

# Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Mast Group Ltd  
Mast House, Derby Road  
Bootle  
Liverpool  
L20 1EA  
United Kingdom

Holds Certificate Number:

FM 724380

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

**Design, manufacture and supply of in-vitro diagnostic devices and associated services.**

For and on behalf of BSI:

\_\_\_\_\_  
Matt Page, Managing Director Assurance - UK & Ireland

Original Registration Date: 1994-06-14

Latest Revision Date: 2021-12-03

Effective Date: 2021-11-11

Expiry Date: 2024-05-31

Page: 1 of 2



...making excellence a habit.™

Certificate No: FM 724380

Location	Registered Activities
Mast Group Ltd Mast House, Derby Road Bootle Liverpool L20 1EA United Kingdom	Design, manufacture and supply of in-vitro diagnostic devices and associated services.
Mast Group Ltd Atlantic House, Derby Road Bootle Liverpool L20 1EA United Kingdom	Manufacturing, QC and warehousing of IVD kits and reagents, bacteriological media and other kits and reagents for the life sciences industry.



Original Registration Date: 1994-06-14

Latest Revision Date: 2021-12-03

Effective Date: 2021-11-11

Expiry Date: 2024-05-31

# Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 13485:2016 & EN ISO 13485:2016

This is to certify that:

Mast Group Ltd  
Mast House, Derby Road  
Bootle  
Liverpool  
L20 1EA  
United Kingdom

Holds Certificate Number:

**MD 724379**

and operates a Quality Management System which complies with the requirements of ISO 13485:2016 & EN ISO 13485:2016 for the following scope:

Design, manufacture and supply of in-vitro diagnostic devices for clinical microbiology and molecular biology and bacteriological media.

For and on behalf of BSI:

Gary E Slack, Senior Vice President - Medical Devices

Original Registration Date: 2020-10-07

Latest Revision Date: 2021-11-28

Effective Date: 2021-06-01

Expiry Date: 2024-05-31



Page: 1 of 2

...making excellence a habit.™

Certificate No: **MD 724379**

Location	Registered Activities
Mast Group Ltd Mast House, Derby Road Bootle Liverpool L20 1EA United Kingdom	Design, manufacture and supply of in-vitro diagnostic devices for clinical microbiology and molecular biology and bacteriological media
Mast Group Ltd Atlantic House, Derby Road Bootle Liverpool L20 1EA United Kingdom	Manufacture of IVD kits and reagents for clinical microbiology and molecular biology, bacteriological media.



Original Registration Date: 2020-10-07

Latest Revision Date: 2021-11-28

Effective Date: 2021-06-01

Expiry Date: 2024-05-31

Page: 2 of 2

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.  
An electronic certificate can be authenticated [online](#).  
Printed copies can be validated at [www.bsigroup.com/ClientDirectory](http://www.bsigroup.com/ClientDirectory)

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000  
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A Member of the BSI Group of Companies.



Mast Group Ltd.  
 Mast House  
 Derby Road  
 Bootle  
 Merseyside L20 1EA  
 United Kingdom  
 Tel. +44 (0)151 933 7277  
 Fax +44 (0)151 944 1332  
 www.mastgrp.com

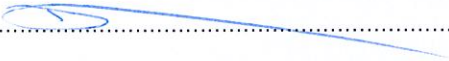
## EC DECLARATION OF CONFORMITY

We hereby declare that the devices described below comply with those provisions which apply to them of the European Directive 98/79/EC on *in vitro* diagnostic medical devices, as set out in UK Statutory Instrument 2002 No. 618 "The Medical Device Regulations."

This declaration is valid for the IVD medical devices described below which are placed on the market by ourselves on or after the date hereof and which bear the CE mark. It is also valid for all the IVD medical devices described below which are manufactured by us and placed on the market on or after the date hereof by third parties with our consent and which bear the CE mark. All supporting documents relating to this declaration are retained at the manufacturer's premises.

Product code	Product description	IVD Directive classification	EDMS code
Various (M-----)	<b>MAST ASSURE™ Salmonella Antisera</b> – for serological identification and epidemiological typing with polyvalent and monovalent O (somatic) and H (flagellar) typing antisera.	Self certification Annex III excluding section 6	1501000000 (code registered - 24/03/2003)

Standards applied: EN ISO 13485:2012, ISO 9001:2008, EN ISO 14971:2012, EN ISO 18113-1:2011, EN ISO 18113-2:2011, EN ISO 15223-1:2012, EN ISO 15223-2:2010.

Declaration made by  Date: 4 January 2017

D N Hogben, Quality Assurance and Regulatory Affairs Manager – Mast Group Ltd.

Document valid till: 31 December 2020



**Product Names:  
MAST ASSURE™ Salmonella Antisera - for Serological identification and epidemiological typing of bacteria**

Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
1	M10308	2ml	MAST ASSURE Salmonella O - POLY O Factor O2, O4, O7, O8, O9, O9, 46, O3, 10, O1, 3, 19	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
2	M10309	2ml	MAST ASSURE Salmonella O - POLY O1 Factor O11, O13, O6, 14, O16, O18, O21, O35	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
3	M14294	2ml	MAST ASSURE Salmonella O - POLY O A-G	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
4	M14300	2ml	MAST ASSURE Salmonella O - POLY O A-S	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
5	M92537	2ml	MAST ASSURE Salmonella O - Omnivalent (Kauffmann-White group A-067)	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
6	M14317	2ml	MAST ASSURE Salmonella H - POLYVALENT PHASE 1&2 (a-z29)	Liquid stable polyvalent antiserum for the determination of H antigens for the serological identification of salmonellae by slide agglutination.
7	M10339	2ml	MAST ASSURE Salmonella H - POLYVALENT PHASE 2 (H-1)	Liquid stable polyvalent antiserum for the determination of H antigens for the serological identification of salmonellae by slide agglutination.
8	M14324	2ml	MAST ASSURE Salmonella H - RAPID DIAGNOSTIC 1 Factors b, d, E, r	Liquid stable polyvalent antiserum for the determination of H antigens for the serological identification of salmonellae by slide agglutination.
9	M14331	2ml	MAST ASSURE Salmonella H - RAPID DIAGNOSTIC 2 Factors b, E, k, l	Liquid stable polyvalent antiserum for the determination of H antigens for the serological identification of salmonellae by slide agglutination.
10	M14348	2ml	MAST ASSURE Salmonella H - RAPID DIAGNOSTIC 3 Factors d, E, G, k	Liquid stable polyvalent antiserum for the determination of H antigens for the serological identification of salmonellae by slide agglutination.



Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
11	M10310	2ml	MAST ASSURE Salmonella O - Mono Factor O2	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
12	M10311	2ml	MAST ASSURE Salmonella O - Mono Factor O4	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
13	M10312	2ml	MAST ASSURE Salmonella O - Mono Factor O7	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
14	M10313	2ml	MAST ASSURE Salmonella O - Mono Factor O8	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
15	M10314	2ml	MAST ASSURE Salmonella O - Mono Factor O9	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
16	M10315	2ml	MAST ASSURE Salmonella O - Mono Factor O9.46	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
17	M10316	2ml	MAST ASSURE Salmonella O - Mono Factor O3,10	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
18	M10318	2ml	MAST ASSURE Salmonella O - Mono Factor O1,3,19	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
19	M10319	2ml	MAST ASSURE Salmonella O - Mono Factor O11	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
20	M10320	2ml	MAST ASSURE Salmonella O - Mono Factor O13	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
21	M10321	2ml	MAST ASSURE Salmonella O - Mono Factor O6,14	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
22	M10322	2ml	MAST ASSURE Salmonella O - Mono Factor O16	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
23	M10323	2ml	MAST ASSURE Salmonella O - Mono Factor O18	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
24	M10324	2ml	MAST ASSURE Salmonella O - Mono Factor O21	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
25	M10325	2ml	MAST ASSURE Salmonella O - Mono Factor O35	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
26	M10326	2ml	MAST ASSURE Salmonella O - Mono Factor Vi	Liquid stable antiserum for the determination of Vi antigens for the serological identification of salmonellae by slide agglutination.



Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
27	M10327	2ml	MAST ASSURE Salmonella H - Mono Factor a	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
28	M10328	2ml	MAST ASSURE Salmonella H - Mono Factor b	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
29	M10329	2ml	MAST ASSURE Salmonella H - Mono Factor c	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
30	M10330	2ml	MAST ASSURE Salmonella H - Mono Factor d	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
31	M10331	2ml	MAST ASSURE Salmonella H - Mono Factor e, h	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
32	M14335	2ml	MAST ASSURE Salmonella H - Mono Factor E	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
33	M10332	2ml	MAST ASSURE Salmonella H - Mono Factor G	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
34	M10333	2ml	MAST ASSURE Salmonella H - Mono Factor i	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
35	M10334	2ml	MAST ASSURE Salmonella H - Mono Factor k	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
36	M10336	2ml	MAST ASSURE Salmonella H - Mono Factor r	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
37	M10344	2ml	MAST ASSURE Salmonella H - Mono Factor 2	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
38	M10345	2ml	MAST ASSURE Salmonella H - Mono Factor 5	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
39	M10346	2ml	MAST ASSURE Salmonella H - Mono Factor 6	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
40	M10364	2ml	MAST ASSURE Salmonella H - Mono Factor f	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
41	M10365	2ml	MAST ASSURE Salmonella H - Mono Factor m	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
42	M10366	2ml	MAST ASSURE Salmonella H - Mono Factor p	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.





Serial No.	Product code	Pack Size	Brand/Trade Name	Intended Purpose of the Medical Device Type
43	M10367	2ml	MAST ASSURE Salmonella H - Mono Factor q	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
44	M10368	2ml	MAST ASSURE Salmonella H - Mono Factor s	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
45	M10369	2ml	MAST ASSURE Salmonella H - Mono Factor t	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
46	M10376	2ml	MAST ASSURE Salmonella H - Mono Factor x	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
47	M10335	2ml	MAST ASSURE Salmonella H - Mono Factor L	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
48	M10337	2ml	MAST ASSURE Salmonella H - Mono Factor y	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
49	M10338	2ml	MAST ASSURE Salmonella H - Mono Factor e,n	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
50	M10340	2ml	MAST ASSURE Salmonella H - Mono Factor v	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
51	M10341	2ml	MAST ASSURE Salmonella H - Mono Factor w	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
52	M10342	2ml	MAST ASSURE Salmonella H - Mono Factor z13	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
53	M10343	2ml	MAST ASSURE Salmonella H - Mono Factor z28	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
54	M10347	2ml	MAST ASSURE Salmonella H - Mono Factor 7	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
55	M10348	2ml	MAST ASSURE Salmonella H - Mono Factor z6	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
56	M10370	2ml	MAST ASSURE Salmonella H - Mono Factor u	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
57	M10372	2ml	MAST ASSURE Salmonella H - Mono Factor z23	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
58	M10373	2ml	MAST ASSURE Salmonella H - Mono Factor z24	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.



Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
59	M10377	2ml	MAST ASSURE Salmonella H - Mono Factor z15	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
60	M10374	2ml	MAST ASSURE Salmonella H - Mono Factor z32	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
61	M10378	2ml	MAST ASSURE Salmonella H - Mono Factor z	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
62	M10379	2ml	MAST ASSURE Salmonella H - Mono Factor z4	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
63	M10380	2ml	MAST ASSURE Salmonella H - Mono Factor z10	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
64	M10381	2ml	MAST ASSURE Salmonella H - Mono Factor z29	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.

Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
65	M10303	18x 2ml	MAST ASSURE Salmonella Antiserum Set 1. This set consists of 17 O-grouping and Vi sera	Liquid stable antiserum for the determination of O antigens for the serological identification of salmonellae by slide agglutination.
66	M10304	17x 5ml	MAST ASSURE Salmonella Antiserum Set 2. This set consists of 17 H antisera	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
67	M10386	4x 5ml	MAST ASSURE Salmonella Antiserum Set 3. This set consists of four H-L Monovalent sera.	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
62	M10387	5x 5ml	MAST ASSURE Salmonella Antiserum Set 4. This set consists of five H-1 Monovalent sera 2, 5, 6, 7 & z6.	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
69	M10388	7x 5ml	MAST ASSURE Salmonella Antiserum Set 5. This set consists of seven H-G Monovalent sera.	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
70	M10389	5x 5ml	MAST ASSURE Salmonella Antiserum Set 6. This set consists of three H-z4 and two H-e <sub>1</sub> monovalent sera.	Liquid stable antiserum for the determination of H antigens for the serological identification of salmonellae by slide and tube agglutination.
71	M10389	3x 2ml + 2x 5ml	MAST ASSURE Salmonella Antiserum Set 7. This set consists of O2, O9, H-a, H-d and Vi monovalent sera	Liquid stable antiserum for the determination of O and H antigens for the serological identification of salmonellae by slide and tube agglutination.



Mast Group Ltd.  
 Mast House  
 Derby Road  
 Bootle  
 Merseyside L20 1EA  
 United Kingdom  
 Tel. +44 (0)151 933 7277  
 Fax +44 (0)151 944 1332  
 www.mastgrp.com

## EC DECLARATION OF CONFORMITY

We hereby declare that the devices described below comply with those provisions which apply to them of the European Directive 98/79/EC on *in vitro* diagnostic medical devices, as set out in UK Statutory Instrument 2002 No. 618 "The Medical Device Regulations."

This declaration is valid for the IVD medical devices described below which are placed on the market by ourselves on or after the date hereof and which bear the CE mark. It is also valid for all the IVD medical devices described below which are manufactured by us and placed on the market on or after the date hereof by third parties with our consent and which bear the CE mark. All supporting documents relating to this declaration are retained at the manufacturer's premises.

Product code	Product description	IVD Directive classification	EDMS code
Various (M-----)	<b>MAST ASSURE™ Shigella Antisera</b> – for serological identification and epidemiological typing with polyvalent and monovalent (flagellar) antisera typing and grouping Shigella species.	Self certification Annex III excluding section 6	1501000000 (code registered - 24/03/2003)

Standards applied: EN ISO 13485:2012, ISO 9001:2008, EN ISO 14971:2012, EN ISO 18113-1:2011, EN ISO 18113-2:2011, EN ISO 15223-1:2012, EN ISO 15223-2:2010.

Declaration made by .....  Date: 4 January 2017

D N Hogben, Quality Assurance and Regulatory Affairs Manager – Mast Group Ltd.

Document valid till: 31 December 2020



**Product Names:**  
**MAST ASSURE™ Shigella Antisera - for Serological identification and epidemiological typing of bacteria**

Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
1	M10109	2ml	MAST ASSURE Shigella dysenteriae POLY A Types 1, 2, 3, 4, 5, 6, 7	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
2	M10110	2ml	MAST ASSURE Shigella dysenteriae POLY A1 Types 8, 9, 10, 11, 12	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
3	M10111	2ml	MAST ASSURE Shigella flexneri POLY B Types I, II, III, IV, V, VI,(Groups(3),4,6&7(8)	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella flexneri by slide agglutination.
4	M10112	2ml	MAST ASSURE Shigella boydii POLY C Types 1, 2, 3, 4, 5, 6, 7	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
5	M10113	2ml	MAST ASSURE Shigella boydii POLY C1 Types 8, 9, 10, 11	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
6	M10114	2ml	MAST ASSURE Shigella boydii POLY C2 Types 12, 13, 14, 15	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
7	M10154	2ml	MAST ASSURE Shigella boydii POLY C3 Types 16, 17, 18	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
8	M10115	2ml	MAST ASSURE Shigella sonnei POLY D Phase I & II	Liquid stable polyvalent antiserum for the determination of O antigens for the serological identification of Shigella sonnei by slide agglutination.



Serial No.	Product code	Pack Size	Brand/Trade Name	Intended Purpose of the Medical Device Type
9	M10116	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 1	Liquid stable antiserum for the determination of O antigen types for the serological identification of Shigella.
10	M10117	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 2	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
11	M10118	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 3	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
12	M10119	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 4	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
13	M10120	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 5	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
14	M10121	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 6	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
15	M10122	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 7	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
16	M10123	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 8	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
17	M10124	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 9	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
18	M10125	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 10	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
19	M10152	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 11	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.
20	M10153	2ml	MAST ASSURE Shigella dysenteriae - Mono Type 12	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella dysenteriae by slide agglutination.



Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
21	M10126	2ml	MAST ASSURE Shigella flexneri - Mono Type I	Liquid stable antisera for the determination of O antigen types for the serological identification of Shigella.
22	M10127	2ml	MAST ASSURE Shigella flexneri - Mono Type II	Liquid stable antisera for the determination of O antigen types for the serological identification of Shigella.
23	M10128	2ml	MAST ASSURE Shigella flexneri - Mono Type III	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella flexneri by slide agglutination.
24	M10129	2ml	MAST ASSURE Shigella flexneri - Mono Type IV	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella flexneri by slide agglutination.
25	M10130	2ml	MAST ASSURE Shigella flexneri - Mono Type V	Liquid stable antisera for the determination of O antigen types for the serological identification of Shigella.
26	M10131	2ml	MAST ASSURE Shigella flexneri - Mono Type VI	Liquid stable antisera for the determination of O antigen types for the serological identification of Shigella.
27	M10132	2ml	MAST ASSURE Shigella flexneri - Mono Group (3)4	Liquid stable antisera for the determination of O antigen group for the serological identification of Shigella.
28	M10133	2ml	MAST ASSURE Shigella flexneri - Mono Group 6	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella flexneri by slide agglutination.
29	M10134	2ml	MAST ASSURE Shigella flexneri - Mono Group 7 (8)	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella flexneri by slide agglutination.



Serial No.	Device ID Number	Pack Size	Brand/Trade Name	Intended Purpose of the Medical Device Type
30	M10135	2ml	MAST ASSURE Shigella boydii - Mono Type 1	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
31	M10136	2ml	MAST ASSURE Shigella Boydii - Mono Type 2	Liquid stable antiserum for the determination of O antigen types for the serological identification of Shigella.
32	M10137	2ml	MAST ASSURE Shigella boydii - Mono Type 3	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
33	M10138	2ml	MAST ASSURE Shigella boydii - Mono Type 4	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
34	M10139	2ml	MAST ASSURE Shigella boydii - Mono Type 5	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
35	M10140	2ml	MAST ASSURE Shigella boydii - Mono Type 6	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
36	M10141	2ml	MAST ASSURE Shigella boydii - Mono Type 7	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
37	M10142	2ml	MAST ASSURE Shigella boydii - Mono Type 8	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
38	M10143	2ml	MAST ASSURE Shigella boydii - Mono Type 9	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
39	M10144	2ml	MAST ASSURE Shigella boydii - Mono Type 10	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
40	M10145	2ml	MAST ASSURE Shigella boydii - Mono Type 11	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
41	M10146	2ml	MAST ASSURE Shigella boydii - Mono Type 12	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
42	M10147	2ml	MAST ASSURE Shigella boydii - Mono Type 13	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
43	M10148	2ml	MAST ASSURE Shigella boydii - Mono Type 14	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
44	M10149	2ml	MAST ASSURE Shigella boydii - Mono Type 15	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
45	M10155	2ml	MAST ASSURE Shigella boydii - Mono Type 16	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.



Serial No.	Device ID Number	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
46	M10156	2ml	MAST ASSURE Shigella boydii - Mono Type 17	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.
47	M10157	2ml	MAST ASSURE Shigella boydii - Mono Type 18	Liquid stable antiserum for the determination of O antigens for the serological identification of Shigella boydii by slide agglutination.

Serial No.	Device ID Number	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
48	M10150	2ml	MAST ASSURE Shigella sonnei - Mono Phase I	Liquid stable antisera for the determination of O antigen phases for the serological identification of Shigella.
49	M10151	2ml	MAST ASSURE Shigella sonnei - Mono Phase II	Liquid stable antisera for the determination of O antigen phases for the serological identification of Shigella.

Serial No.	Device ID Number	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
50	M10104	49x 2ml	MAST ASSURE Shigella Antiserum Set 1 consisting of 8 Polyvalent and 41 Monovalent serum for O antigen typing and grouping.	Liquid stable antisera for the determination of O antigens for the serological identification of Shigella.
51	M10105	19x 2ml	MAST ASSURE Shigella Antiserum Set 2 consisting of 8 Polyvalent and 11 Monovalent serum for O antigen typing and grouping.	Liquid stable antisera for the determination of O antigens for the serological identification of Shigella.
52	M10106	8x 2ml	MAST ASSURE Shigella Antiserum Set 3 consisting of 8 Polyvalent serum O antigen typing and grouping.	Liquid stable antisera for the determination of O antigens for the serological identification of Shigella.





Mast Group Ltd.  
 Mast House  
 Derby Road  
 Bootle  
 Merseyside L20 1EA  
 United Kingdom  
 Tel. +44 (0)151 933 7277  
 Fax +44 (0)151 944 1332  
 www.mastgrp.com

## EC DECLARATION OF CONFORMITY

We hereby declare that the devices described below comply with those provisions which apply to them of the European Directive 98/79/EC on *in vitro* diagnostic medical devices, as set out in UK Statutory Instrument 2002 No. 618 "The Medical Device Regulations."

This declaration is valid for the IVD medical devices described below which are placed on the market by ourselves on or after the date hereof and which bear the CE mark. It is also valid for all the IVD medical devices described below which are manufactured by us and placed on the market on or after the date hereof by third parties with our consent and which bear the CE mark. All supporting documents relating to this declaration are retained at the manufacturer's premises.

Product code	Product description	IVD Directive classification	EDMS code
Various (M-----)	<b>MAST ASSURE™ Vibrio cholerae Antisera</b> – for serological identification and epidemiological typing with polyvalent and monovalent O (somatic typing antisera).	Self certification Annex III excluding section 6	1501000000 (code registered - 24/03/2003)

Standards applied: EN ISO 13485:2012, ISO 9001:2008, EN ISO 14971:2012, EN ISO 18113-1:2011, EN ISO 18113-2:2011, EN ISO 15223-1:2012, EN ISO 15223-2:2010.

Declaration made by  Date: 4 January 2017

D N Hogben, Quality Assurance and Regulatory Affairs Manager – Mast Group Ltd.

