



# MOISTURE & PRESSURE

## IN BATTERIES & ELECTRIC VEHICLES





# COMPANY OVERVIEW

## ABOUT US

### BROWNELL LIMITED

**CLIMATIC CONTROL  
& MEASUREMENT SPECIALISTS**

WORLD LEADERS IN ADVANCED HUMIDITY AND PRESSURE CONTROL SINCE 1952. PROVIDING A WIDE RANGE OF INNOVATIVE SOLUTIONS TO COVER ALL INDUSTRIAL SECTORS INCLUDING POWER GENERATION, PACKAGING & ELECTRONICS

**BROWNELL.CO.UK**

### MATRONIC I SVERIGE AB

**ELECTRONIC PRODUCTION TECHNOLOGY, SOLUTIONS & SUPPORT**

SPECIALISTS IN ELECTRONIC PRODUCTION TECHNOLOGY SINCE 1992. PROVIDING SUPPORT & EXPERTISE TO ASSIST CUSTOMERS IN FINDING THE IDEAL MATERIALS, PRODUCTION AIDS, ESD OR MSD PROTECTION FOR ANY APPLICATION

**MATRONIC.SE**

# COMPANY OVERVIEW

## HOW CAN WE HELP?

### EFFECTIVE SOLUTIONS

- DESICCANTS & SACHETS
- HUMIDITY INDICATORS & CARDS
- PRESSURE RELIEF VALVES
- MOISTURE ADSORBING POLYMERS
- IMMERSION PROOF BREATHERS
- TRANSFORMER BREATHERS
- DOCUMENT & DESICCANT PORTS
- DRUM & TANK VENT DRYERS
- INLINE & PIPELINE DRYERS
- DRY GAS PURGING SYSTEMS
- VIBRATION MEASUREMENT

