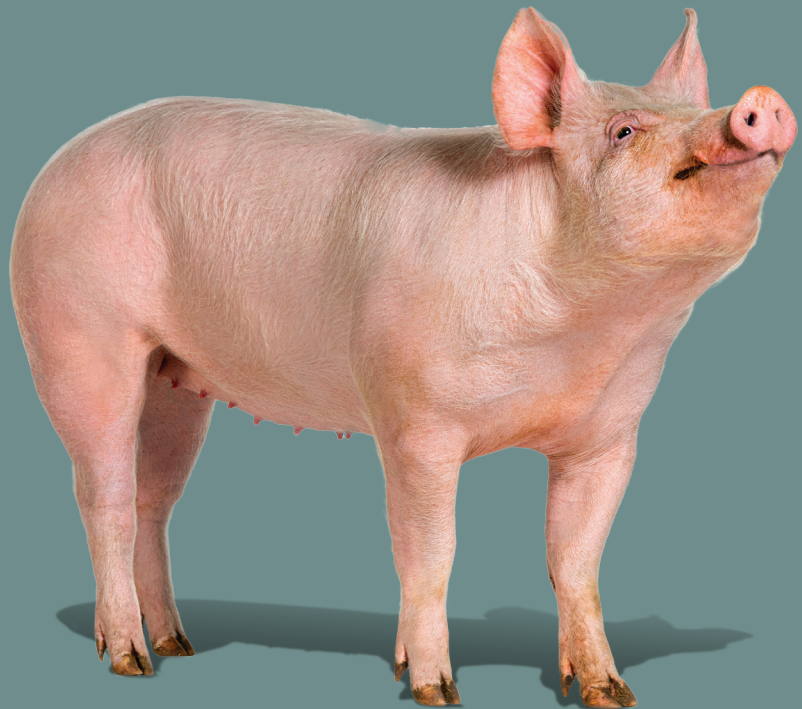


# Take control of PRRS

Smart diagnostics, smart technology, smart support.  
**Decide with confidence.**



 **BioChek**  
SMART VETERINARY DIAGNOSTICS

# About PRRS

Porcine Respiratory and Reproductive Syndrome is a complex challenge for the swine industry. Besides clinical symptoms it causes high production losses and has severe animal welfare and economic implications.

Proper control of PRRS includes correct pathogen and antibody detection, measurable biosecurity practices, and monitoring of the applied strategy. A structured approach to PRRS leads to improved animal welfare, improved production figures, and increased profit.

BioChek offers a full range of products to help your PRRS control and elimination strategy.



## Disease

PRRS virus infections can cause respiratory and reproductive problems in pigs in addition to immunosuppression, resulting in co-infections and syndromes such as Porcine Respiratory Disease Complex (PRDC) and Porcine Multisystemic wasting Syndrome (PMWS).

There are two PRRSv genotypes. Genotype I (EU) is most prevalent in Europe and the CIS. Genotype II (NA) is predominant in all the other regions, and a highly pathogenic variant (PRRS NA-HP) is present in Asia.

## Diagnosis

### Reproductive symptoms

Indications are early farrowing, weak and dead born piglets and abortion.

The diagnosis is made by virus detection via PCR in aborted or weak, dead-born piglets. Antibody testing via ELISA of sows clearly indicates the extent of the infection/outbreak.

### Respiratory symptoms

The diagnosis can be made via necropsy, lung histology + PCR on affected pigs or antibody testing + PCR on affected groups.

## PRRS control and eradication strategies

PRRS control and elimination strategies depend on the possible biosecurity/hygiene level and the infection—immune status of the swine herds. Vaccination is a very useful tool to prevent clinical problems and reduce the circulation of PRRSv in pigs and herds.

Intervention strategies’ success must be monitored via a combination of ELISA and PCR (see AASV classification system applied worldwide (Table 1.) The antibody level reflects the exposure/contact status and its extent, as well as a clear indication of whether it fits with field virus contact, vaccination, or a combination. PCR on piglets at weaning or finishers provide info about the stability of sow herds respectively of active infections in the finishing herd.

With BioChek’s VetAssure system, the farm’s hygiene can be assessed. By setting and tracking baselines, continuous improvements can be made, limiting the risk of (re)infection.

