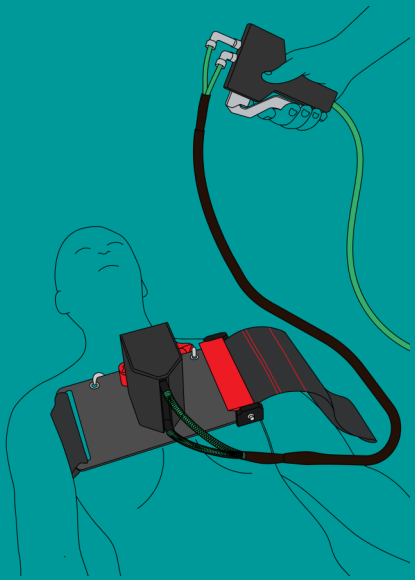
NUI COMPACT CHEST COMPRESSION DEVICE (NCCD)

USER MANUAL



NCCD is a compact, lightweight chest compression device to be used as a substitute to manual chest compression during CPR. NCCD is powered by compressed gas, and designed for use in hyperbaric environments, and other challeging places.

nui.no/service/nccd

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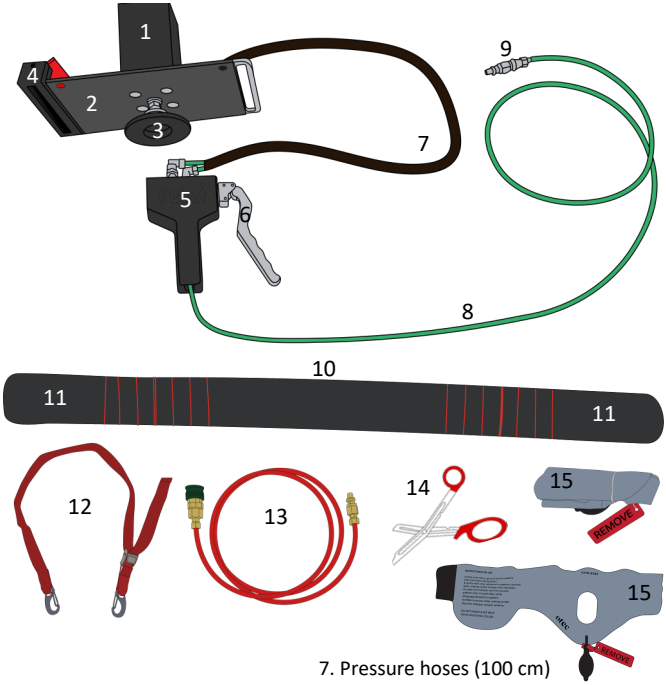
Oct 2025

NCCD COMPONENTS



Parts:

1-4. Compression unit

1. Piston house with piston
2. Bottom plate
3. Piston foot
4. Locking clamp with leaver
5. Hand control unit
6. Compression release handle
7. Pressure hoses (100 cm)
8. Pressure hose (200 cm)
9. Hanson 600 series, 1/4” male coupling
10. Chest belt
11. Velcro
12. Adjustable support strap
13. Extension hose
14. Tough cut scissors
15. OTEC Neck collar

SAFETY

NCCD is only to be used by trained personnel with competence in CPR and with competence in handling of pressurised gas. Incorrect use may cause injury to the patient and user.

- Use of NCCD can increase ppO_2 and atmospheric pressure in closed systems. Do not use NCCD if atmosphere is >22% oxygen.
- Do not use oxygen (>22%), or gas mixture with a O_2 content over 22% as supply gas.
- Do not obstruct the equalisation valve on the NCCD storage box of units that is exposed to increased atmospheric pressure.
- Make sure not to stretch or pull the NCCD hoses [7+8+13] over 5 kgf (kilogram-force).
- Do not compress the hand control unit [5-6] while connecting gas. The NCCD piston foot [3] will move and may cause a pinching hazard. Apply NCCD before gas is connected.
- Incorrect positioning will reduce quality of compressions and may cause injury to the patient.

MALFUNCTION

If proper application and use of NCCD is not possible, start manual CPR immediately.

Recommended checks and actions when possible:

1. Verify 10 bar over ambient supply pressure.
2. Check unit for damage or loose couplings.
3. Tell us about your experience: post@nui.no

Please include NCCD serial number (SN08…..), found on the back of the piston house [1], with correspondence.
Do not include patient ID information in any correspondence.

