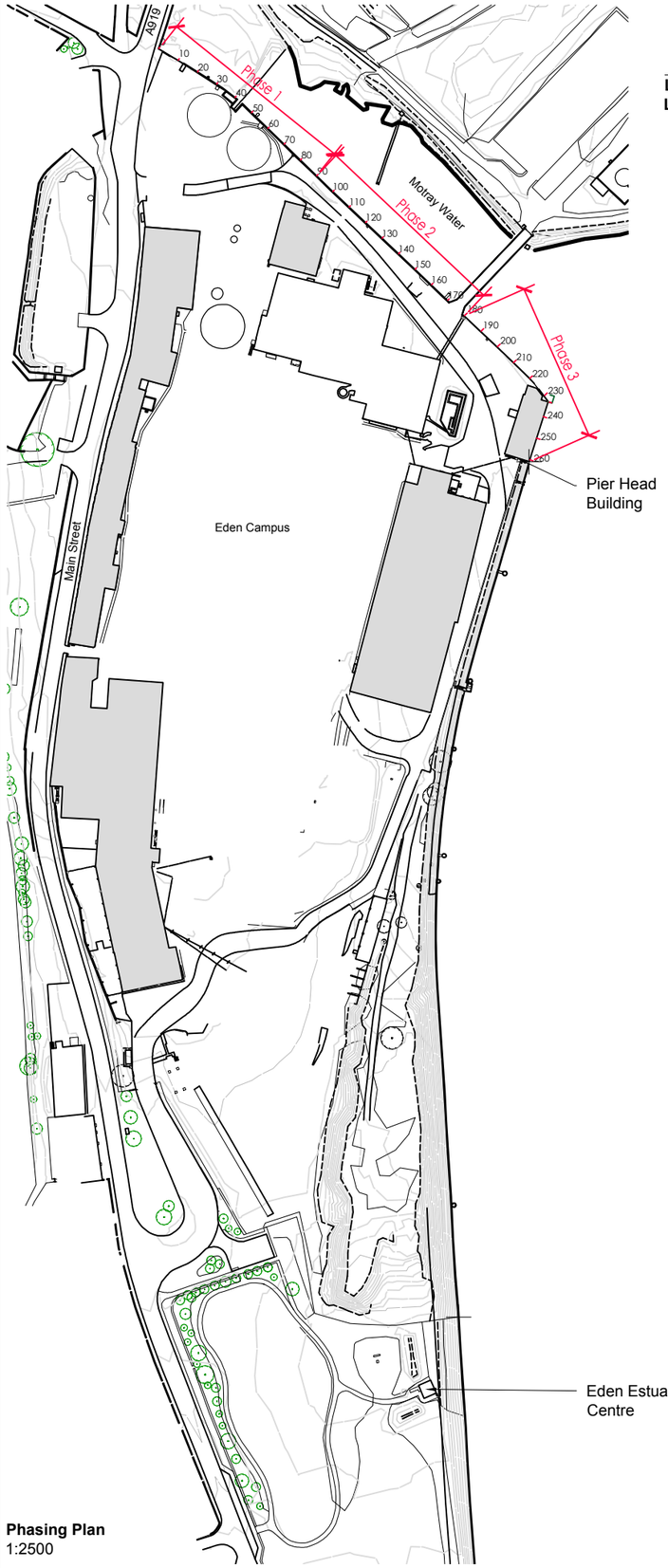
Provide details of other related marine projects, including reference/licence numbers (if applicable):

MS-LOT provided a Marine Construction License (License Number 06556/17/0) for repairs to the East Sea Wall which forms the eastern boundary of the former Guardbridge paper mill site with the Eden Estuary. The repair works to the East Sea Wall were completed in July 2018.

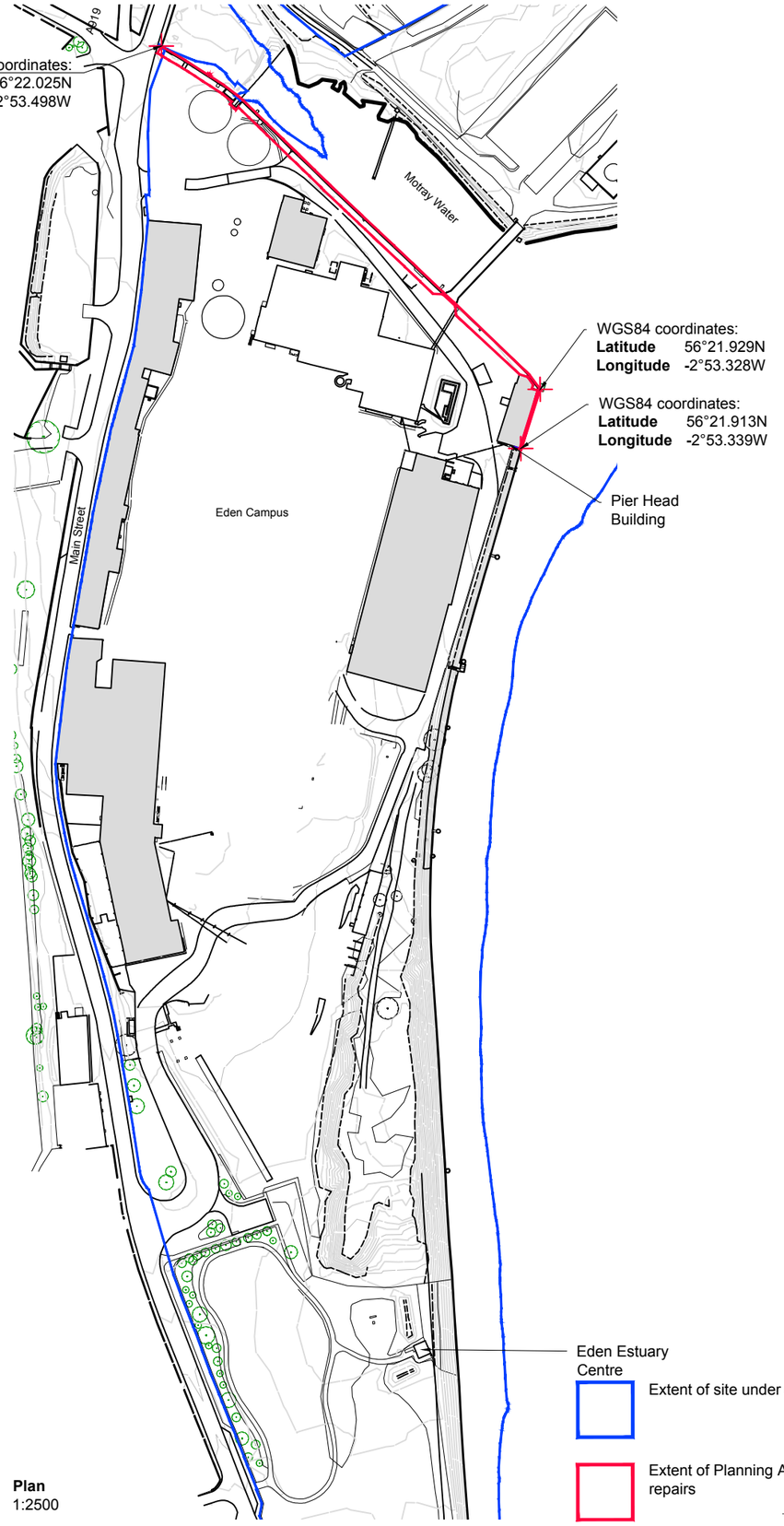
NORTH MOTRAY SEA WALL, GUARDBRIDGE
MARINE LICENSE APPLICATION
SUPPORTING DOCUMENTS

The following documents are included with the Marine License Application:

1. Drawings
   - Proposed Sea Wall repairs – Existing Location and Phasing Plan (ref 06B701423_01, prepared by GVA).
   - Proposed Sea Wall repairs – Typical Sections (ref 06B701423_02, prepared by GVA).
2. Ramboll Environmental Impact Report
   - Figures indicating extent of works, coordinates, level of MHWS and designated sites
   - Draft Contractor Method Statement
   - COSHH and information sheets for concrete to be used for repairs



Phasing Plan
1:2500



Plan
1:2500

N

Notes

Total extent of works is approx c260m in length and is split in to 3 phases:

- Phase 1 starts at the most north western point of the site at the A919 road crossing and extends 90m to the south-east,
- Phase 2 follows and extends another 90m to the south east,
- Phase 3 is the remaining works per the application which is circa 80m

Image looking south from north bank of Motray Water

Rev	Revision Details	By	Chk'd	Date
...	...	...	...	...

A3
Planning

GVA
08449 02 03 04
149 St Vincent Street
Glasgow G2 5NW
www.gva.co.uk

Project Name
Motray Water Retaining Wall Repairs
Eden Campus, Guardbridge

Client
University of St Andrews

Drawing Title
Proposed Sea Wall Repairs
Existing Location and Phasing Plan

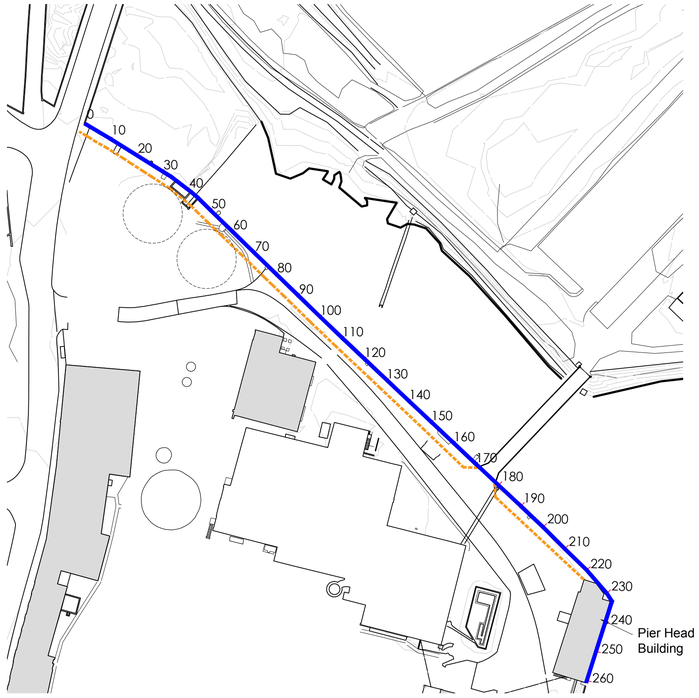
Drawn By	Chk'd By	Scale @ A3	Date
R			

Project No.	Revision
06B701423	-

Drawing No.
(--) 01

N

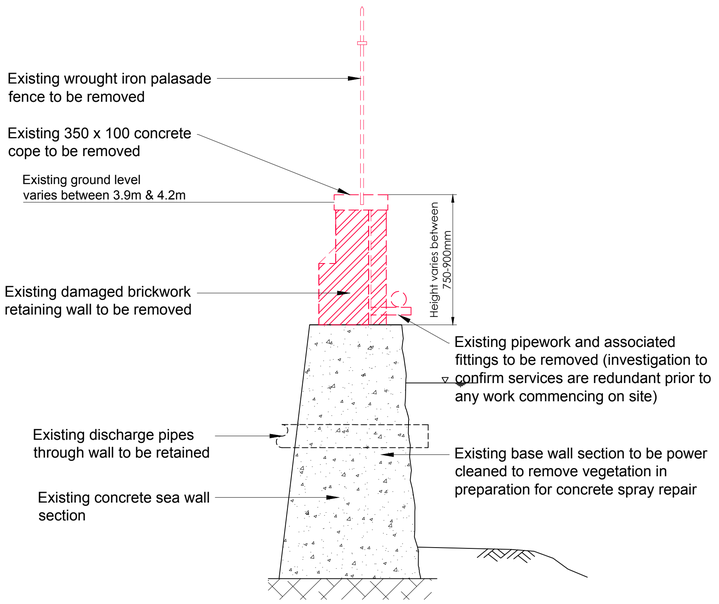
Notes



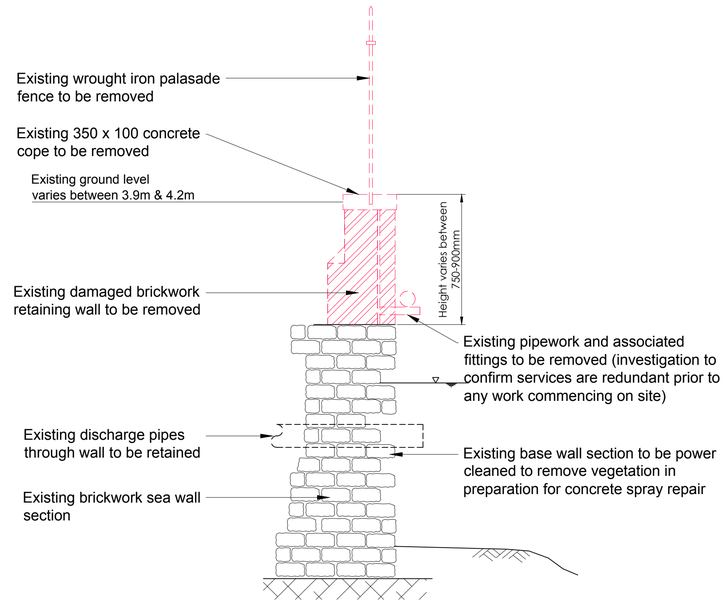
Plan
1:1000

Location of new Armco barrier 3m from wall edge

Extent of sea wall repairs

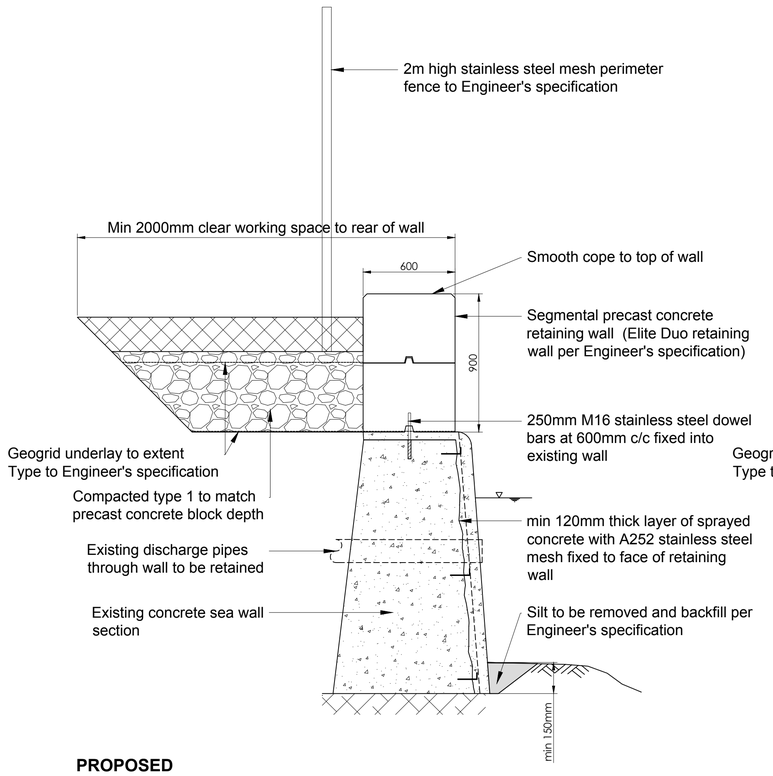


EXISTING
Typical Section through concrete base section
1:20

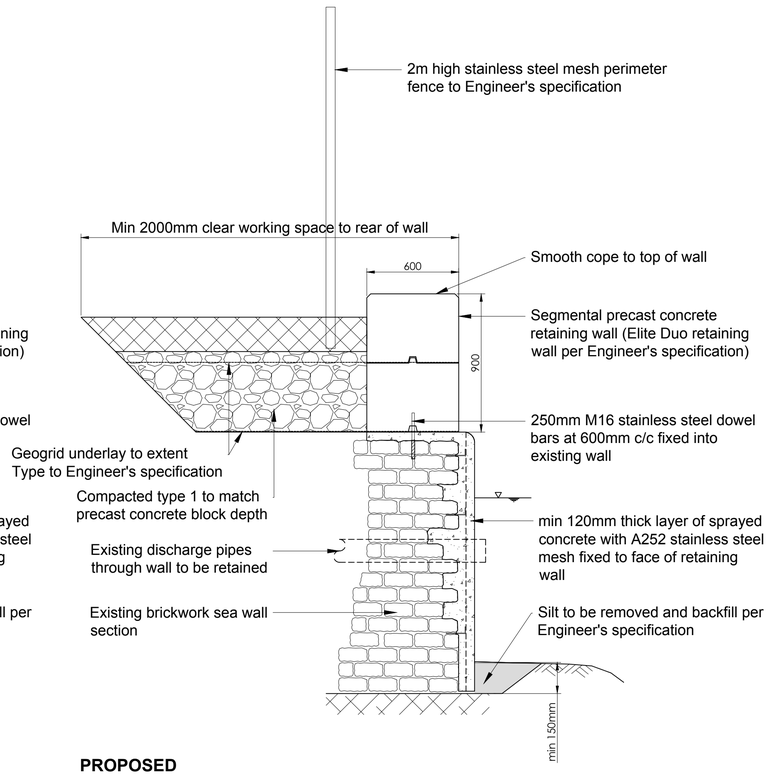


EXISTING
Typical Section through brick base section
1:20

Photo of existing seawall illustrating damaged and dilapidated concrete and stone base sections



PROPOSED
Typical Section through concrete base repair
1:20



PROPOSED
Typical Section through brick base repair
1:20

Rev	Revision Details	By	Ch'k'd	Date

A1

Planning

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Project Name
Motray Water Retaining Wall Repairs
Eden Campus, Guardbridge

Client
University of St Andrews

Drawing Title
Proposed Sea Wall Repairs
Typical Sections

Drawn By | Ch'k'd By | Scale @ A1 | Date

Re
-

Project No.
06B701423

Revision
-

Drawing No.
(--) 02

Intended for
GVA

On behalf of
University of St Andrews

Date
December 2018

Project Number
1700002737

NORTH MOTRAY SEA WALL REPAIRS, GUARDBRIDGE ENVIRONMENTAL IMPACT REPORT

RAMBOLL

NORTH MOTRAY SEA WALL REPAIRS, GUARDBRIDGE
ENVIRONMENTAL IMPACT REPORT

Project No.	**1700002737**
Issue No.	**1**
Date	**19/12/2018**
Made by	Redacted
Checked by	Redacted
Approved by	Redacted

Made by: Redacted Checked/Approved

Version Control Log

Revision	Date	Made by	Checked by	Approved by	Description
A	19/12/2018	R	R	-	First draft
1	19/12/2018	R	R	R	Final for Issue

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CONTENTS

APPENDICES

1. INTRODUCTION

1.1 Background

Ramboll Environment and Health UK Ltd (Ramboll) has been appointed by GVA on behalf of the University of St. Andrews (the Client) to submit an application for a Marine License under the Marine (Scotland) Act 2010. A Marine License is required to allow repairs to the North Motray Sea Wall, Guardbridge (the site) to be undertaken. The repairs are necessary in order for the sea wall to continue to provide effective coastal protection.

