Norwegian Oil and Gas Covid-19 and Offshore Diving (Norway)

Measures to be taken to reduce spread of Covid-19 during manned underwater operations on the Norwegian Continental Shelf

The principal author of this document is Jan Risberg MD, PhD
Norwegian Oil and Gas Association, forum Diving and Underwater operations, appreciate the work that Dr Risberg and others has given.
The report has been published by the Norwegian Oil and Gas Association, Forum Diving and Underwater operations.

We would welcome any comments and improvements to this document. Please submit suggestions for changes to Jan Risberg (jri@nui.no). The revision history of the document is published on the next page and future revisions will be published on the Norwegian Oil and Gas Association web-page.

AMENDMENTS

Rev#	Date	Comment
6	20.4.20	Specified instructions for cleaning and disinfecting Kirby Morgan equipment in Appendices 1 and 2. Underscoring that Klorhexidine is not an efficient disinfectant. Expanded section of asymptomatic carriers. Table 1 recalculated based on a pre-embarcation exposure period of 0-5 days and a column for incubation period inserted. Text revised related to this topic. Editorial and text changes.
5	25.3.20	Minor text changes. Modified statement of quarantine, underscoring the uncertainty of asymptomatic carriers. Attached poster on handwash (Appendix 3). Released for public access through Norwegian Oil and Gas Association.
4	24.3.20	Specific guidance on cleaning and disinfection of Kirby Morgan equipment, incl Appendix 3 (photo series) completely removed based on feedback (risk of causing critical equipment failure). Pre-review before transmission to Norwegian Oil and Gas Association for public release.
3	24.3.20	Restructuring of document (layout and headings). Revision of contents based on feedback received on Rev 2. Added Appendix 2 with Norwegian text intended for inshore diving. Appendix 3 procedure for Kirby Morgan™ and Interspiro™ equipment revised. Expanded section on incubation period and efficacy of quarantine. Limited (not public) distribution for review of changes.
2	20.3.20	Clarified document authorship, reformatted to PDF and distributed in public
1	20.3.20	Complete revision of document. Contents presented as plain text and structured with headings. Detailed data on SARS-CoV-2 and Covid-19, hygienic measures, cleaning and disinfection procedures for diving equipment.
MOM Rev 0	13.3.20	As “Draft” below, but structured as MOM with input from meeting participants. Conclusions remaining as bullet-points
Draft	13.3.20	Document original title “Topics for discussion – Covid-19 and offshore diving (Norway)” presented at meeting 13.3.20. Structured as bullet-point conclusions

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1 Background

WHO has declared Covid-19 as a pandemic infectious disease. Measures are implemented internationally and nationally to reduce the spread and protect vulnerable persons. All sectors of the community are expected to contribute and comply with national regulations as well as best professional practice. While the present pandemic is active, future MUO should be planned to minimize spread.

2 Contributors to and formal status of this document

2.1 Formal status

This document has been drafted by the author on request from representatives from the Norwegian diving industry. Contributors to the document are identified in section 8. The document was forwarded to Norwegian Oil and Gas Association for public release 25.3.20.

3 Scope

The scope of this document is to supplement national and industrial guidance (such as IMCA D06/20 (Novel Coronavirus (COVID-19) – Guidance for Diving Contractors)) in matters related to prevention of Covid-19 infections during MUO on the NCS. This document is in some areas intentionally more prescriptive than the IMCA Information Note. However, the document is intended to supplement rather than replace IMCA D06/20. If disparity exists between the documents, expert guidance should be sought before a final conclusion is taken. An Appendix in Norwegian language has been added for the benefit of Norwegian in-shore diving.

3.1 Document applicability – Surface Oriented diving

This document was primarily developed for preparation of saturation diving operations offshore. While most of the general principles should be equally applicable for Surface Oriented diving, the medical complications of a Covid-19 infection in saturation may be much worse than that for a Surface Oriented diver since the latter within reasonable time could be evacuated to hospital for advanced medical care.

4 Terms and definitions

ARDS	Acute respiratory distress syndrome. Respiratory failure caused by a large number of causes – including Covid-19 disease
Close contact	Term to identify subjects with significantly increased exposure to the SARS-CoV-2 virus from a Covid-19 infected patients. Definition varies slightly between public health authorities, but includes in Norway (*the list is abbreviated*): • have lived in the same household as a person with confirmed COVID-19 disease • have been in direct physical contact (e.g. shaken hands) with someone with confirmed COVID-19 disease • have been in direct contact with saliva (e.g. been coughed upon) from someone with confirmed COVID-19 disease • have been in close contact with, or been near (closer than 2 metres), face to face with a person with confirmed COVID-19 disease for more than 15 minutes • have been in an enclosed space (e.g. a classroom, meeting room, waiting room etc.) with a person with confirmed COVID-19 disease for more than 15 minutes and closer than 2 metres
Covid-19	Abbreviation for Coronavirus Disease 2019. The disease caused by SARS-CoV-2
Incubation period	The time from the patient contracts the infection until the first symptom arise
IQR	Interquartile range. When results from a sample is presented in an increasing order, the interquartile range will represent the mid 50% of the sample – i.e. 25% will have results lower and 25% will have results higher than the IQR
Median	The value separating the higher and lower half of a population. A median incubation period of 5 days implies that 50% of the patients will experience symptoms 5 days after being infected
MUO	Manned Underwater Operations
NCS	Norwegian Continental Shelf
RH	Relative Humidity
SARS-CoV-2	Abbreviation for the virus causing the disease Covid-19. Full name Severe acute respiratory syndrome coronavirus 2.