USE OF NCCD

NCCD is only to be used when CPR is initiated on adult patients, and only by personnel that have sufficient CPR training, and sufficient training in use of the NCCD.

Contact NUI if you need support in NCCD familiarization and training (post@nui.no).

NCCD is **not** to be used if trauma to the chest is suspected, during pregnancy or on children/youth 0-18 years old.

Your gas outlet connection needs to be Hanson 600 series, ¼" female coupling. If your gas connection is of a different model, please contact NUI, and we will deliver with the correct connection.

Do not modify the NCCD or accessories in any way.

Do not use NCCD if the case seal is broken or missing.
Does not apply to the training- and school units.

The NCCD will function while submerged in water.

INSTRUCTIONS

For more information, please visit:
www.nui.no/service/nccd

If proper application and use of NCCD is not possible, start manual CPR immediately.

PRECAUTIONS

Maximum tension on pressurised hoses and fittings: 5 kg (49 N).
Max. distance from patient to hand control unit [5-6]: 100 cm.
Max. distance from patient to gas source connector [9] : 300 cm.
Maximum distance from patient to gas outlet using extension hose [7+8+13]: 450 cm.

When connecting the NCCD QC [9] to gas outlet, make sure the pressure release handle [6] is not compressed.

NCCD is to be used with pressurised HeliOx as drive gas at depth. Compressed air can be used at surface. Use of air as drive gas can significantly limit the NCCD functionality in a hyperbaric environment.

Ensure 10 bar over ambient gas pressure supplied for the NCCD. Gas pressure below 10 bar will cause the NCCD to provide insufficient compression depth.

NCCD can be used along with defibrillator pads from an AED. Make sure to place the pads under the NCCD chest belt.

After use of training unit:

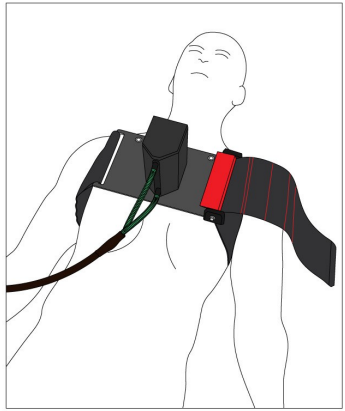
After use (training), make sure to disconnect the NCCD from the gas outlet, and execute a couple of compressions to bleed off pressure from the system before removing the NCCD.
Be aware of pinching hazard.

APPLICATION OF NCCD

A. Undress the patient's upper body.

Cut clothes using included scissors [14] if needed.

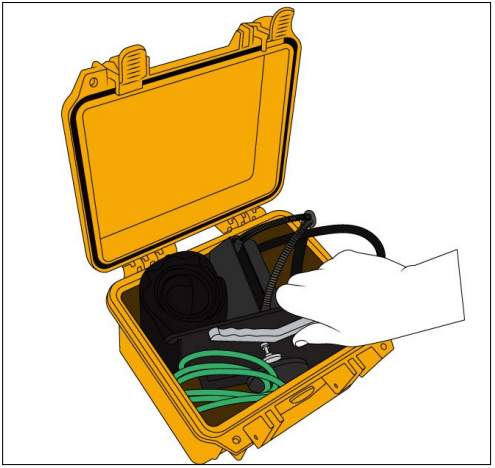
B. Apply NCCD as instructed on the following pages. Image show NCCD applied.



Confirm that the NCCD is firmly applied to the patient's chest, and that it isn't loose.

Important: The NCCD shall not compress the chest by application.

APPLICATION OF NCCD



1. OPEN NCCD CASE

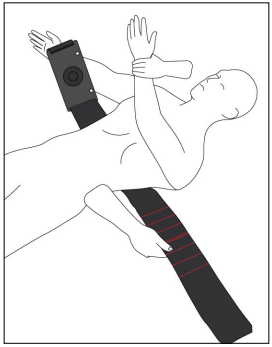
Break sealing. It requires 6 kg of force.

2. TAKE OUT NCCD

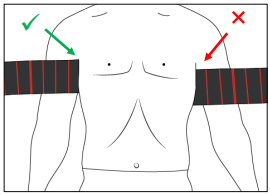
Remove the NCCD unit [1-12] from the case.