This Environmental Impact Report (EIR) provides supporting information to the Marine License Application. It is expected that the EIR is read in conjunction with the Marine License Application.

The extent of the North Motray Sea Wall repairs is shown on Figure 1 within Appendix 1.

1.2 Objective

The main objective of this report is:

- To provide an assessment of the potential environmental impacts that the construction works (i.e. the repairs to the sea wall) may have, including interference with other users of the sea, as required by the Marine License Application for Construction Projects.

1.3 Scope of Works

The scope of works undertaken to achieve the objective as stated above comprised:

- Consideration of Scotland's National Marine Plan with respect to the proposed licensable activity;
- Review of publicly available resources and relevant existing environmental information to confirm the environmental setting and sensitivity of the site;
- Review of the draft methodology for the sea wall repairs in order to identify potential environmental impacts associated with the works; and
- Development of mitigation measures to address any identified potential environmental impacts.

2. SCOTLAND'S NATIONAL MARINE PLAN

Scotland's National Marine Plan (the Plan) covers the management of Scottish inshore and offshore waters and was prepared in accordance with EU Directive 2014/89/EU which came into force in July 2014. The Directive introduces a framework for maritime spatial planning and aims to promote the sustainable development of marine areas and the sustainable use of marine resources.

The Plan specifies a collection of General Policies which apply across existing and future development and use of the marine environment. The policies apply to decision making in the marine environment and these policies have been considered with respect to the Marine License Application for the repairs to the North Motray Sea Wall at Guardbridge. The following policies in particular are considered, and referred to, in subsequent sections of the report:

- GEN 5 Climate change: Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.
- GEN 7 Landscape/seascape: Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.
- GEN 8 Coastal process and flooding: Developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding.
- GEN 9 Natural heritage: Development and use of the marine environment must:
  - (a) Comply with legal requirements for protected areas and protected species.
  - (b) Not result in significant impact on the national status of Priority Marine Features.
  - (c) Protect and, where appropriate, enhance the health of the marine area.
- GEN 13 Noise: Development and use of the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.

In addition to the above, GEN 2 Economic benefit and GEN 3 Social benefit also apply given that the repairs to the North Motray Sea Wall support and enable the redevelopment of the wider former Guardbridge Paper Mill thus enabling reuse of a currently derelict brownfield site.

3. ENVIRONMENTAL SETTING

Desk based research was carried out in order to establish the potential for environmental impacts arising from the North Motray Sea Wall repair works, and to assess the sensitivity and vulnerability of the site's setting with respect to sensitive receptors such as surface water, human health and ecological receptors.

Information was obtained from a number of sources including:

- examination of published geological and hydrogeological maps produced by the British Geological Survey (BGS) and associated sheet memoirs (where available);
- regulatory authority and stakeholder websites including those belonging to Scottish Environment Protection Agency (SEPA), Marine Scotland and Scottish Natural Heritage (SNH); and
- review of relevant existing environmental reports relating to the works undertaken at the adjacent, wider, former Guardbridge Paper Mill site.

3.1 Geology

The majority of the land to the south of the North Motray Sea Wall was historically reclaimed from the sea (prior to 1895) and was reported to be built up by approximately 4 m using materials including lime sludge, demolition material and boiler ash[1].

The BGS online geology viewer[2] indicates that the natural superficial soils beneath the North Motray Sea Wall, the land to the south, and the Eden Estuary comprise Marine Beach Deposits which could include gravel, sand, silt and clay.

The underlying bedrock is indicated to comprise the Devonian aged Glenvale Sandstone Formation consisting of sandstones with bands of siltstone and pebbles of mudstone.

One historical borehole record, located approximately 100 m to the south west of the North Motray sea wall (within the former Guardbridge Paper Mill), recorded boulder clay (Glacial Till) to a depth of approximately 11 m below ground level (m bgl) which was underlain by pink, purple and red sandstones.

3.2 Hydrogeology

The Hydrogeological Map of Scotland (1:625,000) records the natural Marine Deposits to be a Concealed Aquifer of limited potential. The Groundwater Vulnerability Map of Scotland shows the Devonian sandstone bedrock to be highly permeable. Highly permeable aquifers may be highly productive and able to support large abstractions for public supply or other purposes.

According to SEPA's online water environment hub[3], the Tentsmuir Coastal Groundwater underlies the North Motray Sea Wall (and surrounding area). This groundwater body is classified by SEPA as having an overall status of Poor under the Water Framework Directive classification scheme, based on data from 2014. The Poor status reflects Poor water quality but Good flow and levels. No significant improvement is projected by 2021 or 2027.

Licenced groundwater abstractions in Scotland in excess of 10 m^3/day are regulated by SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations 2011. According to SEPA's compliance assessment report in 2014[4], there are three licenced groundwater abstractions within a 2 km radius of the site. There is no indication regarding whether

[1] ENVIRON, May 2014: Environmental Report, SPARC (Ref UK12-19487_2)
[2] http://mapapps.bgs.ac.uk/geologyofbritain/home.html (accessed 17th October 2018)
[3] https://www.sepa.org.uk/data-visualisation/water-environment-hub/ (accessed 17th October 2018)
[4] http://apps.sepa.org.uk/compliance/map.aspx, (accessed 17th October 2018)

groundwater is abstracted from the superficial deposits or bedrock, or the purpose of the extractions.

3.3 Hydrology

The North Motray Water, to the north of the sea wall, is part of the Eden Estuary transitional water body which has been classified by SEPA as having an overall status of Good under the Water Framework Directive classification scheme. This combines Good water quality with Good freedom from invasive species and High physical condition.

Review of SEPA's Compliance Assessment Report suggests that there are no surface water abstractions within a 2 km radius of the site.

The land immediately to the south of the North Motray Sea Wall (i.e. the former Guardbridge Paper Mill and site of the recently developed Guardbridge Energy Centre) is indicated to be in an area at a high risk of coastal flooding from the Eden Estuary based on the SEPA flood map[5].

The proposed repairs to the sea wall are considered to comply with GEN 5 (Climate change) and GEN 8 (Coastal process and flooding) of the National Marine Plan since the repairs relate to the replacement of existing infrastructure which is necessary to provide continued flood defences, particularly with respect to the on-going redevelopment of the former Guardbridge Paper Mill site.

3.4 Ecology

The North Motray Water is part of the Firth of Tay and Eden Estuary which is designated as a Special Protection Area (SPA), a Site of Special Scientific Interest (SSSI), a Ramsar site and a Local Nature Reserve[6]. The Firth of Tay and Eden Estuary Special Area of Conservation (SAC) also extends approximately 50 m into the Motray Water at its south eastern end. The extent of the ecological designations is shown on Figure 2 in Appendix 1.

GEN 9 (Natural heritage) of the National Marine Plan is considered to be of particular importance with respect to the proposed sea wall repairs given the International, National and Local designations associated with the Firth of Tay and Eden Estuary. The project team is aware of the legal requirements to protect the Estuary throughout the construction works and to ensure that the permanent structure does not result in any significant adverse impacts. Mitigation measures to be implemented throughout the construction works are detailed in Section 4 herein, and details relating to the presence of migrating and nesting birds and potential removal of vegetation is discussed below and overleaf.

3.4.1 Migratory Birds

The presence of migrating birds in the Eden Estuary has been identified as a constraint to the proposed sea wall repairs and it is expected that the work will require to be undertaken outwith the migrating bird season as per previous discussions held with SNH prior to the repairs of the East Sea Wall[7] . It is expected that the construction works will require to be carried out between the end of the spring migration period and the end of September (in any given year).

The works will be undertaken in three phases across three years. It is intended that the first phase of work (Chainage 0 to 90) will be carried out between the beginning of May and the end of September 2019. Phases 2 and 3 will follow a similar schedule during 2020 and 2021 incognisance of constraints associated with the migrating bird season.

[5] http://map.sepa.org.uk/floodmap/map.htm (accessed 17th October 2018)
[6] https://sitelink.nature.scot/map (accessed 17th October 2018)
[7] Email communication between Gavin Johnson (SNH Operations Officer) and David Smith (Ramboll) on 29th July 2016.

3.4.2 Breeding birds

It is acknowledged that the proposed construction works will take place during the nesting bird season.

A Draft Method Statement has been prepared (included in Appendix 2 and discussed further in Section 4) which states that removal of scrub/ vegetation will be required prior to commencing the construction works. When such works are intended within the nesting bird season, an ecologist will carry out nesting bird surveys prior to the removal of such scrub/vegetation for each phase of works undertaken. Should nesting birds be identified, the ecologist will advise on mitigation measures to be put in place prior to works commencing.

3.5 Shellfish Harvesting Areas

The Food Standards Scotland's Biotoxin Risk Management Tool, available to view on the Scotland's Environment website[8] indicates that there are no Shellfish Harvesting Areas within 2 km of the site.

3.6 Coastal and Marine Archaeology

The Historic Scotland Designations Map[9] indicates that the site is not located within a Historic Marine Protected Area (MPA).

3.7 Visual Impact

The proposed repairs relate to the replacement of the existing sea wall due to the potential for failure as a result of identified defects, rather than construction of a new structure. The repaired wall is not expected to result in permanent alterations to the landscape or seascape. This complies with GEN 7 (Landscape/ seascape) of the National Marine Plan.

3.8 Noise

The proposed methodologies for the repair works will not result in the production of low to mid frequency (10 Hz to 10kHz) noise. This complies with GEN 13 of the National Marine Plan.

3.9 Environmental Sensitivity and Vulnerability

In consideration of the environmental factors discussed above, the North Motray Sea Wall is considered to be located in a highly sensitive and vulnerable area with respect to surface water and ecological receptors. The Motray Water is part of the Firth of Tay and Eden Estuary which is a transitional water body located immediately adjacent to the site. The Motray Water section of the Estuary is designated as a SPA, a SSSI, a Ramsar site and a Local Nature Reserve[10]. The Firth of Tay and Eden Estuary Special Area of Conservation (SAC) also extends approximately 50 m into the Motray Water at its south eastern end. Since the North Motray Sea Wall becomes submerged below Mean High Water Springs (MHWS), the works are considered to take place within the Firth of Tay and Eden Estuary (i.e. the Marine Environment) and there will be a requirement to comply with best practice construction techniques and implement mitigation measures in order to address the potential environmental impacts that could arise as a result of the sea wall repairs. This is discussed in detail in Section 4.

[8] https://www.environment.gov.scot/data/data-analysis/biotoxin-risk-management/ (accessed 17th October 2018)
[9] http://historicscotland.maps.arcgis.com/apps/Viewer/index.html?appid=18d2608ac1284066ba3927312710d16d (accessed 16th February 2017)
[10] https://sitelink.nature.scot/map (accessed 17th October 2018)

4. METHODOLOGY AND MATERIALS

At the time of reporting the contract for the repair works was in the process of being tendered and as such, the Principal Contractor had not been appointed. GVA therefore commissioned Concrete Repairs Ltd (CRL) (the contractor that carried out the repair works to the adjacent East Sea Wall) to provide advice on appropriate methodologies to be applied during the works. A Draft Method Statement for the repair works which references the construction design is included in Appendix 2.

The Draft Method Statement comprises a step-by-step guide for undertaking the sea wall repairs and includes details on incorporating environmental protection measures throughout the works.

The program of works cannot be confirmed until the Principal Contractor has been appointed. However, the intention is for the repairs to be phased across a three-year period as follows:

- Phase 1: May to September 2019
- Phase 2: May to September 2020
- Phase 3: May to September 2021

4.1 Deposits and Removals Associated with North Motray Sea Wall Repairs

The Marine License Application requires an indication of the quantities of materials that will be removed and deposited below the level of Mean High Water Springs (MHWS). CRL has confirmed the following:

4.1.1 Materials to be removed permanently:

- 40 m^3 of defective masonry wall;
- 20 tonnes of defective concrete from existing sea wall;
- 10 m^3 Made Ground (to be excavated behind the wall at the sluice dam); and
- Redundant plastic pipes and cast-iron pipes with associated steel brackets.

4.1.2 Materials to be placed permanently:

- 40 m^3 ready-mixed concrete;
- 2.5 tonnes of steel reinforcement bars and mesh;
- 25 Litres Hilti Hit HY500 (further information and Safety Data Sheet included in Appendix 3);
- 150 tonnes of dry spray concrete which is suitable for use in the marine environment (further information and Safety Data Sheet included in Appendix 3); and
- 20 m^3 Type 1 imported rock fill (virgin quarried stone). This comprises graded rock ranging from a maximum diameter of 60 mm to sand sized particles.

4.1.3 Temporary Deposits

- 3 No. Youngman boards with handrails, 3 m in length (to be removed at the end of each work shift)
- 2 No. rolls of High Density (HD) polythene sheets
- 10 No. one tonne sandbags
- 200 kg timber shuttering (including nails and screws)

It should be noted that the wall repairs do not require site-won material (i.e. concrete from the existing damaged wall) to be crushed for re-use in the construction of the new wall. Concrete removed from the wall will be temporarily stockpiled and uplifted periodically to an appropriately licensed waste recovery/disposal site.

5. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

As discussed in Section 2, the Firth of Tay and Eden Estuary is designated as an SPA, a SSSI, a Ramsar site and a Local Nature Reserve[11]. The south eastern end (approximately 50 m in length) of the North Motray Sea Wall is located within The Firth of Tay and Eden Estuary Special Area of Conservation (SAC). The Estuary is therefore considered to be the most sensitive receptor with regards to the North Motray Sea Wall repairs.

Table 5.1 overleaf presents the identified potential environmental impacts associated with the sea wall repairs and the mitigation measures that will be implemented by the contractor to minimise the potential for adverse impacts to the Eden Estuary.

