

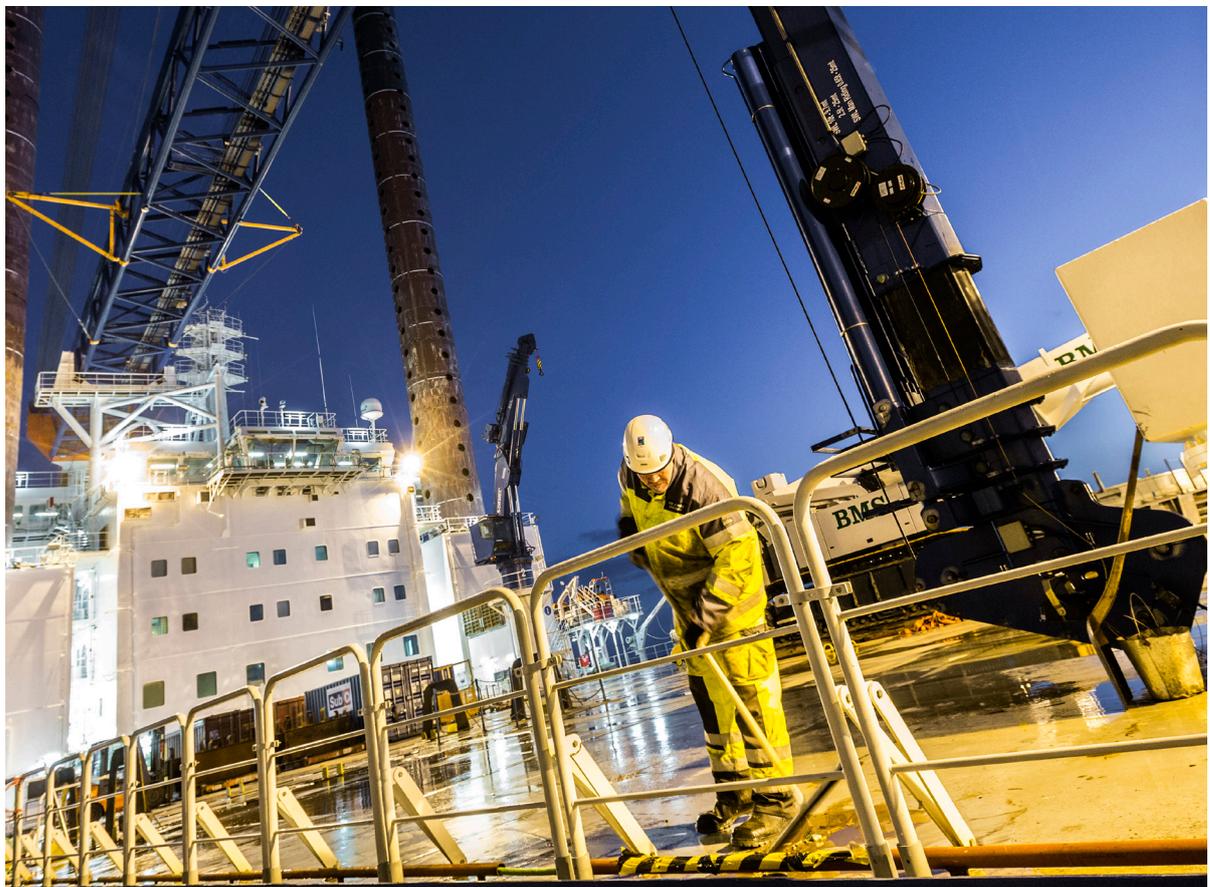
HV Technician Program

High Volt Wind Offshore Worker



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Program for Wind Offshore Technician

Skive College is a provider of courses and certificating tests for installation, service and troubleshooting of high voltage installations in offshore and onshore power plants.

The courses are designed and developed in close cooperation with leading companies within the wind turbine industry.

We train HV Technicians at both basic and specialist levels in the installation, maintenance and troubleshooting of high-voltage installations in wind turbines.

Danish companies are among the world's best to establish and install wind farms at sea.

Internationally there is a growing demand for products and services for the offshore areas. One of Skive College's special goals is to help secure this leadership position.

Skive College is the Nordic region's newest centre for the developing competencies in the electricity supplying sector and the only education centre in Denmark that can educate in the field of high-voltage.