APPLICATION OF NCCD

3)



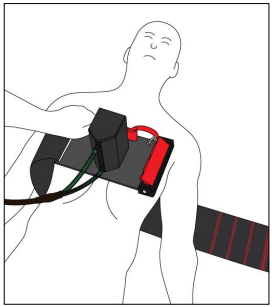
3a)



3. BELT UNDER PATIENT CHEST

Place chest belt centered under the patient's back. Center of the belt should be placed posterior in the middle of the back, between the shoulder blades. The top edge of the belt should be located high up in the armpits (3a).

4)



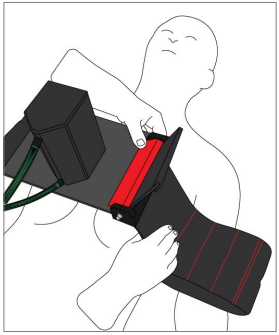
4. PLACE NCCD ON THE PATIENT'S CHEST

Place the NCCD compression unit [1-4] on patient chest so that the piston foot [3] is located where your hands would have been placed during manual CPR.

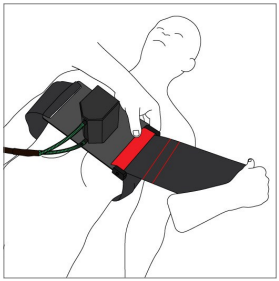
Make sure not to place the piston foot to far down towards the tip of the sternum or too high up on the chest. This could cause injury to the patient or/and cause insufficient compressions.

APPLICATION OF NCCD

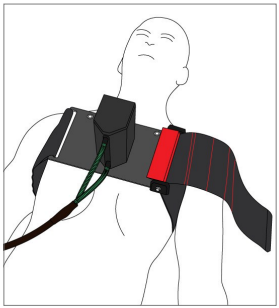
5a)



5b)



5c)



5. FASTEN BELT

a) Thread the chest belt through slot in locking clamp [4] while pressing the red leaver with your thumb.

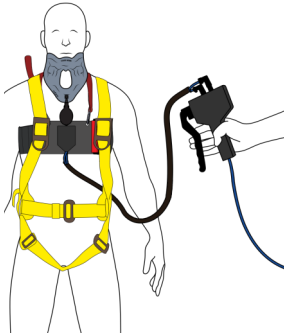
b) Pull the belt through the slot in the locking clamp and tighten the belt so that the compression unit is secured firmly on the chest without compressing the chest.

c) Adjust the position of the NCCD if necessary. Make sure the piston foot [3] is placed where your hands would be placed during manual CPR.

Confirm that the NCCD is firmly applied to the patient's chest. The NCCD shall not compress the chest by application.

Confirm correct placement of the piston foot [3] according to the hand placement used when you are preforming manual CPR.

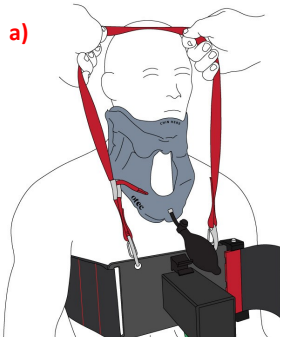
APPLICATION OF NCCD - VERTICAL PATIENT



NCCD can provide compressions when the patient is in a vertical position when the NCCD is secured by the adjustable support strap [12].

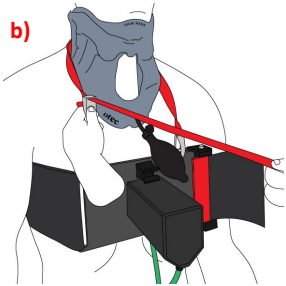
Remove clothes from the patient upper body, and fasten the NCCD, skin tight around the chest (do not compress the chest with the belt).

a)



a) Remove the adjustable support strap [12] from the clip in back of the piston house [1], and hang it around the patient neck.

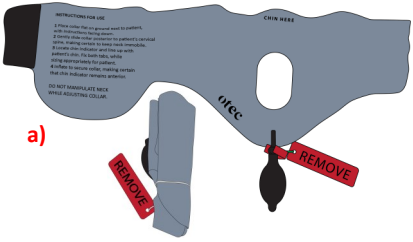
b)



b) The strap length and tension needs to be adjusted so that it supports the NCCD, not causing an angle, perpendicular to patient frontal plane, or causing a rotation of the NCCD.