### PROTECTING AGAINST

HIGH HUMIDITY,  
MOISTURE &  
CONDENSATION

TEMPERATURE  
VARIATIONS

SHOCK &  
VIBRATION

PRESSURE  
& VACUUM  
CHANGES

RUST,  
CORROSION &  
OXIDISATION

MOULD &  
BACTERIAL  
GROWTH

AIRBORNE  
CONTAMINANTS  
& PARTICLES

IMMERSION &  
PROJECTED  
WATER JETS



# PRESSURE BUILD-UP

## PRIMARY CAUSES

HEAT  
GENERATION

ALTITUDE  
CHANGES

DEFECTIVE  
MANUFACTURING

OVER  
CHARGING

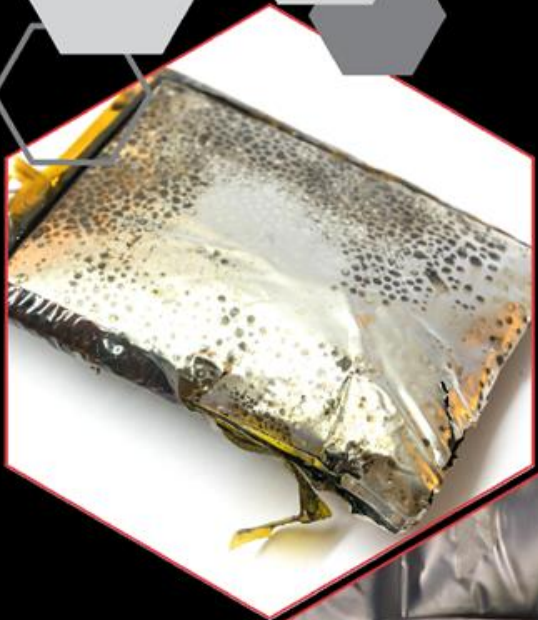
GAS  
FORMATION

MECHANICAL  
DAMAGE

AGING  
& WEAR

IMPROPER  
MANAGEMENT

# PRESSURE BUILD-UP DANGERS & CONSEQUENCES



RISK OF FIRE OR EXPLOSION

