

CHANGE IS IN THE AIR

Wind Energy PPE

Honeywell

PROPELLING THE FUTURE

We've been innovating for more than 100 years.
And now we're creating what's next.

Wind energy is one of the fastest-growing energy sources in the world.¹ In 2022, the global wind energy market was valued at **70.81 Billion (EURO)**. It's projected to be worth around **160.7 Billion (EURO)** by 2030, with a registered CAGR of 9.4% from 2022 to 2030.² With this unprecedented growth comes a sizably increased workforce. **There are presently 1.37 million wind-energy-related jobs worldwide.**³

Harnessing the power of the wind demands numerous skilled workers in major high-risk environments. Whether they're working at height, in confined spaces or being exposed to electrical and chemical dangers, keeping your wind energy crew safer with Personal Protection Equipment (PPE) is critical.

93.6 GW⁴

of new installed capacity in 2021, 2nd best record for global wind industry

466 ft/142 meters⁵

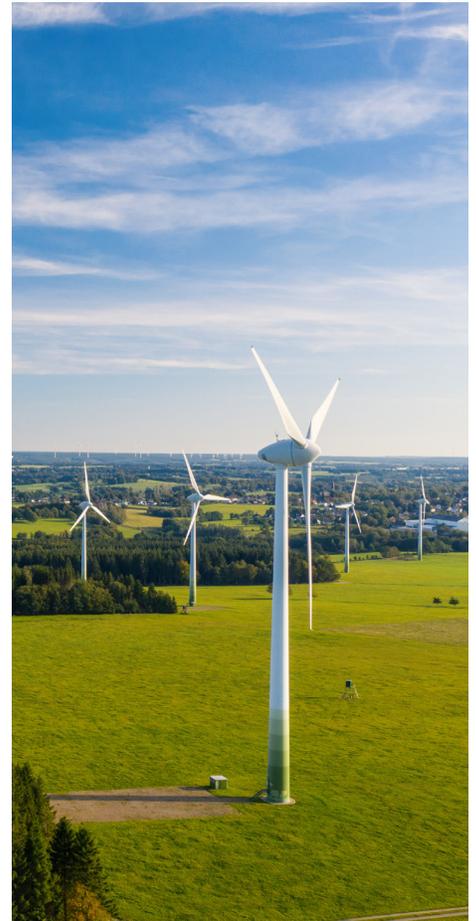
Average height of an onshore turbine

8000

Average number of components in a wind turbine

17% Growth⁶

A record increase in global wind electricity generation in 2021



HIGH-RISK INDUSTRY EVERY STEP OF THE WAY

Before wind turbines can start producing energy, they must be designed, built, transported, and erected. There are significant hazards every step of the way, many of which can result in serious injuries or fatalities:

- Wind turbines generate electricity. Workers can be exposed to live electrical equipment while installing or maintaining turbines. Any contact with live electrical equipment can result in electrical shock, which can be fatal.
- Wind turbines are often installed in open areas and are susceptible to lightning strikes. Lightning can damage the turbine's electrical systems, which can lead to downtime and repair costs.
- Blade failure: Wind turbine blades can fail due to fatigue, manufacturing defects, or extreme weather conditions. If a blade breaks off, it can damage the turbine's electrical and mechanical components, which can be hazardous to workers.

MAJOR HAZARDS IN WIND ENERGY



Falls from height



Confined spaces



Electrocution



Severe burns from electrical shocks and arc flashes/ fires and chemicals



Electric shock



Hazardous noise



Crushing injuries



Epoxy and styrene vapors

INDUSTRY TERMINOLOGY

Wind Turbine Farms: Onshore and Offshore

Wind farms are built on land (**onshore**) and in water (**offshore**).

The technology that these turbines use to generate electricity is generally the same. Where they differ is in their position, size, scale and how the electricity they generate is transferred.

There are two sectors in the production of a wind turbine: Manufacturing (**off-site**) and Assembly/Construction (**on-site**).

PPE FOR WIND ENERGY APPLICATIONS



CONSTRUCTION

Wind turbine construction begins with the tower. The tower sections, blades, nacelle, hub and other steel parts are manufactured off-site in a factory, then transported to and assembled on-site. Offshore turbines are finished off-site and shipped to sea on special sea jacking vessels.

- Fall Protection
- Protection at Multiple Levels
- Anchor Systems
- Vertical Fall Protection Systems



OPERATION AND MAINTENANCE

Daily activities include monitoring performance, controlling operations, and dispatching maintenance crews when necessary. Maintenance tasks include inspection, cleaning, lubrication and repair.