BioChek PRRS XR ELISA combined with the BioChek analytical dashboard offers a convenient overview of the results achieved and a longitudinal follow-up of the exposure status of all animal groups. Biosecurity and hygiene levels can be assessed by monitoring the VetAssure dashboard.

| New AASV guidelines<br>(Hotlkamp et al. 2021) | Shedding Piglets<br>(PCR) | Exposure Sows<br>(ELISA) |
|-----------------------------------------------|---------------------------|--------------------------|
| Positive Unstable High prevalence (IA)        | Positive                  | Positive                 |
| Positive Inestable Low prevalence (IB)        | Positive                  | Positive                 |
| Positive Stable (II)                          | Uncertain                 | Positive                 |
| Positive Stable Vaccine use (II-vx)           |                           |                          |
| Provisional Negative (III)                    | Negative                  | Positive                 |
| Negative (IV)                                 | Negative                  | Negative                 |

Table 1. AASV classification system applied worldwide.

## PRRS monitoring and reporting

Using a uniform sampling and test protocol, PRRS diagnosis can be made, and intervention effects, risk factors, and status can be monitored over time.

The BioChek software and dashboard reporting system will provide a convenient overview of the latest test results and an overview over time.

# PRRS XR Ab ELISA Test Kit

## BioChek Porcine Reproductive and Respiratory Syndrome XR antibody ELISA Test Kit

- Semi-quantitative ELISA, very sensitive and specific for the detection of antibodies against both Genotype I (EU) and II (NA) PRRSv
- Wide dynamic range to clearly differentiate clearly between negative, low, medium and high positive antibody levels, reflecting the true situation on the farm
- High sensitivity and specificity for both genotype I and II infections (>99%)

## Antibody detection with Biochek PRRS XR Ab ELISA

After a primary infection or vaccination, pigs develop an antibody response after 10-14 days. The peak of the antibody response mostly reaches around 4-6 weeks after the contact. When there is no repeated contact, the antibodies decline to lower levels in 3-4 months. When there is repeated contact with another heterologous strain, there is an extra increased antibody response called boosting. The profile over time can indicate recent virus contacts. The same phenomenon can be seen after PRRS vaccination start.

PRRS vaccination reduces/prevents clinical symptoms and often a reduction of viremia. Baseline regarding serological vaccine responses depend on the used vaccine. Nevertheless, the response in the BioChek PRRS XR Ab ELISA gives a clear indication whether the antibody response matches with the type of PRRS vaccine used.

| 6-7 weeks after vaccination |               |        |               |      |        |
|-----------------------------|---------------|--------|---------------|------|--------|
| Vaccine type                | minimum titer |        | maximum titer |      | % CV   |
| PRRS XR MLV's               | 0,8           | 1800   | 3,1           | 8000 | 20-160 |
| PRRS XR KV                  | < 0.5         | ≤ 1070 | 1,0           | 2300 | 20-160 |

The BioChek Interpretation Table below is a good aid for interpretation of the test results in both unvaccinated and vaccinated pigs/herds.

| No vaccination                  |           | BioChek PRRS XR ELISA (S/P and titer) |          | Vaccination |                                                                                        |
|---------------------------------|-----------|---------------------------------------|----------|-------------|----------------------------------------------------------------------------------------|
| No infection                    | Negative  | < 0,5                                 | < 1.070  | Negative    | No infection                                                                           |
| Old infection (or very recent*) | Low       | 0,5                                   | 1.070    | Low         | Vaccination response with NO or MODERATE antibody boosterig due to field virus contact |
|                                 | Moderate  | 1,5                                   | 3.700    | Moderate    |                                                                                        |
|                                 |           | 2                                     | 5.000    |             |                                                                                        |
| Recent-old infection*           |           | 3                                     | 8000     |             |                                                                                        |
| Recent infection*               | High      | 3,5                                   | 9.000    | High*       | Vaccination response with antibody boosting due to field virus contact                 |
|                                 |           | 4                                     | 10.000   |             |                                                                                        |
|                                 | Very high | 4,5                                   | 11.000   | Very high*  |                                                                                        |
|                                 |           | 5                                     | 12.000   |             |                                                                                        |
|                                 |           | ≥ 5,5                                 | ≥ 13.000 |             |                                                                                        |