[11] https://sitelink.nature.scot/map (accessed 17th October 2018)

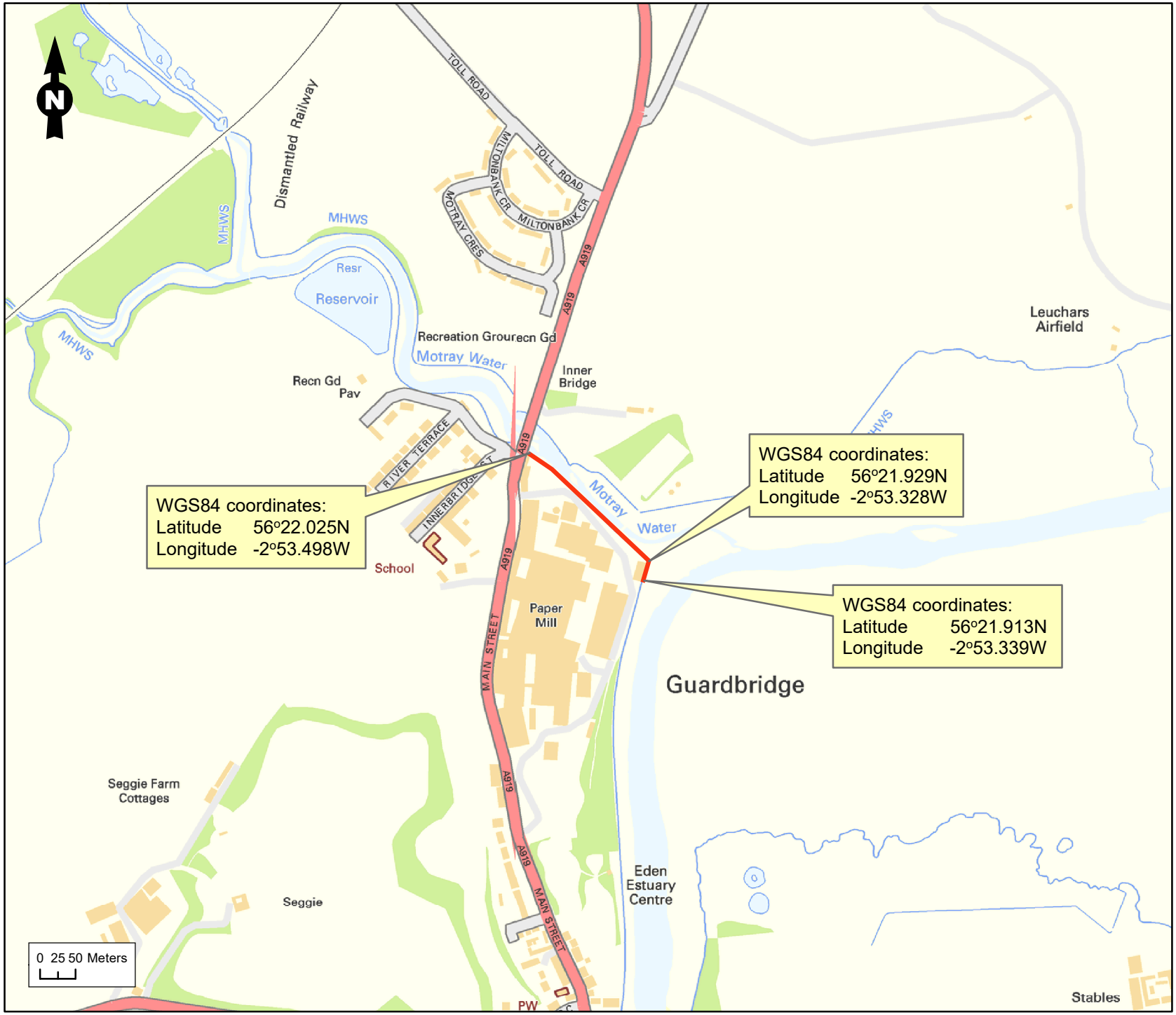
Table 5.1 Mitigation Measures

Activity	Identified Environmental Risks	Environmental Protection Measures
Storage of fuel or oils and use/refuelling of plant	Potential impact on the Firth of Tay and Eden Estuary as a result of leaks or spills entering drains, percolation through unsurfaced ground or direct surface water runoff.	All fuel will be stored in integrally bunded containers that are compliant with applicable legislation and Pollution Prevention Guidelines. Within the lockable lid of the integral fuel tank a spill kit will be available. All oil storage will be in accordance with the Water Environment (Oil Storage) (Scotland) Regulations 2006 with appropriate bunding and spill/leak containment. Fuel tanks and oil storage will be positioned at a safe distance away from the routes of site traffic to avoid accidental collision. Fuel tanks and oil storage will be positioned on hardstanding surfaces. Fuel tanks, oil storage and hazardous materials will not be positioned within 10 m of the Estuary. All plant will carry a spill kit. Plant and equipment will not be refuelled within 10 m of a surface water course or drain. Site drainage entry points (e.g. surface drains and manholes) will be appropriately covered to ensure prevention of fluid entry and damage during plant crossings. Any stationary plant that will be left on the work site overnight will be subject to a visual inspection at the end of the working day to ensure that there are no visible leaks of oil or fuel. All site staff will receive a tool box talk relating to fuel storage, handling and use of spill kits. All spillages of fuel will be reported in the site daily diary, along with actions taken. Plant that is designed to be static (e.g. generators) will have integrated secondary containment with capacity for 110% of the associated fuel tank. No plant or equipment should be washed in/over the Estuary. All washing should be carried out in a manner that enables full control of the wash-down water/run-off and must not enter the Estuary.
Waste storage and management	Nuisance impacts to local residents as a result of incorrect disposal of waste and general poor housekeeping.	All waste disposal will be in accordance with applicable legislation. Waste stored at the site compound will be in covered secure skips or containers appropriate to the waste type. Waste containers will be located on hardstanding surfaces and at least 10 m away from surface drains and the Estuary.

Activity	Identified Environmental Risks	Environmental Protection Measures
Removal of vegetation / scrub from embankment	Potential disturbance to nesting birds.	Any clearance of vegetation or scrub that is undertaken during the nesting bird season will not commence until an ecologist has surveyed the relevant area for the presence of nesting birds.
Repairs to the sea wall	Potential impact to Estuary as a result of spillages of concrete, fuels etc, placement of materials of unknown origin.	Concrete[12] to be used for the sea wall repairs will be appropriate for use in the marine environment and will not result in significant wash out when in contact with water prior to curing. Concrete will be applied at low tide to minimise exposure to water prior to curing. Concrete will be applied using a dry spray pump, powered by an air compressor (to be located a minimum of 10 m from the Estuary). Polythene sheets will be placed on the surface of the Estuary (on top of Youngman boards) and extended 2 m from the face of the wall to catch any rebounded concrete from the spraying operation. Cement will be stored on site in powder form (25 kg bags) which will be stored a minimum of 10 m from the Estuary. Work to coincide with low tide. All aggregates for sea wall repairs will comprise virgin quarried stone to ensure potentially contaminated materials are not introduced to the environment. Care will be taken to ensure that materials placed as part of the repairs (e.g. rock armour) do not fall into the Eden Estuary. In the event that waste is released into the Estuary it must be recovered and disposed of appropriately.

[12] Product Information is included in Appendix 3

APPENDIX 1
FIGURES



Legend

Site Boundary

Figure Title
Figure 1: Extent of Proposed North Motray Sea Wall Repairs

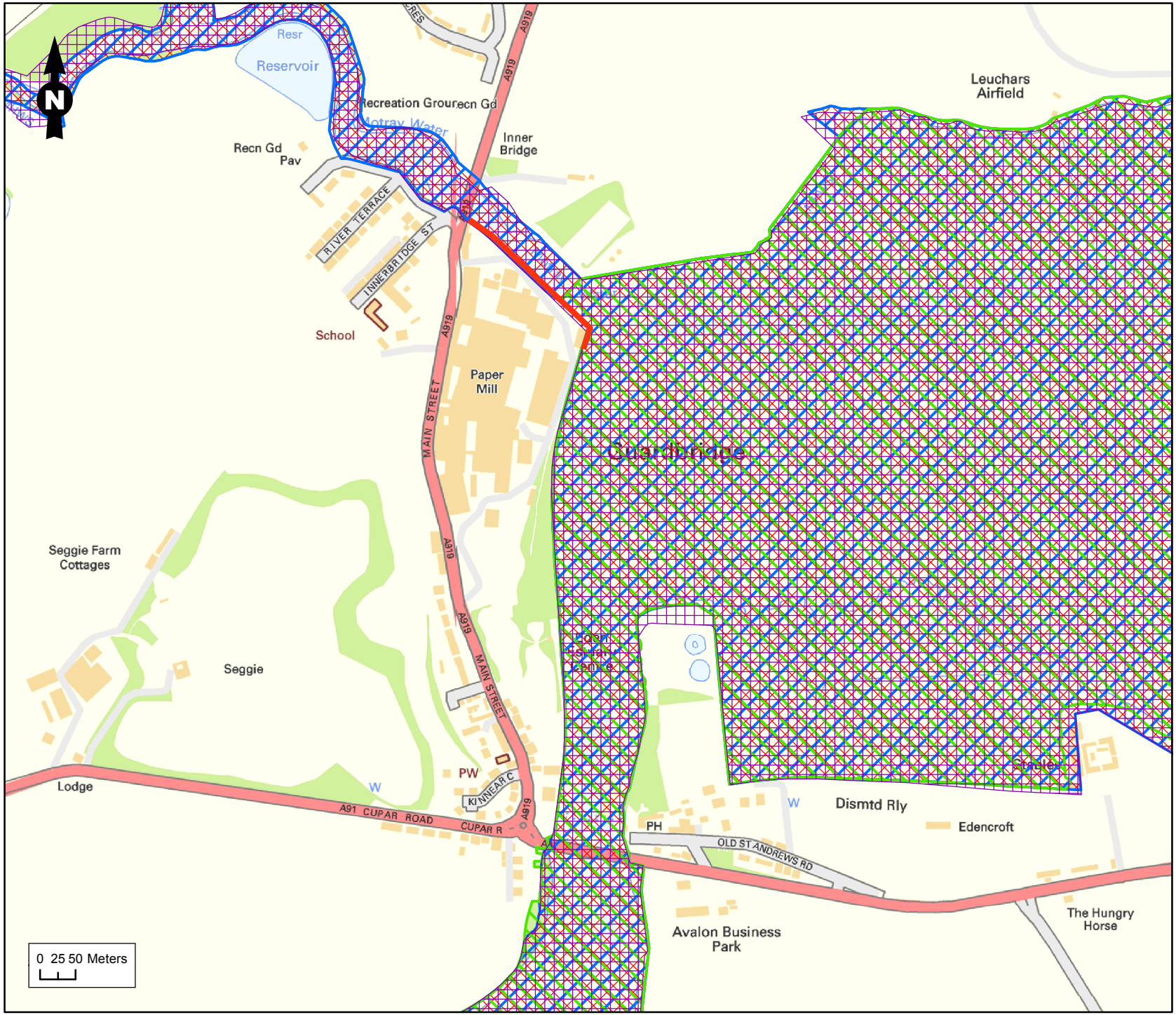
Project Name
North Motray Sea Wall Repairs, Marine License Application

Project Number	Figure No.
1700002737	1
Date	Prepared By
December 2018	Re
Scale	Issue
1:7,500 @A4	1

Client
University of St Andrews c/o GVA

RAMBOLL

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.



Legend

- Site Boundary
- RAMSAR
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest

Figure Title
Figure 2: Extent of Designated Sites

Project Name
North Motray Sea Wall Repairs, Marine License Application

Project Number	Figure No.
1700002737	2
Date	**Prepared By**
December 2018	R
Scale	**Issue**
1:7,500 @A4	1

Client
University of St Andrews c/o GVA

RAMBOLL

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.

APPENDIX 2
DRAFT METHOD STATEMENT

Method Statement

Contract:	Guardbridge North Motray Seawall Refurbishment	Contract No:	FAL191111	Date:	29/10/2018

Brief description of the works:		MS unique No :	FAL191111/MS/01
Repairs, strengthening and reconstruction works to the North Motray sea wall along with associated groundworks and fencing and road improvements		RA unique No :	FAL191111/RA/01
		COSHH ass. ref :	attached
		HAV/Noise ass. ref :	attached
MS & RA written by:	Redacted	Lifting plan required / appended:	y
MS & RA reviewed by:		Other attachments :	Material Data Sheets

Types of permit required: (check as appropriate)	Enter ☐	Electric ☐	Load ☐	Work ☐	Dig ☐	Hot work ☐	Other ☐

What is to be done? *The precise scope of the works*	Establish site compound/stockpile/laydown area. Establish access roads and set up Traffic Management. Excavate and take down section of the brickwork wall and re-build with pre-cast concrete blocks. Carry out repairs to seawall, fix reinforcement mesh and dry-spray concrete. Reinstate the ground and roads and install new fencing/barriers. Works in tidal zones and in accordance with Marine Scotland Licence conditions and SEPA requirements.
When is it to be done? *Either in relation to other activities / events or dates and times where relevant e.g. isolations, shutdowns etc.*	Work start to be agreed. Work windows to be from 1st May to 30th September each year. No works can be carried out beyond these dates as per ecological constraints associated with the Eden Estuary (i.e. no works to be undertaken during bird migration period). Note all works will have to be undertaken on a tidal basis
Who is to do the work and who is to supervise it? *The number and type of personnel including any specific skills, fitness levels, training or qualifications required.*	Works to be supervised by competent and experienced Site Manager and supported by Contracts Manager all with relevant training and certifications. Earthworks to be undertaken by specialist contractor who has considerable experience in marine works. Machine operators to be CPCS certified. All machines working near the water to have vegetable hydraulic oils. Seawall repairs and strengthening to be undertaken by specialist concrete repair contractor with previous experience in similar works. Foreman/supervisor to have SMSTS, CSCS gold and First Aid. Tradesmen to have CSCS blue and industry experience. All site operatives need to be reasonably fit due to required tasks to be carried out.
How is it to be done safely? *Detail here the plant, equipment and materials required, including the access equipment and methods for materials storage and handling*	PLANT : Excavators capable of lifting concrete blocks – circa 2Te, 6 Te dumpers All plant to be re-fuelled in designated area away from the shore (min. 10m) with drip trays placed under the plant with spill kits readily available. Temporary access boards to the wall 5kVA generator and breakers / 5” angle grinders / Stihl saw Drip trays and spill kits. MATERIALS : Pre-cast concrete blocks, Terram , Dry-spray concrete Imported Type 2 – 6F2 (virgin quarried stone) All stone to be delivered to site and off loaded in designated area. Hilti HIT resin, steel reinforcement mesh and ready mix concrete Welfare and storage facilities

How are you going to provide a safe means of access to the work?	Access to site through designated gate in existing fence from existing road to segregate site traffic from other road/estate users. Site layout to be established in the way there is no risk of machines colliding with stored materials or other obstructions. This will require a pedestrian footway and segregation from plant movements using clearly displayed barriers and signs. Bespoke steps and access to be installed on the revetments to gain access to the sea wall.
Detail how a safe place to work is going to be provided e.g. a safe platform to work from.	Whilst working of the front face of the sea wall a Youngman board will be laid on the silt immediately in front of the seawall to spread loads (or other suitable access arrangements). Excavators will be working in close proximity to groundworkers – great care required and only trained and competent operatives will carry out this task. Wall repair works to be staggered from earthworks operations. Edge protection to be installed along the wall. Use existing sluice dam to divert water from the working area – place temporary sand bags to stop water getting into the affected section of the wall.
Provide here the precise method and sequence of operations including any "hold" points	Review topographical survey and site investigation information together with any information on the seawall construction Marine License to be in place before starting and all conditions of the license to be complied with at all times throughout all phases of work. Note all works adjacent to sea wall to be undertaken on a tidal basis Set up site compound, storage and laydown areas in agreed locations all as per Site Layout Plan. All kept in safe distance from the water. Establish extent of the vegetation which will require to be removed and seek Ecologist confirmation as to whether surveys are required prior to removal. (HOLD Point) Locate position of the existing services and mark them up – it might be necessary to re-direct services which might clash with the works. Use existing road to gain access to the works. Set up Traffic Management and display signs where required to segregate site operations from the public/plant movements. Local diversion and temporary road closure will be required. Clear top area and set up storage/Stockpile areas. Areas for material laydown, waste storage, plant and equipment storage will be created min. 10m distant from the watercourse. Hazardous materials will be stored in secure containers on hardstanding surfaces. Fuel storage within integrally bunded containers compliant with relevant PPG/GPPs with spill kits readily available. All plant refuelling to be undertaken more than 10m from the watercourse. If the weed/shrub clearance works will be undertaken during the breeding bird season ecology team will undertake nesting bird surveys prior to commencing the clearance works for each phase. Peregrine falcons have nested at the wider Guardbridge site previously although surveys carried out by Ramboll prior to previous phases of work have not identified evidence of recent nesting. Special care to be taken to not disturb any eventual Peregrine Falcons near working area (Posters to be displayed in site cabin with picture of the falcon and specific Toolbox Talk to be carried out to cover protection of the birds and wildlife). If Peregrine Falcons are spotted near site seek advice from the ecologist.

	Mark up extent of the groundworks required and check with marked-up services. Saw cut the road and carefully remove the surfacing. Excavate the sub-base and soil to required depth. Machines will be working from the existing road – surface protection to be in place and local traffic management and diversions implemented. Excavator to remove redundant drainage and chambers adjacent to the seawall. Remove redundant pipework, brackets, fencing and cables and dispose off site. Carefully remove top section of the wall (brickwork) and dispose off site – care to be taken to not drop the material into estuary. This operation may be assisted with a smaller excavator with rock breaker. Care to be taken to not undermine the wall and any excavations behind the wall to be scheduled at low tides. Continue with this operation till end of the current phase and repeat in next visits as required. Financial provision has been made to cover spoil offsite disposal and/or recycling. Shore side access using Youngman boards or open mesh flooring. Sluice valve to be opened to divert water from the seawall and sand bags to be placed to keep work area dry. Silt from the bottom of the wall will be moved away using water jetting – this will allow access and further application of the sprayed concrete. Section of the wall (near the sluice dam) to be rebuilt using steel reinforcement and ready-mix concrete with “underwater” additive. This operation to be programmed to suit the tidal water levels. Relevant Guidance for Pollution Prevention and Pollution Prevention Guidelines to be followed at all times to reduce the risk of water contamination. Use Hilti Hit for resin fixing dowels and install reinforcement mesh prior to spraying approx. 150mm thick layer of DS concrete. This material is designed for use in the marine environment and will be applied at low tide. Further information and COSHH assessments are attached to this Method Statement. <u>Dry spray concrete application:</u> Ensure wall is cleaned out and bars/mesh fully exposed. Place heavy duty polythene on the youngman boards and extend them onto the silt (bed of the Estuary) – approx. 2m from the face of the wall to catch any re-bound from spraying operation. Set up 400 cfm compressor and dry spray pump (air powered) with potable water supply (from cuboid or hydrant). All equipment to be located a minimum of 10 m from the Estuary. Spray Material to be located close to the spray pump (material in powder form in approx. 100 No. 25kg bags). Saturate substrate by water jet prior to spraying concrete. Using Spray Concrete Association (SCA) nozzleman spray Webercem DS ensuring full coverage and no voids. Slightly overfill, screed off and steel float finish to match existing. Cure. Remove temporary access system along with polythene protection from the water course on the daily basis. Any debris dropped into the silt to be picked-up as soon as practically possible and safe to do so before the next tide comes in. Set levels for Segmental Precast Interlocking Retaining Wall Blocks, place geogrid and bedding mortar and using excavator position first course of blocks. Place additional layer of Type 1 and geogrid all as per Design Drawings.

