

# User manual – NucleoProtect® VET Blood Tube

## 1 Components

### 1.1 Product content

REF	NucleoProtect® VET Blood Tube
740755	Blood collection tube prefilled with 4.0 mL NucleoProtect® VET stabilization and inactivation reagent, compatible with standard Luer cannulas, user manual, box of 50 tubes

It is strongly recommended to read the protocol details in this user manual when using **NucleoProtect® VET Blood Tubes** for the first time.

All technical literature is available online at [www.mn-net.com](http://www.mn-net.com).

### 1.2 Consumables and Equipment to be supplied by the user

- Personal protection equipment (e.g., lab coat, gloves, goggles)
- Cannulas and disinfectant

## 2 Product description

### 2.1 The basic principle

The NucleoProtect® VET Blood Tube is intended for the collection of venous whole blood from animals, inactivate viral pathogens and preserve viral nucleic acids (DNA and RNA) by denaturing nucleases. The ready-to-use system allows for the preservation and save transport of veterinary whole blood samples from the sample collection site to the analyzing laboratory.

The NucleoProtect® VET Blood Tubes allow the safe collection and transport of whole blood specimen from animals and subsequent viral nucleic acid (RNA/DNA) extraction for use in downstream analyses such as (RT)-PCR or q(RT)-PCR.

### 2.2 Product specification

The NucleoProtect® VET Blood Tube is prefilled with 4.0 mL of the NucleoProtect® VET stabilization and inactivation reagent. The NucleoProtect® VET Blood Tube collects 1.6 mL of animal whole blood. The NucleoProtect® VET Blood Tube is compatible with all standard Luer cannulas. The product is not intended for human use.

### Inactivation of viruses

Besides whole blood, the inactivating of high risk viruses was tested in different other background matrices (see table below) using the Tissue Culture Infectious Dose (TCID) assay. Viruses were spiked into the different matrices with titers between  $10^6$  and  $10^7$  virus particles per mL and incubated for 30 minutes in the NucleoProtect® VET reagent. Samples were diluted to prevent toxic effects of the NucleoProtect® VET reagent on cell culture cells and virus specific cell culture cells were infected with the treated viruses. Culture cells were subsequently incubated several days and analyzed for cytopathic effects (CPE). An aliquot of each cell culture supernatant was then passaged to a fresh cell culture. In case of a lack of viral growth in both cell culture infection assays the viruses were considered as completely inactivated. The titer reduction was calculated from the starting titer and the dilution factor.

The level of virus titer reduction is shown in the table below (data kindly provided by the Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health of Germany).

Virus	Background Matrix	Reduction of virus titer
Foot-and-mouth disease virus (FMDV)	Bovine tongue epithelium Whole blood Raw milk Saliva	> $10^4$ (corresponds to an inactivation capacity of > 99,99 %)
Bluetongue virus (BTV-5)		
Peste des petits ruminants virus (PPRV)		
Lumpy skin disease virus (LSDV)	Saliva	
Bovine Coronavirus (BCoV)		

The inactivation capacity of the NucleoProtect VET reagent has been demonstrated for various background matrices and viruses known to have different envelope structures as well as susceptibilities to disinfectants: FMDV (small non-enveloped virus), BTV-5 (large non-enveloped virus), LSDV (large enveloped virus), PPRV and BCoV (enveloped virus).

Claims for inactivation of other viruses or background matrices cannot be made. Samples must be incubated for at least 30 min for complete inactivation.