\* Piglets/finishers: Clinical symptoms present and other PRDC (Porcine Respiratory Disease Complex) infections excluded: likely PRRS. Suspected PRRS clinical symptoms: high probability of PRRS (Check: cross-sectional profile/ evt. necropsy+histology/or paired sampling)

\* Sows: Titers ≥ 3.0/8000 indicates recent field virus contacts/infections. Test later by PCR and track aborted/weak/ stillborn piglets.

| Kit Specifications                 |
|------------------------------------|
| PRRSv XR ELISA, KIT 112            |
| ■ Plates per kit: 5                |
| ■ Maximum sample size: 460         |
| ■ Incubation times: 30-30-15       |
| ■ Read at 405 NM                   |
| ■ 1:50 dilution                    |
| ■ Sensitivity and Specificity >99% |

# vetproof® PRRS qPCR Kit

## vetproof® Porcine Reproductive and Respiratory Syndrome Virus qPCR Kit

- Contains primers and probes targeting a conserved part of the genome to provide full strain coverage, able to detect all current PRRSv strains.
- Detects and differentiates between Genotype I (EU) and II (NA) and the highly pathogenic (HP) genotype II strain in extracts from convenient matrices such as oral fluid, serum, semen, tissues, processing fluids, and nasal swabs.
- Quantification of the viral load is possible with the use of a set of standards (sold separately)
- Highly sensitive with a lower detection limit (LLOD) of 10 viral copies per reaction, making pools of up to 10 sera possible.
- Endogenous extraction control to verify the extraction quality and ensure trusted results.

| Kit Specifications                                                        |
|---------------------------------------------------------------------------|
| vetproof® PRRSV qPCR                                                      |
| KIT230156                                                                 |
| ■ Kit format: 100 tests                                                   |
| ■ LLOD >= 10 cop/rxn                                                      |
| ■ Suitable on all relevant matrixes                                       |
| ■ Excellent strain coverage via primer/prober design and regular blasting |



## Virus detection with vetproof® PRRS qPCR kit

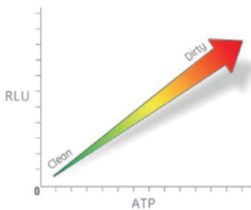
Genetic drifting and shifting make PRRSv detection challenging since changes in the virus can lead to false negative results. RT-qPCR offers accurate detection of nucleic acids in a variety of convenient matrices and a possibility for pooling samples. Results are fast, accurate, and can differentiate between genotypes. The vetproof® qPCR kit has a perfect strain coverage which is checked also via regular blasting of circulating strains.

# Hygiene/biosecurity testing with VetAssure™

PRRS virus can survive in the environment for extended periods of time this causing a significant risk of (re)infections. Infected animals shed virus that contaminates the environment, equipment and materials. Proper hygiene protocols will decrease the spread, but how is the efficiency of and compliance of hygiene protocols were often not measured and monitored.

## What is ATP testing?

Adenosine Triphosphate (ATP) is an energy molecule found in all living cells that allows cellular metabolism to take place. All organic matter contains ATP. Therefore, the detection of ATP on a surface after cleaning is an indication of cleaning efficacy.



## BioChek's VetAssure™ Surface ATP test

- Reduction in risk of spreading contaminants
- Baseline establishment of hygiene/Cleanliness standards
- Consistent metrics for objectively measuring compliance
- Essential tool for incorporation to organizational hygiene SOPS and Quality Assurance Programs
- Data documentation for external stakeholders

| Timelines / treatments                               | Compartment 1:<br>control                | Compartment 2:<br>cleaned               | Compartment 3:<br>cleaned + disinfected |
|------------------------------------------------------|------------------------------------------|-----------------------------------------|-----------------------------------------|
| T0: PRRS MLV inoculation + ATP swab before treatment | RLU: 2697<br>Viral load / 100 cm²: 14155 | RLU: 337<br>Viral load / 100 cm²: 33428 | RLU: 353<br>Viral load / 100 cm²: 56850 |
| T1: ATP swab directly after treatment                | RLU: 523<br>Viral load / 100 cm²: 8375   | RLU: 319<br>Viral load / 100 cm²: <600  | RLU: 193<br>Viral load / 100 cm²: 0     |
| T2: ATP swab 45 min past treatment                   | RLU: 332<br>Viral load / 100 cm²: <600   | RLU: 282<br>Viral load / 100 cm²: <600  | RLU: 198<br>Viral load / 100 cm²: 0     |

Assessment of a possible relation between hygiene protocols measured by bioluminescence and the viral load: an orientationally study.