	The odd locations near the bridges where the full blocks can't be placed will require shuttering and placing ready-mix concrete to complete the wall. Repeat the sequence until full height of the wall is achieved. On completion of the wall the new crash barrier to be installed along with perimeter fence and surfacing works (all covered by separate Method Statements and Risk Assessments by Sub-Contractors) – this work is outwith High Water Spring Levels – GPP5 guidelines to be followed. On completion reinstate access roads and ground back to original and remove compound apparatus welfare etc from site at the end of each phase.
Detail any specific limitations or constraints upon the job e.g. adverse weather, out of sequence working.	All works will have to be undertaken on a tidal basis Bad weather – particularly high winds will affect tides and as such progress. Seek ecologist advice if any changes discovered during the works which might affect the wildlife. Do not disturb nesting birds or other creatures.
Explain systems to be used for the prompt and appropriate removal of any waste generated	Removed concrete sections and bricks to be stock piled in site compound for further disposal off site. General waste will be placed in lockable site skip and disposed of at appropriately licensed facility.
Environmental considerations	The ecological designations of the Eden Estuary (SSSI, SPA, SAC, Ramsar site and Local Nature Reserve)-are high profile considerations. Specific mitigation measures to minimise adverse environmental impacts to the Eden Estuary are outlined in Ramboll's Environmental Impact Report (EIR) and these will be followed at all times during all phases of the sea wall repair works. The EIR includes measures to be taken with respect to fuel storage and chemical storage, minimisation of noise and dust, site set up and ecological considerations. Adopt SEPA PPG1 and GPP5 guidelines Be aware of wildlife and plant life and abide by all rules noted in relevant licences and information received from ecologists. Toolbox Talk on protection of Peregrine Falcons as a conservative measure in case they are found to be frequenting the site (which hasn't been the case in recent years).
Emergency procedures: *Detail here what is to be done in the case of an emergency e.g. location of muster points, first aid station location etc*	First aider and first aid kit on site at all times. Fire extinguisher to be readily available both at work site and compound area. Spill kit to be readily available at worksite and compound. Have mobile phone to call for assistance. Know route to nearest hospital and have transport available at all times to transport casualty to hospital at all times. Due to terrain and the risk of falling into the silt have stretcher available on site.
Risk assessments:	FAL191111/RA/01 attached.

List here the identified hazards, (including those health-related), who might be harmed and the control measures to be taken. (In most cases a separate Risk Assessment sheet will be used for this item.)	
Review: *Detail here when this method statement should be reviewed or updated.*	**This method statement should be reviewed when there is any deviation from the methods or procedures set down in the method statement or at the specific review points set out below.**
Briefing Record: Briefing given by: Name: ……	****THIS IS IMPORTANT READ BEFORE YOU SIGN**** **In signing below you agree that you have been briefed in and understand the contents of this method statement along with its associated risk assessment, if you are in any doubt about anything this method statement contains ask before you sign and always remember if you think there is a better, safer or easier way to do this job we will be happy to give this serious consideration.**

Name:	Signature:	Employer:	Date:

APPENDIX 3
COSHH ASSESSMENTS AND PRODUCT INFORMATION

construction solutions

Polymer-modified, dry-spray, structural repair concrete

webercem spray DS

About this product

webercem spray DS is a pre-bagged, ready-to-use, polymer-modified, cement-based structural concrete. It contains graded inert limestone aggregates and dust suppressants. The formulation has been designed specially for dry process spray application to give high strength, low rebound and wastage, and to maximise the application thickness.

Conformity testing to BS EN 1504-3 has confirmed that **webercem spray DS** meets the requirements for a Class R4 repair product.

Technical data

The values given below are indicative of typical properties that are achievable on sprayed material in good conditions by an experienced contractor.

Dry density	2250 kg/m³
Initial set	2 – 3 hours

Performance to BS EN 1504-3

Test results – all intended uses

Performance characteristic	Method	BS EN 1504-3 requirement	Pass/ Fail
Compressive strength	EN 12190	≥ 45 MPa	Pass
Chloride ion content	EN 1015-17	≤ 0.05%	Pass
Adhesive bond	EN 1542	≥ 2.0 MPa	Pass
Restrained shrinkage/expansion	EN 12617-4	Bond strength after test ≥ 2.0 MPa	Pass
Carbonation resistance	EN 13295	d_k ≤ control concrete (1.3)	Pass

Test results – certain intended uses

Performance characteristic	Method	BS EN 1504-3 requirement	
Elastic modulus	EN 13412	≥ 20 GPa	Pass
Thermal compatibility Part 1 Freeze/thaw	EN 13687-1	Bond strength after 50 cycles ≥ 2.0 MPa	Pass
Coefficient of thermal expansion	EN 1770	Result = 9.0 x 10^{-6}/°C	N/A
Capillary absorption	EN 13057	≤ 0.5 $kgm^{-2}h^{-0.5}$	Pass

Uses

- Repairs to large areas of structural concrete
- Repairs of highway structures: bridge columns, piers, deck soffits, beams, abutments, parapets, retaining walls, tunnels and viaducts
- Repairs of marine structures: jetties, piers, quays, seawalls, concrete offshore platforms, docks and drydocks
- Repairs of fire damaged concrete structures
- Sealing of mine roadways and tunnels
- Structural enhancement of mineshafts
- Structural encasement of steel sections, pylons, chimneys, cooling towers
- Rock and embankment stabilisation

Features and benefits

- Economical – low rebound
- Safe to use and handle. Relatively low dust emission, no siliceous aggregates, no caustic accelerators
- High-build – up to 150 mm thickness can be applied in one pass on vertical and overhead faces encapsulating existing steel reinforcement
- Rapid strength gain
- Low permeability to water and chlorides
- Complies with Highways Agency specifications for repairs to highway structures
- Class 4 repair product meeting the requirements of BS EN 1504-3

webercem spray DS

Preparation

As with all repairs and applications it is essential to apply to a clean, sound surface free from all grease, oil, dust and loose material.

Concrete
Concrete substrates must be adequately prepared by a suitable mechanical method such as scabbling, grit blasting, water jetting or needle gunning, or by such other means as appropriate. Concrete must be carefully prepared to give a clean, freshly-exposed surface. The outer limits of concrete patches should be cut square to avoid feather edges.

Old concrete surfaces contaminated with oil or grease must be cleaned with a suitable detergent. Care must be taken to ensure that the oil or grease is removed from the surface and not simply spread over a larger area.

Steel Substrates
Reinforcing bars should be exposed leaving a clear gap at least 25mm behind the bars to allow for full encapsulation. Steel bars should be free of loose rust and grease. Ideally they should be grit blasted to a uniform grey metal finish to achieve first quality to BS 7079-A1 followed by degreasing with a suitable solvent.

Additional mesh reinforcement
Where there are no exposed bars and where the thickness of the sprayed concrete is 50mm or greater, then mesh reinforcement must be provided. Mesh helps to evenly distribute stresses due to thermal movement or shrinkage and reduces the risk of cracking especially on corners. The mesh should be designed and fixed in accordance with the guidelines of the Code of Practice for Sprayed Concrete published by the Concrete Society.

Reducing suction
Before using webercem spray DS, the concrete substrate must be thoroughly pre-wetted for at least 30 minutes and then all surplus water removed. Water from the spray nozzle followed by high pressure air is the method commonly adopted.

Application

Guidelines on the method of working are detailed in the *Code of Practice for Sprayed Concrete* published by the Concrete Society and should be strictly observed.

webercem spray DS should be emptied from the bags directly into the hopper of the dry process spraying machine. The equipment should be balanced so as to produce a steady stream of material with minimal pulsing.

The amount of water added at the spraying nozzle will be controlled by the nozzleman – too low an addition will increase rebound and dust emission; too wet a mix will slump. The correct amount of water can be judged by the appearance of the sprayed concrete; any glossiness of the surface should be avoided.

In case of a long delay between applied coats of the sprayed concrete, the surface of the newly applied hardened concrete should be water jetted using maximum air pressure and water flow through the nozzle to ensure that any laitance and all weak or loose material has been removed.

The surface should be allowed to drain before proceeding with the next coat.

webercem spray DS can be applied down to 15 mm thickness but, because of the higher cement content, (due to aggregate loss through rebound) there is the likelihood of greater shrinkage. The recommended minimum thickness is 25 mm. The recommended minimum thickness for protection over steel is 40 mm.

Finishing
Any necessary trowelling or profiling should be done immediately after spraying has finished.

An 'as-sprayed' appearance is recommended, but if overcoating is to follow, finish with a wooden float or damp sponge. Avoid the use of steel floated finishes as these normally result in crazing and cracking. The effect is, however, much less with this product.

Curing
This product must be properly cured if it is to achieve its optimum properties. Cure immediately with a high efficiency curing membrane unless the surface is to be overcoated or subject to chemical impregnation, in which case cure with polythene sheeting and/or wet hessian for a minimum of 3 days.

Protect from frost.

Packaging

webercem spray DS is supplied in 25 kg polylined paper sacks.

Yield

Approximately 11·5 litres per 25 kg bag, but allowance must be made for rebound and profiling.

Storage and shelf life

When stored unopened in a dry place at temperatures above 5°C, shelf life is 12 months from date of manufacture.

Health and safety

Contains cement (Contains chromium (VI). May produce an allergic reaction). Harmful by inhalation. Irritating to eyes and skin. Keep out of the reach of children. In case of contact with eyes, rinse immediately with plenty of water and seek medical help. After contact with skin, wash immediately with plenty of soap and water. Wear suitable protective clothing, gloves and eye/face protection.

For further information, please request the Material Safety Data Sheet for this product.

Technical services

Weber's Customer Services Department has a team of experienced advisors available to provide on-site advice both at the specification stage and during application. Detailed specifications can be provided for specific projects or more general works. Site visits and on-site demonstrations can be arranged on request.

Technical helpline
Tel: **08703 330 070**
e-mail **technical@netweber.co.uk**

Sales enquiries

Weber products are distributed throughout the UK through selected stockists and distributors. Please contact the relevant Customer Services Team below for all product orders and enquiries.

UK and Ireland
Tel: **08703 330 070**
Fax: **0800 014 2995**
e-mail **customerservice@netweber.co.uk**

Saint-Gobain Weber
Dickens House, Enterprise Way, Maulden Road, Flitwick, Bedford MK45 5BY, UK
Tel: 08703 330 070 Fax: 0800 014 2995 e-mail: mail@netweber.co.uk
www.netweber.co.uk

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 31.05.2017 Version number 2 Revision: 17.03.2015

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SECTION 1: Identification of the substance/mixture and of the company/ undertaking

1.1 Product identifier
Trade name weber.cem spray DS

Safety data sheet no.: 44P45998
1.2 Relevant identified uses of the substance or mixture and uses advised against
No further relevant information available.
Application of the substance / the mixture Construction chemicals

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Saint-Gobain Weber
Dickens House
Enterprise Way
Flitwick
Bedford.
MK45 5BY
Tel: +44(0)1525 718877
Web: www.netweber.co.uk
Redacted
1.4 Emergency telephone number: +44(0) 8703 330070 Office hours only (08.30-17.00 UK time)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
Results of in vitro- tests have shown that cement based mixtures with more than 1% of cement cause serious skin irritation and serious eye damage, therefore the classification of these mixtures regarding H315 and H318 is not based on the calculation of the ingredients or the pH in this case.


GHS05 corrosion

Eye Dam. 1 H318 Causes serious eye damage.


GHS07

Skin Irrit. 2 H315 Causes skin irritation.
Skin Sens. 1 H317 May cause an allergic skin reaction.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008
The product is classified and labelled according to the CLP regulation.
Hazard pictograms


GHS05 GHS07

Signal word Danger

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Hazard-determining components of labelling:
cement portland, grey
Hazard statements
H315 Causes skin irritation.
H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.
Precautionary statements
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P363 Wash contaminated clothing before reuse.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
2.3 Other hazards
Results of PBT and vPvB assessment
PBT: Does not contain PBT substances.
vPvB: Does not contain vPvB substances.

SECTION 3: Composition/information on ingredients

3.2 Chemical characterisation: Mixtures
Description: Mixture: consisting of the following components.

Dangerous components:		
CAS: 65997-15-1 EINECS: 266-043-4	cement portland, grey Eye Dam. 1, H318; Skin Irrit. 2, H315; Skin Sens. 1, H317; STOT SE 3, H335	10 - 20%

SVHC Void
Additional information
The mixture is "low chromate" according to 2006/1907/EEC within the product shelf-life, so that the identification with R 43 (H317 + EUH203) is not applicable, when the packing was not opened in the meantime.
For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures
General information
Remove the victim immediately from the danger area. If the patient is unwell consult a doctor and present this data sheet.
After inhalation Supply fresh air; consult doctor in case of complaints.
After skin contact Generally the product does not irritate the skin.
After eye contact
Rinse opened eye for several minutes under running water. Rinse liquid should be tempered (20-30 °C).
After swallowing If symptoms persist consult a doctor.

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4.2 Most important symptoms and effects, both acute and delayed
No further relevant information available.
4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents
CO2, powder or water spray. Fight larger fires with water spray
or alcohol resistant foam.
5.2 Special hazards arising from the substance or mixture
No further relevant information available.
5.3 Advice for firefighters
Protective equipment: No special measures required.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures Not required.
6.2 Environmental precautions: No special measures required.
6.3 Methods and material for containment and cleaning up: Pick up mechanically.
6.4 Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling Provide suction extractors if dust is formed.
Information about fire - and explosion protection: No special measures required.

7.2 Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and receptacles:
Store only in unopened original receptacles.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: None.
7.3 Specific end use(s) No further relevant information available.

*
SECTION 8: Exposure controls/personal protection

Additional information about design of technical facilities: No further data; see item 7.

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8.1 Control parameters
Ingredients with limit values that require monitoring at the workplace:

CAS No. Designation of material	%	Type	Value Unit
65997-15-1 cement portland, grey			
WEL	Long-term value: 10* 4** mg/m³ *inhalable dust **respirable dust		

Additional information:
The applicable TRGS 900 (MAK list) was used as the basis for the preparation and/or revision of this safety data sheet.

8.2 Exposure controls
Personal protective equipment:
General protective and hygienic measures:
The usual precautionary measures are to be adhered to when handling chemicals.
Wash hands before breaks and at the end of work.
Respiratory protection:
In case of brief exposure or low pollution use respiratory filter device.
In case of intensive or longer exposure use self-contained respiratory protective device.
Protection of hands: Protective gloves.
Eye protection: Tightly sealed goggles
Body protection: Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
General Information
Appearance:

Form:	Powder
Colour:	Grey
Odour:	Characteristic
Odour threshold:	Not determined.
pH-value:	Not applicable.
Change in condition	
Melting point/freezing point:	Undetermined.
Initial boiling point and boiling range:	Undetermined.
Flash point:	Not applicable
Flammability (solid, gas):	Product is not flammable.
Ignition temperature:	Not determined.
Decomposition temperature:	Not determined.
Auto-ignition temperature:	Product is not selfigniting.
Explosive properties:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.

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Oxidising properties	Not determined.
Vapour pressure:	Not applicable.
Density:	Not applicable.
Relative density	Not determined.
Vapour density	Not applicable.
Evaporation rate	Not applicable.
Solubility in / Miscibility with	
Water:	Unsoluble
Segregation coefficient (n-octanol/water) log	
Pow:	Not determined.
Viscosity:	
dynamic:	Not applicable.
kinematic:	Not applicable.
Solvent content:	
Organic solvents:	0.0 %
EU-VOC	0.00 %
Solids content:	100.0 %
9.2 Other information	No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity No further relevant information available.
10.2 Chemical stability Stable at recommended storage conditions
Thermal decomposition / Conditions to be avoided:
No decomposition if used according to specifications.
10.3 Possibility of hazardous reactions No dangerous reactions known
10.4 Conditions to avoid No further relevant information available.
10.5 Incompatible materials: No further relevant information available.
10.6 Hazardous decomposition products: No dangerous decomposition products known.

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity Based on available data, the classification criteria are not met.
LD/LC50 values relevant for classification:

Components	Type	Value	Species
1317-65-3 limestone			
Oral	LD50	> 5000 mg/kg (Rat)	
65997-15-1 cement portland, grey			
Dermal	LD50	> 2000 mg/kg (Rabbit)	

Primary irritant effect:
Skin corrosion/irritation
Causes skin irritation.
Serious eye damage/irritation
Causes serious eye damage.

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Respiratory or skin sensitisation
May cause an allergic skin reaction.
CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)
Germ cell mutagenicity Based on available data, the classification criteria are not met.
Carcinogenicity Based on available data, the classification criteria are not met.
Reproductive toxicity Based on available data, the classification criteria are not met.
STOT-single exposure Based on available data, the classification criteria are not met.
STOT-repeated exposure Based on available data, the classification criteria are not met.
Aspiration hazard Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity: No further relevant information available.

Type of test	Effective concentration	Method	Assessment
1317-65-3 limestone			
LC50/96h	>10000 mg/l (Oncorhynchus mykiss (Rainbow trout))		
EC50/48h	>1000 mg/l (Daphnia magna)		
EC50/72h	>200 mg/l (Algae)		

12.2 Persistence and degradability No further relevant information available.
12.3 Bioaccumulative potential No further relevant information available.
Behaviour in environmental systems:
12.4 Mobility in soil No further relevant information available.
Additional ecological information:

General notes: Do not allow product to reach ground water, water course or sewage system.
12.5 Results of PBT and vPvB assessment
PBT: Does not contain PBT substances.
vPvB: Does not contain vPvB substances.
12.6 Other adverse effects No further relevant information available.

*
SECTION 13: Disposal considerations

13.1 Waste treatment methods
European waste catalogue
Possible waste code. The concrete waste code depends on the source of the waste.