5 SARS-CoV-2 and Covid-19 facts – background for risk assessment

The median incubation period for Covid-19 cases is 5.1 days (95% CI 4.5-5.8d) (1) with 6.7d (5.7-7.9) to reach the 75 percentile and 11.5d (8.2-15.6) to reach the 97,5 percentile, see Fig 1. A 14 days observation period is commonly applied for quarantine in the public health domain. Current knowledge of Covid-19 disease spread (transmission, disease presentation, disease severity) is limited. The fraction of asymptomatic SARS-CoV-2 is unknown, but was reported to be 18% in a cruise vessel with 634 infected patients (2). Infectivity of asymptomatic carriers is probably less than symptomatic patients, but this remains to be ascertained. A recent work (3) reported 17.6% severe cases in Beijing during Jan 20th to Feb 10th 2020 (N=262). Wu et al. (4) reported that among 201 patients with Covid-19 associated pneumonia, 42% developed Adult Respiratory Distress Syndrome (ARDS). Hospital-treated ARDS had a mortality of 52%. Higher age and comorbidity were risk factors for ARDS. This was an unscreened population from China and certainly not representative for the off-shore divers, however in the absence of other data the epidemiological reports so far suggest that complications of Covid-19 requiring advanced medical treatment cannot be ignored.

Coronavirus aerosol survival is dependent on temperature and relative humidity (5). 80% RH with 20 °C was least favourable for virus survival with a half-time of 3h while 50% RH allowed a half-time of 3d. In cold environment (6 °C) and 80% RH survival was longest with almost 4d halftime. Coronavirus is highly resistant to freezing and will survive 25 cycles of freezing/thawing (6). Coronavirus may survive on steel surface for 2d, on metal surfaces for 5d and on plastic surfaces for 9d (7, 8). A saturation decompression procedure would typically range 4-10 days depending on water depth. A Covid-19 pneumonia would impose a significant health risk to the diver as it could develop into respiratory distress and ARDS. A recent summary (9) stipulate a median time from first symptom to radiologically confirmed pneumonia of 5 days (IQR 3-7d) and from symptom onset to intensive care unit admission to 11 days (IQR 7-14d). There is no knowledge on how the illness would develop in divers in saturation. Any risk assessment on development of Covid-19 illness in the cohort of medically screened divers exposed to high ambient pressure, raised temperature, increased humidity, hyperoxia and a recognized "conventional" microbiological burden would be highly speculative. Available data suggests that virus survivability would be extended in the saturation environment.

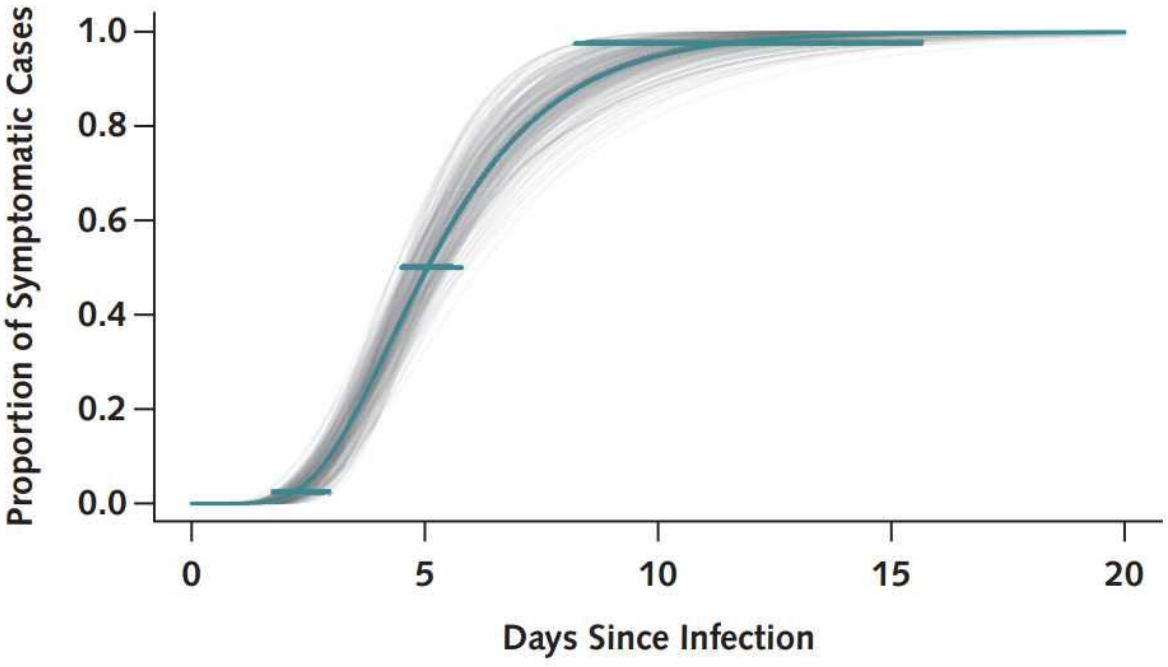

Fig 1 Incubation period for Covid-19 in days presented as a cumulative density function based on a log-normal distribution. From (1)

6 Measures to reduce the likelihood and consequences of Covid-19 infections during offshore MUO

6.1 Contingency

Virus transmission mainly occurs by respiratory droplets being transmitted between close contacts. In addition, virus may remain on surfaces. Close contacts on the same shift would have an increased likelihood of infecting each other. Try to organize shifts to allow replacement for critical functions in the event of an infectious outbreak. Sharing beds ("hot bunking") should be discouraged, establish routines wherever possible to reduce close contacts between critical personnel on time off (cabin allocation, recreational areas etc.). See definition of close contacts above.

