



## NATtrol™ MRSA Positive Control Part Number: NATMRSA-6MC-IVD

### INTENDED USE:

The NATtrol™ Methicillin-Resistant *Staphylococcus aureus* (MRSA) Positive Control is an unassayed *in vitro* diagnostic external run control intended to be used with qualitative molecular assays for detection of nucleic acids from this organism. The control is intended to be used as an aid to diagnosis in that it is used to verify performance of the assays used to detect a physiological or pathological state. The routine and repetitive use of external run controls enables laboratories to monitor daily test variation, lot-to-lot test kit performance, individual operator variation, and can provide assistance in identifying increases in random or systemic errors. NATtrol™ MRSA Positive Control contains intact organisms and should be run in a manner identical to that used for clinical specimens. This qualitative control is not automated and does not have an assigned value and it is the responsibility of the end user to establish their own target specifications for the control using their laboratory's molecular procedures.

### PRODUCT SUMMARY AND EXPLANATION:

NATtrol™ MRSA Positive Control is formulated with purified, intact MRSA bacterium that have been chemically modified to render them non-infectious and refrigerator stable\*.

Each NATtrol™ MRSA Positive Control contains 6 x 0.5 mL vials of NATtrol™ MRSA formulated in a Purified Protein Matrix.

\*Pat.: <http://www.zeptometrix.com/patent-information/>

### PRINCIPLE:

The NATtrol™ MRSA Positive Control contains MRSA cells inactivated by ZeptoMetrix's patented NATtrol™ process formulated in a proprietary purified protein matrix that mimics the composition of a true clinical specimen. These are full process controls designed to monitor the effectiveness of extraction, amplification, and detection in nucleic acid testing procedures. These controls are suitable for use in in-house molecular assays and commercially available platforms.

### WARNINGS AND PRECAUTIONS:

Although NATtrol™ MRSA Positive Control contains inactivated microorganisms, handling and disposal should be conducted as if materials are potentially infectious.

This control contains material of human and animal origin and the user should observe Universal Precautions when handling and disposing of this product. Disposal must follow local regulations, if more stringent than regulations enforced by the CDC or the FDA.

Do not pipette by mouth.

To avoid cross-contamination, use separate transfer pipettes or tips for all materials.

Do not use beyond the expiration date shown on the label.

Usage beyond the expiration date shown on the label or after storage outside the recommended temperature may be detrimental to product performance or stability and lead to invalid or erroneous results.

If product is received damaged or leaking, contact ZeptoMetrix for instructions.

Changes in physical appearance of the product such as excessive turbidity, presence of precipitates, or discoloration may indicate degradation or contamination of the product. Discard the vial.

Failure to follow the assay or kit manufacturer's instructions explicitly for testing and analysis of results may lead to invalid or erroneous results.

If the expected result is not obtained, contact ZeptoMetrix for instructions.

### NOT FOR USE IN HUMANS:

These products are NOT intended for use in the manufacture or processing of injectable products subject to licensure under section 351 of the Public Health Service Act or for any other product intended for administration to humans.

### RECOMMENDED STORAGE:

NATtrol™ MRSA Positive Control should be stored at 2-8°C upon arrival.

When stored as directed, controls are suitable for use for up to 56 days (8 weeks) once opened.

### INSTRUCTIONS FOR USE:

Vortex NATtrol™ MRSA Positive Control vials for 10 seconds to mix.

Follow the assay or kit manufacturer's instructions for use as a clinical sample.

Any serious incident that has occurred in relation to the device shall be reported to ZeptoMetrix and the competent authority of the Member State in which the user and/or the patient is established.

### LIMITATIONS:

NATtrol™ MRSA Positive Control is USA FDA Class 1 exempt, unassayed, external run controls intended for *in vitro* diagnostic use and are for professional use only.

NATtrol™ MRSA Positive Control is not intended for use as a substitute for the internal controls provided by *in vitro* diagnostic kit manufacturers.

NATtrol™ MRSA Positive Control is not intended for use as a primary reference standard or material for any assay or testing procedure.

Quality control materials should be used in accordance with local, state, federal and accreditation requirements.

### EXPECTED RESULTS:

Qualitative results are shown in Table 1 below. This is provided for informational purposes only.

As stated in the intended use, this product does not have an assigned value. Each laboratory must evaluate each lot of controls and establish acceptance criteria with their own specific molecular assay procedure and according to their own established quality assurance requirements and guidelines.

Product homogeneity has been demonstrated by validation studies and quality control testing.

