

OXYLOCK®

PURE HYDROGEN. ZERO OXYGEN.

INTRODUCTION

OXYLOCK® Hydrogen Purification Technology by Watch Water GmbH sets a new benchmark in hydrogen purification by delivering the world's first true oxygen elimination system for hydrogen streams. Even trace oxygen can compromise hydrogen purity, damage catalysts, corrode infrastructure, and create serious safety risks. OXYLOCK® uses a breakthrough adsorption and electrochemical framework to remove oxygen completely - down to zero. The result is safer operation, higher hydrogen purity, and improved efficiency across hydrogen production, storage, and utilization systems.

THE WORLD'S FIRST TRUE OXYGEN ELIMINATION SYSTEM FOR HYDROGEN

In hydrogen production, even trace oxygen levels destroy efficiency, reduce purity, and create serious safety risks.

WHY OXYGEN MUST BE ELIMINATED

- ◆ Explosive risk in H₂/O₂ mixtures
- ◆ Reduced hydrogen purity
- ◆ Catalyst poisoning in fuel cells
- ◆ Corrosion in pipelines and storage
- ◆ Loss of efficiency in electrolysis systems



THE SOLUTION

OXYLOCK®

PURE HYDROGEN. ZERO OXYGEN.

A revolutionary adsorption and electrochemical framework that Permanently removes oxygen from Hydrogen gas streams.

- FILTERSORB
- FILTRATION
- ADSORPTION
- INSTANT PRODUCTS
- OXY TREATMENT
- SYSTEMS



SCIENCE & TECHNOLOGY

OXYLOCK[®] combines Advanced, Covalent, and Metal Organic Frameworks with a dual-mechanism technology to eliminate oxygen from hydrogen streams. First, its ultra-high surface area media selectively captures oxygen through a unique “vacuum lock” adsorption effect. Then, an internal electrochemical framework breaks and neutralizes the trapped oxygen, locking it into a stable, non-reactive form. The result is absolute oxygen elimination and an anoxic passivation effect that prevents corrosion and oxidation inside hydrogen systems.

OXYLOCK IS BASED ON A NEXT-GENERATION FRAMEWORK COMBINING:

OXYLOCK[®] is based on a next-generation framework combining:

- ◆ MOF (Metal Organic Frameworks)
- ◆ COF (Covalent Organic Frameworks)
- ◆ AOF (Anode Organic Frameworks)

ABSOLUTE OXYGEN ELIMINATION

Complete removal and permanent locking of oxygen.

- Not reduction
- Not scavenging
- Not chemical dosing

Complete Removal and Permanent Locking of Oxygen from Hydrogen Streams

DOWN TO ZERO

DUAL MECHANISM TECHNOLOGY

1. Oxygen Capture (Vacuum Lock Effect)

- ◆ Ultra-high surface area media
- ◆ Selective oxygen adsorption
- ◆ Active oxygen “pull” through internal vacuum behavior

2. Electrochemical Destruction

- ◆ Built-in anode/cathode framework
- ◆ High internal current generation
- ◆ Oxygen molecules are:
 - Broken
 - Neutralized
 - Locked into stable, non-reactive form



ANOXIC PASSIVATION EFFECT

OXYLOCK[®] creates a completely oxygen-free hydrogen environment that naturally passivates internal system surfaces. This anoxic condition prevents corrosion and stops oxidation reactions at their source. The result is longer equipment life, safer operation, and sustained system efficiency.

OXYLOCK[®] creates a unique condition:

- ◆ Oxygen-free hydrogen
- ◆ Surface passivation inside systems
- ◆ No corrosion
- ◆ No oxidation reactions



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APPLICATIONS

HYDROGEN PRODUCTION PLANTS

- ◆ Electrolysis systems
- ◆ Green hydrogen facilities
- ◆ Hydrogen reforming units

FUEL CELL SYSTEMS

- ◆ Prevent catalyst degradation
- ◆ Ensure maximum efficiency
- ◆ Extend system lifespan

HYDROGEN STORAGE & TRANSPORT

- ◆ Eliminate oxidation risk
- ◆ Protect tanks and pipelines
- ◆ Ensure safe long-term storage

SEMICONDUCTOR INDUSTRY

- ◆ Ultra-pure hydrogen required
- ◆ Zero oxygen contamination critical

NUCLEAR & ADVANCED ENERGY SYSTEMS

- ◆ Oxygen-free zones required
- ◆ Maximum process stability

OXYGEN LOCKED. HYDROGEN UNLOCKED.
THE FUTURE ENABLED

OXYLOCK® ADVANTAGES



100% Oxygen Removal



No Chemicals Required



No Byproducts



Continuous Operation



Long Media Life



Safe & Sustainable

WHY OXYLOCK® IS UNIQUE

Conventional Methods	OXYLOCK®
Chemical scavengers	⊗ Not needed
Partial oxygen removal	⊗ Not acceptable
Continuous dosing	⊗ Eliminated
Maintenance-heavy	⊗ No
Residual oxygen remains	⊗ Zero tolerance



TRUSTED BY INDUSTRIES THAT DEMAND ZERO COMPROMISE

OXYLOCK® is engineered for mission-critical hydrogen environments where failure is not an option. From green hydrogen gigaplants to precision semiconductor fabs, our technology delivers the same result every time:

Zero Oxygen

Zero Risk

Zero Compromise

- ◆ Field-validated across industrial hydrogen applications
- ◆ Compliant with ultra-high purity hydrogen standards
- ◆ Designed, engineered, and manufactured in Germany

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INDUSTRIAL OXYLOCK[®] SYSTEM DESIGN

- ◆ High-performance pressure vessel
- ◆ Advanced internal media (OXYLOCK[®])
- ◆ Optimized flow design
- ◆ Minimal pressure drop
- ◆ Scalable for any hydrogen plant

PERFORMANCE

Oxygen Removal	Up to 0 ppm
Flow Range	Custom engineered
Operation	Continuous
Maintenance	Minimal



THE MOST ADVANCED HYDROGEN PURIFICATION TECHNOLOGY EVER DEVELOPED

OPERATING PARAMETERS

Flow direction	Up-flow (packed bed) and Down-flow
System freeboard (down-flow)	25 - 30 %
Filtration rate	10 - 20 Bv/h
Backwash velocity	10 - 20 m/h
Minimum depth	80 cm
EBCT	≥ 90 seconds

TECHNICAL PARAMETERS

Technology Type	OXYGEN ELIMINATION TECHNOLOGY
Appearance	Granular, Dark Grey/Black
Granule size	0.6 - 2.4 mm
Mesh size	8 x 30
Bulk density	Approx 520-530 g/L



Standard Packaging

Packaging	Weight of product	Quantity/ pallet	Gross Wt./ pallet
Bag (30 L)	15.7 kg	40	653 kg

★ Other packaging can be considered on request