Consider whether administrative close contacts between the nurse and other workers could be limited and replaced by written, telephone and videoconference alternatives. The intention is to reduce the risk of infecting the nurse in contacts not related to health care.

6.2 Personnel selection

Exclusion of personnel with increased likelihood of transmitting infectious illness should be put in place. The clinical characteristics of Covid-19 illness is difficult to separate from other respiratory infections and seasonal flu. A structured screening to exclude personnel with increased risk of infectious disease transmission should be put in place. The questionnaire should as a minimum include travel history the past 14 days, exposure to patients suffering Covid-19 or other respiratory disease and any symptoms of respiratory illness (Fever, cough, dyspnoea, fatigue and musculoskeletal pain). Personnel with current upper or lower respiratory tract infection of flu-like symptoms (fever, malaise, aches) should not be allowed to embark. Appendix 1 and 3 to IMCA D06/20 is well prepared for this purpose.

A pre-sat quarantine of 14d is probably an effective measure to reduce the likelihood of contracting Covid-19 infection while in saturation. Establishing crew collection points that ensures effective quarantine prior to embarking may be practically demanding. Efficacy of active monitoring during disease outbreaks has been discussed by Reich et al (10) in the relation to cost-benefit. An online calculator for such analysis has been presented by Reich et al. (11) as an offspring of the analysis of Covid-19 incubation time published by Lauer et al. (1). Table 1 below presents extracts of expected efficacy of active monitoring. "Active monitoring" was the measure used by US CDC during the Ebola outbreak in 2014-2016 to closely monitor development of symptoms for 21d following exposure. The outcome of such monitoring would be either (10):

1. No symptoms warranting clinical follow-up
2. No symptomatic infection with the disease of interest, but occurrence of symptoms that necessitate ruling out of the disease of interest
3. Symptomatic infection with the disease of interest occurring during the individual's period of active monitoring
4. Symptomatic infection with the disease of interest occurring outside the individual's period of active monitoring

Though this model was based on a public health surveillance program, it's general principle could be applied to a group of divers monitored during a quarantine period (e.g. on a vessel or a hotel). The table (Table 1) could be used as a basis for quantitative risk assessment. The rightmost column ("Infected at day of arrival) would represent the worst case scenario – a diver entering pre-embarcation quarantine on the day of being infected. The numbers listed in this column will effectively show which fraction of *infected* divers that will be undetected depending

on the length of quarantine. On a group level, this is not a representative situation. Not all divers will be infected, and amongst those being infected, not all will be infected at the day of pre-embarcation quarantine. The risk for getting infection is difficult to assess as little is known on the community prevalence and incidence of Covid-19. As per April 2020 the fraction of positive SARS-CoV-2 tests in Norway is in the order of 5%. This represents a selected cohort as testing is presently offered only to high risk group. In the absence of better data, the middle column presents fraction of missed cases in a group exposed to a "very high risk level" (10). This is a very conservative approach, which is selected to include the uncertainty of asymptomatic carriers of SARS-CoV-2. A pre-embarcation exposure interval of 0-5 days is chosen somewhat arbitrarily but is suggested as a baseline. The mid column could then be used as part of a quantitative risk analysis. The required length of quarantine could be determined based on the risk acceptance level for Covid-19 occurring in saturation. If the decision is taken that "we should cater for the worst-case situation that a diver is infected at the day of embarkation" the rightmost column (incubation time column) should be used.

The limitations of these presumptions should be recognized. The data of incubation times in Covid-19 patients (1) is limited as it is only based on 181 cases. The model is based on public active disease surveillance rather than measures taken to identify development of symptoms in divers during a quarantine. Virus shedding from asymptomatic and presymptomatic carriers is largely unknown (12) and will affect the conclusions (increasing the fraction of undetected infections) but this uncertainty is probably best handled by stratifying divers to a higher risk group (e.g. "very high risk"). On the other hand, it could be argued that infection risk could be significantly lower than the 5% presently identified in Norwegian SARS-CoV-2 analyses as these have been analysed from cohorts initially considered to be of higher risk.

Day	Very high risk (1:10) Infected 0-5 days before arrival	Infected at day of arrival (=incubation time)
1	8.2 (3.2-10.0)	99 (96-100)
2	6.1 (1.8-9.9)	99 (96-100)
3	4.2 (0.9-9.0)	90 (81-97)
4	2.7 (0.4-7.1)	72 (61-83)
5	1.7 (0.2-5.1)	51 (38-63)
6	1.0 (0.8-3.6)	34 (19-47)
7	0.6 (0.3-2.5)	21 (8-34)
8	0.4 (0.1-1.7)	13 (3-24)
9	0.2 (0-1.2)	8 (1-18)
10	0.1 (0-0.9)	5 (0-13)
11	0.1 (0-0.6)	3 (0-10)
12	0.1 (0-0.5)	2 (0-7)
13	0.1 (0-0.3)	1 (0-5)
14	0 (0-0.2)	1 (0-4)

Table 1 Estimated fraction (%(5-95% CI) of monitored persons from an unscreened population with undetected infection of Covid-19 as a function of days of monitoring. This fraction will depend on the incubation time (rightmost column), likelihood of achieving infection and the time of infection before monitoring is initiated. The middle column provide data for a cohort of subjects at "very high risk" (one in ten infected) and pre-monitoring infection period 0-5 days. Adapted from (11) based on the publications of (1, 10)

Tests for presence of SARS-CoV-2 are presently time consuming, require advanced equipment and there is insufficient capacity in Norway. Future development is expected to provide point of care testing for SARS-CoV-2 (RNA rapid test)). Such testing may reduce likelihood of introducing an infected diver into saturation. Antibody tests (blood samples) are available, but antibodies develop at a later stage of disease, and these tests have presently no place in the medical screening process.