The school has many years of experience with educating for electricity supplies and educates as the only school in Denmark Supply Operators (2 years of vocational education, it's completed with a certificate to work with installation, maintenance and service on distribution of high volumes from 10kv to 1000kv and in some situations even higher).

Courses and students can be accommodated at the school's trainee hotel and attend to morning, dinner and evening in the school's course canteen.

In the free time there are many possibilities for indoor sports and relaxation activities at the course hotel.

If you want activities in nature, there is the possibility of mountain biking, swimming, fitness and walking in stunning nature around the Limfjord. Skive College is located in the middle of Jutland in the town called Skive. Skive is one of Denmark's oldest and most beautiful market towns and is close to an airport with daily flights to the whole world via CPH Kastrup.

EHS-8270 (Medium/High Voltage safe work training), 5 days

Purpose of the course

To give the participant theoretical and practical knowledge to perform work correctly and safely, on medium/high voltage equipment, such as XLPE and EPR Cables, Switchgears, and Transformers. knowledge of the contents in Regulations EN-50110-1.

Content of the course

Theory of MV/HV XLPE and EPR cables design, electrical fields, stress control and cable handling.

Practical work on 1 and 4 core EPR (rubber) insulated cables incl. break-out part, and terminations of NKT CB 36-630 and Euromold 430TB/G Tee connectors.

Preparing XLPE insulated cables with bonded isolations screen (50 to 630 MM²) by using of various stripping tools, followed by sanding, and polishing.

Installation of full end-terminated cable including Surge arrester, on switchgear bushing.

AL/CU connectors and lugs, screw and crimping methods, theory about importance of good contact.

To understand the structure of the switchgear, and purpose of it in the grid/Wind turbine, vacuum breaker, interlock and SF₆ gas and consequences of exposure of this, to the environment.

Convenient operation of switchgear (SIEMENS NX-Plus, ABB, ORMAZABAL up to 36kV).

Using and install remote control box for operation of switchgear.

Knowledge of Protection relay and Primary + Secondary relay trip test.

MOM (Micro Ohm Meter) test of internal connections inside switchgear.

Theory regarding transformer in Wind turbines, Busbar connections and measuring devices. Execution of insulations test on Primary and Secondary windings to Earth, and between windings.

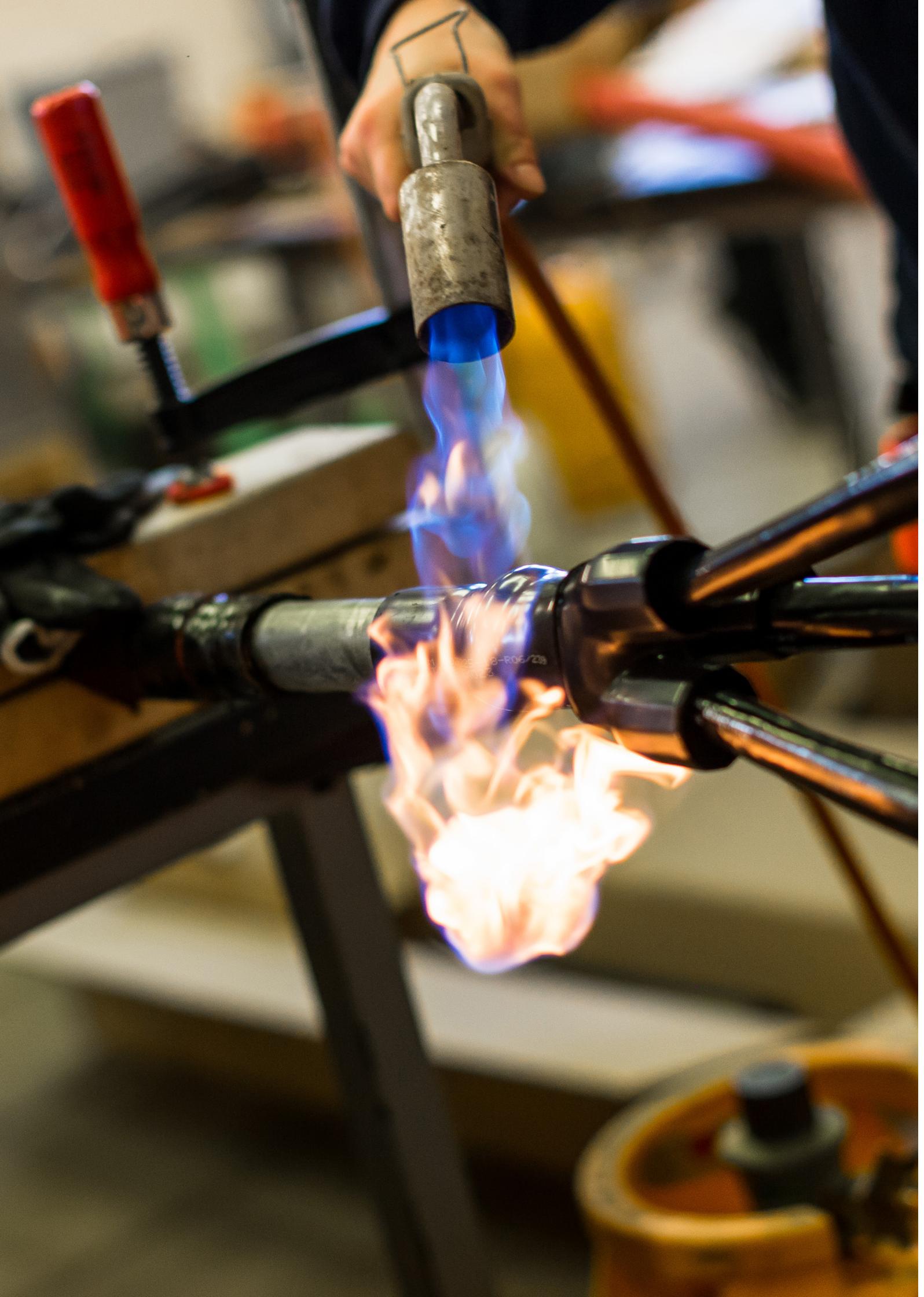
Safe use of equipment and tester for detection of deenergized state on voltage systems.