Document valid till: 31 December 2020



**Product Names:**  
**MAST ASSURE™ Vibrio cholerae Antisera - for Serological identification and epidemiological typing of bacteria**

Serial No.	Product code	Pack Size	Brand/Trade Name	Indented Purpose of the Medical Device Type
1	M11002	2ml	MAST ASSURE Vibrio cholerae Polyvalent (O1) Antiserum - POLY (INABA, OGAWA)	Liquid stable antiserum the determination of O antigens for the serological identification of <i>Vibrio cholerae</i> by the slide agglutination method.
2	M11002	2ml	MAST ASSURE Vibrio cholerae (O1) Monovalent Antiserum - INABA	Liquid stable antiserum the determination of O antigens for the serological identification of <i>Vibrio cholerae</i> by the slide agglutination method.
3	M11004	2ml	MAST ASSURE Vibrio cholerae (O1) Monovalent Antiserum - OGAWA	Liquid stable antiserum the determination of O antigens for the serological identification of <i>Vibrio cholerae</i> by the slide agglutination method.
4	M15001	2ml	MAST ASSURE Vibrio cholerae Monovalent Antiserum - O139 (Bengal)	Liquid stable antiserum the determination of O antigens for the serological identification of <i>Vibrio cholerae</i> by the slide agglutination method.
5	M11001	2ml	MAST ASSURE Vibrio cholerae Antisera set consisting of 1x Polyvalent antiserum – serovar Inaba and Ogawa + 2x Monovalent antisera – serovar Inaba and serovar Ogawa.	Liquid stable antiserum the determination of O antigens for the serological identification of <i>Vibrio cholerae</i> by the slide agglutination method.

E. coli  
Salmonella  
Haemophilus

# **mast**assure™

## Bacterial Agglutinating Antisera Guide

Shigella

Vibrio

Campylobacter

**Bordetella**

Clostridium

**Legionella**

Pseudomonas

Staphylococcus

Listeria

Streptococcus

Yersinia

**Proteus**

Brucella



# Contents

<b>Section 1</b>	Page No
Salmonella agglutination methods	3-15
Salmonella stock antisera	16
<b>Section 2</b>	
Pathogenic Escherichia coli agglutination methods	17-25
E.coli Stock antisera	26
<b>Section 3</b>	
Shigella sp agglutination methods	27-32
Shigella sp stock antisera	32
<b>Section 4</b>	
Vibrio cholera agglutination methods	33-35
Vibrio cholerae stock antisera	35

**This document does not replace the IFU's intended for use with these products. It is primarily aimed at being a resource for education, training and a guide for a laboratory writing Standard Operating Procedures looking at the more traditional methods associated with bacterial agglutinating sera.**

References available upon request.

A scanning electron micrograph (SEM) showing several green, rod-shaped salmonella bacteria. The bacteria are positioned on a highly textured, red surface that resembles biological tissue. The lighting creates strong highlights and shadows, emphasizing the three-dimensional structure of the bacteria and the surface they are on.

**mast**assure™

**SALMONELLA ANTISERA**

# A. MAST ASSURE™ Salmonella Antisera

## 1. Introduction

### a. Salmonella and Disease

Salmonella are Gram negative organisms belonging to the family *Enterobacteriaceae*. They are non-spore forming rods, and most of them are motile possessing flagella.

Salmonellae are widely distributed in nature, with all vertebrates and some invertebrates capable of harbouring salmonella in their gut. Most animal infections seem to be symptomless or to cause a self-limiting gastroenteritis of variable severity. Many serotypes e.g. *S. typhimurium* show a wide host range, while others e.g. *S. typhi* and *S. paratyphi* A, B and C are primarily human pathogens and are rarely isolated from animals other than humans. Others are particularly adapted to animal hosts include *S. cholera-suis* (pigs), *S. dublin* (cattle), *S. gallinarum-pullorum* (poultry), *S. abortus-equi* (horses) and *S. abortus-ovis* (sheep).

Salmonella infection in man can cause a wide spectrum of clinical illness however it mainly manifests itself in four syndromes. These are enteric fever, gastroenteritis, bacteraemia with or without metastatic infection, and the asymptomatic carrier state.

- Enteric fever is most usually caused by *S. typhi* and *S. paratyphi* A, B and C but can be caused by other Salmonella serotypes. The clinical features tend to be more severe with *S. typhi* (typhoid fever). Enteric fever is a systemic disease whose major symptoms are fever and headache and may be fatal if untreated.
- Acute gastroenteritis is characterised by vomiting, abdominal pain, diarrhoea and fever and is commonly seen as a result of food poisoning from infected poultry.
- Bacteraemia is a constant feature of enteric illness and may occur as a rare complication of any salmonella infection. Transient bacteraemia may occur in gastroenteritis but in most cases organisms are cleared from the blood stream without ill effect.
- Carrier State. Most sufferers from a salmonella infection continue to excrete the organism in their stools for days or weeks after complete clinical recovery, but eventual clearance from the body is usual. A few patients continue to excrete salmonellae for prolonged periods. Chronic carriers may excrete salmonellae for a year or more and may have no symptoms of disease.

Laboratory diagnosis of salmonella infection usually depends upon the isolation and identification of the causal salmonella from a specimen of the patient's blood or faeces. Further antigenic analysis of the organism is often needed to identify the species or strain for epidemiological purposes.

### b. Antigenic characterisation of Salmonellae

Salmonella possess two main types of antigen, the O (somatic or body) and the H (flagellar) antigens. The O antigens are heat stable and upon which grouping of the organisms are based. The H antigens are heat labile and are used for confirming and identifying the serotypes within the groups. The H antigen of an organism of a known O group may occur as two different serological entities, known as phases. Diphasic organisms may be separated into individual phases by growing the culture in the presence of a small amount of the specific phase antiserum of the phase already recognised, such that the only motile organisms isolated will be of the alternative phase. Occasionally a third antigen called the Vi antigen is also present in certain Salmonella strains. When present the Vi antigen may block the activity of the O antigens and must be inactivated before proceeding with the serological grouping of the organism.

As an example *Salmonella typhimurium* possess the O antigens 1, 4, [5], 12 and may possess either phase 1 antigen i or phase 2 antigen 1, 2. This may be written as 1, 4, [5], 12: i : 1, 2.

In the early 1920s White recognised the antigenic variation in *Salmonella* species and its importance in differentiating *Salmonella* on the basis of serotyping. Kauffmann later confirmed White's observations and greatly extended them to form the current Kauffmann-White Schema for classification of types within the genus *Salmonella*. Today more than 2000 serotypes of *Salmonella* have been identified.

### c. MAST ASSURE™ *Salmonella* Antisera: preparation and presentation.

MAST ASSURE™ *Salmonella* Antisera are prepared from rabbit's hyperimmunised with standard strains of *Salmonella* organisms possessing defined antigenic factors. All sera are heat inactivated at 56°C for 30 minutes, absorbed to remove cross-reacting agglutinins and filter sterilised. The MAST ASSURE™ *Salmonella* Antisera provide a comprehensive range of O, H and Vi antisera and in addition *Salmonella* Phase Induction Antisera, for the induction of a hidden flagellar phase. Antigens are identified normally by qualitative slide agglutination or by quantitative tube agglutination tests or in the case of *Salmonella* Phase Induction Antisera using culture tubes (semi-solid medium) or agar plates (bridging method).

All MAST ASSURE™ *Salmonella* Antisera except the Phase Induction Antisera are provided as 2ml (or 5ml) amounts in vials with dropper attachments and contain 0.1% sodium azide as preservative. Supplied ready to use. This is sufficient for 50 (125) slide agglutination tests or 20 (50) tube agglutination tests. The MAST ASSURE™ *Salmonella* Phase Induction Antisera are provided sterile in 5 ml volumes and sealed in injection vials. Supplied ready to use with no preservative is added.

## 2. Culture of *Salmonella* - Preparation for Serology

*Salmonella* belong to the family *Enterobacteriaceae* and there is much cross-reaction and antigenic relationships between *Salmonella* and other genera within this family. Hence it is important that organisms undergoing serological classification should be correctly identified as *Salmonella* by morphological and biochemical features first.

## 3. *Salmonella* O - Grouping Antisera

Classically *Salmonella* somatic O antigenic factors have been grouped together according to alphabetical designations as detailed in the Kaufmann-White Scheme. However these have become outdated as new antigenic factors were realised. Mast prefers to use the numbered designations as recommended by the WHO Collaborative Centre for Reference and Research on *Salmonella* in their MAST ASSURE™ Antisera range.

Table 1 below indicates the correlation between the alphabetical and numerical systems.

**Table 1 - Correlation between the Alphabetical Grouping and Numerical O Factor Designation Systems for *Salmonella* O Grouping.**

Alphabetical group designation	Numerical O factor designation	Alphabetical group designation	Numerical O factor designation	Alphabetical group designation	Numerical O factor designation
A	O2	F	O11	Q	O39
B	O4	G <sub>1</sub>	O13, 22	R	O40
C <sub>1</sub> + C <sub>4</sub>	O6, 7	G <sub>2</sub>	O13, 23	S	O41
C <sub>2</sub>	O6, 8	H	O6, 14	T	O42
C <sub>3</sub>	O8, [20]	I	O16	U	O43
D <sup>1</sup>	O9, 12	J	O17	V	O44
D <sub>2</sub>	O9, 46	K	O18	W	O45
D <sub>3</sub>	O9, 46, 27	L	O21	X	O47
E <sub>1</sub>	O3, 10 *	M	O28	Y	O48
E <sub>2</sub>	O3, 15 *	N	O30	Z	O50
E <sub>3</sub>	O3, 15, 34 *	O	O35	no code	O51 - O67
E <sub>4</sub>	O3, 19	P	O38		

**NOTE** \* = Group E<sub>1</sub> was originally classified as O3, 10, Group E<sub>2</sub> as O3,15 and Group E<sub>3</sub> as O3, 15, 34. It was later noted that Group E<sub>1</sub> strains could be lysogenised by phage ε15 (O3, 10 → O3, 15) and then by phage ε34 (O3, 15 → O3, 15, 34). Because of this these strains are now classified under one common group.

Table 2 lists all the MAST ASSURE™ Salmonella O Grouping Antisera (and Vi Antiserum) available to date together with the product codes, the Kauffmann-White alphabetical group equivalent and the actual antigenic agglutinins present. It is impractical to provide single factor sera for all known Salmonella antigens, however a wide range of sera is available in the MAST ASSURE™ range which is sufficient to identify with a reasonable degree of probability the majority of Salmonella types isolated.

To determine the O-group of a Salmonella strain, polyvalent O antisera should be used initially to narrow down the range before specific grouping sera are used. This is illustrated schematically in Figure 1 and according to methods as detailed in section 4.