- Ladder Climbing
- Rope Access
- Nacelle Rooftop Access
- Offshore Embarkation



RESCUE AND EVACUATION

Working at extreme heights, in confined spaces and in changing weather conditions presents many challenges. Descent and rescue devices are used to raise or lower a fallen worker to safety.

- Hub Rescues
- Rooftop Rescues
- Tower Rescues
- Evacuation

HONEYWELL WIND ENERGY PPE SOLUTIONS

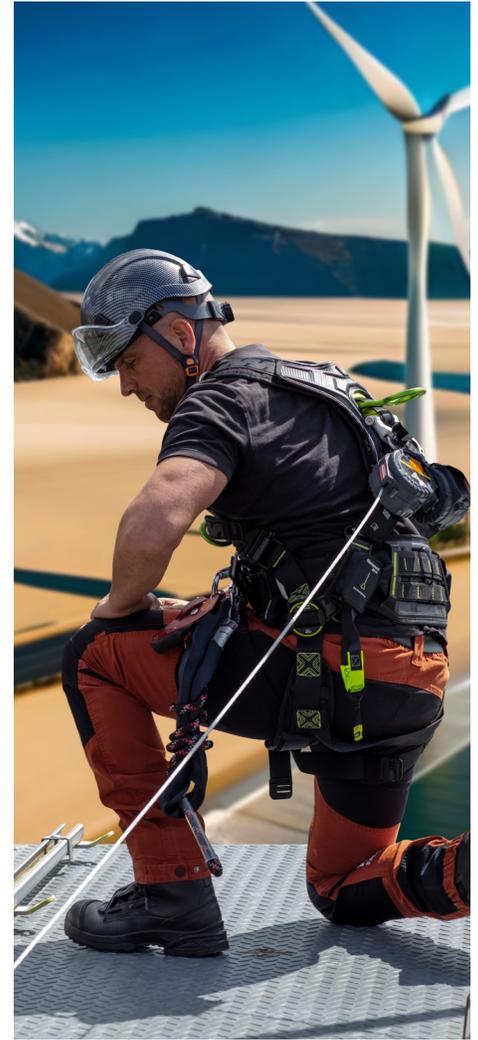
FALL PROTECTION IS MANDATORY

Given the extreme heights of wind turbines, fall protection is an imperative element of PPE in the on-site wind industry, both onshore and offshore. Construction workers on wind farms, when exposed to fall distances of six feet or more, must be protected from falls by using one of the following methods:

- Guardrail systems
- Safety net systems
- Personal fall arrest systems

A comprehensive fall protection system is based on five essential components:

1. **Anchors:** They must be of suitable strength and designed for loads in the applied directions, but they must be located where they can protect the user from injury, minimize fall distances, and yet permit efficient and free movement.
2. **Body Wear:** Dedicated wind energy harnesses for the onshore and offshore markets incorporate features specific to wind workplaces, as well as rope access, confined space and basic fall arrest models.
3. **Connection Device:** When correctly-positioned anchor systems are combined with the appropriate connection device, workers can be protected without impeding access to the turbine, or creating hazards from entanglement.
4. **Deceleration Device:** Fall arrest systems must incorporate an energy-limiting deceleration device to ensure the peak force applied to the user remains at a safe level (below 6kN).
5. **Evacuation Device:** Typically an evacuation/rescue kit is located in every turbine nacelle, and should be selected to match the tower height so that multiple users can descend in rapid succession.



HARNESSES AND LANYARD

Wind energy applications like construction, maintenance and rescue demand the best training, equipment and procedures. Our next generation ergonomically designed harnesses for optimum fall protection and comfort can be used as an integral part of fall protection for workers on wind turbines.



Honeywell Miller® H700 – CC7



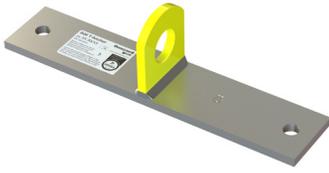
Honeywell Miller® H700 – CC3



Honeywell Miller Manyard Lanyard

SÖLL™ ANCHORS

Anchorage is a secure point of attachment that must be able to carry the load of a person's fall, working in suspension or a rescue.



Söll T-Anchor



Söll Eye Anchor



Söll C-Anchor

SÖLL VI-GO VERTICAL CABLE SYSTEM

This system provides enhanced safety with continuous fall protection when climbing fixed ladders.

Areas Of Use

- Wind Turbines
- Telecommunications
- Utilities
- Industrial/Manufacturing Facilities
- Drilling Rigs/Platforms
- Shipbuilding
- Crane Installation
- Confined Spaces



Söll Vi-Go Vertical Cable System



SÖLL VI-GO GUIDED TYPE FALL ARRESTERS

Used on cable systems to help arrest a fall before a worker hits the surface below.