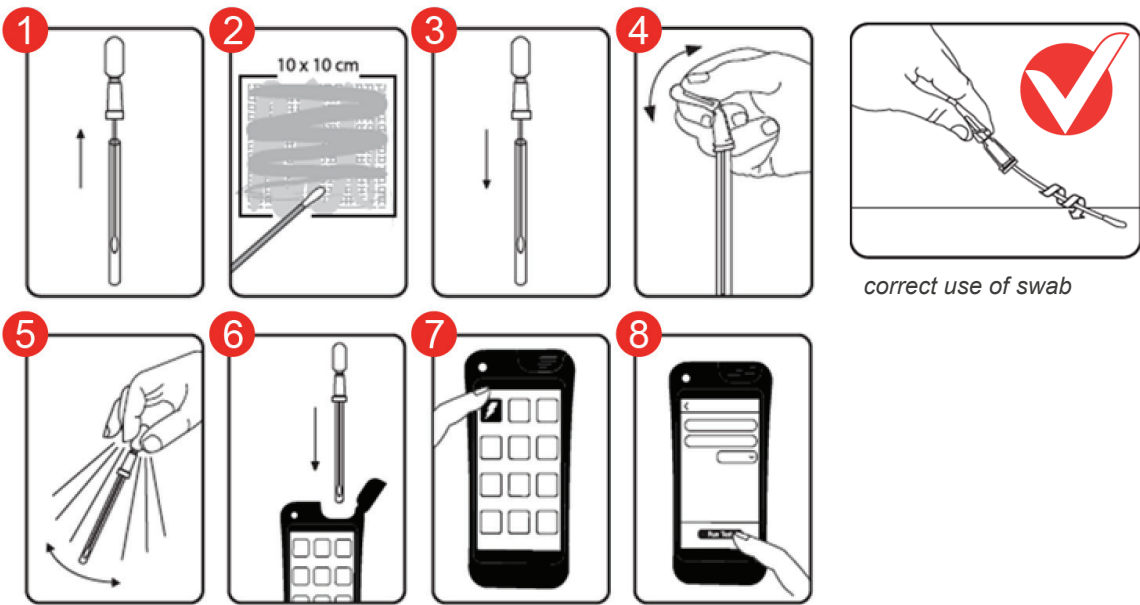
## VetAssure™ Surface ATP test

The VetAssure™ Surface ATP test uses bioluminescence technology to identify and measure ATP. This measurement objectively determines from a microbiological level if a surface has been cleaned thoroughly. With a result in as little as 10 seconds corrective action such as a recleaning can be initiated immediately.

Cleaned surfaces are swabbed with the VetAssure™ Surface ATP and read in the Ensure Touch™ Luminometer. The RLU (relative light units) value correlates directly to the amount of organic matter present on the tested surface. Organic matter may harbor pathogens such as bacteria, virus, yeast, molds and spores. A relation is found between the ATP levels and the presence/reduction of the PRRS viral load.



## VetAssure™ ATP testing procedure



## BioChek's qPCR Sample Preparation

**vetproof® MagBead Extraction kit 1** is designed for the rapid and safe high-throughput extraction of DNA and RNA from up to 200 µl sample material. After preparing and loading the plates into the RoboPrep® 32, the RoboPrep® 96 or the KingFisher™ Flex, all lysis and purification steps are performed automatically without needing external lysis or centrifugation steps.

The kit uses Proteinase K, chaotropic salts, and carrier-t RNA for the lysis and magnetic beads for the washing and purification steps. Magnetic bead technology results in highly purified nucleic acids, free of inhibitory components, to be used directly in real-time PCR assays.