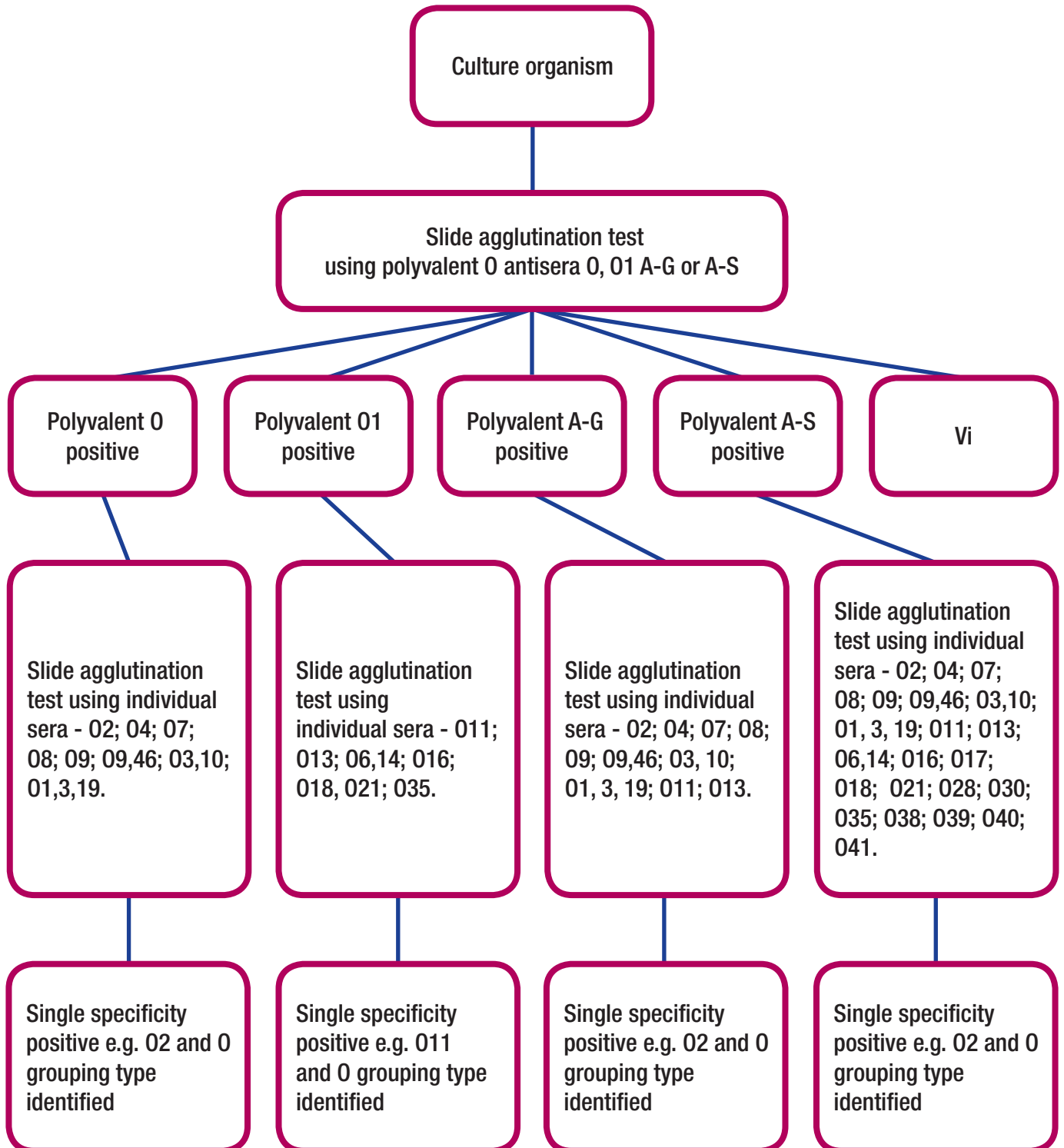
**Table 2 - MAST ASSURE™ Salmonella O-Grouping Antisera Details**

Mast Product Code	MAST ASSURE™ Salmonella O Antiserum	Kauffmann-White alphabetical grouping equivalent	Agglutinins present
M10308	Polyvalent O	A - E	O2, 3, 4, 5, 7, 8, 9, 10, 12, 15, 19, 34, 46.
M10309	Polyvalent O1	F - O excluding J, M and N.	O11, 13, 14, 16, 18, 21, 22, 23, 24, 35.
M14294	Polyvalent A-G	A - G	O2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 19, 22, 34, 46.
M14300	Polyvalent A-S	A - S	O2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 28, 30, 34, 35, 38, 39, 40, 41, 46.
M10310	O2	A	O2
M10311	O4	B	O4, 5
M10312	O7	C1 + C4	O7
M10313	O8	C2 + C3	O8
M10314	O9	D	O9
M10315*	O9, 46	D2	O46
M10316	O3, 10	E1 + E2 + E3 *	O10, 15, 34
M10318*	O1, 3, 19	E4	O19
M10319*	O11	F	O11
M10320	O13	G1 + G2	O13, 22, 23
M10321	O6, 14	H	O14, 24, 25
M10322*	O16	I	O16
M10323*	O18	K	O18
M10324*	O21	L	O21
M10325*	O35	O	O35
M10326	Vi	-	Vi

\* Denotes an 8 week lead time



Figure 1 - Summary of Salmonella O-Grouping Procedures



This document does not replace the IFU's intended for use with these products. It is primarily aimed at being a resource for education, training and a guide for a laboratory writing Standard Operating Procedures looking at the more traditional methods associated with bacterial agglutinating sera

References available upon request.

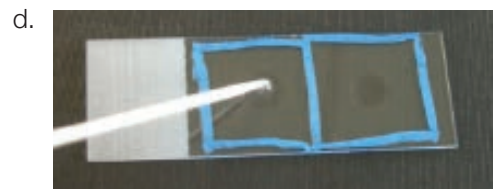
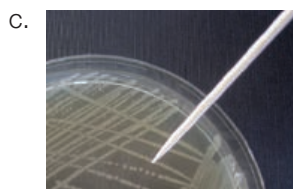
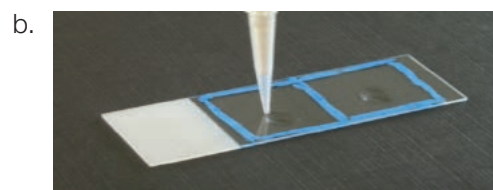
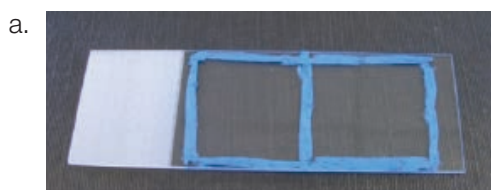
#### 4. Procedures for O serotyping and Interpretation of Results

MAST ASSURE™ Salmonella O Grouping Antisera are intended for use in the identification of O antigens by qualitative slide agglutination, although they may be used in quantitative tube agglutination tests for confirmatory purposes.

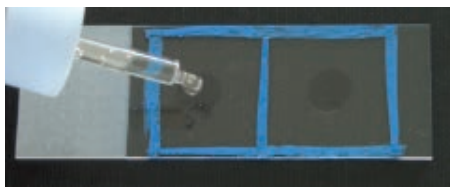
Cultures of organisms identified as *Salmonella* by their morphological and biochemical features may be serotyped by the following procedures. Also refer to figure 2 for a summary of the Salmonella O grouping procedure.

##### a. Slide Agglutination for O-antigen and Vi grouping.

1. Place two drops of sterile 0.85% saline solution (saline) onto a carefully cleaned microscope slide. The slide may be partitioned into several parts using a chinograph or glass pencil Picture a ,b. With an inoculation loop or wire emulsify into each drop of saline a live cell colony from a fresh agar plate or slope culture to produce a distinct and uniform turbidity Picture c, and d.



2. Place a drop of polyvalent antiserum onto one of the drops of emulsified isolate and to the other a drop of saline as a control.



**Note:** allow the antiserum to freefall from the dropper provided with the bottle. Do not contaminate the antiserum with organism.

3. Mix the reagents by tilting the slide back and forth for 60 seconds while viewing under indirect light against a dark background.

Distinct clumping or agglutination within this period, without clumping in the saline control (auto- agglutination) should be regarded as a positive result.



An isolate producing a distinct positive reaction with a polyvalent antiserum is assumed to be *Salmonella* bearing one or more of the O antigenic factors represented by that antiserum. Using this information, further testing of the isolate should be conducted, as described in steps 1 - 3, with specific O antisera to reveal the full O antigenic grouping of the isolate.

5. If no agglutination is found with any of the polyvalent sera and saline, repeat steps 1 - 3 above using the Vi antiserum. If a positive reaction is found with the Vi antiserum, prepare a dense cell suspension of the organism in 0.85% saline and heat the suspension to 100°C for 60 minutes or autoclave at 121°C for 15 minutes, then repeat the agglutination test using polyvalent and Vi sera on the heated cell suspension.

If the live cell isolate produces a negative result with the polyvalent antisera and a positive result with the Vi antiserum, whilst the heated cell isolate produces a positive result with the polyvalent antisera and a negative result with the Vi antiserum the isolate should probably be regarded as *Salmonella typhi* (O9, 12, Vi). A few other organisms e.g. *Salmonella paratyphi* C (O6, 7, Vi) also contain the Vi antigen but may easily be distinguished by their O antigenic specificities.

#### **b. Tube Agglutination method.**

This method may be used for confirmatory testing only.

Live cell suspensions may be used as antigens, but care must be taken to handle cultures with care to avoid laboratory infection. Killed O antigens may be prepared by heating a saline suspension of organisms to 100°C for 10 minutes, centrifuging and resuspending the deposit in saline. The use of phenol or formalin in O antigen preparations should be avoided since these substances inhibit O agglutination in the presence of H antigens.

1. Remove colonies from a suitable agar or broth culture and prepare a fairly light suspension of bacteria of approximately  $10^9$  organisms per ml in sterile saline (0.85% saline).
2. Make serial dilutions of antiserum in 0.5ml volumes of saline from 1:10 to 1:640 or 1:1280. Round bottomed glass tubes approximately 9 x 85mm are most suitable.
3. To each tube add 0.5ml of antigen suspension.

**Note:** this doubles the dilution of the antiserum.

4. A control tube should be additionally set up containing 0.5ml of antigen suspension and 0.5ml of saline.
5. Shake the tubes thoroughly and incubate O factor tubes at 50°C for 4 hours or Vi factor tubes at 37°C for 2 hours then at 4°C for 18 hours.

**Note:** Vi factor tubes should be allowed to warm to room temperature before reading.

6. Examine the tubes for agglutination. Positive agglutination will be observed as obvious granular agglutination. In a negative reaction and in the saline control the appearance of the suspension should be unchanged, with a cloudy appearance, and show a typical swirl on agitation. The titre value is the dilution of the last tube showing agglutination. Titres at or near the stated value (available on request) indicate that the antigen is of the same serotype as the antiserum.

If agglutination is observed in the saline control, the test is invalid. A new antigen solution should be prepared from a fresh culture preparation of the organism and retested.