### Sample stability

The stabilization capability of the NucleoProtect® VET reagent was tested with all naturally occurring viral genome structures: ss (+/-)RNA, dsRNA and dsDNA. In particular, the following viruses were tested:

Virus	Genome structure
Foot-and-mouth disease virus (FMDV) Porcine enterovirus (PEV) Bovine viral diarrhea virus (BVDV)	ss(+)RNA
Peste des petits ruminants virus (PPRV) Canine distemper virus (CDV)	ss(-)RNA
Bluetongue virus (BTV serotypes 5 and 8)	dsRNA
Lumpy skin disease virus (LSDV) Vaccinia virus (VV) Bovine herpes Virus (BoHV)	dsDNA

Stabilization of viral RNA and DNA was tested with spiked blood samples using virus specific q(RT)-PCR assays. NucleoProtect® VET Blood Tube samples can be stored and shipped at the following conditions without sensitivity loss\*:

Storage condition	Storage time*
15 – 25 °C	7 days
4 °C	7 days
37 °C	2 days
-20 °C	30 days

\* the specified storage time indicates how long the samples can be stored at the specified condition with a change in Cq-value of < 1 on average, as demonstrated in q(RT)-PCR analyses comparing stored samples to the time point of collection.

The NucleoProtect® VET Blood Tubes are not intended for preserving morphology or viability of microorganisms. Due to the lytic and denaturing activity of the inactivation and stabilization reagent, samples collected with NucleoProtect® VET are not suited for serological testing.

### 2.3 Product handling

The NucleoProtect® VET Blood Tube is intended for single blood collection only. The NucleoProtect® VET Blood tube's aspiration technology always builds up a fresh vacuum through a simple piston movement, thus enabling gentle blood sampling.

The NucleoProtect® VET Blood Tube is ready for use. No further preparation is necessary before use.

The NucleoProtect® VET stabilization and inactivation reagent appears colorless and clear. Do not use NucleoProtect® VET Blood Tubes if the solution appears discolored or contains precipitates. Do not use if foreign matter is observed within the blood collection tube.

Do not use if the product or packaging are damaged or if there is evidence of leakage.

The NucleoProtect® VET Blood Tube is intended for professional use only. Follow veterinarian and laboratory's standard procedures for collecting blood from animals and apply appropriate safety procedures when collecting blood.

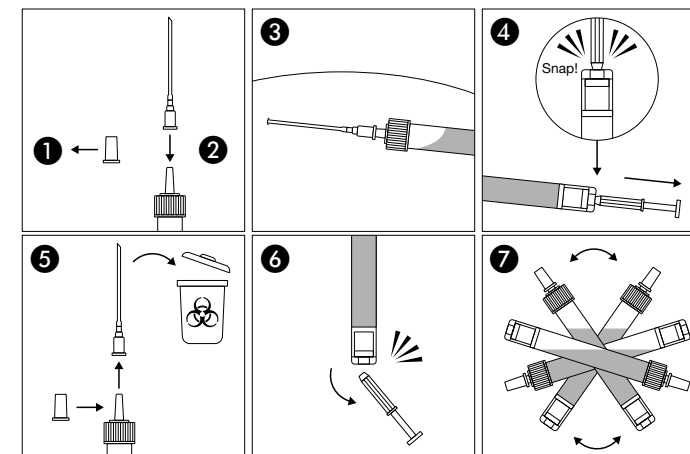
### Blood collection procedure

- Remove the protective cap from the NucleoProtect® VET Blood Tube by gently pulling and twisting it (1).
- Place a commercial standard Luer cannula on the Luer cone and remove the protective cap of the cannula (2).
- Puncture the vein and pull the piston rod carefully until the piston is fixed in the detent. Hold the tube below the puncture site during the blood collection (3/4).
- Wait a few seconds until the residual vacuum is balanced and the blood flow stops completely.
- After blood sampling, remove the NucleoProtect® VET Blood tube together with the cannula from the vein.
- Remove the cannula from the NucleoProtect® VET Blood tube and dispose the cannula in a designated container (5).
- Place the protective cap back on the NucleoProtect® VET Blood collection tube and close tightly (5).
- Break off the piston (6).

IX. Gently invert the blood sample at least five times to ensure thoroughly mixing of the animal's blood with the NucleoProtect® VET reagent (7).