The question as to whether stricter selection criteria should be imposed remains open. Currently there is no advice to enforce stricter selection, but it is recognized that the incidence of complications secondary to Covid-19 increase as a function of age and particularly for subjects older than 60 years (4).

6.3 Hygienic measures

Information to all personnel on the transmission of the disease and preventive hygienic measures is paramount. Disinfectants should be readily available. Consider closing of gyms, saunas, cinemas and similar. Cleaning and disinfection routines should be re-assessed, particularly surfaces that are frequently touched (e.g. door handles, tables, staircase handrails, arm rests, keyboards, control panels, serving utensils etc.).

Consider improvements of HVAC filter systems to allow filtering of virus particles. Technical aspects will decide whether this is feasible or necessary. Consider whether filters could/should be inserted in vent outlets from cabins intended for isolation of patients.

Diver gas and reclaim systems: Do these contain or is it possible to install filters improving removal of microbiological agents? Consider filtering of reclaimed gas and it's re-use for divers breathing.

Helmets and diver's breathing equipment: Manufacturers procedures should be adhered to and only performed by qualified personnel.

6.4 PPE

There should be sufficient stores of PPE for microbiological protection (gloves, coveralls, respiratory protections, face shields/eye protections). Some of this equipment would only be relevant for the nurse, but the contents should be addressed well in advance of the diving operation.

6.5 Cleaning and disinfection

Cleaning and disinfection procedures should be effective against SARS-CoV-2. As an initial step consider this general advice on cleaning and approved disinfectants in Norwegian and English language. Cleaning should be done with conventional detergents. A large number of disinfectants are effective against SARS-CoV-2. However, offgasing and skin irritation is a particular concern in offshore diving. One disinfectant has been extensively used in saturation diving – with good experience and a favourable toxicological profile:

- Rely+On Virkon, 1%, 10 min action time (13)

Alternatives that may be considered for surface pressure based disinfection are:

- Ethanol surface disinfection (>70% for 1-2 min) (7)
- Household bleach 0.1% (e.g. Klorin® 4%, 1 dl for 4l water) with 10 min of contact time (7, 14)
- Rely+On Pera Safe for 10 min (7)

Reports of virucidal efficacy of Klorhexidine are contradictive (7, 15), and until this has been resolved we dissuade against using Klorhexidine as a disinfectant against SARS-CoV-2.

The SARS-CoV-2 virus is thermolabile and heat will inactivate it, however there is limited data available on required temperature and exposure time. Previous work on the similar SARS-CoV virus (16, 17) suggests that the virus will be fully inactivated after 30 min exposure to 58 °C and

after 10 min at 68 °C. A domestic dishwasher will wash with a temperature of 65-70 °C temperature unless heat-preserving ("Ecological") programs are chosen.

Cleaning of hands should be done with conventional hand detergents if dirty. Alcohol based hand disinfectants (>60% Ethanol) can be used on *clean* hands – allow 20-30 sec to reach full effect. Regrettably, hand disinfection with ethanol represents an off-gassing concern as well as a fire risk in the saturation diving environment. However, conventional hand wash with soap is effective against the SARS-CoV-2. For any high risk procedure (close contact handling of fellow divers, physical contact, food preparation) the hand wash should be done in the professionally recommended method which takes slightly longer time (40-60 sec). A poster like this (included in Section 0 Appendix 3, to this document) provides guidance on the specific procedures.

6.6 Handling suspected infections of Covid-19 and close contacts to these

6.6.1 Handling subjects with close contact to Covid-19 identified patients

The vessel shall establish systems for quarantine of asymptomatic but potentially infected subjects. There should similarly be prepared systems for isolation of subjects with infectious disease (minor symptoms as well as Covid-19 potential disease).

6.6.2 Biological testing for SARS-CoV-2 virus

As per 10.4 there is still insufficient capacity for SARS-CoV-2 testing in Norway by means of conventional PCR verification of upper airway specimens, though analysis capacity is expected to increase within short. Equipment for sampling nasopharynx specimens) should be available on the vessel. Rapid PCR tests for point of care use have been developed, but are not commercially available.

Test kits for analysis of antibodies (IgM and IgG) in blood are available. However, antibodies are not detectable in the early phase of infection and there is insufficient data to allow interpretation of the results with respect to infectivity and immunity. Great caution should be exercised in the interpretation of antibody test results.

6.6.3 Handling upper and lower respiratory tract infections

Emergency response plans should include identification of optimal ports considering sailing distance and available health care facilities and means of transportation in the event of a severe infectious disease.

6.6.3.1 Divers in the chamber (sat diving)

Unless appropriate steps have been taken to exclude Covid-19 infection (based on professional medical advice) any upper or lower respiratory infection and flu-like infection should call for initiation of saturation decompression. Continuous separation of TUP's and living chambers must be considered where possible. Only one dive team in TUP at the time should be considered closing doors between living chamber/wetpot to TUP when not transferring personnel. In the event of an infectious outbreak, abortion of the diving operation is advised.