- ✓ Integrated: No external lysis or heat treatment
- ✓ Automated: Reduces hands-on time
- ✓ Sensitive and rapid: excellent RNA/DNA quality within 45 minutes
- ✓ Reproducible and precise: Minimizes human error
- ✓ Easy: Quick and simple to implement

## BioChek vetproof® RoboPrep® 32/96

**RoboPrep® 32/96** makes light work of DNA / RNA extraction. Reduces hands-on time and allows you to optimization of daily routine, freeing up time for other valuable lab tasks. Perform automated extractions of up to 32/96 samples.

The RoboPrep® 32/96 is intuitive to operate and does not require any special training. Protocols for vetproof® MagBead Extraction Kit are preinstalled for full flexibility and easy implementation of any other kind of extraction protocols using the integrated touch display.

- Workflow Optimization
- High yields & purity of nucleic acids
- High sample throughput
- Reduces hands-on time
- Produces consistent and reproducible results
- Minimizes operator's error
- Reduces risk of cross-contamination
- Eliminates PCR inhibition
- Provides flexibility with an open platform, customizable protocols, and straightforward application



## BioChek ELISA Assay Robot (BEAR)

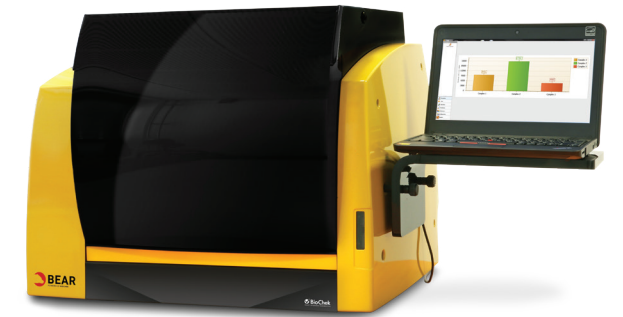
### Be in control: running ELISA fully automated

The BEAR is a completely automated solution for running ELISA assays.

Load the BEAR with kit components and serum samples, press start and walk away.

Results are available in 2 - 3 hours.

The results are stored and can be accessed with the BioChek Monitoring Software.



### Automation Platform

- Fully Automated: load and walk away
- High Capacity: runs up to 4 plates a day, and 2 overnight
- Flexibly adapted: runs multiple assays simultaneously
- Robust Software: BioChek interface, ELISA protocols & LIS compatible
- Space saving: BEAR measures 60 cm x 60 cm with 28 kgs weight hold

### High-precision micro syringe

- Accurate pipetting: Aspirate 1µl with less than 3% CV

### Sliding Sample and Reagent Tray

- 90 Poultry samples or 180 Swine samples per run
- 16 reagent positions



### Benefits of the BEAR

- ✓ Easy to operate
- ✓ Reduces hands-on technician time
- ✓ Runs all BioChek ELISA kits (both poultry and swine)
- ✓ Runs both solid plates and strip formats
- ✓ Prepares full sample dilution
- ✓ Remote controlled via your smartphone
- ✓ Eco-friendly: no pipette tips used
- ✓ Online support with TeamViewer
- ✓ Limited maintenance and service required

# BioChek II Monitoring Software and Dashboard

With the BioChek II Monitoring Software, you can:

- ✓ Manage ELISA and PCR data in an easy and reliable manner
- ✓ Analyse trends & compare data using customized reports
- ✓ Access your data anytime, anywhere using your online database
- ✓ Scan barcoded sample forms to avoid laborious input of all flock/herd data
- ✓ Set up an interface with your LIMS system
- ✓ Contact BioChek Technical Support (through TeamViewer)