X. Store and / or prepare sample for transport.

*Note: In rare cases, small amounts of liquid can leak through the sealing septum and accumulate in the Luer cone of the NucleoProtect® VET Blood collection tube after removing the cap. As a precautionary measure, a gentle shaking motion can remove this liquid before attaching the cannula. Make sure, that the reagent does not come into contact with animal or human skin or eye. Do not use the NucleoProtect® VET blood collection tube if the liquid accumulation protrudes beyond the Luer cone outlet or if you observe a liquid accumulation on the cannula tip after it has been placed on the blood collection tube.*



## 3 Product storage conditions

Store NucleoProtect® VET Blood Tubes at ambient temperatures (15 – 25 °C).

The product can be used until the expiry date printed on the label.

## 4 Safety instructions

Always wear suitable protective clothing (e.g., protective clothes, gloves, and goggles) when working with the NucleoProtect® VET reagent or when working with potentially infectious biological material.

Follow veterinary and laboratory standard procedures for collecting blood from animals and apply appropriate safety measures when collecting blood.

For more information consult the appropriate Material Safety Data Sheets (MSDS available online at [www.mn-net.com/msds](http://www.mn-net.com/msds)).



Caution: Avoid mixing the NucleoProtect® VET reagent with sodium hypochlorite (bleach) or other strong acids and bases. The mixtures could form highly reactive compound when combined with bleach!

The NucleoProtect® VET reagent contains chemical additives. Prevent contact with the animal.

Remove spilled NucleoProtect® VET reagent with an excess of water.

## 5 Nucleic acid extraction

The NucleoProtect® VET Blood Tube is compatible with the MACHERY-NAGEL NucleoSpin® VET kit (silica membrane single spin kit; REF 740842.10 / .50 / .250) and the NucleoMag® VET kit (magnetic bead based kit; REF 744200.1 / .4) nucleic acid extraction systems.

The NucleoProtect® VET Blood Tube is also compatible with other common commercial nucleic acid extraction solutions. The user is responsible for validating additional nucleic acid extraction and methodologies and compability with downstream veterinary diagnostic assays.

Always interpret molecular diagnostic results in conjunction with other clinical or laboratory findings!

### Nucleic acid extraction using the NucleoMag® VET\* kit (see ordering information below):

For detailed description of the nucleic acid extraction procedure from NucleoProtect® VET-stabilized samples using the NucleoMag® VET kit, please refer to the user manual.

Download user manual NucleoMag® VET\*:



[www.mn-net.com/NucleoMagVETmanual](http://www.mn-net.com/NucleoMagVETmanual)

Carefully read the user manual of the NucleoMag® VET kit before starting the nucleic acid extraction procedure.

For the processing of blood collected with the NucleoProtect® VET Blood Tube using the NucleoMag® VET kit, additional buffer VIA is needed (REF 744206, see ordering information).

Non-stabilized and NucleoProtect® VET-stabilized samples can be processed in parallel. For detailed description, please refer to the user manual.

**\*The NucleoMag® VET extraction kit has been automated on a wide variety of open liquid-handling or magnetic-rod platforms. Please contact MACHERY-NAGEL for technical automation support and verified methodologies: tech-bio@mn-net.com | +49 24 21 969-270**

### Nucleic acid extraction using the NucleoSpin® VET kit (see ordering information below):

For detailed description of the nucleic acid extraction procedure from NucleoProtect® VET-stabilized samples using the NucleoSpin® VET kit, please refer to the user manual.

Download user manual NucleoSpin® VET:



[www.mn-net.com/NucleoSpinVETmanual](http://www.mn-net.com/NucleoSpinVETmanual)

Carefully read the user manual of the NucleoSpin® VET kit before starting the nucleic acid extraction procedure.

For the processing of NucleoProtect® VET-stabilized samples using the NucleoSpin® VET kit, additional buffer PFN is needed (REF 740121.5, see ordering information).