DAMAGE TO ADJACENT PARTS

THERMAL RUNAWAY / OVERHEATING

BATTERY RUPTURE & LEAKAGE

INCREASED COSTS & MAINTENANCE

SHORTENED VEHICLE LIFESPAN



# MOISTURE INGRESS

## CAUSES & CONSEQUENCES

### ENTRY POINTS

VENTS & COOLING SYSTEMS

SEAL DEGRADATION

ACCIDENTS OR DAMAGE

TEMPERATURE FLUCTUATIONS

MANUFACTURING DEFECTS

CHARGING PORTS

### NEGATIVE EFFECTS

ELECTROCHEMICAL IMBALANCE

INTERNAL SHORT-CIRCUITING

CORROSION & OXIDISATION

DEGRADATION OF ELECTROLYTE

ACCELERATED AGING

REDUCED EFFICIENCY



# OUR SOLUTIONS

## PRESSURE RELIEF VALVES



INWARD



HIGH-FLOW



TWO-WAY



NON-RETURN



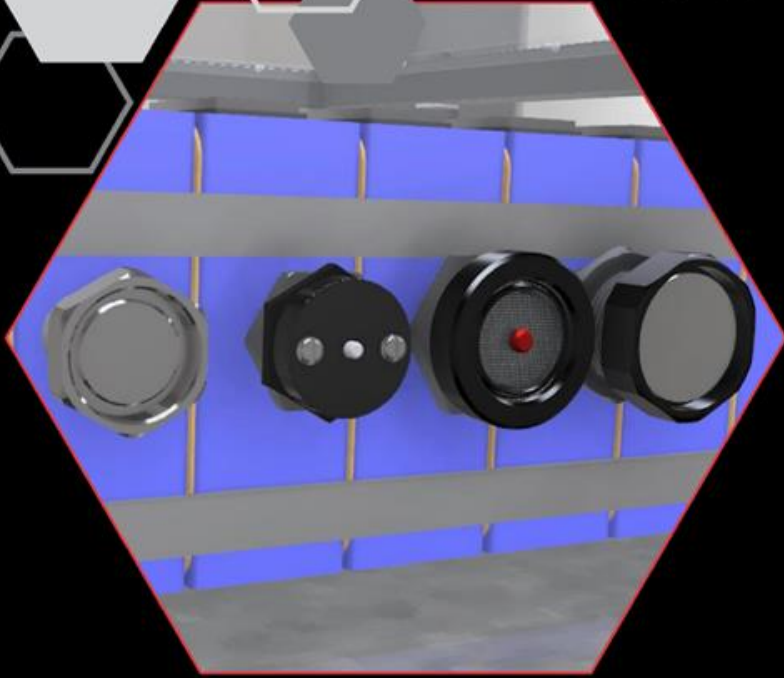
MANUAL



OUTWARD

# PRESSURE RELIEF VALVES

## KEY FEATURES & SPECIFICATIONS



FULLY AUTOMATIC OPENING & CLOSING

MANUAL OVERRIDE FACILITY FOR EQUALISATION

SIMPLE INSTALLATION & MAINTANANCE

PRESSURE OR VACUUM OPENING: **MINIMUM 250N/M<sup>2</sup> (1INCH W G)**

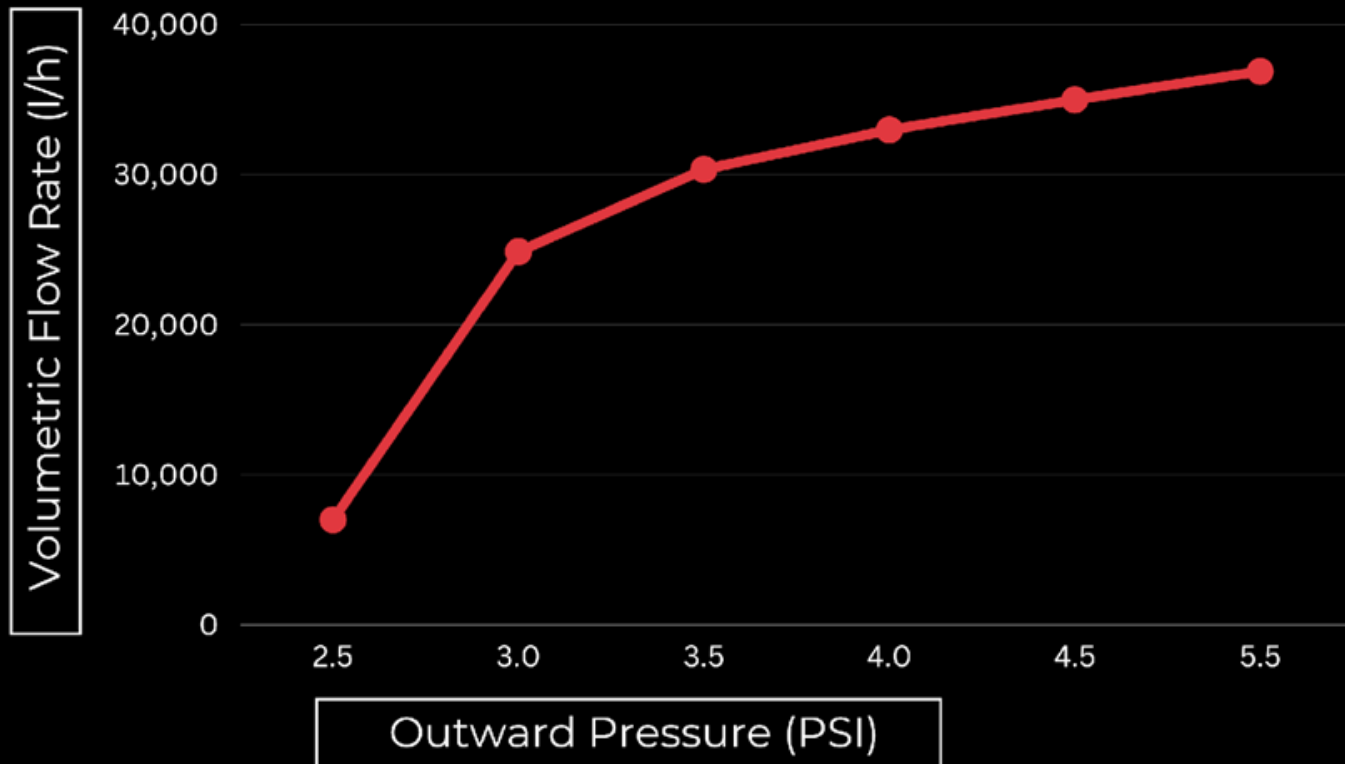
WIDE OPERATING TEMPERATURE RANGE: **FROM -30°C TO +90°C**



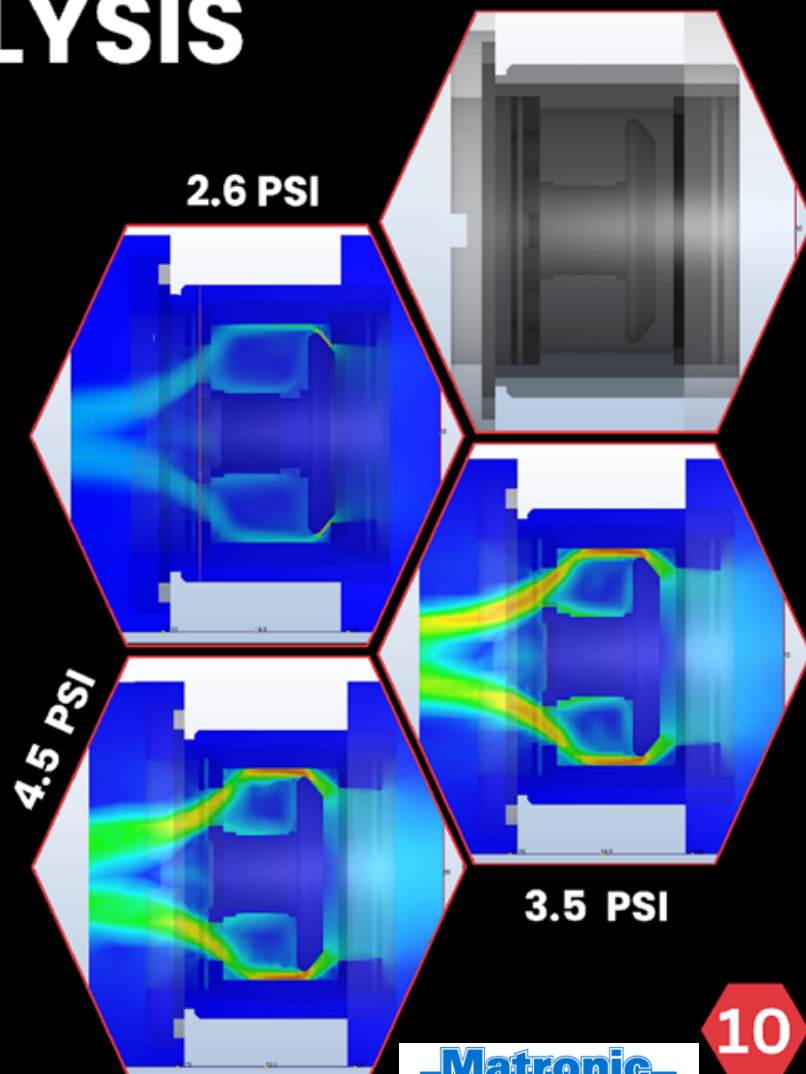
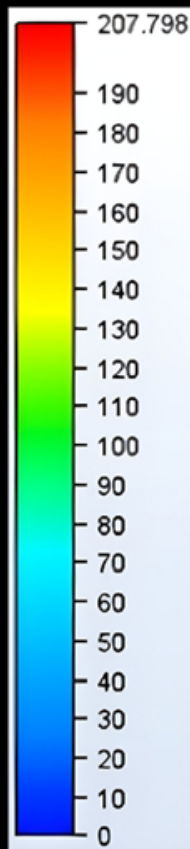
# PRESSURE RELIEF VALVES