Uncleaned packaging:
Recommendation: Disposal must be made according to official regulations.

SECTION 14: Transport information

14.1 UN-Number	
ADR, ADN, IMDG, IATA	Void
14.2 UN proper shipping name	
ADR, ADN, IMDG, IATA	Void

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14.3 Transport hazard class(es)	
ADR	
Class	- (-)
ADN/R Class:	Void
IMDG	
Class	Void
Label	-
14.4 Packing group	
ADR, IMDG, IATA	Void
14.5 Environmental hazards:	Not applicable.
14.6 Special precautions for user	Not applicable.
EMS Number:	-
14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
Transport/Additional information:	Not dangerous according to the above specifications.
UN "Model Regulation":	Void

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Directive 2012/18/EU
Named dangerous substances - ANNEX I None of the ingredients is listed.
15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

*

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
Contact: Dr S. Kelly; tel. + 44 (0) 1525 718877
Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organisation

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GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern (REACH regulation)
vPvB: very Persistent and very Bioaccumulative
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Skin Sens. 1: Skin sensitisation – Category 1
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
*** Data compared to the previous version altered.**

Hilti HIT-RE 500 V3 mortar with HIT-V rod

Injection mortar system		Benefits
	Hilti HIT-RE 500 V3 330 ml, 500 ml and 1400 ml foil pack	- **SafeSet** technology: Simplified method of borehole preparation leaving some of the cleaning steps out: Hilti hollow drill bit for hammer drilling and Roughening tool for diamond cored applications - suitable for cracked/non-cracked concrete C 20/25 to C 50/60 - high loading capacity - suitable for dry and water saturated concrete - under water application - high corrosion resistance - long working time at elevated temperatures - cures down to -5°C - odourless epoxy
	Static mixer	
	HIT-V rod	

Base material


Concrete (non-cracked)

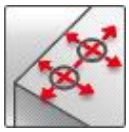

Concrete (cracked)

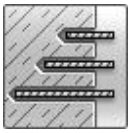
Installation conditions


Hammer drilled holes


Diamond drilled holes

Hilti SafeSet technology


Small edge distance and spacing


Variable embedment depth

Load conditions


Static/ quasi-static


Seismic, ETA-C1, C2


Fire resistance

Other information


European Technical Assessment


CE conformity

PROFIS Anchor design Software

Corrosion resistance

High corrosion resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment	CSTB	ETA-16/0143 / 2016-11-30
Fire test report	MFPA Leipzig	GS 3.2/15-361-4 / 2016-08-04

a) All data given in this section according to ETA-16/0143, issue 2016-11-30.

Static and quasi-static resistance (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Anchor HIT-V with strength class 5.8 and 8.8, anchor AM 8.8
- Base material thickness, as specified in the table
- One typical embedment depth as specified in the table
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- Temperature range I
  (min. base material temperature -40°C, max. long/short term base material temperature: +24°C/40°C)
- Installation temperature range -5°C to +40°C

Embedment depth[a] and base material thickness

Anchor size		ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Eff. Anchorage depth	[mm]	80	90	110	125	170	210	240	270	300	330	360
Base material thickness	[mm]	110	120	140	161	214	266	300	340	374	410	444

a) The allowed range of embedment depth is shown in the setting

For hammer drilled holes, hollow drill bit[1] and diamond cored with roughening tool[2]:

Mean ultimate resistance

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non cracked concrete													
Tensile $N_{Ru,m}$	HIT-V 5.8	[kN]	*18,9*	*30,5*	*44,1*	*83,0*	*129,2*	*185,9*	*241,5*	*295,1*	348,4	401,9	457,9
Shear $V_{Ru,m}$	HIT-V 5.8	[kN]	*9,5*	*15,8*	*22,1*	*41,0*	*64,1*	*92,4*	*120,8*	*147,0*	*182,7*	*214,2*	*256,2*
Cracked concrete													
Tensile $N_{Ru,m}$	HIT-V 5.8	[kN]	17,4	28,2	44,0	66,7	105,9	145,4	177,7	212,0	-	-	-
Shear $V_{Ru,m}$	HIT-V 5.8	[kN]	*9,5*	*15,8*	*22,1*	*41,0*	*64,1*	*92,4*	*120,8*	*147,0*	-	-	-

1) Hilti hollow drill bit available for element size M12-M30.
2) Roughening tools are available for element size M16-M30.

Characteristic resistance

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tensile N_{Rk}	HIT-V 5.8	[kN]	*18,0*	*29,0*	*42,0*	70,6	111,9	153,7	187,8	224,0	262,4	302,7	344,9
	HIT-V 8.8, AM 8.8		*29,0*	43,1	58,3	70,6	111,9	153,7	187,8	224,0	262,4	302,7	344,9
Shear V_{Rk}	HIT-V 5.8		*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115,0*	*140,0*	*174,0*	*204,0*	*244,0*
	HIT-V 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*	*278,0*	*327,0*	*390,0*
Cracked concrete													
Tensile N_{Rk}	HIT-V 5.8	[kN]	13,1	21,2	33,2	50,3	79,8	109,6	133,9	159,7	-	-	-
	HIT-V 8.8, AM 8.8		13,1	21,2	33,2	50,3	79,8	109,6	133,9	159,7	-	-	-
Shear V_{Rk}	HIT-V 5.8		*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115,0*	*140,0*	-	-	-
	HIT-V 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*	-	-	-

1) Hilti hollow drill bit available for element size M12-M30.
2) Roughening tools are available for element size M16-M30.

Design resistance

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tensile N_{Rd}	HIT-V 5.8	[kN]	12,0	19,3	28,0	47,1	74,6	102,5	125,2	149,4	145,8	168,2	191,6
	HIT-V 8.8, AM 8.8		19,3	28,7	38,8	47,1	74,6	102,5	125,2	149,4	145,8	168,2	191,6
Shear V_{Rd}	HIT-V 5.8		7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	139,2	163,2	195,2
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2	222,4	261,6	312,0
Cracked concrete													
Tensile N_{Rd}	HIT-V 5.8	[kN]	8,7	14,1	22,1	33,5	53,2	73,0	89,2	106,5	-	-	-
	HIT-V 8.8, AM 8.8		8,7	14,1	22,1	33,5	53,2	73,0	89,2	106,5	-	-	-
Shear V_{Rd}	HIT-V 5.8		7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	-	-	-
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2	-	-	-

1) Hilti hollow drill bit available for element size M12-M30.
2) Roughening tools are available for element size M16-M30.

Recommended loads [a)]

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non cracked concrete													
Tensile N_{Rec}	HIT-V 5.8	[kN]	8,6	13,8	20,0	33,6	53,3	73,2	89,4	106,7	104,1	120,1	136,9
Shear V_{Rec}	HIT-V 5.8		5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0	99,4	116,6	139,4
Cracked concrete													
Tensile N_{Rec}	HIT-V 5.8	[kN]	6,2	10,1	15,8	23,9	38,0	52,2	63,7	76,1	-	-	-
Shear V_{Rec}	HIT-V 5.8		5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0	-	-	-

a) With overall partial safety factor for action γ=1,4. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

For diamond drilling:

Mean ultimate resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non cracked concrete										
Tensile $N_{Ru,m}$	HIT-V 5.8	[kN]	*18,9*	*30,5*	*44,1*	*83,0*	*129,2*	*185,9*	*241,5*	*295,1*
Shear $V_{Ru,m}$	HIT-V 5.8		*9,5*	*15,8*	*22,1*	*41,0*	*64,1*	*92,4*	*120,8*	*147,0*

Characteristic resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non cracked concrete										
Tensile N_{Rk}	HIT-V 5.8	[kN]	*18,0*	*29,0*	*42,0*	70,6	111,9	153,7	187,8	224,0
	HIT-V 8.8, AM 8.8		24,1	33,9	49,8	70,6	111,9	153,7	187,8	224,0
Shear V_{Rk}	HIT-V 5.8		*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115,0*	*140,0*
	HIT-V 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*

Design resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non cracked concrete										
Tensile N_{Rd}	HIT-V 5.8	[kN]	12,0	18,8	27,6	33,6	53,3	73,2	89,4	106,7
	HIT-V 8.8, AM 8.8		13,4	18,8	27,6	33,6	53,3	73,2	89,4	106,7
Shear V_{Rd}	HIT-V 5.8		7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2

Recommended loads[a)]

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non cracked concrete										
Tensile N_{Rec}	HIT-V 5.8	[kN]	8,6	13,5	19,7	24,0	38,1	52,3	63,9	76,2
Shear V_{Rec}	HIT-V 5.8		5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0

a) With overall partial safety factor for action γ=1,4. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

Seismic resistance

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Anchor HIT-V strength class 8.8, anchor AM 8.8
- Base material thickness, as specified in the table
- One typical embedment depth as specified in the table
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- Temperature range I
  (min. base material temperature -40°C, max. long/short term base material temperature: +24°C/40°C)
- Installation temperature range -5°C to +40°C
- α_{gap}=1,0 (using Hilti seismic filling set)

Embedment depth and base material thickness for seismic C1 and C2

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Eff. Anchorage depth	[mm]	80	90	110	125	170	210	240	270
Base material thickness	[mm]	110	120	140	165	220	270	300	340

For hammer drilled holes, hollow drill bit and diamond cored with roughening tool:

Characteristic resistance in case of seismic performance category C1

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rk}	HIT-V 8.8, AM 8.8	[kN]	12,1	19,8	32,8	42,8	67,8	93,1	113,8	135,8
Shear V_{Rk}	HIT-V 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*

Design resistance in case of seismic performance category C1

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rd}	HIT-V 8.8, AM 8.8	[kN]	8,0	13,2	21,8	28,5	45,2	62,1	75,9	90,5
Shear V_{Rd}	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2

For hammer drilled holes and hammer drilled holes with Hilti hollow drill bit:

Characteristic resistance in case of seismic performance category C2 using Hilti seismic filling set

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rk}	HIT-V 8.8, AM 8.8	[kN]	-	-	-	34,6	57,7	80,8	-	-
Shear V_{Rk}	HIT-V 8.8, AM 8.8		-	-	-	*46,0*	*77,0*	*103,0*	-	-

Design resistance in case of seismic performance category C2 using Hilti seismic filling set

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rd}	HIT-V 8.8, AM 8.8	[kN]	-	-	-	23,0	38,5	53,8	-	-
Shear V_{Rd}	HIT-V 8.8, AM 8.8		-	-	-	36,8	61,6	82,4	-	-

Materials

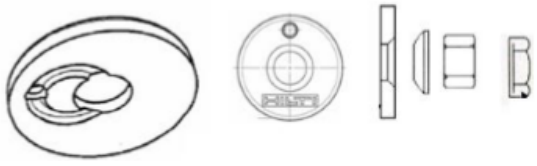
Mechanical properties

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti Technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Nominal tensile strength f_{uk}	HIT-V 5.8	[N/mm²]	500	500	500	500	500	500	500	500	500	500	500
	HIT-V 8.8		800	800	800	800	800	800	800	800	800	800	800
	AM 8.8		800	800	800	800	800	800	800	800	800	800	800
	HIT-V-R		700	700	700	700	700	700	500	500	500	500	500
	HIT-V-HCR		800	800	800	800	800	700	700	700	500	500	500
Yield strength f_{yk}	HIT-V 5.8	[N/mm²]	400	400	400	400	400	400	400	400	400	400	400
	HIT-V 8.8		640	640	640	640	640	640	640	640	640	640	640
	AM 8.8		640	640	640	640	640	640	640	640	640	640	640
	HIT-V-R		450	450	450	450	450	450	210	210	210	210	210
	HIT-V-HCR		640	640	640	640	640	400	400	400	250	250	250
Stressed cross-section A_s	HIT-V AM 8.8	[mm²]	36,6	58,0	84,3	157	245	353	459	561	694	817	976
Moment of resistance W	HIT-V AM 8.8	[mm³]	31,2	62,3	109	277	541	935	1387	1874	2579	3294	4301

Material quality

Part	Material
Threaded rod HIT-V 5.8	Strength class 5.8, A5 > 8% ductile Electroplated zinc coated ≥ 5μm Hot dip galvanized ≥ 45 μm
Threaded rod HIT-V 8.8	Strength class 8.8, A5 > 12% ductile Electroplated zinc coated ≥ 5μm Hot dip galvanized ≥ 45 μm
Hilti Meter rod AM 8.8	Strength class 8.8, A5 > 12% ductile Electroplated zinc coated ≥ 5μm
Threaded rod HIT-V-R	Strength class 70 for ≤ M24 and class 50 for > M24, A5 > 8% ductile Stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362
Threaded rod HIT-V-HCR	Strength class 70 for ≤ M24 and class 50 for > M24, A5 > 8% ductile High corrosion resistance steel 1.4528; 1.4565;
Washer	Electroplated zinc coated ≥ 5 μm, hot dip galvanized ≥ 45 μm
	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014
Nut	Strength class of nut adapted to strength class of threaded rod. Electroplated zinc coated ≥ 5μm, hot dip galvanized ≥ 45 μm
	Strength class of nut adapted to strength class of threaded rod. Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
	Strength class of nut adapted to strength class of threaded rod. High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014

Materials of Hilti seismic filling set

Part	Material	
Filling washer	Electroplated zinc coated ≥ 5μm	
Spherical washer		
Lock nut		

Service temperature range

Hilti HIT-RE 500 V3 injection mortar may be applied in the temperature ranges given below. An elevated base material temperature may lead to a reduction of the design bond resistance.

Temperature range	Base material temperature	Maximum long term base material temperature	Maximum short term base material temperature
Temperature range I	-40 °C to +40 °C	+24 °C	+40 °C
Temperature range II	-40 °C to +70 °C	+43 °C	+70 °C

Max short term base material temperature

Short-term elevated base material temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

Max long term base material temperature

Long-term elevated base material temperatures are roughly constant over significant periods of time.

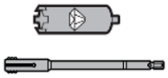
Setting

Installation equipment

Anchor size	M8	M10	M12	M16	M20	M24	M27	M30
Rotary hammer	TE 2 – TE 16				TE 40 – TE 80			
Other tools	compressed air gun, set of cleaning brushes, dispenser, roughening tools TE-YRT							
Additional Hilti recommended tools	DD EC-1, DD 100 … DD 160 [a)]							

a) For anchors in diamond drilled holes load values for combined pull-out and concrete cone resistance have to be reduced (see section “Static and quasi-static resistance (for a single anchor)).

Parameters of cleaning and setting tools

Threaded rod HIT-V-, AM 8.8	Drill bit diameters d_0 [mm]				Installation	
	Hammer drill (HD)	Hollow Drill Bit (HDB)	Diamond coring		Brush HIT-RB	Piston plug HIT-SZ
			Diamond coring (DD)	With roughening tool (RT)		
						
M8	10	-	10	-	10	-
M10	12	-	12	-	12	12
M12	14	14	14	-	14	14
M16	18	18	18	18	18	18
M20	22	22	22	22	22	22
M24	28	28	28	28	28	28
M27	30	-	30	30	30	30
M30	35	35	35	35	35	35

Associated components for the use of Hilti Roughening tool TE-YRT

Diamond coring		Roughening tool TE-YRT	Wear gauge RTG…
			
d_0 [mm]		d_0 [mm]	size
Nominal	measured		
18	17,9 to 18,2	18	18
20	19,9 to 20,2	20	20
22	21,9 to 22,2	22	22
25	24,9 to 25,2	25	25
28	27,9 to 28,2	28	28
30	29,9 to 30,2	30	30
32	31,9 to 32,2	32	32
35	34,9 to 35,2	35	35

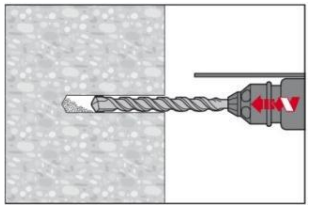
Minimum roughening time $t_{roughen}$ ($t_{roughen}$ [sec] = h_{ef} [mm] /10)

h_{ef} [mm]	$t_{roughen}$ [sec]
0 to 100	10
101 to 200	20
201 to 300	30
301 to 400	40
401 to 500	50
501 to 600	60

Setting instructions

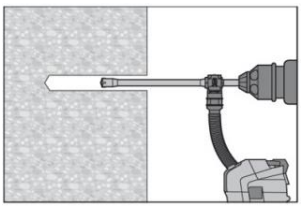
Bore hole drilling

a) Hammer drilling: For dry and wet concrete and installation in flooded holes (no sea water).



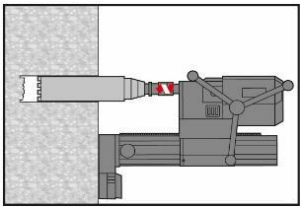
Drill Hole to the required embedment depth with a hammer drill set in rotation-hammer mode using an appropriately sized carbide drill bit.

b) Hammer drilling with Hilti hollow drill bit: For dry and wet concrete only.



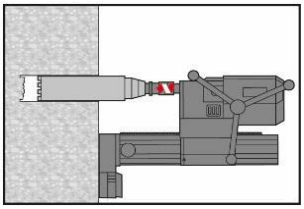
Drill hole to the required embedment depth with an appropriately sized Hilti TE-CD or TE-YD hollow drill bit with Hilti vacuum attachment. This drilling system removes the dust and cleans the bore hole during drilling when used in accordance with the user's manual. After drilling is complete, proceed to the "injection preparation" step in the installation instruction.

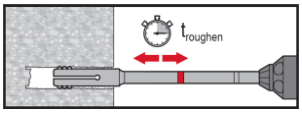
c) Diamond coring: For dry and wet concrete only.