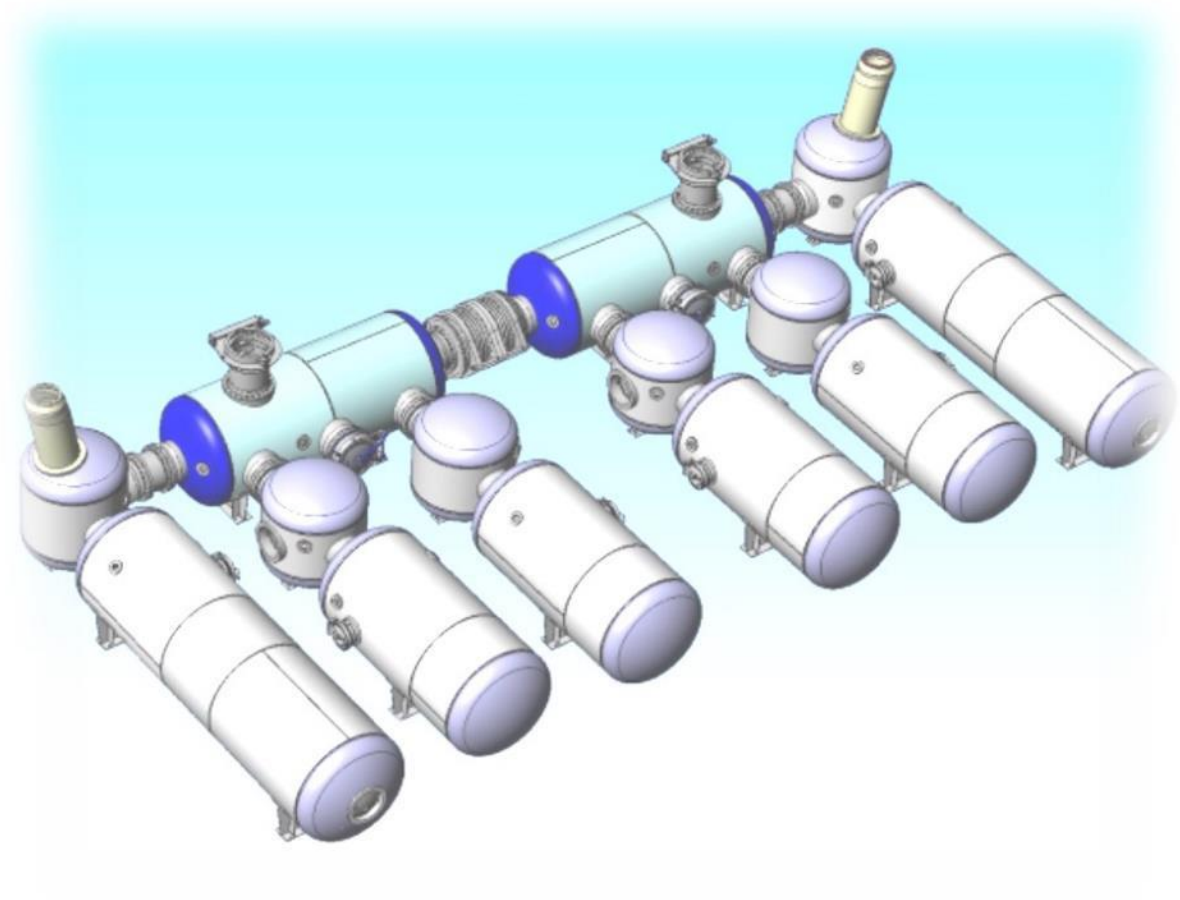

Figure 1 Example of saturation system layout allowing separation of TUP's between different living chambers. Presented with permission from Øyvind Loennechen, Technip FMC.

In the event that infection occurs, the final decision of treatment and post-dive quarantine and isolation would be the one of the duty diving physician in collaboration with national and local health authorities. However, the operator and diving contractor should establish plans for the event that disembarking of infected divers and other personnel will take place in port rather than by helicopter. There should be plans for optimal extraction of infected patients, minimizing the risk for spreading infectious agents. The diving contractor, operator and provider of SAR-services should plan for the event that infected patient(s) would need medical evacuation by helicopter.

6.6.3.2 Other crewmembers (incl. diving support personnel, project personnel, project crewmembers)

Plans should be prepared for establishing quarantine and isolation of subjects/patients (i.e. nomination of cabins, food provision etc.).

7 Surface supplied diving

Hygienic measures and disinfection procedures should be enhanced (as discussed previously). Selection criteria similar to saturation divers should take place (i.e. exclude divers with ongoing infections, close contacts to Covid-19 patients etc.). However, there is no reason to exclude divers based on age or comorbidity as discussed previously for saturation divers.

8 Acknowledgement and contributors

The author carries the formal responsibility for the contents of this document. However, the work has progressed through a series of meetings and e-mail correspondence. The persons below are recognized for their valuable feedback, support and improvements through the series of revision (see front page). Their important contribution does however not imply that they endorse the contents in person or through their employers.

Geir Amundsen, Amundsen diving
Arnfinn Anfindsen, AkerBP
Dag Atle Ask, Subsea 7
Olav Eftedal, Equinor
Joar Gangenes, Subsea 7
John Hjelle, Subsea 7
Bård Humborstad, NUI and Lundin
Roar Jørgensen, Equinor
Frode Kaland, Western Norway University of Applied Sciences, Diver Education
Øystein Kleppestø, SubseaPartner
Øyvind Loennechen, TechnipFMC
Stein Modahl, TechnipFMC
Rolf Røssland, NUI
Bjørn Venn, ConocoPhillips

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Appendix 1 - Cleaning procedures for diver's hat and breathing equipment

General

Cleaning and disinfection should be completed according to the maintenance procedures of the diving contractor. Consult manufacturer's instructions when needed.