## The BioChek Summary Dashboard

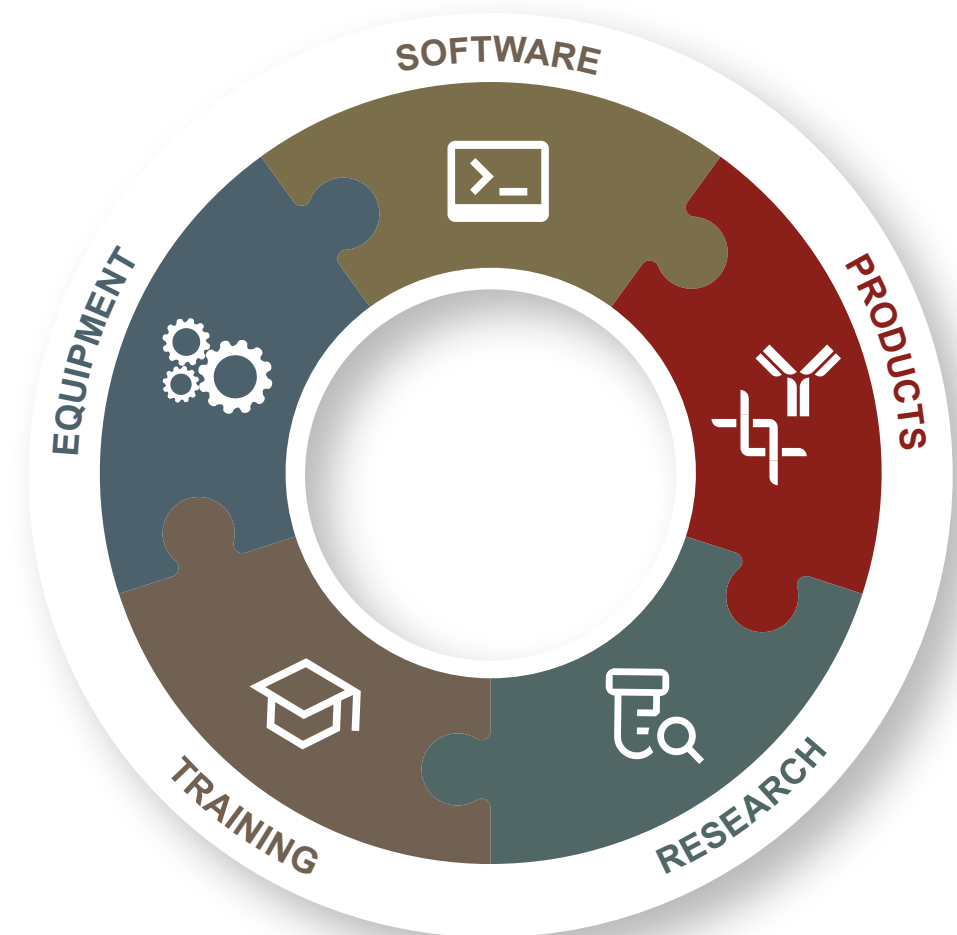
The Summary Dashboard helps to analyse the results of the latest submission and connect them with previous results of the farms including the selection of the preferred easy to read graphical overview, and provides instant info about:

- Serological profile of an infection between the animal groups of a farm
- Serological overview a multiple infection between animal groups to assess for the primary and secondary causes of a clinical problem
- Vaccine responses
- Monitor and benchmark vaccine take and compliance in and over farms
- Benchmark infection status of all farms or animal groups of your integration or veterinary practice

*BioChek offers a full solution for all your PRRS ELISA, PCR and extraction needs.  
Contact your representative for more information and to discuss further.*

# Adding value to test results

BioChek offers a reliable and easy-to-use animal health monitoring system to help you identify trends in immune status, allow for corrective action, identify the presence of unwanted organisms, and generate reproducible and accurate test results.



## BioChek Animal Health Monitoring System

- ELISA & PCR diagnostic test kits
- Reference controls (ELISA)
- Extraction Solutions and Standards (PCR)
- BioChek Monitoring Software
- BioChek ELISA Assay Robot (BEAR)
- RoboPrep nucleic acid extraction robot
- Dedicated Technical and Logistics Support

Since 1997, BioChek has supported the poultry and swine industries to help improve livestock productivity and promote animal health. BioChek's extensive portfolio of veterinary diagnostics is used worldwide to detect a wide range of poultry and swine diseases.

Our head office is based in the Netherlands, and we have an R&D department and production facility in the UK, a USDA-licensed facility in the USA, a regional office in South Africa, regional and local sales teams, and numerous distributors across the globe.

### **BioChek Animal Health Monitoring System**

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