## CFD PRESSURE DIFFERENTIAL VS FLOW ANALYSIS

BLD12783 Outward Relief Valve  
Volumetric Flow Rate at 15 °C (l/h)



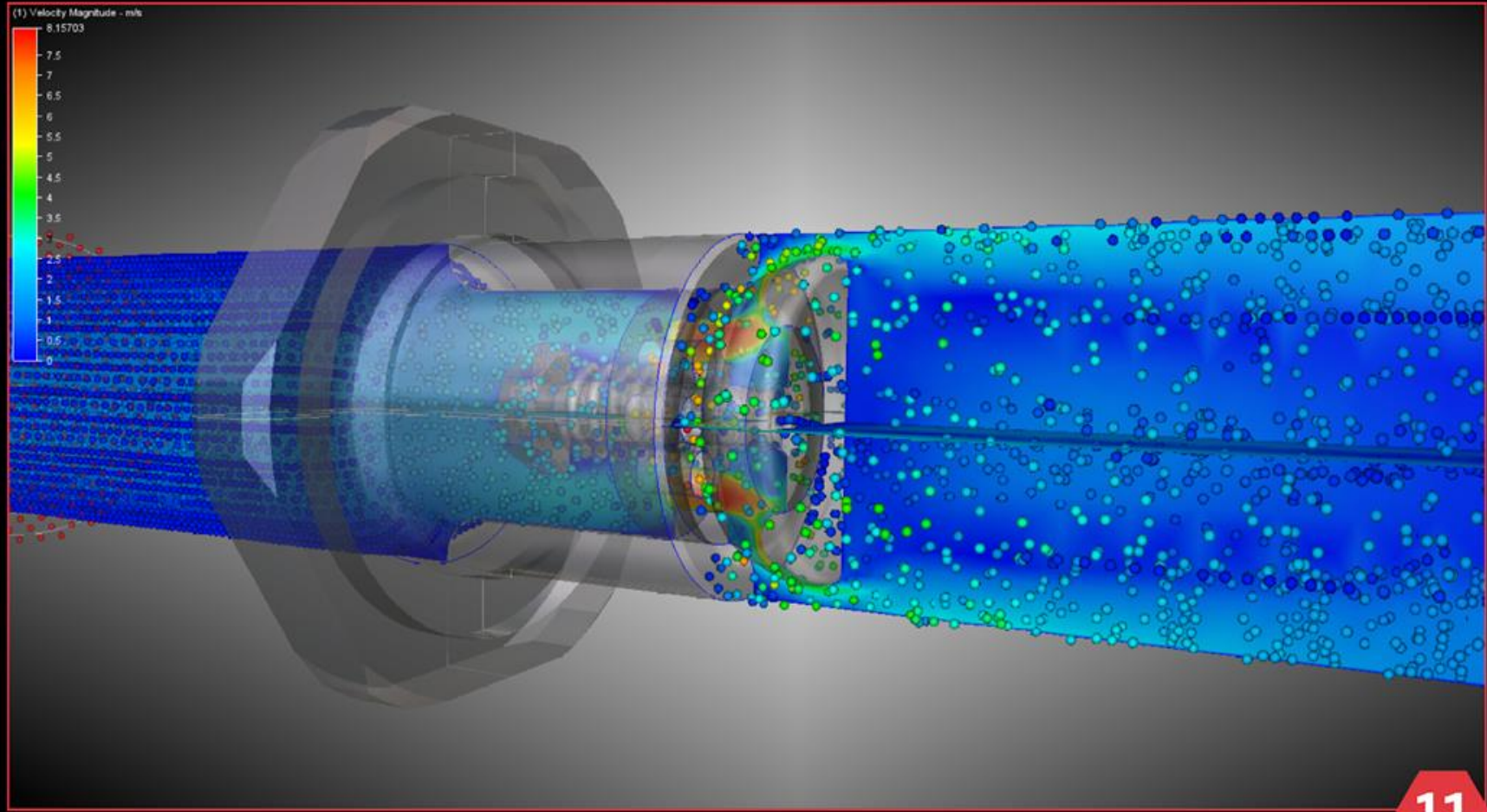
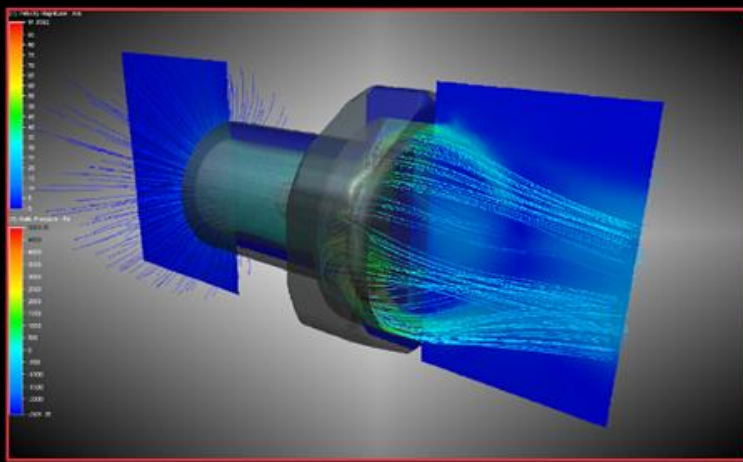
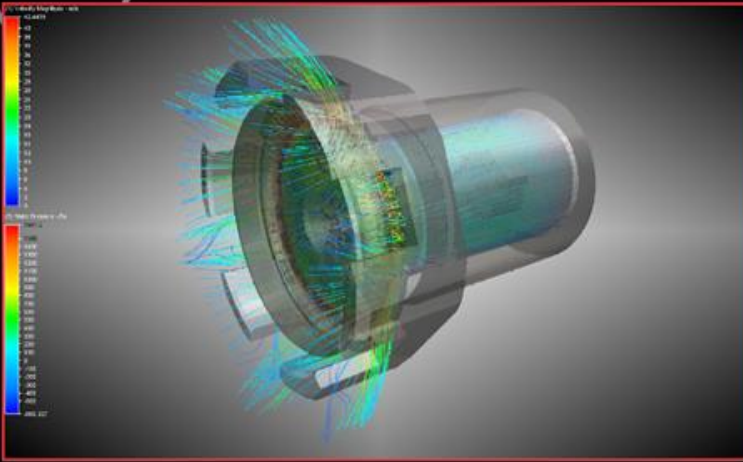
Velocity  
Magnitude  
m/s