Interspiro Divator™

The maintenance including cleaning procedures can be downloaded from this site. While the Divator Full Face Mask can be comparatively easily cleaned and disinfected, the procedure for appropriate regulator dismantling (required to complete the disinfection) is more complicated. As per the manufacturer's instructions, the regulator should be disassembled prior to disinfection. This will introduce a risk for erroneously re-assembly of the regulator. The authors of this document has contacted a number of Norwegian dive technicians who has unanimously agreed that dismantling of the oral nasal and disassembly of the regulator should be limited to those having extensive training and sufficient practice to uphold the skills. It is not ideal to provide recommendation on disinfection procedures deviating from the manufacturer's, but in the present situation a balance must be sought between the risk of infectious spread vs loss of breathing gas. We recommend these steps:

- Whenever possible, the Interspiro Divator mask should be considered a personal diving equipment not to be shared with other divers.
- Whenever logistic resources allow, the cleaning and disinfection procedures addressed by the manufacturers should be followed. This will include dismantling the oral nasal from the mask and dismounting and disassembling the regulator as per the manufacturers' instruction between users and for every month of use. We dissuade against allowing divers without sufficient training to do this maintenance, and recommend the alternative procedure below when this is not possible.
    - Dismount the regulator from the mask
    - Rinse with water, luke warm if possible. Remove any dirt with a neutral detergent or alternatively a slightly acidic detergent such as Zalo™ or Fairy™ liquid. Rinse.
    - Soak the mask in disinfectant. We suggest Rely+On Virkon™ as described for the Kirby Morgan™ equipment as described below.
    - Pressurize the regulator and let it stay soaked in disinfectant for the time required. This would be 10 min for Rely+On Virkon™.
    - Rinse to remove the disinfectant
    - If at all possible let the equipment dry in a warm (20-30 °C) room, but any procedure allowing air drying of the equipment will contribute tor reduce the spread of virus.

Kirby Morgan™ band masks and helmets

General

Maintenance manuals can be downloaded from this page on the Company's website. The main principle recommended by the manufacturer to dismantle oral nasal, nose clip and open the front shield of the regulator. It is recognized that this require training and experience to avoid critical equipment failure. The procedure recommended by the manufacturer has not been adapted by the diving industry, but disinfection is required to avoid transmission of disease. We would recommend that the procedures include these aspects:

- Rinse with water. Any visible dirt should be removed, preferably a neutral detergent but a slightly acidic domestic detergent such as Zalo® or Fairy® will work fine as well. Don't use "Grønnsåpe" as this may leave a fatty layer that will inactivate later disinfection and be a layer for biofilm.

- SARS-CoV-2 spreads by means of droplets from expired air/gas. Rinsing and disinfection should include neck dam, oral nasals (including the microphone), nose clips and the exhalation part of the regulator.
- There is a large number of disinfectants available and the selection will depend on efficacy, availability, cost, logistics (e.g. contact time, requirement for PPE) and any undesirable effect on the equipment to be infected. If no other decision has been made, we suggest the use of Rely+On Virkon®. It is not claimed that Rely+On Virkon® is "better" than alternative disinfectants, but it is approved for technical disinfection and has been used in diving since many years without recognized problems on humans or equipment.
    - Rely+On Virkon® 1% for 10 min. Soak the equipment in a bath. Make a new solution every 5 days. For equipment that cannot be soaked, use a spray or put on a cloth, but keep the area covered for a minimum of 10 minutes.
- Alternative disinfectants include alcohol (disinfectant alcohol with >75% ethanol) with a contact time of 1-2 min, Rely+On Pera Safe® 16,2g/l. Make a fresh solution every 24h. Household bleach (e.g. Klorin®) may be used in a 0,1% Solution (1 dl of Klorin® 4% in 4l of water) but has high pH (basic solution) , might be corrosive and use of PPE is imperative.

Appendix 2 – Smittevern ved dykking. Rengjørings- og desinfeksjonsprosedyrer for dykkeutstyr (Norwegian text)

Innledning og formål

Alle deler av samfunnslivet påvirkes av den pågående Covid-19 epidemien. Formålet med dette *vedlegget* er å beskrive hvilke tiltak man bør iverksette ved innaskjærs dykking for å redusere smitterisikoen. Dokumentet er basert på et mer omfattende engelskspråklig dokument, men dette sammendraget er med hensikt gjort mer kortfattet for å oppsummere de viktigste og mest relevante forholdene for innaskjærs dykking i Norge.

Organisatoriske forhold

Prøv å organisere arbeidet på en slik måte at nøkkelpersonell ikke jobber i fysisk nærhet der det er mulig. Smittes en person vil nærkontakter normalt bli plassert i karantene.

Informasjon

La diskusjon om smittevern bli en del av morgenkaffen, oppstartmøtet e.l. Hør hvilke forslag de ansatte har til å forbedre smittevernet. Hent hyppig og regelmessig informasjon fra helsemyndighetene på www.fhi.no eller www.helsenorge.no . En rutine som den du nå holder kan fort bli utdatert.