Dead work by - EN 50110. (5 safety rules). DL and DV zone. Safety distance.

High Voltage grounding equipment (Spider), requirements and safe work practices and procedures to be followed when grounding High Voltage electrical equipment. Locks and Notices (LOTO).

Theoretical and practical test, to ensure the participants' skills and knowledge of the course content.





EHS-8271 (Medium/High Voltage safe work training refresher), 1 day

Purpose of the course

To give the participant updated and refresh theoretical and practical knowledge of the course EHS 8270 below, so he/she always can ensure safe working and operation with medium/high voltage equipment such as Switchgears, Transformers, Cables and Regulations EN-50110 content and laws.

Content of the course EHS 8270

To understand the structure of the switchgear, the purpose of it in the grid, vacuum breaker, interlock and SF6 gas, as well exposure to the environment.

Reading and understanding of internal switchgear diagram / control system, engines, trip coils etc.

Convenient operation of switchgear (SIEMENS NX-Plus, ABB, ORMAZABAL and others up to 36kV).

Using and install remote control box for operation of switchgear.

Protection relay knowledge and Primary + Secondary test whit Megger 900, 780 and Ingvar 1000 Amp.

MOM (Micro Ohm Meter) test of connections internal in SWG.

Theoretical and practice work regarding Transformer structure including insulations test.

Busbar connections and measuring devises on Transformer knowledge.

Theory of MV/HV cables constructions and electrical fields, stress control and handling.

Practical work on 1 and 4 core EPR (rubber) and XLPE insulated cables up to 36kV incl. break-out part.

Mounting of T-connectors on cable and Switchgear incl. Surge arresters.

Safe use of equipment and tester for detection of deenergized state on voltage systems.

Dead work by - EN 50110. (5 safety rules). DL and DV zone. Safety distance.

High Voltage grounding equipment (Spider), requirements and safe work practices and procedures to be followed when grounding High Voltage electrical equipment. Locks and Notices (LOTO) and switching schedules.

Assembly of 72 KV cables and accessories for technicians in off-shore installations, 5 days

HV Cable mounting offshore

Purpose for the 72 KV assembly course, is to give a specific knowledge about preparing cables and installation of equipment, due to recommended methods given by Nexans and NKT and with use of their recommended tools.

The 66 KV course is dedicated to experienced HV-engineers with experiences from work with assembling and work with 33 KV High voltage cables.

Basic education and knowledge about assembly and workmanship for cablework is not included. Teaching will be done on specific assignments in cable assembly on Nexan and NKT 66 KV cables and equipment.