Diamond coring is permissible when suitable diamond core drilling machines and the corresponding core bits are used.

d) Diamond coring with Hilti roughening tool TE-YRT: For dry and wet concrete only.





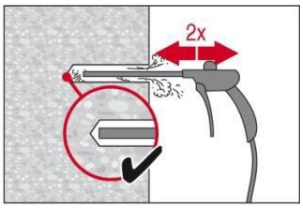
Diamond coring is permissible when suitable diamond core drilling machines and the corresponding core bits are used.

Before roughening the borehole needs to be dry. Check usability of the roughening tool with the wear gauge RTG.
Roughen the borehole over the whole length to the required h_{ef}.

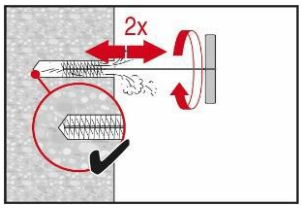
Drill hole cleaning

Just before setting an anchor, the drill hole must be free of dust and debris.
Inadequate hole cleaning=poor load values.

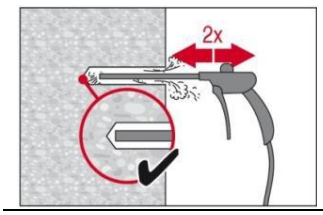
a) Compressed air cleaning (CAC): For all drill hole diameters d_0 and all drill hole depths h_0.



Blow 2 times from the back of the hole (if needed with nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m^3/h) until return air stream is free of noticeable dust.
For drill hole diameters ≥32 mm compressor has to supply a min. air flow of 140 m^3/h.

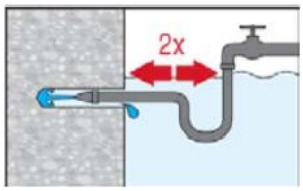


Brush 2 times with the specified brush by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is too small and must be replaced with the proper brush diameter.

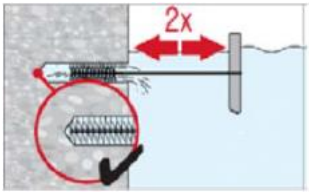


Blow again with compressed air 2 times until return air stream is free of noticeable dust.

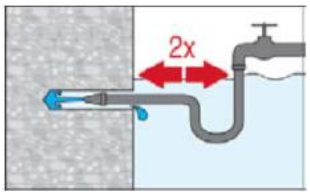
b) Cleaning for under water: For all bore hole diameters d_0 and all bore hole depth h_0.



Flush 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.

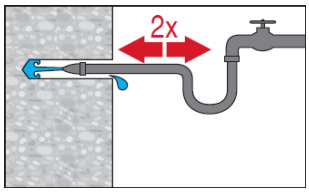
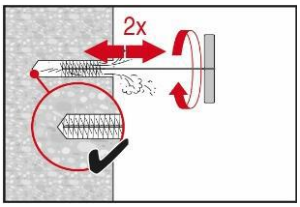
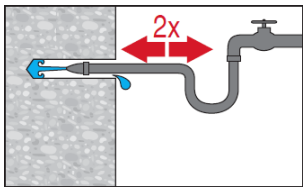
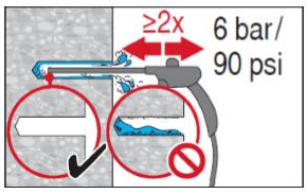
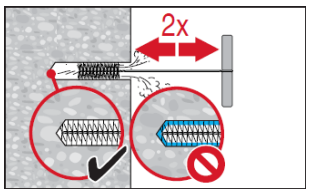
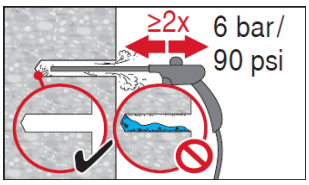


Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.

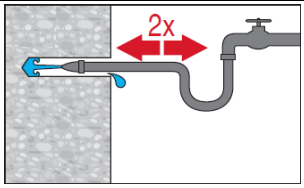


Flush again 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.

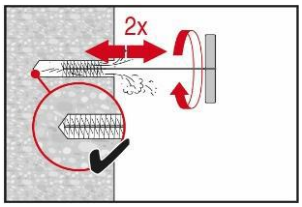
c) Cleaning of hammer drilled holes and diamond cored holes: For all bore hole diameters d_0 and all bore hole depth h_0

	Flush 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.
	Brush 2 times with the specified brush by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.
	Flush 2 times by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.
	Blow 2 times from the back of the hole (if needed with nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust and water. For drill hole diameter ≥ 32 mm the compressor must supply a minimum air flow of 140 m³/hour.
	Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.
	Blow again with compressed air 2 times until return air stream is free of noticeable dust and water.

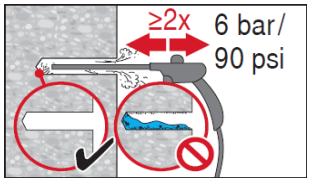
d) Cleaning of diamond cored holes with Hilti roughening tool TE-YRT: For all drill hole diameters d_0 and all drill hole depths h_0.



Flush 2 times by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.

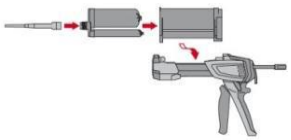


Brush 2 times with the specified brush by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is too small and must be replaced with the proper brush diameter.

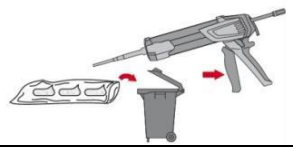


Blow 2 times from the back of the hole (if needed with nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust and water. For drill hole diameters ≥ 32 mm the compressor has to supply a minimum air flow of 140 m³/h.

Injection preparation

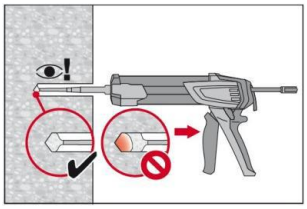


Tightly attach new Hilti mixing nozzle HIT-RE-M to foil pack manifold. Do not modify the mixing nozzle.
Observe the instruction for use of the dispenser and mortar.
Check foil pack holder for proper function.
Insert foil pack into foil pack holder and put holder into dispenser.

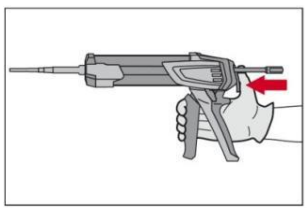


The foil pack opens automatically as dispensing is initiated. Discard initial adhesive. Depending on the size of the foil pack an initial amount of adhesive has to be discarded.
Discard quantities are: 3 strokes for 330 ml foil pack, 4 strokes for 500 ml foil pack, 65 ml for 1400 ml foil pack.

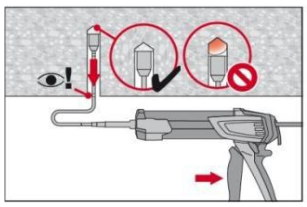
Inject adhesive from the back of the drill hole without forming air voids.



Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull.
Fill holes approximately 2/3 full. It is required that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment length.

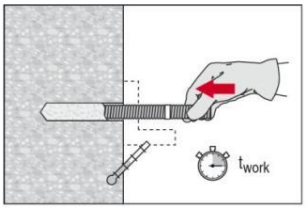


After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.

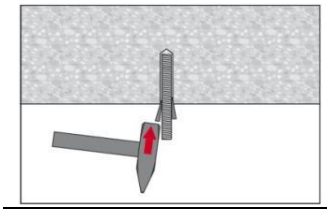


Overhead installation and/or installation with embedment depth h_{ef} > 250mm.
For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble HIT-RE-M mixer, extension(s) and appropriately sized piston plug HIT-SZ. Insert piston plug to back of the hole and inject adhesive. During injection the piston plug will be naturally extruded out of the bore hole by the adhesive pressure.

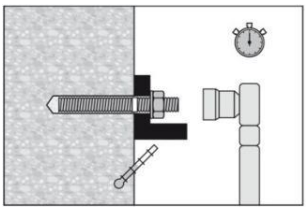
Setting the element: Just before setting an anchor, the drill hole must be free of dust and debris.



Before use, verify that the element is dry and free of oil and other contaminants. Mark and set element to the required embedment depth before working time t_{work} has elapsed.

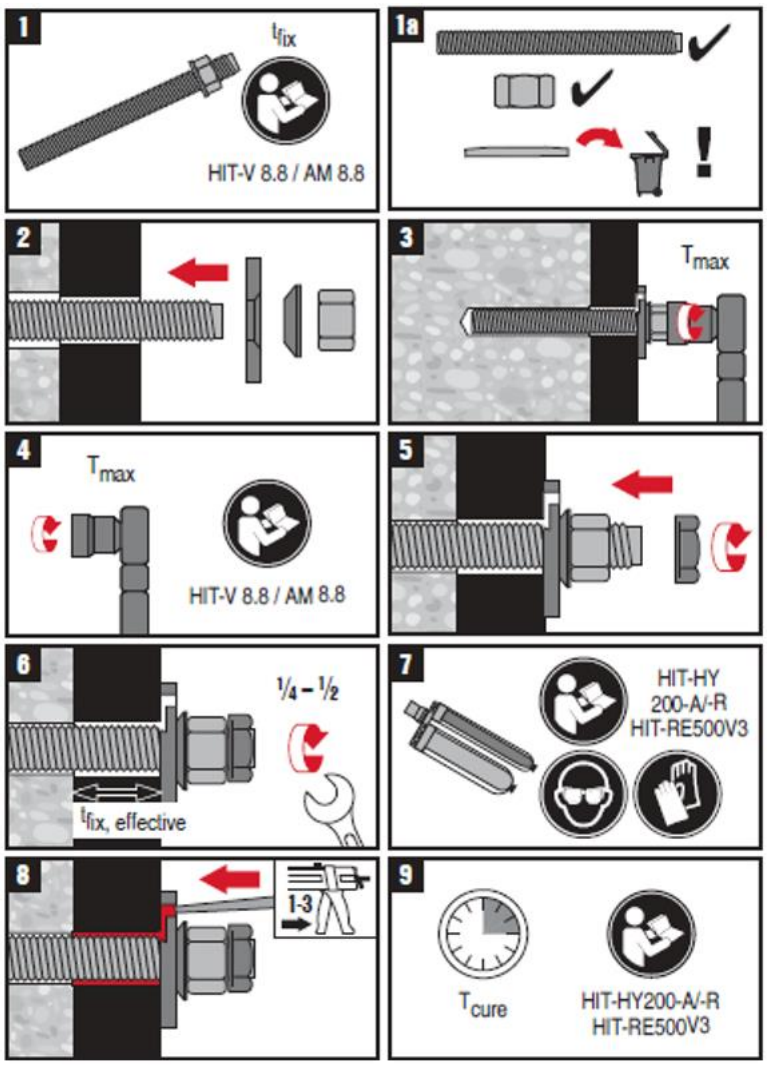


For overhead installation use piston plugs and fix embedded parts with e.g. wedges.



Loading the anchor: after required curing time t_{cure} the anchor can be loaded. The applied installation torque shall not exceed T_{max}.

Installation with Seismic filling set (HIT-V and AM 8.8)



For detailed information on installation see instruction for use given with the package of the product.

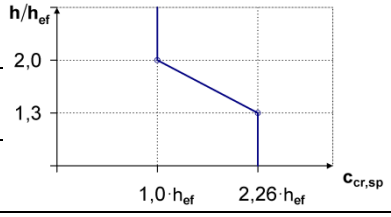
Curing time for general conditions

Temperature of the base material T	Working time t_{work}	Minimum curing time t_{cure} [1)]
-5 °C to -1 °C	2 h	168 h
0 °C to 4 °C	2 h	48 h
5 °C to 9 °C	2 h	24 h
10 °C to 14 °C	1,5 h	16 h
15 °C to 19 °C	1 h	16 h
20 °C to 24 °C	30 min	7 h
25 °C to 29 °C	20 min	6 h
30 °C to 34 °C	15 min	5 h
35 °C to 39 °C	12 min	4,5 h
40 °C	10 min	4 h

1) The curing time data are valid for dry base material only. In wet base material the curing times must be doubled.

Setting details

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti Technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22	28	30	35	37	40	42
Effective anchorage and drill hole depth range [a)]	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120	132	144	156
	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600	660	720	780
Minimum base material thickness	h_{min}	[mm]	h_{ef} +30 mm ≥ 100 mm			h_{ef} + 2 d_0							
Maximum torque moment	T_{max}	[Nm]	10	20	40	80	150	200	270	300	330	360	390
Minimum spacing	s_{min}	[mm]	40	50	60	75	90	115	120	140	165	180	195
Minimum edge distance	c_{min}	[mm]	40	45	45	50	55	60	75	80	165	180	195
Critical spacing for splitting failure	$s_{cr,sp}$		2 $c_{cr,sp}$										
Critical edge distance for splitting failure [b)]	$c_{cr,sp}$	[mm]	**1,0 · h_{ef}** for h / h_{ef} ≥ 2,0 **4,6 h_{ef} - 1,8 h** for 2,0 > h / h_{ef} > 1,3 **2,26 h_{ef}** for h / h_{ef} ≤ 1,3										
Critical spacing for concrete cone failure	$s_{cr,N}$		2 $c_{cr,N}$										
Critical edge distance for concrete cone failure [c)]	$c_{cr,N}$		1,5 h_{ef}										

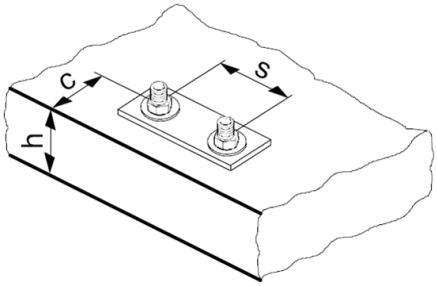


For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

a) $h_{ef,min} \le h_{ef} \le h_{ef,max}$ (h_{ef}: embedment depth)

b) h: base material thickness ($h \ge h_{min}$)

c) The critical edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance. The simplified formula given in this table is on the save side.



Simplified design method

Simplified version of the design method according ETAG 001.

- Influence of concrete strength
- Influence of edge distance
- Influence of spacing
- Valid for a group of two anchors. The method may also be applied for anchor groups with more than two anchors or more than one edge distance. The influencing factors must then be considered for each edge distance and spacing.

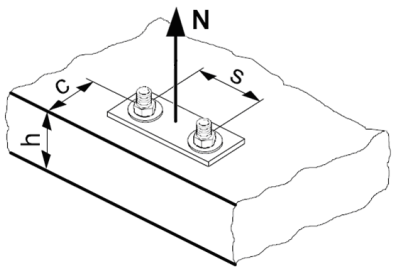
The design method is based on the following simplification:

- No different loads are acting on individual anchors (no eccentricity)

The values are valid for one anchor.

Tension loading

The design tensile resistance is the lower value of



- Steel resistance: $N_{Rd,s}$
- Combined pull-out and concrete cone resistance:

$$N_{Rd,p} = N^0_{Rd,p} \cdot f_{B,p} \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,p} \cdot f_{re,N}$$

- Concrete cone resistance: $N_{Rd,c} = N^0_{Rd,c} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,N} \cdot f_{re,N}$
- Concrete splitting resistance (only non-cracked concrete):

$$N_{Rd,sp} = N^0_{Rd,c} \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,N} \cdot f_{re,N}$$

Design steel resistance $N_{Rd,s}$

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
$N_{Rd,s}$	HIT-V 5.8	[kN]	12,0	19,3	28,0	52,7	82,0	118,0	153,3	187,3	231,3	272,7	325,3
	HIT-V 8.8, AM 8.8		19,3	30,7	44,7	84,0	130,7	188,0	244,7	299,3	370,0	436,0	520,7
	HIT-V-R		13,9	21,9	31,6	58,8	92,0	132,1	80,4	98,3	121,3	143,0	170,6
	HIT-V-HCR		19,3	30,7	44,7	84,0	130,7	117,6	152,9	187,1	144,6	170,4	203,3

Design combined pull-out and concrete cone resistance for anchors

$N_{Rd,p} = N^0_{Rd,p} \cdot f_{B,p} \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,p} \cdot f_{re,N}$

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Typypical embedment depth $h_{ef,typ}$ [mm]			80	90	110	125	170	210	240	270	300	330	360
Hammer drilling + Hilti hollow drill bit	$N^0_{Rd,p}$ [kN]	Temp range I	24,1	33,9	47,0	67,0	106,8	158,3	190,0	220,5	190,1	207,3	245,0
	$N^0_{Rd,p}$ [kN]	Temp range II	18,8	24,5	35,9	50,3	85,5	116,1	135,7	169,6	155,5	176,2	196,0
Diamond coring	$N^0_{Rd,p}$ [kN]	Temp range I	13,4	18,8	27,6	35,9	61,0	82,9	106,6	133,3	-	-	-
	$N^0_{Rd,p}$ [kN]	Temp range II	10,6	14,1	20,7	26,9	45,8	64,1	82,4	103,0	-	-	-

Design concrete cone resistance $N_{Rd,c} = N^0_{Rd,c} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,N} \cdot f_{re,N}$

Design splitting resistance $N_{Rd,sp} = N^0_{Rd,c} \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,N} \cdot f_{re,N}$

Anchor size		ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
$N^0_{Rd,c}$	[kN]	24,1	28,7	38,8	47,1	74,6	102,5	125,2	149,4	145,8	168,2	191,6

Influencing factors

Influence of concrete strength on combined pull-out and concrete cone resistance

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_{B,p} = (f_{ck,cube}/25N/mm^2)^{0,1}$ a)	1	1,02	1,04	1,06	1,07	1,08	1,09

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length

Influence of embedment depth on combined pull-out and concrete cone resistance

$$f_{h,p} = h_{ef}/h_{ef,typ}$$

Influence of concrete strength on concrete cone resistance

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_B = (f_{ck,cube}/25N/mm^2)^{1/2}$ a)	1	1,1	1,22	1,34	1,41	1,48	1,55

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length

Influence of edge distance [a)]

$c/c_{cr,N}$ / $c/c_{cr,sp}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{1,N} = 0,7 + 0,3 \cdot c/c_{cr,N}$ / $f_{1,sp} = 0,7 + 0,3 \cdot c/c_{cr,sp}$	0,73	0,76	0,79	0,82	0,85	0,88	0,91	0,94	0,97	1
$f_{2,N} = 0,5 \cdot (1 + c/c_{cr,N})$ / $f_{2,sp} = 0,5 \cdot (1 + c/c_{cr,sp})$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1

a) The the edge distance shall not be smaller than the minimum edge distance c_{min} given in the table with the setting details. These influencing factors must be considered for every edge distance smaller than the critical edge distance.