Table 1:

Part Number	Organism/ Strain	Expected Results
NATMRSA-6MC-IVD	<i>Staphylococcus aureus</i> (MRSA Strain; C1598)	MRSA Detected



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**Analytical Performance Characteristics:**

Precision testing was performed in replicates of four per the final release assay in the QC SOP. Precision testing was performed on five different days for each of the three validation lots resulting in testing over 15 days. The testing was performed by three different technicians on two different instruments. The acceptance criteria for all precision testing were a positive result for each target (SPA, Mec, SCC) from each run and a %CV of ≤5%.

Intra-assay repeatability was measured by comparing the results of each day of testing for all three validation lots (Table 1). Inter-assay reproducibility was measured by analyzing the results of testing of each validation lot across the five different days (Table 2), each technician (Table 3), and each instrument (Table 4).

Accuracy/Assay System Comparison testing was conducted on six lots (Table 5). The final release QC testing data was generated on Cepheid® GeneXpert® (Assay System/Platform 1 and 2) using the Xpert® MRSA/SA Blood Culture Assay. Additional assays were performed on the BioFire FilmArray with the BioFire Blood Culture Identification (BCID) Panels (Assay System/Platform 3) and on the Luminex ARIES® MRSA Assay (Assay System/Platform 4). The data was from all three lots tested was analyzed on each platform. The acceptance criteria for all accuracy testing were a result of detected for each validation lot on all three assay systems/platforms.

For all data analyses, all acceptance criteria were met. MRSA was detected and the %CV values were ≤5%. The control produces repeatable and reproducible results which are independent of the operator and instrument. All accuracy data was positive, for a 100% detection rate. The control produces accurate results when tested using three different assay systems/platforms.

**Table 1 – Intra-Assay Repeatability**

Validation Lot	Day	Mean (Ct) of Staphylococcal protein A (SPA)	SPA Repeatability		Mean (Ct) of Methicillin resistance (mec)	Mec Repeatability		Mean (Ct) of Staphylococcal cassette chromosome mec (SCC)	SCC Repeatability	
			SD	CV (%)		SD	CV (%)		SD	CV (%)
2	1	25.7	0.3	1.0	26.7	0.2	0.6	27.7	0.1	0.5
	2	26.0	0.5	1.9	27.0	0.2	1.7	28.0	0.5	1.7
	3	25.9	0.4	1.7	26.9	0.4	1.6	27.9	0.5	1.7
	4	26.6	0.4	1.6	27.5	0.5	1.7	28.5	0.4	1.4
	5	26.2	0.2	0.1	27.3	0.2	0.9	28.2	0.1	0.5
3	1	26.0	0.3	1.2	26.9	0.3	1.2	27.8	0.3	1.0
	2	26.2	0.3	1.0	27.1	0.3	1.1	28.1	0.2	0.9
	3	26.1	0.5	1.9	27.1	0.4	1.4	28.1	0.4	1.6
	4	26.1	0.4	1.5	27.2	0.5	1.8	28.1	0.5	1.6
	5	26.3	0.1	0.5	27.3	0.1	0.5	28.2	0.1	0.4
4	1	25.6	0.7	2.6	26.3	0.5	1.9	27.5	0.6	2.2
	2	25.8	0.9	3.5	26.4	0.8	3.1	27.7	0.9	3.2
	3	25.6	0.4	1.6	26.2	0.4	1.4	27.4	0.4	1.3
	4	25.3	0.4	1.7	26.0	0.4	1.4	27.2	0.4	1.4
	5	25.4	0.5	1.8	26.1	0.3	1.1	27.3	0.4	1.3

**Table 2 - Inter-Assay Precision - By Validation Lot**

Validation Lot	Member	SPA Mean (Ct)	SPA Std Dev (Ct)	SPA %CV	mec Mean (Ct)	mec Std Dev (Ct)	mec %CV	SCC Mean (Ct)	SCC Std Dev (Ct)	SCC %CV
2	MRSA Positive Control	26.1	0.4	1.7%	27.1	0.4	1.6%	28.1	0.4	1.5%
3	MRSA Positive Control	26.1	0.3	1.2%	27.1	0.3	1.2%	28.1	0.3	1.2%
4	MRSA Positive Control	25.5	0.6	2.2%	26.2	0.5	1.8%	27.4	0.5	1.9%

**Table 3 - Inter-Assay Precision - By User**

User (number of tests)	Instrument	SPA Mean (Ct)	SPA Std Dev (Ct)	SPA %CV	mec Mean (Ct)	mec Std Dev (Ct)	mec %CV	SCC Mean (Ct)	SCC Std Dev (Ct)	SCC %CV
BC (n=40)	Inst. 1	26.1	0.4	1.5%	27.1	0.4	1.4%	28.1	0.4	1.3%
EL (n=12)	Inst. 2	25.6	0.6	2.5%	26.3	0.5	2.1%	27.5	0.6	2.2%
DB (n=8)	Inst. 1	25.4	0.4	1.6%	26.1	0.3	1.2%	27.2	0.3	1.3%