Ikke skriv rutiner som omhandler «alt» eller plakater som er så tettskrevne at ingen orker lese dem. Fra denne siden hos Helsedirektoratet kan du laste ned flere gode plakater (på mange språk) som kan trykkes opp. Fokuser på det som vi vet er viktigst:

- Hold deg oppdatert fra anerkjente kunnskapskilder som www.fhi.no og www.helsenorge.no
- Følg myndighetenes anbefalinger, hold avstand, ha god hoste- og nysehygiene. Unngå personkontakt der det er mulig. Hyppig håndvask og desinfeksjon
- Gjennomgå virksomhetens rutiner for rengjøring og desinfeksjon av pusteutstyr (se under)

Rengjøring og desinfeksjon av pusteutstyr

Innledning

Covid-19 viruset (SARS-CoV-2) spres gjennom dråpesmitte. Pusteutstyret kan dermed spre smitten fra en dykker til en annen og *må* rengjøres og desinfiseres for å hindre smittespredning. Følg disse rådene:

- ***Der det overhode er mulig bør maske, neseklype («nose block») og pusteventil være personlig dykkeutstyr som ikke byttes mellom dykkerne.***
- Maske og pusteventil som deles mellom dykkerne må først vaskes og deretter desinfiseres – se detaljer under.

Generelt om rengjøring og desinfeksjon

- Følg virksomhetens prosedyrer for rengjøring og desinfeksjon. Benytt produsentens anbefalinger der det ikke er utarbeidet egne selskapsinterne prosedyrer.
- Rengjør hjelm og maske med såpevann med nøytralt eller lett surt rengjøringsmiddel (som f.eks. Zalo) for å fjerne synlig forurensing. Skyll
- Desinfiser med egnet desinfeksjonsmiddel. Rely+On Virkon er utmerket og har i praksis vist seg godt egnet uten å ødelegge materialene i pusteutstyret. La utstyret ligge i 10 min i Virkon før det tas opp og skylles. Husk å merke beholderen med dato for utblandet løsning – det skal lages ny bruksløsning etter maksimalt fem dagers bruk.
- Alternative desinfeksjonsmidler inkluderer

  - Desinfeksjonssprit (f.eks. Antibac, minimum 75% konsentrasjonstid, virketid 1-2 min)
  - Rely+On Perasafe. Virketid 10 min. Bruksløsning må skiftes daglig
  - Klorin, 0,1% (Selges normalt i 4% konsentrat og må da fortynnes med 1dl til 4l vann). Klorin er svært skadelig ved inhalasjon og ved sprut mot øynene – bruk korrekt verneutstyr. Klorin kan også korrodere og oksidere metaller.
- Vandig Klorhexidin er *ikke* effektivt mot Coronavirus og bør ikke benytt. Det er mer effektivt å benytte vanlig rengjøringsmiddel hvis ikke det er effektive desinfeksjonsmidler tilgjengelig.

Spesifikke anbefalinger for utvalgte typer pusteutstyr

Innledning

Disse anbefalingene er *ikke* ment å erstatte produsentens råd. Vi tror likevel det kan være nyttig å understreke enkelte forhold fordi produsentens vaske- og desinfeksjonsråd har vist seg vanskelig å etterleve i praksis.

Interspiro Divator

Masken inkludert oral nasalmasken: Rengjøring med f.eks. Zalo etterfulgt av desinfeksjon med Virkon vil være en god rutine. Et alternativ til dette vil være å vaske den i vaskemaskin i 65-70 grader med minimum 1t program (ikke bruk «hurtigprogram» eller «spareprogram»).
Regulatoren (andretrinnet): Produsenten anbefaler at den demonteres for å sikre at rengjøring og desinfeksjon blir god nok. Demontering av regulatoren vil øke risiko for feilfunksjon hvis det ikke gjøres av opplært personell og bør ikke gjøres av den enkelte dykker. Der det ikke er mulig å ha regulator som personlig pusteutstyr eller dykketekniker kan foreta rengjøring så vil nedenstående prosedyre være beste alternative løsning:

- Skyll regulatoren med rikelig vann, fjern all synlig forurensing
- La regulator være tilkoblet trykkluftkilde og legg den i desinfeksjonsløsning. Vi anbefaler Virkon med 10 min virketid
- Skyll med rikelig vann for å fjerne rester av desinfeksjonsmiddel