# PRESSURE RELIEF VALVES

## VELOCITY CONTOURS / STREAMLINE VISUALISATION





# OUR SOLUTIONS

## IMMERSION BREATHERS



MINI



STANDARD



BREATHER  
DESICCATORS



VENT  
BREATHERS



SPLASH PROOF



DRAIN PLUGS

# IMMERSION BREATHERS

## KEY FEATURES & SPECIFICATIONS

UP TO  
IP68  
RATED

SOLVENT & OIL RESISTANT

HIGH FILTRATION EFFICIENCY

SIMPLE INSTALLATION & MAINTENANCE

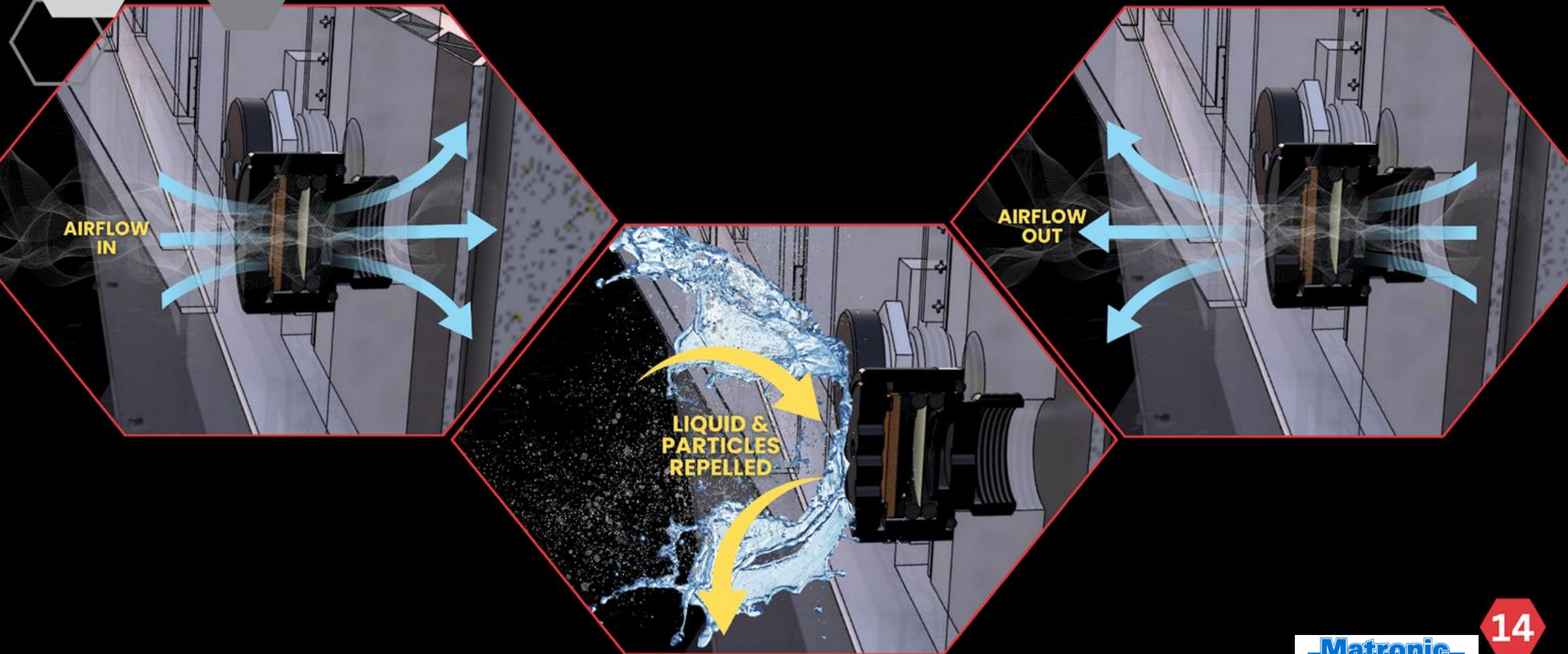
IMMERSION TIME PERIOD: **24 HOURS** | IMMERSION DEPTH: **5 METRES**

WIDE OPERATING TEMPERATURE RANGE: **FROM -40°C TO +125°C**



# IMMERSION BREATHERS

## ENCLOSURE VENTING IN ACTION





**THANK YOU**

**ANY QUESTIONS?**

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