Confirm correct placement of the piston foot [3] according to the hand placement used when you are preforming manual CPR.

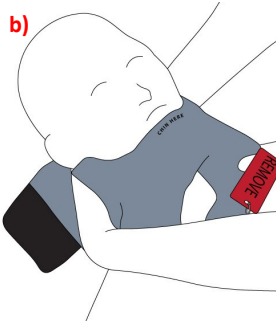
APPLICATION OF THE NECK COLLAR (Otec)



a)

The OTEC Neck Collar [15] is useful to keep the head in a neutral position when the patient is in a vertical position.

b)



a) Remove the rubber band and fold out the collar.

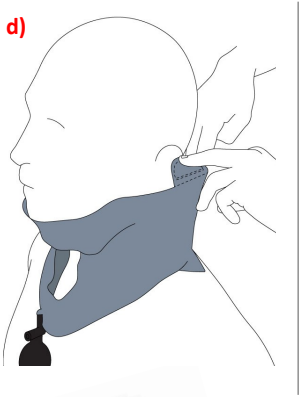
b) Fold the collar around the neck, making certain to keep neck and head immobile. Make sure to keep the chin indicator lined up with patient's chin.

c)

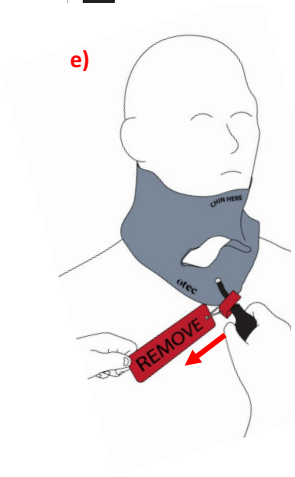
c) Fix the large hook-and-loop-tab, while sizing appropriately for patient. The collar should sit firmly around the patient's neck, but not compress the neck or skin.

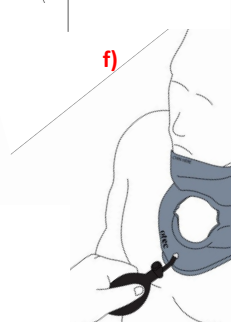
DO NOT MANIPULATE NECK WHILE ADJUSTING COLLAR

APPLICATION OF THE NECK COLLAR (Otec)



d) Fix the small hook-and-loop-tab to secure the collar's position.

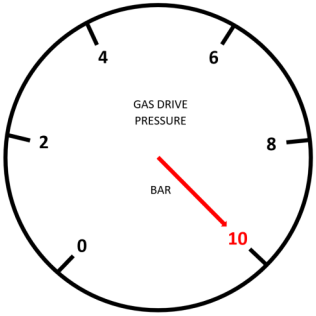




e) Remove clip from deflation valve on the pressure bulb.

f) Press the bulb repeatably to inflate the collar until it is firmly and securely fitted, and the head is stable.

USE OF NCCD



CONFIRM PRESSURE and ppO_2

NCCD runs on pressurised gas.

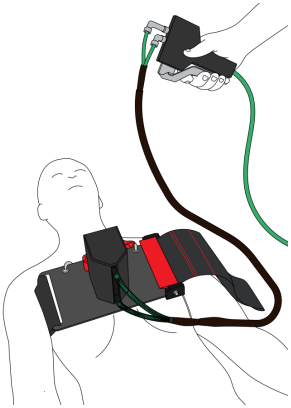
Confirm 10 bar “over ambient” gas drive pressure.

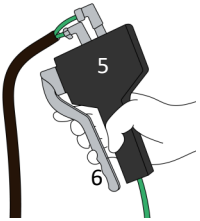
Confirm that gas supply has approx. the same ppO_2 as compartment atmosphere.

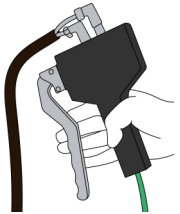
CONNECT TO GAS

Locate quick connector (QC) [9] for gas connection. Insert male QC on NCCD into gas outlet female QC (as you would a BIBS mask).

USE OF NCCD





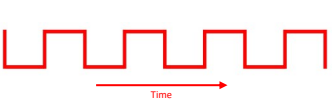


8. START COMPRESSIONS

Locate NCCD hand control unit [5+6]. Hold it as shown in the illustration. You might find it necessary to hold the control unit with both hands.