Kirby Morgan båndmasker og hjelmer

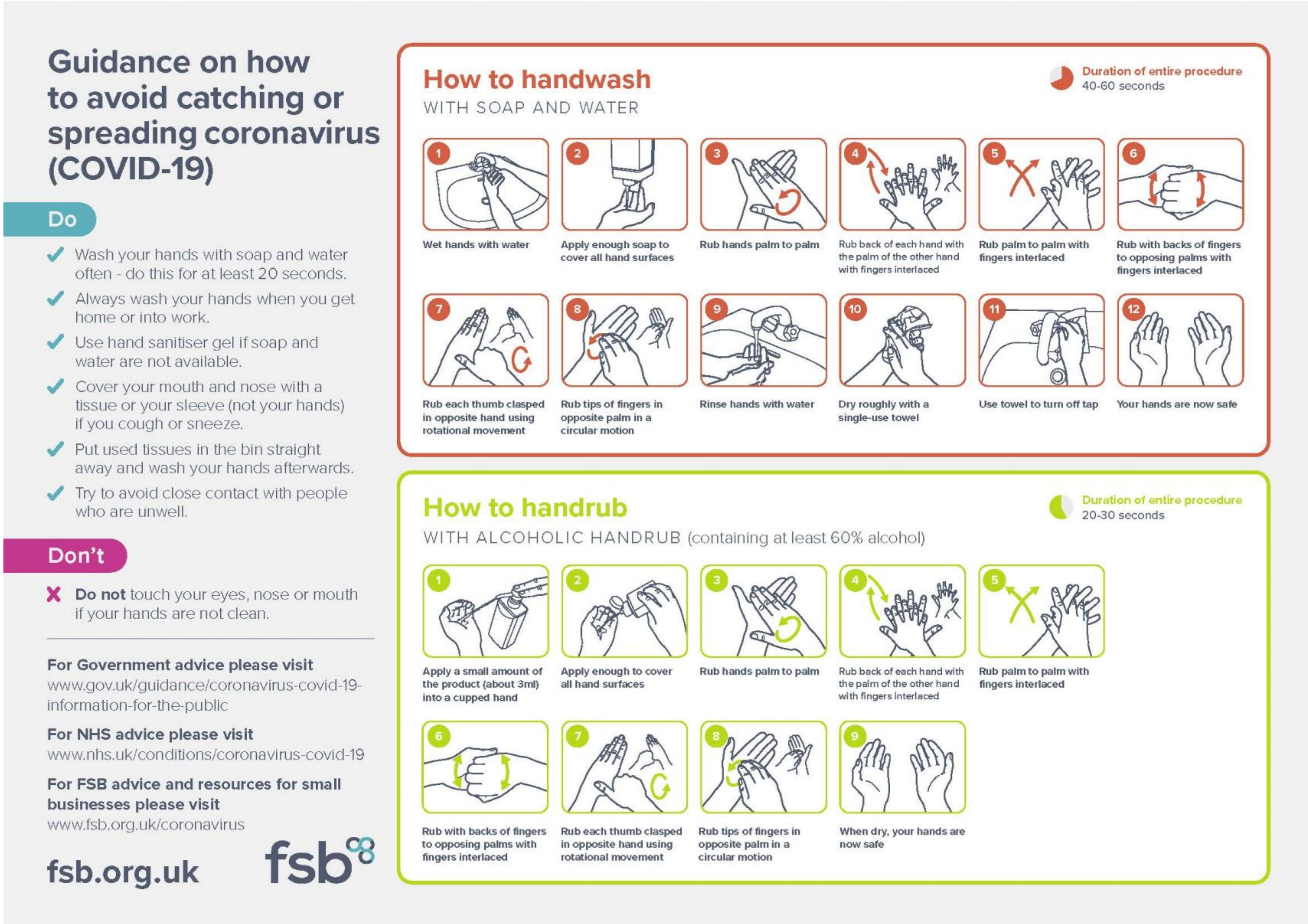
Den største smittefaren er i oral nasal, neseklype og regulator. Disse *må* rengjøres og desinfiseres mellom hver bruker. Følg virksomhetens rutiner. Hvis ikke det foreligger selskapsinterne prosedyrer så anbefaler vi nedenstående:

- Skru av strøm til mikrofon/høyttaler. La regulator være trykksatt.
- Ta ut oral nasalmaske, løsne mikrofonen, ta ut «neseklypen» (nose block). Skyll bort evt synlig forurensing. Legg oral nasal og neseklype i Virkon 1% i 10 min. Skyll med rikelig vann. Tørk over mikrofon med desinfeksjonssprit (75% etanol). Halstetning (neck dam): Legg i Virkon 1% i 10 min. Skylle.
- Regulator: Legg båndmaske/hjelm slik at regulator ligger flatt mot underlaget. Skyll slik at forurensing (spytt ol) blir skylt ut av regulatoren. Fyll regulatoren fra maskens/hjelmens innside med Virkon 1%. La virke i 10 min. Snu hjelm/båndmaske og tøm ut – evt bruk «purge» knappen forsiktig. Skyll med ferskvann i regulatoren for å fjerne overskytende Virkon.

Appendix 3 – Handwash poster

Source

The poster on the next page has been downloaded from www.fsb.org.uk


Guidance on how to avoid catching or spreading coronavirus (COVID-19)
Do
Wash your hands with soap and water often - do this for at least 20 seconds.
Always wash your hands when you get home or into work.
Use hand sanitiser gel if soap and water are not available.
Cover your mouth and nose with a tissue or your sleeve (not your hands) if you cough or sneeze.
Put used tissues in the bin straight away and wash your hands afterwards.
Try to avoid close contact with people who are unwell.
Don't
Do not touch your eyes, nose or mouth if your hands are not clean.
For Government advice please visit
www.gov.uk/guidance/coronavirus-covid-19-information-for-the-public
For NHS advice please visit
www.nhs.uk/conditions/coronavirus-covid-19
For FSB advice and resources for small businesses please visit
www.fsb.org.uk/coronavirus
fsb.org.uk
fsb
How to handwash
WITH SOAP AND WATER
Duration of entire procedure
40-60 seconds
1
Wet hands with water
2
Apply enough soap to cover all hand surfaces
3
Rub hands palm to palm
4
Rub back of each hand with the palm of the other hand with fingers interlaced
5
Rub palm to palm with fingers interlaced
6
Rub with backs of fingers to opposing palms with fingers interlaced
7
Rub each thumb clasped in opposite hand using rotational movement
8
Rub tips of fingers in opposite palm in a circular motion
9
Rinse hands with water
10
Dry roughly with a single-use towel
11
Use towel to turn off tap
12
Your hands are now safe
How to handrub
WITH ALCOHOLIC HANDRUB (containing at least 60% alcohol)
Duration of entire procedure
20-30 seconds
1
Apply a small amount of the product (about 3ml) into a cupped hand
2
Apply enough to cover all hand surfaces
3
Rub hands palm to palm
4
Rub back of each hand with the palm of the other hand with fingers interlaced
5
Rub palm to palm with fingers interlaced
6
Rub with backs of fingers to opposing palms with fingers interlaced
7
Rub each thumb clasped in opposite hand using rotational movement
8
Rub tips of fingers in opposite palm in a circular motion
9
When dry, your hands are now safe