#### **5. Salmonella H - Typing Antisera**

Salmonella flagellar (H) antigens may occur as two different serological entities, known as phases. Antigens labelled alphabetically may appear in phases 1 or 2, but antigens labelled numerically only appear in phase 2. The alphabetically labelled antigens are designated as:- a-z, and  $z_1$ - $z_{68}$  and the numerically labelled antigens are designated as:- 1, 2, 5, 6 and 7. For the alphabetically labelled antigens certain factors are always seen in association with others. These are listed below:-

E complex - contains e and one or more of n, h, x, z<sub>15</sub>

G complex - contains g and one or more of f, m, p, q, s, t, u, z<sub>51</sub>, (z<sub>52</sub>, z<sub>62</sub>, z<sub>63</sub>)

L complex - contains l and one or more of v, w, z<sub>13</sub>, z<sub>28</sub>, (z<sub>40</sub>)

z<sub>4</sub> complex - contains z<sub>4</sub> and one or more of z<sub>23</sub>, z<sub>24</sub>, z<sub>32</sub>

For the numerically labelled antigens factors 2, 5, 6 and 7 are always seen in association with factor 1, e.g. 1, 2 or 1,7. Antigen z<sub>6</sub> is also linked with this group.

Once the O - group of a Salmonella strain has been determined the organism may be identified further using MAST ASSURE™ Salmonella H-Typing Antisera. A list of the MAST ASSURE™ Salmonella H-Typing Antisera available is given in Table 3.

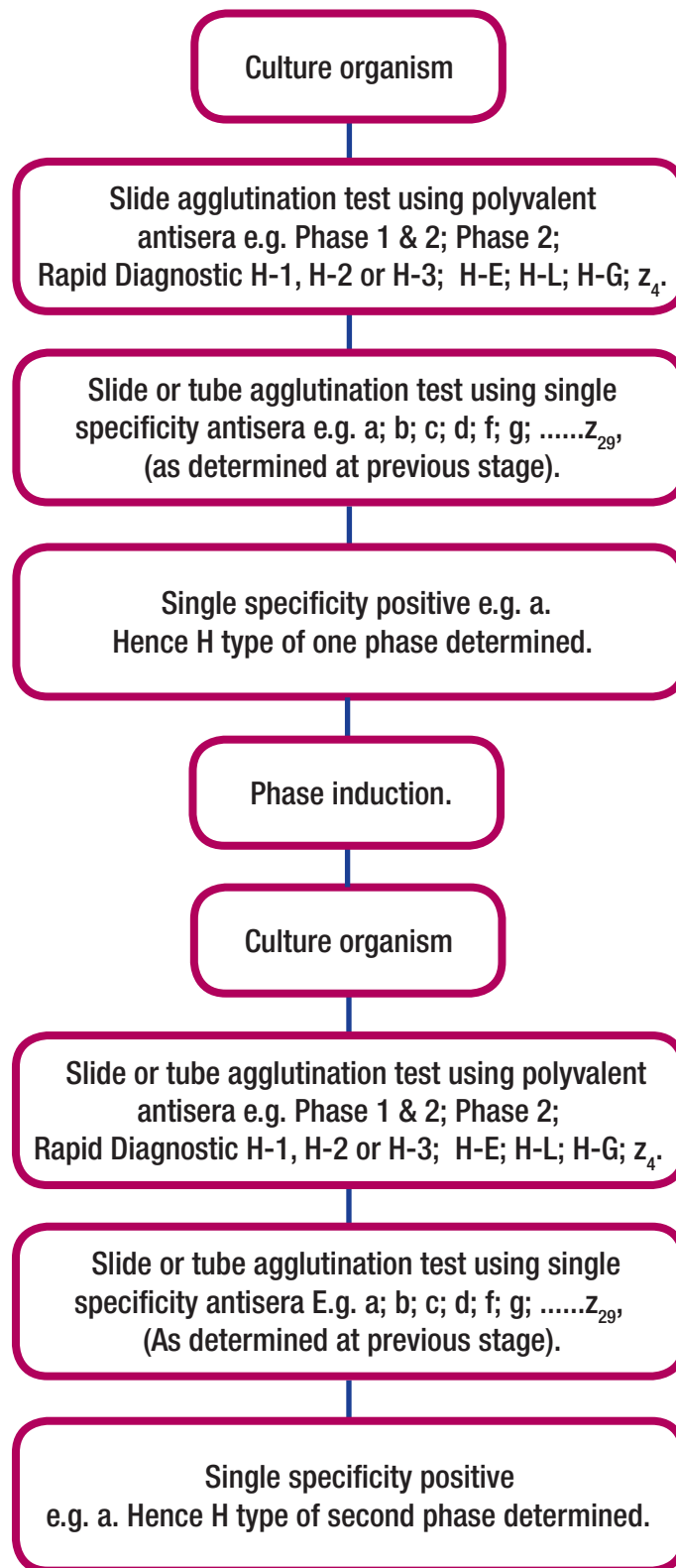
To determine the H-type of a Salmonella strain, polyvalent H antisera should be used initially to narrow down the range before specific typing sera are used. This is illustrated schematically in Figure 2 and according to methods as detailed in section 6.

**Table 3 - MAST ASSURE™ Salmonella H-Typing Antisera Details**

Mast Product Code	MAST ASSURE™ Salmonella H Antiserum	Agglutinins present	Comments
M14317	Polyvalent Phase 1 & 2	a-z <sub>29</sub>	
M10339	Polyvalent Phase 2 (H-1)	1, 2, 5, 6, 7, z <sub>6</sub>	
M14324	Rapid Diagnostic 1	b; d; E (n, x, h); r	
M14331	Rapid Diagnostic 2	d; E (n, x, h); k; L (l, v, w)	
M14348	Rapid Diagnostic 3	d; E (n, x, h); G (g, m, s, t); k	
M10327	H - a	a	
M10328	H - b	b	
M10329	H - c	c	
M10330	H - d	d	
M14335	H - E	n, x, h	
M10331	H - e, h	h	A factor of H - E
M10338*	H - e, n	n, x.	A factor of H - E
M10376*	H - x	x	A factor of H - E and H - e, n
M10377*	H - z <sub>15</sub>	z <sub>15</sub>	A factor of H - E and H - e, n
M10332	H - G	g, m, s, t	
M10364	H - f	f	A factor of H - G
M10365	H - m	m	A factor of H - G
M10366	H - p	p	A factor of H - G
M10367	H - q	q	A factor of H - G
M10368	H - s	s	A factor of H - G
M10369	H - t	t	A factor of H - G
M10370*	H - u	u	A factor of H - G
M10333	H - i	i	
M10334	H - k	k	
M10335	H - L	v, w,	
M10336	H - r	r	
M10337*	H - y	y	
M10378*	H - z	z	
M10379*	H - z <sub>4</sub>	z <sub>4</sub> , z <sub>23</sub> , z <sub>24</sub>	
M10372*	H - z <sub>23</sub>	z <sub>23</sub>	A factor of H - z <sub>4</sub>
M10373*	H - z <sub>24</sub>	z <sub>24</sub>	A factor of H - z <sub>4</sub>
M10374*	H - z <sub>32</sub>	z <sub>32</sub>	A factor of H - z <sub>4</sub>
M10380*	H - z <sub>10</sub>	z <sub>10</sub>	
M10381*	H - z <sub>29</sub>	z <sub>29</sub>	
M10344	H - 2	2	A factor of H - 1
M10345	H - 5	5	A factor of H - 1
M10346	H - 6	6	A factor of H - 1
M10348*	H - z <sub>6</sub>	z <sub>6</sub>	A factor of H - 1

\* Denotes an 8 week lead time

Figure 2 - Summary of Salmonella H-Typing Procedures



This document does not replace the IFU's intended for use with these products. It is primarily aimed at being a resource for education, training and a guide for a laboratory writing Standard Operating Procedures looking at the more traditional methods associated with bacterial agglutinating sera

References available upon request.

## 6. Procedures for H serotyping and Interpretation of Results

MAST ASSURE™ Salmonella H Typing Antisera are intended for use in the identification of H (flagellar) antigens. Polyvalent antisera should preferably be used in slide agglutination tests. Specific H-typing sera may also be used in initial qualitative slide agglutination, although they may be used in quantitative tube agglutination tests for confirmatory purposes.

Normally an isolate is tested initially against the Polyvalent H phase 1 & 2 serum (specific and non-specific antigens). If this shows agglutination it should be tested against the Polyvalent H phase 2 serum (non-specific antigens i.e. 1, 2, 5, 6, 7, z<sub>6</sub>). If it is not agglutinated by this serum the isolate is assumed to be in the specific phase and attempts should be made to determine the phase 1 antigens using the Rapid antisera, Polyvalent H - G, L or E complex antisera or monovalent H-antisera, as described below.

The commonly occurring Phase 1 antigen, with the exception of factor i, may be identified by slide agglutination tests using the Rapid Diagnostic Antisera, as illustrated below:-

Antigenic factor(s)	Rapid Diagnostic 1	Rapid Diagnostic 2	Rapid Diagnostic 3
B	+	+	-
d	+	-	+
E	+	+	+
G	-	-	+
k	-	+	+
L	-	+	-
r	+	-	-

For H-serotypes possessing common determinants (for example the G group: f,g; g,m; g,p; g,s,t) specific antisera should be used for characterising the antigenic group further e.g. f, m, p, s or t.

Sometimes only one of the two phases possessed by a diphasic organism are detected in this test. To determine the antigens in the other phase, secure the culture in the other phase by phase induction (see section 8 - Phase Induction Procedures).

### a. Slide Agglutination for H-antigen typing.

Cultures of organisms identified as *Salmonella* by their morphological and biochemical features and O-grouped as detailed in section 4 may be H-serotyped by the following procedures.

1. Place two drops of sterile 0.85% saline solution (saline) onto a carefully cleaned microscope slide. The slide may be partitioned into several parts using a chimograph or glass pencil. With an inoculation loop or wire emulsify into each drop of saline a live cell colony from a fresh agar plate or slope culture to produce a distinct and uniform turbidity.
2. Place a drop of polyvalent antiserum onto one of the drops of emulsified isolate and to the other a drop of saline as a control.

**Note:** allow the antiserum to freefall from the dropper provided with the bottle. Do not contaminate the antiserum with organism.

3. Mix the reagents by tilting the slide back and forth for 60 seconds while viewing under indirect light against a dark background.
4. Distinct clumping or agglutination within this period, without clumping in the saline control (auto-agglutination) should be regarded as a positive result.

An isolate producing a distinct positive reaction with a polyvalent antiserum is assumed to be a Salmonella bearing one or more of the H antigenic factors represented by that antiserum. Using this information, further testing of the isolate should be conducted, as described in steps 1 - 3, with specific H antisera to reveal the full H antigenic grouping of the isolate.

#### **b. Tube Agglutination method.**

1. Prepare a suspension of bacteria in 0.5% (v/v) formal saline or formalinised broth cultures may be used. Colonies taken from primary isolation media may be unsatisfactory for use in determining the H serotype due to poor motility of organisms. This may be improved by using organisms grown at 37°C for 6-8 hours in a broth culture, by subculture onto moist agar slopes, using 0.5% agar in a Petri dish or in 0.2% agar in a Craigie tube and picking the leading edge of the culture after incubation.

2. Make serial dilutions of antiserum in 0.5ml volumes of saline from 1:10 to 1:640 or 1:1280. Round bottomed glass tubes approximately 9 x 85mm are most suitable.