Non-stabilized and NucleoProtect® VET-stabilized samples can be processed in parallel. For detailed description, please refer to the user manual.

## 6 Disposal

Always dispose hazardous, infectious or biologically contaminated materials in a safe and acceptable manner and in accordance with all local and regulatory requirements.

Discard blood collection sharps like cannulas in biohazard containers approved for their disposal. Please follow local waste regulations.

## 7 Contact information

For more detailed product use restriction / warranty please visit: [www.mn-net.com](http://www.mn-net.com)

Please contact our technical support for any product related inquiries:

MACHERY-NAGEL Germany Tel.:  
+49 (0) 24 21 969-270  
e-mail: tech-bio@mn-net.com

## 8 Ordering information

Product	Description	Pack of	REF
NucleoProtect® VET Blood Tube	Blood collection tube prefilled with 4.0 mL NucleoProtect® Vet stabilization and inactivation reagent, box of 50, compatible with standard Luer cannulas.	50	740755
Secondary caps for NucleoProtect® VET Blood Tubes	Sealing caps for NucleoProtect® VET Blood Tubes	100	740756
<b>Accessory / related products</b>			
NucleoProtect® VET Swab Tube	Screw cap swab collection tube prefilled with 1.5 mL NucleoProtect® VET stabilization and inactivation reagent including swabs	50	740760
Secondary caps for NucleoProtect® VET Swab Tubes	Sealing caps for NucleoProtect® VET Swab Tubes	100	740761
NucleoProtect® VET stabilization and inactivation reagent	NucleoProtect® VET stabilization and inactivation reagent for filling into own transport or storage vessels	50 / 500 mL	740750.50 / .500
NucleoMag® VET	Magnetic bead based kit for extraction of RNA and DNA from veterinary samples, containing NucleoMag® B-Beads, buffers, Carrier RNA, Proteinase K	1 × 96 / 4 × 96	744200.1 / .4
Buffer VIA	Needed for the nucleic acid extraction from NucleoProtect® VET collected blood samples using the NucleoMag® VET kit	150 mL	744206
NucleoSpin® VET	Single spin kit for extraction of RNA and DNA from veterinary samples, containing binding columns, collection Tubes (2 mL), collection tubes for lysis and elution (1.5 mL), buffers, liquid Proteinase K, Carrier RNA (lyophilized)	10 / 50 / 250	740842.10 / .50 / .250
Buffer PFN	Needed for the nucleic acid extraction from NucleoProtect® VET collected samples using the NucleoSpin® VET kit	5 mL	740121.5

Visit [www.mn-net.com](http://www.mn-net.com) for more detailed product information or contact our technical support (tech-bio@mn-net.com)

## 9 Product use restriction / warranty

All MACHERY-NAGEL products are designed for their intended use only. They are not intended to be used for any other purpose. The description of the intended use of the products can be found in the original MACHERY-NAGEL product leaflets. Before using our products, please observe the instructions for use and the safety instructions from the respective Material Safety Data Sheet of the product.

This MACHERY-NAGEL product is carrying documentation stating specifications and other technical information. MACHERY-NAGEL warrants to meet the stated specifications. The provided warranty is limited to the data specifications and descriptions as given in the original MACHERY-NAGEL literature. No other statements or representations, written or oral, by MACHERY-NAGELS employees, agents or representatives, except written statements signed by a duly authorized officer of MACHERY-NAGEL are authorized. They should not be relied upon by the customer and are not a part of a contract of sale or of this warranty.

Liability for all possible damages that occur in any connection with our products is limited to the utmost minimum as stated in the general business terms and conditions of MACHERY-NAGEL in their latest edition which can be taken from the company's website. MACHERY-NAGEL does not assume any further warranty.

Products and their application are subject to change. Therefore, please contact our Technical Service Team for the latest information on MACHERY-NAGEL products. You may also contact your local distributor for general scientific information. Descriptions in MACHERY-NAGEL literature are provided for informational purposes only.

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