Compress handle [6]. all the way in and release it all the way out. Confirm that piston is compressing the chest according to CPR requirements. Repeat and continue preforming chest compressions **in accordance with current CPR protocol**.

Not fully compressing and releasing the handle on the control unit will cause insufiiccient chest compressions. Strive to complete full compressions og decompressions using as much time to compress the handle as to release the handle fully on the control unit.



CLEANING / DISINFECTION

Clean NCCD after use, before returning to NUI. Use a damp cloth with mild detergent to remove visible contamination.

Biological matter
If the unit is contaminated with biological matter the unit shall first be cleaned with a cloth with detergent and warm water until visibly clean. Then use sufficient disinfection like alcohol +75% or Virkon®.

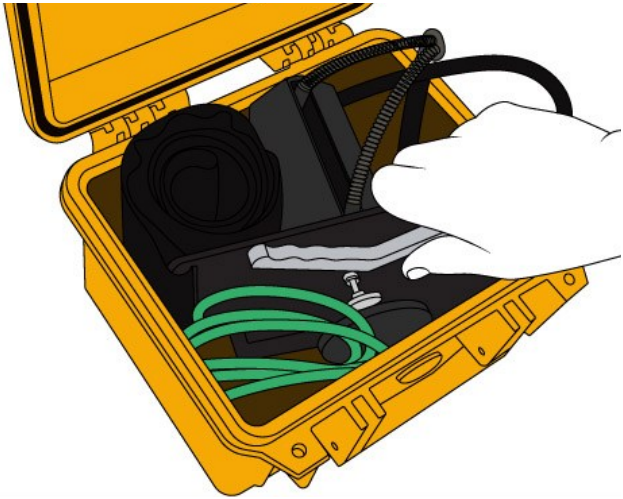
NCCD chest belt [10]
The belt can be machine washed at 90°C (194°F) up to one hour program. Shrinking of the fabric when washed: <1 %.

If the belt is contaminated with biological matter, it should be cleaned with soap and water, or machine washed as described above. Then cleaned with a sufficient disinfection like alcohol 95% or Virkon®.

SERVICE AND RETURN AFTER USE

When time for service, or when used, NCCD shall be returned to NUI for maintenance. You will be contacted by NUI when it's time for service, and a new device will be sent to replace the unit that is scheduled for maintenance.

Please make sure to repack it according to the illustration, including scissors, OTEC neck collar and extension hose:



Return complete unit [1-15] (NCCD+accessories) in transport case to:
NUI AS
Gravdalsveien 245
5165 Laksevåg,
Norway

SPECIFICATIONS

NUI Compact Chest Compression Device (NCCD) is gas driven, and has no electrical parts. It is designed to function under hyperbaric conditions, and in heliox atmospheres.

NCCD will function while wet.

Specifications
Operating temperature: -5°C (41F) to 60°C (140F).
Sound level at operating distance: ≤80 dB.
Storage temperature: 5°C (41F) to 40°C (104F).
Maximum ambient pressure: 30 bar (435 psi/300 msw).

Requirements
Gas drive pressure: 10 bar (145 psi) over ambient.
Chest circumference: 90-130 cm (31-51 in).

Dimensions
Case (Peli 1300): W270 x D246 x H174 mm
Case empty weight: 1410 g
Case with NCCD and accessories weight: 3705 g
NCCD unit [1-12] weight: 1996 g
Chest belt [10] : L150 cm, W11 cm

Compression rate
Maximum 5 bar/min (50 m/min)

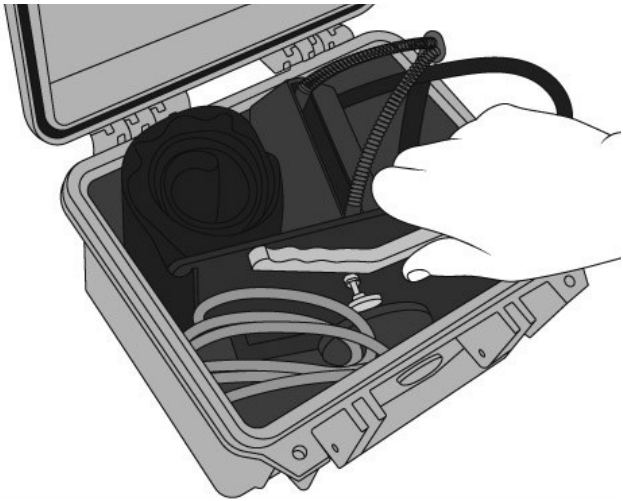
Decompression rate
Maximum 5 bar/min (50 m/min)

NCCD TRAINING UNIT

A NCCD training unit is included in your service.