Through the course will the participants achieve a complete overview of recommended tools and methods for cable preparation given by Nexans and NKT.

Participants will, after passing an examination, be able to perform a complete termination on Nexan and NKT T-connectors used for transfor-

mers and switchgear solutions.

The course includes 3 general modules.
Theoretical module.
Practical module.
Theoretic- and practical safety module.

Cost

5 days education for 6 participants.
Kr. 54.624,-

Material price per person.

Kr. 5.060,-

Tools

By appointment

Certification test and diploma

Includes a PD measured practical certification test: Each participant
Kr. 3.560,-

Other prices for participants inside the AMU group, contact Jochi Bahat, Skive college.



Program for High Voltage Technician, 15 days in total

Assembly of HV-cables in on/off-shore installations 10-36kV, 4 days

After this course, the participant can:

- Perform muffles and endings on PEX and EPR high-voltage cables up to 72 kV.
- Perform correct mounting of electrical connections with pressure cable lugs and screw connector lugs.
- Prepare strippable, thermostable, and solid-extruded semiconductor layer cables, and mount suitable accessories that do not cause the electrical fields to do partial discharges following insulation errors.
- The participants can make the correct cable installations in high-voltage distribution systems.

Basic switching, safety, Theoretical and Practical Competency Assessment, 5 days

After this course, the participant has gained:

- In-depth knowledge of different types of switch gears, which is used to connect voltage levels up to 72 kV.
- In-depth theoretical knowledge of role assignments, role definition, communication and place of responsibility in connection with the coupling process.
- Knowledge of power distribution during and after coupling alongside short-circuit level in the switching point.
- Ability to read an agenda of work plan, grid diagram og make a risk assessment in connection to working on an electrical plant.
- Perform work on high-voltage system; knowing one's duties and responsibility to live up to the demands in valid safety declarations.
- Knowledge on the fact that the supervisor has been authorized in accordance to the regulations in the declaration on safety on operating electrical installations.



Operating on power supply plant off-shore, 5 days

Use of test instruments on HV switchgears and HV cables.
Safe working on high and low voltage installations.

The participant can, based on fundamental knowledge on the foundation of the power supply network and 72.5-04 kV transformation stations and operation of electrical systems, construct, operate and maintain power supply plants in cooperation with other parts of the power supply industry.

The participant can, based on knowledge on construction, operate and perform fault finding on control units, inverters, transducer, meters and relay in a correct safety manner.

The participant can perform the abovementioned tasks in a safely and environmentally correct way,

including lifting technique. In addition, the participant can use measuring instruments for voltage and current measurements on the supply network.

The participant can use his/hers basic understanding of technical connections, technical terms and measuring units to the performance of simple calculations with reference to Ohm's law.

Furthermore, the participant can perform the correct procedure regarding lock-in and lock-out. Lastly, the participant can perform the tasks in accordance to the valid declaration and work instruction. .

Safety, L-AUS/AUS for Operators with High voltage, 1 day

The participant can perform operational tasks on the electricity supply system in a safe manner.

The participant can assess the risk involved in various tasks and can help to implement the necessary security measures.

The participant can work in a safe manner on both voltage-free, high-voltage systems and near-voltage or high-voltage power plants (AUS Class 1).

As part of the work on high voltage systems, the participant can perform proper control of

the voltage-free state of the system, as well as assessing the risks of network connection and the activation / synchronization of emergency generators.

The participant can provide first aid in case of workplace accidents related to power supply work and can perform proper security checks on tools and equipment used in power supply work in accordance with regulations issued in accordance with the Act on Electrical Safety.



Prices and participatory assumptions

National students

Courses, employed in the Danish registry company, who comply with applicable rules for the AMU target group (not other educations than the basic technical education), pay a small participant fee for all 15 days, DKK 1860, - (DKK 124, - per day)

Courses outside the AMU target group (higher education than EDD) pay full course price DKK 12,428.90 for all 15 days.

Accommodation and catering,

Course participants, within the target group and with more than 60 km to the location of the course, are accommodated (including breakfast) free of charge.

Day care (morning/lunch/afternoon) DKK 180, - per day.

Evening buffet DKK 200, - per day.

Course participants outside the target group are invited to DKK 500,- per person. night (including breakfast)

International students

Course participants who are not employed by a Danish registered company should contact the school for course costs.