3. To each tube add 0.5ml of antigen suspension.

**Note:** this doubles the dilution of the antiserum.

4. A control tube should be additionally set up containing 0.5ml of antigen suspension and 0.5ml of saline.

5. Shake the tubes thoroughly and incubate tubes at 50-52°C for 1-2 hours.

6. Examine the tubes for agglutination. Positive agglutination will be observed as characteristic floccular agglutination. In a negative reaction and in the saline control the appearance of the suspension should be unchanged, with a cloudy appearance, and show a typical swirl on agitation. The titre value is the dilution of the last tube showing agglutination. Titres at or near the stated value (available on request) indicate that the antigen is of the same serotype as the antiserum.

If agglutination is observed in the saline control, the test is invalid. A new antigen solution should be prepared from a fresh culture preparation of the organism and retested.

### **7. Salmonella H Antigen Phase Induction**

Sometimes it is necessary to isolate the second phase of a diphasic organism for complete serological identification. A list of the MAST ASSURE™ Salmonella H Phase Induction Antisera available is given in Table 4.

These antisera are provided sterile in sealed injection vials and contain no preservative. For use, the required volume may be withdrawn under sterile conditions using a syringe and needle.

### **8. Salmonella H Antigen Phase Induction Procedures**

Phase induction may be done according to the following procedures:-

#### **A. Craigie Tube Method**

1. Add 0.1ml of the H antiserum by which the organism is agglutinated, to about 3ml of semi-solid nutrient agar held at 50°C in a water bath. Mix the contents taking care to avoid frothing.

2. After mixing the serum and agar, aseptically place a previously sterilised Craigie tube vertically into the medium, with the upper end projecting well above the agar surface.

3. After the medium has cooled and solidified, inoculate the organism using a straight wire into the agar inside the Craigie tube. Incubate the culture at 37°C overnight (16-18 hours).

4. After incubation, remove organisms from the agar outside the Craigie tube, place into glucose broth and incubate at 37°C for 6-8 hours. By this time there should be enough growth to assess the H antigens of the induced phase.
5. Determine the H antigens of the induced phase using MAST ASSURE™ - SALMONELLA Antisera.  
For method see separate instructions.

If the organism fails to appear outside the Craigie tube at 37°C overnight (16-18 hours), the cultures should be left a further 24 hours, or reduce the volume of serum used for phase induction by half to 0.05ml. If such procedures fail to work, it should be assumed that the organism has flagella of only one phase.

## **B. Bridging Method**

1. Cut a 50 × 20mm ditch in a well dried nutrient agar plate.
2. Soak a strip of previously sterilised filter paper (approximately 36 × 7mm) in the H antiserum by which the organism is agglutinated and place this strip across the ditch at right angles. At one end of the filter paper strip place a sterilised filter paper disc (approximately 7mm in diameter) so that half of it is on the serum strip and half is on the agar.
3. Inoculate the agar at the opposite end of the paper strip to the disc with organisms from a 6-8 hour nutrient broth culture of the organism and incubate overnight (16-18 hours) at 37°C.
4. After incubation, remove the paper disc with sterile forceps and place it into glucose broth and incubate at 37°C for 4 hours. By this time there should be enough growth to assess the H antigens of the induced phase.
5. Determine the H antigens of the induced phase using MAST ASSURE™ - SALMONELLA Antisera.  
For method see separate instructions.

If the organism fails to appear on the paper disc after incubation at 37°C overnight (16-18 hours), repeat the test. If the procedures fail to work again, it should be assumed that the organism has flagella of only one phase.

**Note:-** ensure that the surface of the agar plate is dry before use and that the filter paper strip is not over saturated with antiserum. If moisture is present on the surface of the plate organisms may swarm round the side of the ditch and be recovered on the filter paper disc giving erroneous results.



**Table 4 - MAST ASSURE™ Salmonella Phase Induction Antisera Details Non –CE marked, special order only, please check lead times**

Mast Product Code	MAST ASSURE™ Salmonella H Antiserum	Agglutinins present
M10349/NCE	H - a	a
M10350/NCE	H - b	b
M10351/NCE	H - c	c
M10352/NCE	H - d	d
M10353/NCE	H - e, h	h
M10354/NCE	H - G	g, m, s, t
M10355/NCE	H - i	i
M10356/NCE	H - k	k
M10357/NCE	H - L	l, v, w
M10358/NCE	H - r	r
M10359/NCE	H - y	y
M10360/NCE	H - e, n	n, x
M10361/NCE	H - 1	1, 2, 5, z <sub>6</sub>
M10382/NCE	H - z	z
M10383/NCE	H - z <sub>4</sub>	Z <sub>4</sub>
M10384/NCE	H - z <sub>10</sub>	Z <sub>10</sub>
M10385/NCE	H - z <sub>29</sub>	Z <sub>29</sub>

## 9. Antisera Sets

MAST ASSURE™ Salmonella Antisera are also available as convenient sets as listed in Table 5 and comprise of individual bottles of stated antisera.

**Table 5 - MAST ASSURE™ Salmonella Antisera Sets**

Mast Product Code	MAST ASSURE™ Salmonella Antisera Set Components	Comments
M10303*	<b>Salmonella Antisera Set 1</b> - This set consists of 17 O-Grouping + Vi antisera. i.e. Polyvalent O and O1, and O-Grouping sera O2; O4; O7; O8; O9; <u>O9, 46</u> ; <u>O3, 10</u> ; <u>O1, 3, 19</u> ; O11; O13; <u>O6, 14</u> ; O16; O18; O21; O35; and Vi	2ml × 18
M10304*	<b>Salmonella Antisera Set 2</b> - This set consists of 17 H-Typing antisera. i.e. a; b; c; d; e, h; G; i; k; L; r; y; e, n; 1; z; z <sub>4</sub> ; Z <sub>10</sub> ; Z <sub>29</sub>	5ml × 17
M10386*	<b>Salmonella Antisera Set 3</b> - This set consists of 4 H-L complex antisera. i.e. v; w; Z <sub>13</sub> ; Z <sub>28</sub>	5ml × 4
M10387*	<b>Salmonella Antisera Set 4</b> - This set consists of 5 H-1 complex antisera. i.e. 2; 5; 6; 7; z <sub>6</sub>	5ml × 5
M10388*	<b>Salmonella Antisera Set 5</b> - This set consists of 7 H-G complex antisera. i.e. f; m; p; q; s; t; u	5ml × 7
M10389*	<b>Salmonella Antisera Set 6</b> - This set consists of 3 H-z4 complex antisera and 2 H-e,n complex antisera. i.e. z <sub>23</sub> ; Z <sub>24</sub> ; Z <sub>32</sub> ; X; Z <sub>15</sub>	5ml × 5
M10390*	<b>Salmonella Antisera Set 7</b> - This set consists of O-Grouping O2 and O9 antisera, H-Typing antisera a and d, and Vi antiserum	2ml × 3 + 5ml × 2
M10391/NCE*	<b>Salmonella H-sera for Phase Induction</b> - This set consists of 17 H-Phase Induction antisera. i.e. a; b; c; d; e, h; G; i; k; L; r; y; e, n; 1; z; z <sub>4</sub> ; Z <sub>10</sub> ; Z <sub>29</sub>	5ml × 17

\* Non CE marked, special order only, please check lead times

\* Denotes an eight week lead time.

# Bacterial Agglutinating Antisera

Order No

Product

Packsize

**mastassure™**

**MAST ASSURE™ ANTISERA** AVAILABLE FROM STOCK

## SALMONELLA O ANTISERA - MONOVALENT

M10310	Salmonella O Factor O2	2ml
M10311	Salmonella O Factor O4	2ml
M10312	Salmonella O Factor O7	2ml
M10313	Salmonella O Factor O8	2ml
M10314	Salmonella O Factor O9	2ml
M10316	Salmonella O Factor O3,10	2ml
M10321	Salmonella O Factor O6,14	2ml
M10326	Salmonella O Factor Vi	2ml

## SALMONELLA O ANTISERA - POLYVALENT

M10308	POLY O Factor O2, O4, O7, O8, O9, O9, 46, O3, 10 and O1,3,19	2ml
M10309	POLY O1 Factor O11, O13, O6, 14, O16, O18, O21, O35	2ml
M14294	POLY O A-G	2ml
M14300	POLY O A-S	2ml
M92537	Omnivalent (Kauffmann-White group A-067)	2ml

## SALMONELLA H ANTISERA - MONOVALENT

M10327	Salmonella H Factor a	2ml
M10328	Salmonella H Factor b	2ml
M10329	Salmonella H Factor c	2ml
M10330	Salmonella H Factor d	2ml
M10331	Salmonella H Factor e, h	2ml
M14335	Salmonella H Factor G	2ml
M10332	Salmonella H Factor E	2ml
M10333	Salmonella H Factor i	2ml
M10344	Salmonella H Factor 2	2ml
M10345	Salmonella H Factor 5	2ml
M10346	Salmonella H Factor 6	2ml
M10364	Salmonella H Factor f	2ml
M10365	Salmonella H Factor m	2ml
M10366	Salmonella H Factor p	2ml
M10367	Salmonella H Factor q	2ml
M10368	Salmonella H Factor s	2ml
M10369	Salmonella H Factor t	2ml

## SALMONELLA H ANTISERA - POLYVALENT

M14317	POLYVALENT PHASE 1&2 (a-z29)	2ml
M10339	POLYVALENT PHASE 2 (H-1)	2ml
M14324	RAPID DIAGNOSTIC 1 Factors b, d, E, r	2ml
M14331	RAPID DIAGNOSTIC 2 Factors b, E, k, l	2ml
M14348	RAPID DIAGNOSTIC 3 Factors d, E, G, k	2ml

**mast**assure™

**PATHOGENIC  
ESCHERICHIA COLI ANTISERA**

# A. MAST ASSURE™ Pathogenic Escherichia coli Antisera

## 1. Introduction

### a. Escherichia coli and Disease

Escherichia coli (*E. coli*) is a group of Gram negative organisms belonging to the family *Enterobacteriaceae*. They are non-spore forming rods, and most are motile possessing flagella.

Many strains of *E. coli* occur naturally in human and animal intestine where they are the predominant organism in the aerobic commensal flora. Some strains however may be associated with human infection, causing urinary tract infections (the most common cause of acute, uncomplicated urinary tract infection), diarrhoea and gastroenteritis, suppurative lesions, abscesses in a variety of wounds, neonatal septicaemia and meningitis, or with animal infections causing mastitis, pyometria in bitches, coli granulomata in fowls and white scours in calves.

There are four groups of pathogenic *E. coli* that cause diarrhoea, acute gastritis or colitis based on their pathogenic mechanisms:- Enteropathogenic (EPEC), Enterotoxigenic (ETEC), Enteroinvasive (EIEC) and Enterohaemorrhagic (EHEC) or now referred to as Verotoxigenic (VTEC).