Söll VC510 Fall Arrester



Söll VC570 Fall Arrester

SÖLL GLIDELoc® VERTICAL RAIL SYSTEM

A vertical rail system can be mounted on an existing ladder or includes a ladder. For the wind industry, it's a vertical aluminum rail that is installed on existing ladders. In that rail, a fall arrester called the "Universal II" is fitted. These shuttles are then connected to the worker's harness and thus prevent him/her from falling since there is a connection to the ladder.

Söll GlideLoc® Vertical Rail System



SÖLL GLIDELoc GUIDED TYPE FALL ARRESTERS

Hands-free safety at height that helps increase worker mobility, protection and productivity on rail systems.



Söll GlideLoc Fall Arrester Universal II



SELF-RETRACTING LIFELINES (SRLS)

Lightweight, high-strength, impact and abrasion-resistant, Honeywell's self-retracting lifelines provide maximum versatility and unsurpassed comfort. Choose safety at its highest and benefit from excellent protection, mobility and durability.



Miller® DuraSeal Self-Retracting Lifeline



Miller® Falcon™+ Self-Retracting Lifeline



Honeywell Miller SafEscape ELITE

RESCUE AND EVACUATION

Workers at height are at risk of fall among other risks. Rescue devices can lift or lower a fallen worker to a safe area.

COMBISAFE

Founded in Sweden, the Combisafe® brand has become the industry benchmark with its innovative modular approach, integrating site-wide solutions.



Combisafe Loading System MkII | Honeywell



HEAD PROTECTION

Protective helmets help to safeguard workers from falling debris and objects, reducing the amount of force to the head from impact. Outdoor workers can also gain protection from direct sunlight where the helmet covers the head.



North Short Brim Hard Hat White



Honeywell Short Brim Hard Hat Black



Perforama Nova Combi North PC Hard Hat



Fibre Metal Safety Helmet

EYE PROTECTION

While chemical splash protection may be more important during the manufacturing stage of wind turbines, construction and maintenance workers need eye protection with anti-fog, anti-scratch and anti-static properties to help ensure eye safety and clear vision.



Honeywell Avatar Black FRM Clear Lens HS



A800 Clear Temples/Clear Lens Fogban



Clearways Face Shield



Honeywell SP1000 2G

HAND PROTECTION

The assembly and maintenance of these wind turbines may require the use of impact or cut-resistant gloves; however, the manufacturing process may require additional types of gloves that offer protection like chemical resistance.



Rig Dog Knit



Coreshield™



Flextril™ Nitrile Chemical Gloves



Dermatril® P 743

RESPIRATORY PROTECTION

PAPR, headgear and half-mask PPE solutions can help protect against hazards like dust, chemicals and vapors during blade and nacelle manufacturing.



Honeywell North® Primair™ PA700 Series Powered Air Purifying Respirator (PAPR)



North PrimAir™ 900 Series



Honeywell North® HM500 Series Half Mask

HEARING PROTECTION

In addition to common noise hazards during production and construction, wind turbines can also generate high levels of noise, up to 105 dB(A) at the turbine, making hearing protection essential.



VeriShield™ 100 Passive Earmuffs



VeriShield™ 100 Dielectric Series Passive Earmuffs



Howard Leight Laserlite



Impact IE Pro HT+BT Blister Orange

FOOT PROTECTION

When working at high altitudes and on uneven terrain regardless of weather conditions, it is essential to have a reliable safety footwear to prevent slips, trips and falls. Workers need footwear that is specifically designed for outdoor use, providing excellent stability along with great comfort.



Agile Runner Mid Blue S3



Otter Premium Guard Ice



MTS Tech Score

HONEYWELL SAFETY TRAINING

As a recognized leader in worker safety training, Honeywell offers comprehensive behavior-based safety training, taught by qualified, knowledgeable industry experts.

For climber training, please contact:

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¹<https://www.energy.gov/eere/wind/advantages-and-challenges-wind-energy>

²<https://www.globenewswire.com/en/news-release/2023/01/06/2584179/0/en/Top-News-Wind-Energy-Market-is-expected-to-grow-at-a-9-4-CAGR-is-Expected-to-cross-174-75-billion-by-year-2030-Data-by-Contrive-Datum-Insights-Pvt-Ltd.html>

³<https://www.statista.com/statistics/268400/jobs-in-the-wind-energy-industry-worldwide-since-2005/#:~:text=The%20number%20of%20wind%20energy,in%20the%20period%20of%20consideration.>

⁴<https://gwec.net/global-wind-report-2022/>

⁵<https://www.iea.org/reports/wind-electricity>

⁶<https://www.vox.com/energy-and-environment/2018/3/8/17084158/wind-turbine-power-energy-blades>

For more information

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