The training unit only needs maintenance when it is malfunctioning. In such a case, please contact NUI at post@nui.no, and include NCCD serial number (SN08…..), found on the back of the piston house [1], with correspondence.

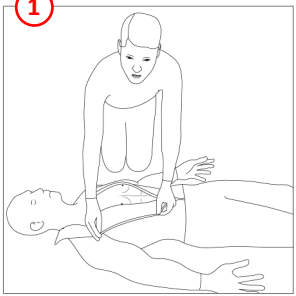
Please make sure to repack the unit according to the illustration, including scissors, OTEC neck collar and extension hose:



Return complete unit [1-15] (NCCD+accessories) in black transport case to:
NUI AS
Gravdalsveien 245
5165 Laksevåg, Norway

NCCD QUICK GUIDE

1



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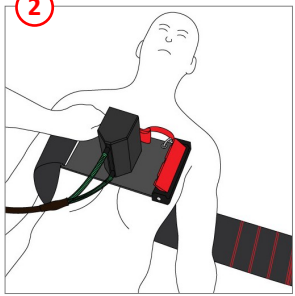

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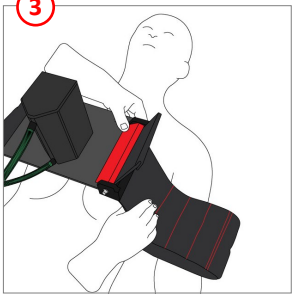

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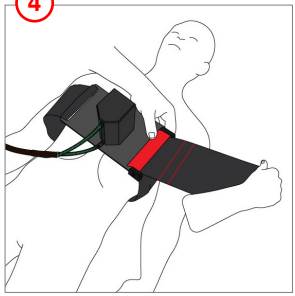

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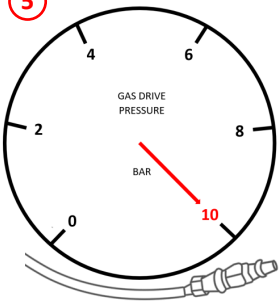
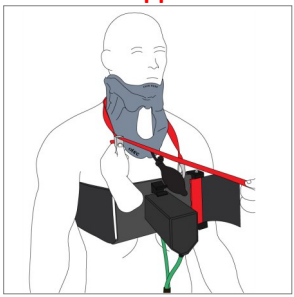


Vertical application



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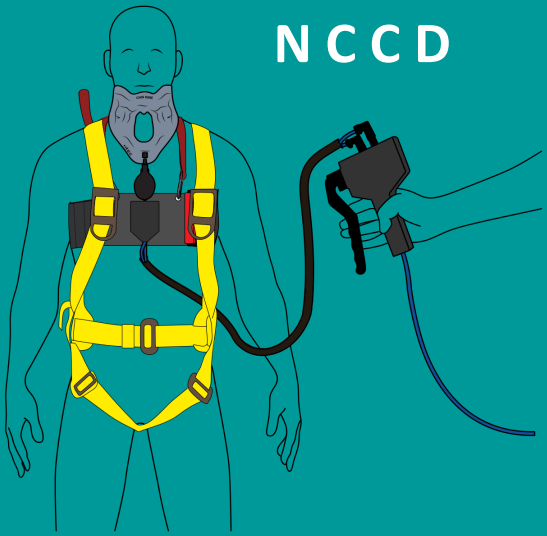

NCCD is delivered by NUI AS in Bergen, Norway

For more than 50 years, we have accuired unique competence, experience and facilities within underwater technology.

NUI provides the subsea industry with a great diversity of products and services; ranging from research, development and advisory, to hyperbaric contingency, engineering, pressure- and equipment testing.

Our aim is to continuously contribute to improving equipment safety, lowering health risks and raising awareness around hyperbaric operations.

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