- The Enteropathogenic *E. coli* (EPEC) cause infantile enteritis especially in tropical countries, where outbreaks often occur in hospitals resulting in high mortality rates. Such outbreaks in industrialised countries have become uncommon. Symptoms include diarrhoea, stomach ache, fever and vomiting.
- The Enterotoxigenic *E. coli* (ETEC) produce a heat-labile (ST) or a heat-stable (LT) enterotoxin or both. In addition they possess colonisation factors that are specific for the host animal species and which enables the organisms to adhere to the epithelium of the small intestine. Symptoms include diarrhoea, stomach ache, fever and vomiting.
- The Enteroinvasive *E. coli* (EIEC) cause an illness identical to Shigella dysentery in patients of all agents. Symptoms include diarrhoea (with mucus and blood), stomach ache and fever.
- The Verotoxigenic *E. coli* (VTEC) produce one or two Vero cytotoxins (VT1 and VT2). VT1 is closely related to the so-called Shiga toxin produced by strains of *Shigella dysenteriae* 1 and is sometimes called Shiga-like toxin. VTEC organisms cause a range of symptoms from mild, watery diarrhoea to a severe diarrhoea with large amounts of fresh blood in the stool (haemorrhagic colitis). An important complication in children is the Haemolytic uraemic syndrome. Symptoms include diarrhoea (with blood), stomach ache and fever.

The most common groups of diarrhoea causing *E. coli* are given below:-

Pathogenic <i>E. coli</i> group	Common <i>E. coli</i> Serogroup
Enteropathogenic <i>E. coli</i> (EPEC)	O26, O44, O55, O86, O111, O114, O119, O125, O126, O127, O128, O142, O158
Enterotoxigenic <i>E. coli</i> (ETEC)	O6, O8, O15, O20, O25, O27, O63, O78, O85, O115, O148, O153, O159, O167
Enteroinvasive <i>E. coli</i> (EIEC)	O28, O29, O32, O42, O112, O124, O136, O143, O144, O152, O164
Verotoxigenic <i>E. coli</i> (VTEC)	O157

### b. Antigenic characterisation of Escherichia coli

Members of the species *E. coli* possess three main types of surface antigen, the O (somatic), the K (capsular) and the H (flagellar) antigens. The O antigens are heat stable and upon which grouping of the organisms are based. The H and K antigens are heat labile and normally only the H antigens are used for identifying the serotype of an organism further. The term K antigen was originally used collectively for surface or capsular antigens and were divided into three classes L, A and B according to the effect of heat on the agglutinability, antigenicity and antibody binding power. The designations L, A and B are now no longer used and indeed the determination of K antigens is no longer deemed necessary for identification of *E. coli* serotype. Many of the antigens thought to be K antigens are now known not to be K antigens. K antigens are only used diagnostically for example with certain toxigenic *E. coli* of veterinary importance. These toxigenic *E. coli* have pili antigens which are antigenically different from those of other *E. coli*. The pili are important not only for attachment and infection of the organism to the intestinal mucous epithelial cells but also

associated with the organism's ability to produce enterotoxin. The K88 and 987P antigens occur in strains of *E. coli* associated with diarrhoeal disease in swine, and the K99 antigen with diarrhoeal disease in lambs and calves. Enterotoxigenic *E. coli* (ETEC) in humans also have colonisation factor antigens (CFA I, II, and E8775) and there may be others, but they are not routinely used for clinical diagnosis<sup>2</sup>.

In 1947 Kauffmann first proposed a scheme for classifying *E. coli* on the basis of their O antigens. Currently more than 160 O, 90 K and 50 H antigens have been described, and this forms the basis for current serological testing of pathogenic *E. coli*.

### **c. MAST ASSURE™ Pathogenic *E. coli* Antisera: preparation and presentation.**

MAST ASSURE™ Pathogenic *E. coli* Antisera are prepared from rabbits hyperimmunised with standard strains of *E. coli* organisms possessing defined antigenic factors. All sera are heat inactivated at 56°C for 30 minutes, absorbed to remove cross-reacting agglutinins and filter sterilised. The MAST ASSURE™ Pathogenic *E. coli* Antisera provide a comprehensive range of O and H antisera for the determination of O and H antigens of pathogenic *E. coli*. Antigens are identified normally by qualitative slide agglutination or by quantitative tube agglutination tests.

MAST ASSURE™ Pathogenic *E. coli* Antisera are provided as 2ml (or 5ml) amounts in vials with dropper attachments and contain 0.1% sodium azide as preservative. Supplied ready to use. This is sufficient for 50 (125) slide agglutination tests or 20 (50) tube agglutination tests.

## **2. Culture of *E. coli* - Preparation for Serology**

*E. coli* belong to the family Enterobacteriaceae and there is much cross-reaction and antigenic relationships between *E. coli* and other genera within this family particularly *Shigellae*. Hence it is important that organisms undergoing serological classification should be correctly identified as *E. coli* by morphological and biochemical features first.

## **3. Pathogenic *E. coli* O -Grouping and H -Typing Antisera Products**

Table 1 lists the MAST ASSURE™ Polyvalent Pathogenic *E. coli* O-Grouping Antisera available together with the product codes, Table 2 lists the MAST ASSURE™ single factor Pathogenic *E. coli* O-Grouping Antisera available and Table 3 lists the MAST ASSURE™ Pathogenic *E. coli* H-Typing Antisera available. It is impractical to provide single factor sera for all known *E. coli* antigens, however a wide range of sera is available in the MAST ASSURE™ range which is sufficient to identify with a reasonable degree of probability the majority of *E. coli* types isolated.

To determine the O-group of a pathogenic *E. coli* isolate, polyvalent O-Grouping antisera should be used initially to narrow down the range before specific grouping sera are used. This is illustrated schematically in Figure 1 and according to methods as detailed in section 4.

MAST ASSURE™ Pathogenic *E. coli* Antisera are also available as convenient sets as listed in Table 4 and comprise of individual bottles of stated antisera.

## **4. Procedures for Serogrouping and Typing, and Interpretation of Results**

MAST ASSURE™ Pathogenic *E. coli* Antisera are intended for use in the identification of O antigens by qualitative slide agglutination, although they may be used in quantitative tube agglutination tests for confirmatory purposes.

Cultures of organisms identified as *E. coli* by their morphological and biochemical features may be serotyped by the following procedures. Also refer to figure 6 for a summary of the Pathogenic *E. coli* O-grouping and H-Typing procedures.

## A. O-Antigen Grouping

### a. Slide Agglutination of live organisms

1. Place two drops of sterile 0.85% saline solution (saline) onto a carefully cleaned microscope slide. The slide may be partitioned into several parts using a chinograph or glass pencil. With an inoculation loop or wire emulsify into each drop of saline a live cell colony from a fresh agar plate or slope culture to produce a distinct and uniform turbidity.
2. Place a drop of polyvalent antiserum onto one of the drops of emulsified isolate and to the other a drop of saline as a control.

**Note:** allow the antiserum to freefall from the dropper provided with the bottle. Do not contaminate the antiserum with organism.

3. Mix the reagents by tilting the slide back and forth for 60 seconds while viewing under indirect light against a dark background.
4. Distinct clumping or agglutination within this period, without clumping in the saline control (auto-agglutination) should be regarded as a positive result.

An isolate producing a distinct positive reaction with a polyvalent antiserum is assumed to be an *E. coli* bearing one or more of the O antigenic factors represented by that antiserum. Using this information, further testing of the isolate should be conducted, as described in steps 1 - 3, with single factor O antisera to reveal the full O antigenic grouping of the isolate.

Always confirm the O grouping by slide agglutination on heat killed organisms (see below).

In general the serogroups covered by polyvalent O antisera D1, D2 and D3 are considered to be enteropathogenic, serogroups covered by polyvalent sera D4, D5 and D6 are considered to be enterotoxigenic, and serogroups covered by polyvalent sera D7 and D8 are considered to be enteroinvasive. These represent the most common O antigenic groups encountered.

### b. Slide Agglutination for heat killed organisms

If the live organisms give a positive reaction with a particular single factor O antiserum, prepare a dense cell suspension of the organism in 0.85% saline and heat the suspension to 100°C for 60 minutes or autoclave at 121°C for 15 minutes then repeat the agglutination test as above using single factor O antiserum on the heated cell suspension. This should be done to identify the O antigen type as distinct from the K antigen.

### c. Interpretation of Results

If both live and heat killed cells of the bacterial isolate, which has been previously morphologically characterised as an *E. coli*, positively agglutinate with a single factor antiserum the organism should be regarded as a pathogenic *E. coli* belonging to the sero-group represented by single factor antiserum. However if the live cells give a positive agglutination result while the heat killed cells do not, the O sero-group cannot be determined as represented by that single factor antiserum.

### d. Tube Agglutination

Quantitative tube agglutination tests may be carried out according to the following method:-

1. The cell suspension should be prepared by removing colonies from a suitable pure agar culture or from a centrifuged and washed broth culture, and resuspending them in sterile saline or 0.5% formal saline to give a fairly light suspension (about  $7.5 \times 10^8$  organisms per ml).

2. Heat the suspension for 1 hour at 100°C to obtain an O antigen suspension. Alternatively a heat treated 4-6 hour broth culture may be used.
3. Make serial dilutions of antisera in 0.5ml volumes of saline, from 1:10 to 1:1280. Round bottomed glass tubes approximately 9 × 85mm are most suitable.
4. To each tube add 0.5ml of the antigen suspension.

**Note:** this doubles the dilution of the antiserum.

5. A control tube should additionally be set up containing 0.5ml of antigen suspension and 0.5ml of saline.
6. Shake the tubes thoroughly and incubate the tubes at 50°C for 16-24 hours.
7. Examine the tubes for agglutination. Positive agglutination will appear as a clearing of the fluid with sediment that rises in a granular mass when the tube is flicked with the finger. The control tube should be cloudy and any sediment should resuspend on flicking. Agglutination titres of 1:20 are not counted as significant. Titres at or near that stated for the antiserum indicate that the antigen is of the O group stated by the antiserum that caused the agglutination.

## **B. H - Antigen Serotyping**

The majority of *E. coli* strains are poorly motile when first isolated; hence it is normally necessary to passage them serially through several tubes of semi-solid agar motility medium to enhance motility and H antigen development. The number of passages required may vary with individual cultures.

### **Tube Agglutination Test**

1. Allow the organism to pass through Craigie tubes with semi-solid nutrient medium 3-5 times. Then inoculate the passaged organism into a suitable nutrient broth tubes and incubate at 37°C for 6-8 hours.
2. After incubation make a 1:2 dilution by adding an equal volume of 0.85% saline containing 1% (v/v) formalin to the culture.
3. Add 2 drops of the required type specific H serum into a small test tube, and add 0.45 - 0.5ml of the treated organism suspension it. As a control prepare a similar tube which contains only the antigen suspension.
4. Shake the contents of the test tube thoroughly and allow the tubes to stand in a water bath at 50-52°C for 1 hour.
5. Observe the tubes for spontaneous and distinct agglutination seen easily with the naked eye. Do not shake them as this will disturb the agglutination pattern. An isolate producing a distinct positive reaction is assumed to be an *E. coli* bearing the H antigenic factors represented by that antiserum.

Quantitative tube agglutination tests may be performed as described in section d above (O - Antigen Grouping, Tube Agglutination Procedure).

## Limitations of the Test

1. The test results obtained when using these sera cannot determine whether a particular organism is pathogenic. To determine pathogenicity it is necessary to test for factors associated with pathogenicity e.g. toxins.
2. In general the serotypes covered by polyvalent sera 1, 2 and 3 are considered to be enteropathogenic, serotypes covered by polyvalent sera 4, 5 and 6 are considered to be enterotoxigenic, and serotypes covered by polyvalent sera 7 and 8 are considered to be enteroinvasive. However, it must be noted that there are other pathogenic *E. coli* that are not covered by these antisera.
3. Organisms must be morphologically and biochemically characterised as being an *E. coli* before testing with the antisera as cross-reactions with closely related members of the Enterobacteriaceae may occur.