**Table 4 - Inter-Assay Precision - By Instrument**

Instrument	Number of tests	SPA Mean (Ct)	SPA Std Dev (Ct)	SPA %CV	mec Mean (Ct)	mec Std Dev (Ct)	mec %CV	SCC Mean (Ct)	SCC Std Dev (Ct)	SCC %CV
Inst. 1	n=48	26.0	0.5	1.8%	26.9	0.5	2.0%	27.9	0.5	1.7%
Inst. 2	n=12	25.6	0.6	2.5%	26.3	0.5	2.1%	27.5	0.6	2.2%

**Table 5 – Accuracy/Assay System Comparison**

Validation Lot	Assay System/Platform 1 +2 SPA, mec, and SCC Results (Final Release n=4)	Assay System/Platform 3 Staph. aureus and mec Results n=1	Production Lot	Assay System/Platform 4 mecA/mecC, SCC mec, orfX Results n=4
Lot 2	Detected, 100%	Detected, 100%	Lot 5	Detected, 100%
Lot 3	Detected, 100%	Detected, 100%	Lot 6	Detected, 100%
Lot 4	Detected, 100%	Detected, 100%	Lot 7	Detected, 100%



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**ETIOLOGIC STATUS/BIOHAZARD TESTING:**

NATtrol™ inactivation was completed on the stocks used to formulate each control and further verified by the absence of bacterial growth in a validated growth protocol.

The Purified Protein Matrix used in the manufacture of this product is treated with 0.09% sodium azide. It was manufactured from materials that have been tested and found non-reactive at the donor level for HIV-1/HIV-2 Antibody, HBsAg and HCV Antibody by FDA licensed donor screening test methods. All materials are also tested for HIV-1 and HCV by FDA approved Nucleic Acid Test (NAT) methods. Heat inactivated bovine based source materials used in the manufacture of this product meet applicable USDA requirements for abattoir sourced animals, traceability and country of origin. The materials were collected at USDA licensed establishments or legally imported from countries recognized by the USDA as negligible or controlled for risk for Bovine Spongiform Encephalopathy (BSE) and other exotic disease agents. Donor animals were inspected ante and post mortem at the abattoir as required by the USDA.

**PRODUCT WARRANTY:**

ZeptoMetrix LLC's limited product warranty and other terms and conditions related to the purchase and use of ZeptoMetrix products are set forth in ZeptoMetrix's Terms and Conditions of sale found on ZeptoMetrix's website at [Sales Terms and Conditions](#). If you have any questions, please contact ZeptoMetrix Customer Service at [diagnostic.cs@zeptometrix.com](mailto:diagnostic.cs@zeptometrix.com).

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**LEGEND OF LABELING SYMBOLS:**

	Manufacturer		Temperature Limitation
	<i>In vitro</i> Diagnostic Use		Use-By Date
	European Mark of Conformity		Biological Risk
	Catalogue Number		Authorized Representative
	Batch Code		Consult Instructions for Use
	Contains biological material of animal origin		Contains biological material of human origin
	Unique Device Identifier		UKCA Mark of Conformity

Manufacturer:  
 ZeptoMetrix LLC  
 25 Kenwood Circle  
 Franklin, MA 02038, USA

EC Representative:



**EMERGO EUROPE**  
 Westervoortsedijk 60  
 6827 AT, Arnhem  
 The Netherlands

UK Responsible Person:  
**Emergo Consulting (UK) Limited**  
 c/o Cr360 – UL International,  
 Compass House, Vision Park Histon,  
 Cambridge CB24 9BZ, United Kingdom

**REVISION HISTORY.**

Revision Level	Description of Revisions
06	Added additional statement to warning concerning usage beyond the expiration date shown on the label or after storage outside the recommended temperature, changes in physical appearance of the product, failure to follow the assay or kit manufacturer's instructions explicitly, and if the expected result is not obtained action. Added "NATtrol™ MRSA Positive Control is not intended for use as a primary reference standard or material for any assay or testing procedure." to Limitations. Added "Any serious incident that has occurred in relation to the device shall be reported to ZeptoMetrix and the competent authority of the Member State in which the user and/or the patient is established." to Instructions for Use. Added verbiage to Intended Use to indicate it is a qualitative control that is not automated. The fundamental Intended Use has not changed. Added Revision History section. Changes in response to BSI Technical File review for IVDR compliance. Added biological and UDI symbols. Updated EC Representative Emergo Europe address to new location. Added UK Responsible Person contact details.
07	Added UKCA Mark of Conformity. Added in a section, text, and data describing the analytical performance characteristics.
08	Adding CE2797 Mark of Conformity per DC-24-004.