Influence of anchor spacing [a)]

$s/s_{cr,N}$ / $s/s_{cr,sp}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{3,N} = 0,5 \cdot (1 + s/s_{cr,N})$ / $f_{3,sp} = 0,5 \cdot (1 + s/s_{cr,sp})$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1

a) The anchor spacing shall not be smaller than the minimum anchor spacing s_{min} given in the table with the setting details. This influencing factor must be considered for every anchor spacing.

Influence of embedment depth on concrete cone resistance: $f_{h,N} = (h_{ef}/h_{ef,typ})^{1,5}$

Influence of reinforcement

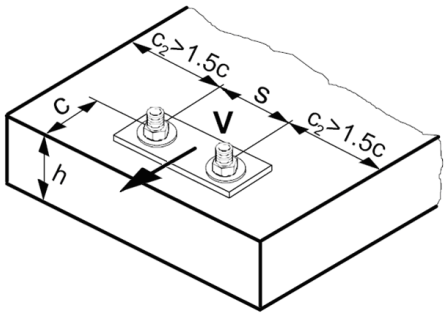
h_{ef} [mm]	40	50	60	70	80	90	≥ 100
$f_{re,N} = 0,5 + h_{ef}/200mm \leq 1$	0,7 [a)]	0,75 [a)]	0,8 [a)]	0,85 [a)]	0,9 [a)]	0,95 [a)]	1

a) This factor applies only for dense reinforcement. If in the area of anchorage there is reinforcement with a spacing ≥ 150 mm (any diameter) or with a diameter ≤ 10 mm and a spacing ≥ 100 mm, then a factor $f_{re} = 1$ may be applied.

Shear loading

The design shear resistance is the lower value of

- Steel resistance: $V_{Rd,s}$
- Concrete pryout resistance: $V_{Rd,cp} = k \cdot$ lower value of $N_{Rd,p}$ and $N_{Rd,c}$
- Concrete edge resistance: $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_{ß} \cdot f_h \cdot f_4 \cdot f_{hef} \cdot f_c$



Design steel resistance $V_{Rd,s}$

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
$V_{Rd,s}$	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	139,2	163,2	195,2
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2	222,4	261,6	312,0
	HIT-V-R		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	73,1	85,7	102,5
	HIT-V-HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112,0	87,0	102,0	122,0

Design concrete pryout resistance $V_{Rd,cp}$ = lower value[a)] of $k \cdot N_{Rd,p}$ and $k \cdot N_{Rd,c}$

$k = 1$ for $h_{ef} < 60$ mm

$k = 2$ for $h_{ef} \geq 60$ mm

a) $N_{Rd,p}$: Design combined pull-out and concrete cone resistance
$N_{Rd,c}$: Design concrete cone resistance

Design concrete edge resistance $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_{ß} \cdot f_h \cdot f_4 \cdot f_{hef} \cdot f_c$

Anchor size	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete											
$V^0_{Rd,c}$ [kN]	5,9	8,6	11,6	18,7	27,0	36,6	44,5	53,0	62,1	71,7	81,9

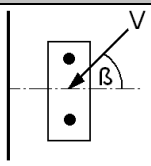
Influencing factors

Influence of concrete strength

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_B = (f_{ck,cube}/25N/mm^2)^{1/2}$ a)	1	1,1	1,22	1,34	1,41	1,48	1,55

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length

Influence of angle between load applied and the direction perpendicular to the free edge

Angle ß	0°	10°	20°	30°	40°	50°	60°	70°	80°	≥ 90°
$f_\beta = \frac{1}{\sqrt{(\cos\alpha_V)^2 + \left(\frac{\sin\alpha_V}{2,5}\right)^2}}$ 	1	1,01	1,05	1,13	1,24	1,40	1,64	1,97	2,32	2,50

Influence of base material thickness

h/c	0,15	0,3	0,45	0,6	0,75	0,9	1,05	1,2	1,35	≥ 1,5
$f_h = \{h/(1,5 \cdot c)\}^{1/2} \leq 1$	0,32	0,45	0,55	0,63	0,71	0,77	0,84	0,89	0,95	1,00

Influence of anchor spacing and edge distance [a] for concrete edge resistance: f_4
$f_4 = (c/h_{ef})^{1,5} \cdot (1 + s / [3 \cdot c]) \cdot 0,5$

c/h_{ef}	Single anchor	Group of two anchors s/h_{ef}														
		0,75	1,50	2,25	3,00	3,75	4,50	5,25	6,00	6,75	7,50	8,25	9,00	9,75	10,50	11,25
0,50	0,35	0,27	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35
0,75	0,65	0,43	0,54	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65
1,00	1,00	0,63	0,75	0,88	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
1,25	1,40	0,84	0,98	1,12	1,26	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40
1,50	1,84	1,07	1,22	1,38	1,53	1,68	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84
1,75	2,32	1,32	1,49	1,65	1,82	1,98	2,15	2,32	2,32	2,32	2,32	2,32	2,32	2,32	2,32	2,32
2,00	2,83	1,59	1,77	1,94	2,12	2,30	2,47	2,65	2,83	2,83	2,83	2,83	2,83	2,83	2,83	2,83
2,25	3,38	1,88	2,06	2,25	2,44	2,63	2,81	3,00	3,19	3,38	3,38	3,38	3,38	3,38	3,38	3,38
2,50	3,95	2,17	2,37	2,57	2,77	2,96	3,16	3,36	3,56	3,76	3,95	3,95	3,95	3,95	3,95	3,95
2,75	4,56	2,49	2,69	2,90	3,11	3,32	3,52	3,73	3,94	4,15	4,35	4,56	4,56	4,56	4,56	4,56
3,00	5,20	2,81	3,03	3,25	3,46	3,68	3,90	4,11	4,33	4,55	4,76	4,98	5,20	5,20	5,20	5,20
3,25	5,86	3,15	3,38	3,61	3,83	4,06	4,28	4,51	4,73	4,96	5,18	5,41	5,63	5,86	5,86	5,86
3,50	6,55	3,51	3,74	3,98	4,21	4,44	4,68	4,91	5,14	5,38	5,61	5,85	6,08	6,31	6,55	6,55
3,75	7,26	3,87	4,12	4,36	4,60	4,84	5,08	5,33	5,57	5,81	6,05	6,29	6,54	6,78	7,02	7,26
4,00	8,00	4,25	4,50	4,75	5,00	5,25	5,50	5,75	6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75
4,25	8,76	4,64	4,90	5,15	5,41	5,67	5,93	6,18	6,44	6,70	6,96	7,22	7,47	7,73	7,99	8,25
4,50	9,55	5,04	5,30	5,57	5,83	6,10	6,36	6,63	6,89	7,16	7,42	7,69	7,95	8,22	8,49	8,75
4,75	10,35	5,45	5,72	5,99	6,27	6,54	6,81	7,08	7,36	7,63	7,90	8,17	8,45	8,72	8,99	9,26
5,00	11,18	5,87	6,15	6,43	6,71	6,99	7,27	7,55	7,83	8,11	8,39	8,66	8,94	9,22	9,50	9,78
5,25	12,03	6,30	6,59	6,87	7,16	7,45	7,73	8,02	8,31	8,59	8,88	9,17	9,45	9,74	10,02	10,31
5,50	12,90	6,74	7,04	7,33	7,62	7,92	8,21	8,50	8,79	9,09	9,38	9,67	9,97	10,26	10,55	10,85

a) The anchor spacing and the edge distance shall not be smaller than the minimum anchor spacing s_{min} and the minimum edge distance c_{min}.

Influence of embedment depth

h_{ef}/d	**4**	**4,5**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
$f_{hef} = 0,05 \cdot (h_{ef} / d)^{1,68}$	0,51	0,63	0,75	1,01	1,31	1,64	2,00	2,39	2,81
h_{ef}/d	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
$f_{hef} = 0,05 \cdot (h_{ef} / d)^{1,68}$	3,25	3,72	4,21	4,73	5,27	5,84	6,42	7,04	7,67

Influence of edge distance [a]

c/d	**4**	**6**	**8**	**10**	**15**	**20**	**30**	**40**
$f_c = (d / c)^{0,19}$	0,77	0,71	0,67	0,65	0,60	0,57	0,52	0,50

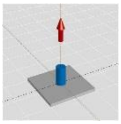
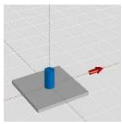
a) The edge distance shall not be smaller than the minimum edge distance c_{min}.

Combined tension and shear loading for hammer drilling or Hilti hollow drill bit

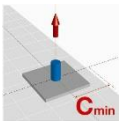
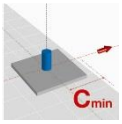
Precalculated values

Recommended loads can be calculated by dividing the design resistance by an overall partial safety factor for action γ = 1,4. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

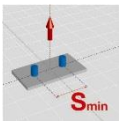
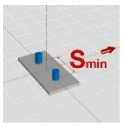
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth $h_{ef,1}$ =		[mm]	60	60	70	80	90	96	108	120	132	144	156
Base material thickness h_{min}=		[mm]	100	100	100	116	134	152	168	190	206	224	240
	Tensile N_{Rd}: single anchor, no edge effects												
	HIT-V 5.8	[kN]	12,0	15,6	19,7	24,1	28,7	31,7	37,8	44,3	42,5	48,5	54,7
	HIT-V 8.8, AM 8.8		15,6	15,6	19,7	24,1	28,7	31,7	37,8	44,3	42,5	48,5	54,7
	HIT-V-R		13,9	15,6	19,7	24,1	28,7	31,7	37,8	44,3	42,5	48,5	54,7
	HIT-V-HCR		15,6	15,6	19,7	24,1	28,7	31,7	37,8	44,3	42,5	48,5	54,7
	Shear V_{Rd}: single anchor, no edge effects, without lever arm												
	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	63,3	75,6	88,5	102,1	116,4	131,2
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	48,2	57,5	63,3	75,6	88,5	102,1	116,4	131,2
	HIT-V-R		8,3	12,8	19,2	35,3	55,1	63,3	48,3	58,8	73,1	85,7	102,5
	HIT-V-HCR		12,0	18,4	27,2	48,2	57,5	63,3	75,6	88,5	87,0	102,0	122,0

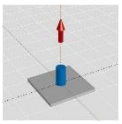
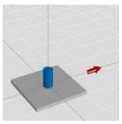
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth $h_{ef,1}$ =		[mm]	60	60	70	80	90	96	108	120	132	144	156
Base material thickness h_{min}=		[mm]	100	100	100	116	134	152	168	190	206	224	240
Edge distance c = c_{min}=		[mm]	40	45	45	50	55	60	75	80	165	180	195
	Tensile N_{Rd}: single anchor, min. edge distance (c = c_{min})												
	HIT-V 5.8 HIT-V 8.8, AM 8.8 HIT-V-R HIT-V-HCR	[kN]	9,1	9,7	10,3	12,6	15,1	17,3	21,4	24,9	32,8	37,3	41,6
	Shear V_{Rd}: single anchor, min. edge distance (c = c_{min}) , without lever arm												
	HIT-V 5.8 HIT-V 8.8, AM 8.8 HIT-V-R HIT-V-HCR	[kN]	3,5	4,3	4,6	5,7	6,9	8,1	11,3	12,9	30,1	34,8	39,5

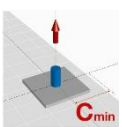
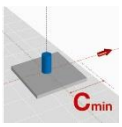
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I
(load values are valid for single anchor)

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,1}$ =	[mm]	60	60	70	80	90	96	108	120	132	144	156
Base material thickness	h_{min}=	[mm]	100	100	100	116	134	152	168	190	206	224	240
Spacing	s = s_{min}=	[mm]	40	50	60	75	90	115	120	140	165	180	195
	Tensile N_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min})												
	HIT-V 5.8 HIT-V 8.8, AM 8.8 HIT-V-R HIT-V-HCR	[kN]	9,5	9,9	11,9	14,9	18,1	21,3	24,7	29,5	28,7	32,7	36,7
	Shear V_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min}) , without lever arm												
	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	38,3	44,3	51,8	61,5	72,3	82,4	92,9
	HIT-V 8.8, AM 8.8	[kN]	12,0	18,4	25,4	31,6	38,3	44,3	51,8	61,5	72,3	82,4	92,9
	HIT-V-R	[kN]	8,3	12,8	19,2	31,6	38,3	44,3	48,3	58,8	72,3	82,4	92,9
	HIT-V-HCR	[kN]	12,0	18,4	25,4	31,6	38,3	44,3	51,8	61,5	72,3	82,4	92,9

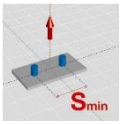
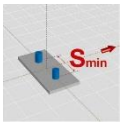
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,typ}$ =	[mm]	80	90	110	125	170	210	240	270	300	330	360
Base material thickness	h_{min}=	[mm]	110	120	140	161	214	266	300	340	374	410	444
	Tensile N_{Rd}: single anchor, no edge effects												
	HIT-V 5.8	[kN]	12,0	19,3	28,0	47,1	74,6	102,5	125,2	149,4	145,8	168,2	191,6
	HIT-V 8.8, AM 8.8	[kN]	19,3	28,7	38,8	47,1	74,6	102,5	125,2	149,4	145,8	168,2	191,6
	HIT-V-R	[kN]	13,9	21,9	31,6	47,1	74,6	102,5	80,4	98,3	121,3	143,0	170,6
	HIT-V-HCR	[kN]	19,3	28,7	38,8	47,1	74,6	102,5	125,2	149,4	144,6	168,2	191,6
	Shear V_{Rd}: single anchor, no edge effects, without lever arm												
	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	138,8	163,4	195,2
	HIT-V 8.8, AM 8.8	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2	222,1	261,4	312,3
	HIT-V-R	[kN]	8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	72,9	85,8	102,5
	HIT-V-HCR	[kN]	12,0	18,4	27,2	50,4	78,4	70,9	92,0	112,0	86,8	102,1	122,0

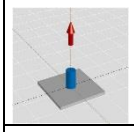
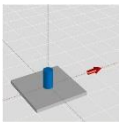
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,typ}$ =	[mm]	80	90	110	125	170	210	240	270	300	330	360
Base material thickness	h_{min}=	[mm]	110	120	140	161	214	266	300	340	374	410	444
Edge distance	c = c_{min}=	[mm]	40	45	45	50	55	60	75	80	165	180	195
	Tensile N_{Rd}: single anchor, min. edge distance (c = c_{min})												
	HIT-V 5.8 HIT-V 8.8, AM 8.8 HIT-V-R HIT-V-HCR	[kN]	11,5	13,5	17,3	20,9	31,7	42,6	52,8	62,5	70,1	80,6	91,7
	Shear V_{Rd}: single anchor, min. edge distance (c = c_{min}) , without lever arm												
	HIT-V 5.8 HIT-V 8.8, AM 8.8 HIT-V-R HIT-V-HCR	[kN]	3,7	4,7	5,1	6,4	8,4	10,5	14,6	16,9	41,1	47,8	54,9

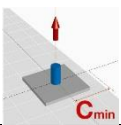
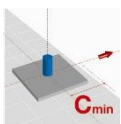
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I
(load values are valid for single anchor)

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,typ}$ =	[mm]	80	90	110	125	170	210	240	270	300	330	360
Base material thickness	h_{min}=	[mm]	110	120	140	161	214	266	300	340	374	410	444
Spacing	s = s_{min}=	[mm]	40	50	60	75	90	115	120	140	165	180	195
	Tensile N_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min})												
	HIT-V 5.8	[kN]	12,0	16,2	21,8	26,6	41,7	57,4	69,5	83,2	81,8	94,2	107,3
	HIT-V 8.8, AM 8.8	[kN]	13,5	16,2	21,8	26,6	41,7	57,4	69,5	83,2	81,8	94,2	107,3
	HIT-V-R	[kN]	13,5	16,2	21,8	26,6	41,7	57,4	69,5	83,2	81,8	94,2	107,3
	HIT-V-HCR	[kN]	13,5	16,2	21,8	26,6	41,7	57,4	69,5	83,2	81,8	94,2	107,3
	Shear V_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min}) , without lever arm												
	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	139,2	163,2	195,2
	HIT-V 8.8, AM 8.8	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	146,0	175,2	207,0	238,5	271,5
	HIT-V-R	[kN]	8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	73,1	85,7	102,5
	HIT-V-HCR	[kN]	12,0	18,4	27,2	50,4	78,4	70,9	92,0	112,0	87,0	102,0	122,0

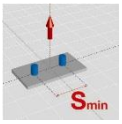
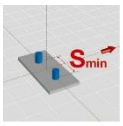
Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,2}$ =	[mm]	96	120	144	192	240	288	324	360	396	432	468
Base material thickness	h_{min}=	[mm]	126	150	174	228	284	344	384	430	470	512	552
	Tensile N_{Rd}: single anchor, no edge effects												
	HIT-V 5.8	[kN]	12,0	19,3	28,0	52,7	82,0	118,0	153,3	187,3	221,1	251,9	284,0
	HIT-V 8.8, AM 8.8	[kN]	19,3	30,7	44,7	84,0	125,2	164,5	196,3	230,0	221,1	251,9	284,0
	HIT-V-R	[kN]	13,9	21,9	31,6	58,8	92,0	132,1	80,4	98,3	121,3	143,0	170,6
	HIT-V-HCR	[kN]	19,3	30,7	44,7	84,0	125,2	117,6	152,9	187,1	144,6	170,4	203,3
	Shear V_{Rd}: single anchor, no edge effects, without lever arm												
	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	139,2	163,2	195,2
	HIT-V 8.8, AM 8.8	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2	222,4	261,6	312,0
	HIT-V-R	[kN]	8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	73,1	85,7	102,5
	HIT-V-HCR	[kN]	12,0	18,4	27,2	50,4	78,4	70,9	92,0	112,0	87,0	102,0	122,0

Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,2}$ =	[mm]	96	120	144	192	240	288	324	360	396	432	468
Base material thickness	h_{min}=	[mm]	126	150	174	228	284	344	384	430	470	512	552
Edge distance	c = c_{min}=	[mm]	40	45	45	50	55	60	75	80	165	180	195
	Tensile N_{Rd}: single anchor, min. edge distance (c = c_{min})												
	HIT-V 5.8	[kN]	12,0	19,3	24,6	36,7	50,4	65,4	79,1	92,1	98,9	112,7	127,0
	HIT-V 8.8, AM 8.8	[kN]	14,2	19,3	24,6	36,7	50,4	65,4	79,1	92,1	98,9	112,7	127,0
	HIT-V-R	[kN]	13,9	19,3	24,6	36,7	50,4	65,4	79,1	92,1	98,9	112,7	127,0
	HIT-V-HCR	[kN]	14,2	19,3	24,6	36,7	50,4	65,4	79,1	92,1	98,9	112,7	127,0
	Shear V_{Rd}: single anchor, min. edge distance (c = c_{min}) , without lever arm												
	HIT-V 5.8 HIT-V 8.8, AM 8.8 HIT-V-R HIT-V-HCR	[kN]	3,9	5,0	5,5	7,4	9,5	12,0	16,5	19,1	45,0	52,3	60,0

Design resistance: concrete C 20/25 – $f_{ck,cube}$ = 25 N/mm², Temperature range I
(load values are valid for single anchor)

Anchor size			ETA-16/0143, issue 2016-11-30								Additional Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Embedment depth	$h_{ef,2}$ =	[mm]	96	120	144	192	240	288	324	360	396	432	468
Base material thickness	h_{min}=	[mm]	126	150	174	228	288	344	384	430	470	512	558
Spacing	s = s_{min}=	[mm]	40	50	60	75	90	115	120	140	165	180	195
	**Tensile N_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min})**												
	HIT-V 5.8	[kN]	12,0	19,3	28,0	48,7	67,8	89,5	106,2	124,9	120,7	137,6	155,1
	HIT-V 8.8, AM 8.8		17,3	24,2	31,8	48,7	67,8	89,5	106,2	124,9	120,7	137,6	155,1
	HIT-V-R		13,9	21,9	31,6	48,7	67,8	89,5	80,4	98,3	120,7	137,6	155,1
	HIT-V-HCR		17,3	24,2	31,8	48,7	67,8	89,5	106,2	124,9	120,7	137,6	155,1
	**Shear V_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min}) , without lever arm**												
	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0	139,2	163,2	195,2
	HIT-V 8.8, AM 8.8	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2	222,4	261,6	312,0
	HIT-V-R	[kN]	8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	73,1	85,7	102,5
	HIT-V-HCR	[kN]	12,0	18,4	27,2	50,4	78,4	70,9	92,0	112,0	87,0	102,0	122,0

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1 Identification

· **Product identifier**

· **Trade name: Hilti HIT-RE 500**
· **Container size:** 330 ml, 500 ml
· **Relevant identified uses of the substance or mixture and uses advised against**
· **Sector of Use** Building and construction work
· **Application of the substance / the mixture** Adhesive mortar for rebar and anchor fastenings in solid concrete

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Hilti, Inc.
5400 South 122nd East Ave.
US-Tulsa, OK 74146
Phone: (800) 879-8000
Fax: (800) 879-7000
Español: (800) 879-5000

· **Information department:**
anchor.hse@hilti.com
see section 16
· **Emergency telephone number:**
Chem-Trec
Tel.: 1 800 424 9300 (USA, PR, Virgin Islands, Canada)
Tel.: 703 527 3887 (Other countries)
Hilti, Inc.
Phone: (800) 879-8000
Fax: (800) 879-7000
Español: (800) 879-5000

*
2 Hazard(s) identification

· **Classification of the substance or mixture**

Skin Corr. 1A	H314	Causes severe skin burns and eye damage.
Eye Dam. 1	H318	Causes serious eye damage.
Aquatic Chronic 2	H411	Toxic to aquatic life with long lasting effects.
Skin Sens. 1	H317	May cause an allergic skin reaction.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS05 GHS07 GHS09

· **Signal word** Danger

· **Hazard-determining components of labeling:**
m-Xylylenediamine
reaction product: bisphenol-A-(epichlorhydrin) epoxy resin
(number average molecular weight = 700)
Reaction product: bisphenol-F epichlorhydrin resin, MW ≤ 700
· **Hazard statements**
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H411 Toxic to aquatic life with long lasting effects.
· **Precautionary statements**

P260	Do not breathe vapours.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.

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Trade name: Hilti HIT-RE 500

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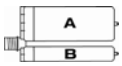
· **Classification system**
· **NFPA ratings (scale 0-4)**

Health = 3
Fire = 1
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

· **Additional information:**



Hilti HIT

· **Information pertaining to particular dangers for man and environment: A**
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H317 May cause an allergic skin reaction.
H411 Toxic to aquatic life with long lasting effects.
· **Information pertaining to particular dangers for man and environment: B**
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H412 Harmful to aquatic life with long lasting effects.

*

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:**
2-component-foilpack, contains:
Component A: Epoxy resin, Reactive diluent, inorganic filler
Component B: Amine hardener, inorganic filler

Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:** .

· **Dangerous components A:**		
25068-38-6	reaction product: bisphenol-A-(epichlorhydrin) epoxy resin (number average molecular weight = 700)	25-50%
28064-14-4	Reaction product: bisphenol-F epichlorhydrin resin, MW ≤ 700	10-25%
16096-31-4	1,6-bis(2,3-epoxypropoxy)hexane	10-25%
30499-70-8	Trimethylolpropane, (chloromethyl)oxirane polymer	2.5-10%
14808-60-7	Quartz (SiO2)	25-50%

.

· **Dangerous components B:**		
1477-55-0	m-Xylylenediamine	30-40%
14808-60-7	Quartz (SiO2)	15-30%
1344-28-1	aluminium oxide	5-10%

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· **Additional information** For the wording of the listed risk phrases refer to section 16.

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4 First-aid measures

· **Description of first aid measures**
· **General information** Immediately remove any clothing soiled by the product.
· **After inhalation**
Take affected persons into fresh air and keep quiet.
Seek medical treatment in case of complaints.
· **After skin contact** Immediately wash with water and soap and rinse thoroughly.

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Trade name: Hilti HIT-RE 500

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· **After eye contact**
Seek immediate medical advice.
Rinse opened eye for several minutes under running water. Then consult a doctor.
Protect unharmed eye.
Seek medical treatment.
· **After swallowing**
Do not induce vomiting; immediately call for medical help.
Rinse out mouth and then drink plenty of water.
· **Information for doctor**
· **Most important symptoms and effects, both acute and delayed** Allergic reactions
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents** Water with full jet.
· **Special hazards arising from the substance or mixture**
In case of fire, the following can be released:
Nitrogen oxides (NOx)
Carbon monoxide (CO)
In certain fire conditions, traces of other toxic gases cannot be excluded.
· **Advice for firefighters**
· **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Wear protective clothing.
Ensure adequate ventilation
· **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Do not allow to penetrate the ground/soil.
· **Methods and material for containment and cleaning up:**
Pick up mechanically.
Clean the affected area carefully; suitable cleaners are:
organic solvent
Dispose contaminated material as waste according to item 13.
· **Reference to other sections**
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

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7 Handling and storage

· **Handling**
· **Precautions for safe handling**
The usual precautionary measures for handling chemicals should be followed.
Take note of emission threshold.
Use only in well ventilated areas.
Check the expiry date: see imprint on manifold (month/year). Do not use expired mortar!
· **Information about protection against explosions and fires:** Keep ignition sources away - Do not smoke.

· **Conditions for safe storage, including any incompatibilities**
· **Storage**
· **Requirements to be met by storerooms and receptacles:**
Keep in a cool, dry and dark place; 41 °F / 5 °C to 77 °F / 25 °C.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:** Protect from heat and direct sunlight.

· **Storage class** As per VCI (1991) storage classification concept.

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· **Specific end use(s)** Adhesive mortar for rebar and anchor fastenings in solid concrete

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8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The product has a pasty consistency. Exposure limit values for respirable dusts ar not relevant for this product.

1477-55-0 m-Xylylenediamine	
REL	Short-term value: C 0.1 mg/m³ Skin
TLV	Short-term value: C 0.1 mg/m³ Skin

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment**
· **General protective and hygienic measures**
The usual precautionary measures for handling chemicals should be followed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
Do not eat, drink, smoke or sniff while working.
Clean skin thoroughly immediately after handling the product.
Ensure that washing facilities are available at the work place.
Keep away from foodstuffs, beverages and feed.
Use skin protection cream for skin protection.
Do not carry product impregnated cleaning cloths in trouser pockets.
· **Breathing equipment:**
Not necessary if room is well-ventilated.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· **Recommended filter device for short term use:** Filter AX
· **Protection of hands:**

Protective gloves.

Only use chemical-protective gloves with CE-labeling of category III.
EN 374
Avoid direct contact with the chemical/ the product/ the preparation by organizational measures.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
· **Material of gloves**
Nitrile rubber, NBR
Recommended thickness of the material: ≥ 0.4 mm
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **As protection from splashes gloves made of the following materials are suitable:** Nitrile rubber, NBR
· **Not suitable are gloves made of the following materials:**
Natural rubber, NR
Leather gloves
Strong gloves
· **Eye protection:**

Tightly sealed goggles.

Gauze goggles
Face protection

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EN 166 / EN 170
· **Body protection:**

Protective work clothing.

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9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Pasty
Color:	Component A: grey Component B: red Mixture: red
· **Odor:**	Amine-like
· **Odour threshold:**	Not determined
· **pH-value:**	Component A: 7 Component B: 11,5 Mixture: 11,5
· **Change in condition**	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	> 200 °C (> 392 °F)
· **Flash point:**	> 100 °C (> 212 °F) (DIN EN ISO 1523)
· **Flammability (solid, gaseous)**	Not determined
· **Ignition temperature:**	Not determined
· **Decomposition temperature:**	Not determined
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined
Upper:	Not determined
· **Vapor pressure at 20 °C (68 °F):**	0.04 hPa
· **Density:**	Component A: 1.5 g/cm³ (DIN 51757) Component B: 1.4 g/cm³ (DIN 51757) Not determined
· **Relative density**	Not determined
· **Vapour density**	Not determined
· **Evaporation rate**	Not determined
· **Solubility in / Miscibility with**	
Water:	Insoluble
· **Partition coefficient (n-octanol/water):**	Not determined
· **Viscosity:**	
dynamic at 20 °C (68 °F):	50 Pas (DIN 53019)
kinematic at 20 °C (68 °F):	>20 s (ISO 2431)
· **Solvent content:**	
Organic solvents:	0 %
Water:	0 %
· **Other information**	No further relevant information available.

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10 Stability and reactivity

· **Reactivity**
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known

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11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
1477-55-0 m-Xylylenediamine		
Oral	LD50	1040 mg/kg (rat)
Dermal	LD50	2000 mg/kg (rabbit)
Inhalative	LC50/4h	2.4 mg/l (rat)

· **Primary irritant effect:**
· **on the skin:** Strong caustic effect on skin and mucous membranes.
· **on the eye:**
Strong caustic effect.
Strong irritant with the danger of severe eye injury.
· **Sensitization:** Sensitization possible through skin contact.
· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Harmful
Corrosive
Irritant
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

· **Carcinogenic categories**

· **NTP (National Toxicology Program)**		
14808-60-7	Quartz (SiO2)	K

12 Ecological information

· **Toxicity**

· **Aquatic toxicity:**	
25068-38-6 reaction product: bisphenol-A-(epichlorhydrin) epoxy resin (number average molecular weight = 700)	
EC50/48h	9.4 mg/l (Algae)
	1.7 mg/l (magna daphnia)
EC50/96h	1.2 mg/l (fish)
28064-14-4 Reaction product: bisphenol-F epichlorhydrin resin, MW ≤ 700	
EC50/48h	9.4 mg/l (Algae)
	1.7 mg/l (magna daphnia)
EC50/96h	1.5 mg/l (fish)
16096-31-4 1,6-bis(2,3-epoxypropoxy)hexane	
EC50/48h	23.1 mg/l (Algae)
	39 mg/l (magna daphnia)
EC50/96h	17.1 mg/l (fish)
1477-55-0 m-Xylylenediamine	
EC50/48h	12 mg/l (Algae)

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	15.2 mg/l (magna daphnia)
EC50/96h	75 mg/l (fish)

· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Ecotoxical effects:**
· **Remark:** Toxic for fish
· **Additional ecological information:**
· **According to the formulation contains the following heavy metals and compounds from the EU guideline NO. 2006/11/EC:**
None
· **General notes:**
Avoid transfer into the environment.
The product contains materials that are harmful to the environment.
Also poisonous for fish and plankton in water bodies.
Toxic for aquatic organisms
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

*
13 Disposal considerations

· **Waste treatment methods**
· **Recommendation**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
Hand over to hazardous waste disposers.
Full or only partially emptied cartridges must be disposed of as special waste in accordance with official regulations.

· **European waste catalogue:**	
08 04 09*	waste adhesives and sealants containing organic solvents or other dangerous substances
20 01 27*	paint, inks, adhesives and resins containing dangerous substances

· **Uncleaned packagings:**
· **Recommendation:**
Disposal must be made according to official regulations.
Dispose of packaging according to regulations on the disposal of packagings.

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14 Transport information

· **UN-Number**	
· **ADR, IMDG, IATA**	3259 / PG II 3077 / PG III
· **UN proper shipping name**	
· **ADR**	AMINES, SOLID, CORROSIVE, N.O.S. (m-Xylylenediamine) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Bisphenol A/F Epoxy Resin)
· **IMDG, IATA**	AMINES, SOLID, CORROSIVE, N.O.S (m-Xylylenediamine) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S (Bisphenol A/F Epoxy Resin)
· **Transport hazard class(es)**	
· **ADR**	
· **Class**	8 Corrosive substances 9 Miscellaneous dangerous substances and articles.
· **IMDG, IATA**	
· **Class**	8 9

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· **Label**	8 9
· **Packing group** · **ADR, IMDG, IATA**	 3259 / PG II 3077 / PG III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user** · **EMS Number:**	Not applicable. F-A, S-B
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **IMDG** · **Remarks:**	 Limited Quantity (LQ) 1 kg 5 kg
· **IATA** · **Remarks:**	 Packing Instruction No. UN 3259: 859 UN 3077: 956 All packed in one
· **UN "Model Regulation":**	II
· **HS-Code:**	3214 10 10: Glaziers' putty, grafting putty, resin cements, caulking compounds and other mastics

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15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Section 355 (Extremely hazardous substances):**

None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

1344-28-1	aluminium oxide

· **TSCA (Toxic Substances Control Act):**

14808-60-7	Quartz (SiO2)
25068-38-6	reaction product: bisphenol-A-(epichlorhydrin) epoxy resin (number average molecular weight = 700)
28064-14-4	Reaction product: bisphenol-F epichlorhydrin resin, MW ≤ 700
1477-55-0	m-Xylylenediamine
16096-31-4	1,6-bis(2,3-epoxypropoxy)hexane
30499-70-8	Trimethylolpropane, (chloromethyl)oxirane polymer
67762-90-7	FUMED SILICA (SILOXANES AND SILICONES, DI-ME, REACTION PRODUCTS WITH SILICA)
65997-16-2	Cement, alumina, chemicals
1344-28-1	aluminium oxide

· **Proposition 65:**

· **Chemicals known to cause cancer:**

14808-60-7	Quartz (SiO2)

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**

14808-60-7	Quartz (SiO2)	A2
1344-28-1	aluminium oxide	A4
108-46-3	resorcinol	A4

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Trade name: Hilti HIT-RE 500

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· **MAK (German Maximum Workplace Concentration)**		
14808-60-7	Quartz (SiO2)	1
1344-28-1	aluminium oxide	2

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**	
14808-60-7	Quartz (SiO2)

· **National regulations**
The product is subject to be labeled according with the prevailing version of the regulations on hazardous substances.

· **Information about limitation of use:** Employment restrictions concerning young persons must be observed.
· **Chemical safety assessment:** not required.

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16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases** H318 Causes serious eye damage.

· **Department issuing SDS:**
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· **Contact:** Mechthild Krauter
· **Date of preparation / last revision** 05/18/2015 / 7
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2
· *** Data compared to the previous version altered.**