**Table 1 - MAST ASSURE™ Pathogenic *E. coli* Polyvalent O Antisera Details**

Mast Product Code	MAST ASSURE™ Pathogenic <i>E. coli</i> O Antisera	O serotypes detected
M12005*	<i>E. coli</i> O - Polyvalent D1	O1; O26; O86a; O111; O119; O127a, O128;
M12006*	<i>E. coli</i> O - Polyvalent D2	O44; O55; O125; O126; O146; O166
M12007*	<i>E. coli</i> O - Polyvalent D3	O18; O114; O142; O151; O157; O158
M12008*	<i>E. coli</i> O - Polyvalent D4	O6; O27; O78; O148; O159; O168
M12009*	<i>E. coli</i> O - Polyvalent D5	O20; O25; O63; O153; O167
M12010*	<i>E. coli</i> O - Polyvalent D6	O8; O15; O115; O169
M12011*	<i>E. coli</i> O - Polyvalent D7	O28ac; O112ac; O124; O136; O144
M12012*	<i>E. coli</i> O - Polyvalent D8	O29; O143; O152; O164
M14263	<i>E. coli</i> O - Polyvalent 2	O26; O55; O111; O119; O126
M14270	<i>E. coli</i> O - Polyvalent 3	O86; O114; O125; O127; O128
M14287	<i>E. coli</i> O - Polyvalent 4	O44; O112; O124; O142

\* Denotes an eight week lead time.



**Table 2 - MAST ASSURE™ Pathogenic *E. coli* Single Factor O-Grouping Antisera**

Mast Product Code	<i>E. coli</i> O Serotype
M12013*	O1
M12014	O26
M12015*	O86a
M12016	O111
M12017	O119
M12018	O127a
M12019*	O128
M12020*	O44
M12021*	O55
M12022*	O125
M12023*	O126
M12024*	O146
M12025*	O166
M12026*	O18
M12027*	O114
M12028*	O142
M12029*	O151
M12030	O157
M12031*	O158
M12032*	O6
M12033*	O27
M12034*	O78
M12035*	O148
M12036*	O159
M12037*	O168
M12038*	O20
M12039*	O25
M12040*	O63
M12041*	O153
M12042*	O167
M12043*	O8
M12044*	O15
M12045*	O115
M12046*	O169
M12047*	O28ac
M12048*	O112ac
M12049*	O124
M12050*	O136
M12051*	O144
M12052*	O29
M12053*	O143
M12054*	O152
M12055*	O164

\* Denotes an eight week lead time.

**Table 3 - MAST ASSURE™ Pathogenic *E. coli* Single Factor H -Typing Antisera**

Mast Product Code	<i>E. coli</i> H Serotype
M12056*	H-2
M12057*	H-4
M12058*	H-5
M12059*	H-6
M12060*	H-7
M12061*	H-9
M12062*	H-10
M12063*	H-11
M12064*	H-12
M12065*	H-16
M12066*	H-18
M12067*	H-19
M12068*	H-20
M12069*	H-21
M12070*	H-27
M12071*	H-28
M12072*	H-34
M12073*	H-40
M12074*	H-41
M12075*	H-42
M12076*	H-45
M12077*	H-51

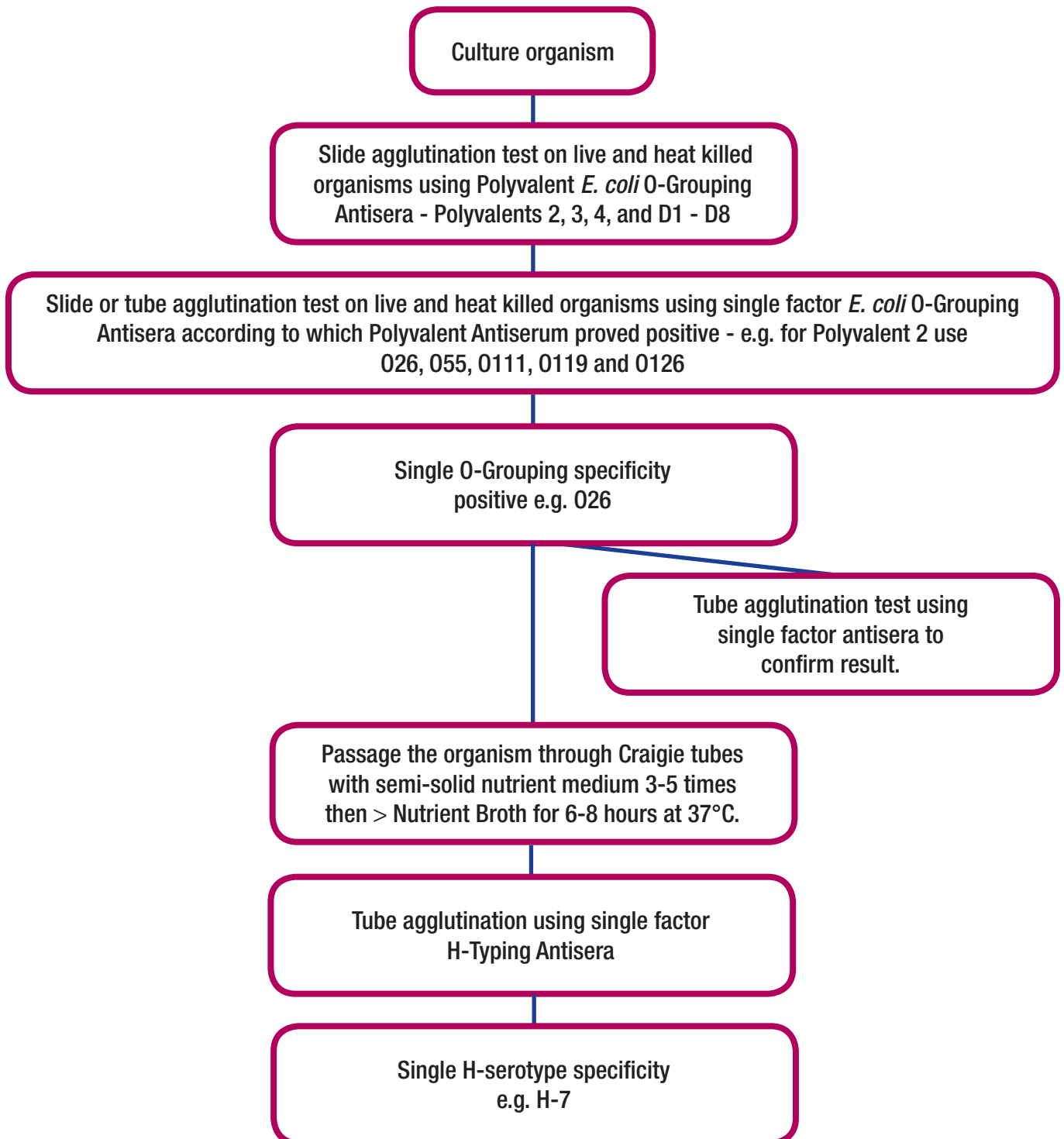
\* Denotes an eight week lead time.

**Table 4 - MAST ASSURE™ Pathogenic *E. coli* Polyvalent O-Grouping and H-Typing Antisera Sets**

Mast Product Code	MAST ASSURE™ Pathogenic <i>E. coli</i> Antisera Set components	Comments
M12001*	<b><i>E. coli</i> O Antisera Set 1</b> - This set consists of 8 O-Grouping Polyvalent Antisera and 43 single factor O-Grouping antisera. i.e. Polyvalent. D1 - D8, and single factor sera O1; O26; O86a; O111; O119; O127a, O128; O44; O55; O125; O126; O146; O166; O18; O114; O142; O151; O157; O158; O6; O27; O78; O148; O159; O168; O20; O25; O63; O153; O167; O8; O15; O115; O169; O28ac; O112ac; O124; O136; O144; O29; O143; O152; O164.	2ml × 51
M12002*	<b><i>E. coli</i> O Antisera Set 2</b> - This set consists of 22 H-Typing Antisera. i.e. 2; 4; 5; 6; 7; 8; 9; 10; 11; 12; 16; 18; 19; 20; 21; 27; 28; 34; 40; 42; 45; 51	5ml × 22

\* Denotes an eight week lead time.

Figure 1- Summary of Pathogenic *E. coli* O-Grouping and H-Serotyping Procedures



This document does not replace the IFU's intended for use with these products. It is primarily aimed at being a resource for education, training and a guide for a laboratory writing Standard Operating Procedures looking at the more traditional methods associated with bacterial agglutinating sera

References available upon request.

# Bacterial Agglutinating Antisera

Order No

Product

Packsize

---

**mastassure™**

**MAST ASSURE™ ANTISERA** AVAILABLE FROM STOCK

## **E.COLI O ANTISERA - MONOVALENT**

M12014	<i>Escherichia coli</i> Factor O26	2ml
M12016	<i>Escherichia coli</i> Factor O111	2ml
M12017	<i>Escherichia coli</i> Factor O119	2ml
M12018	<i>Escherichia coli</i> Factor O127a	2ml
M12030	<i>Escherichia coli</i> Factor O157	2ml

---

## **E.COLI O ANTISERA - POLYVALENT**

AVAILABLE FROM STOCK

M14263	<i>E. coli</i> POLY 2 Factors O26, O55, O111, O119, O126	2ml
M14270	<i>E. coli</i> POLY 3 Factors O86, O114, O125, O127, O128	2ml
M14287	<i>E. coli</i> POLY 4 Factors O44, O112, O124, O142	2ml

---



**mast**assure™

**SHIGELLA ANTISERA**

# A. MAST ASSURE™ Shigella Antisera

## 1. Introduction

### a. Shigella and Disease

The genus *Shigella* is a group of Gram negative organisms belonging to the family *Enterobacteriaceae* and is closely related to the genus *Escherichia*. They are non-spore forming rods that possess no flagella and hence are non-motile.

Shigellae are the causative agents of classic bacillary dysentery. The disease is usually spread via the faecal-oral route, though occasional epidemics have been traced to unchlorinated water supplies. The disease is endemic in most warm-climate countries and is also prevalent in many countries with a temperate climate. In the UK and other countries outbreaks are common in institutions and schools where more lax sanitation allows spread of organism.

The disease varies in severity according to species and serotype of the causal organism, but is characterised by severe blood stained, mucopurulent diarrhoea accompanied by fever and malaise. A brief episode of watery diarrhoea often precedes the severe bloody flux. In the more virulent forms such as that caused by *Shigella dysenteriae* symptoms such as severe water and electrolyte loss from the small intestine are caused by toxin production, and indeed the infectious dose of organisms required to produce disease is small. After reaching the large intestine the organisms multiply in the gut lumen where many adhere to and invade epithelial cells of the gut mucosa. Organisms then multiply within the epithelial cells and spread to adjacent cells and patches of necrotic epithelial cells slough off and ulcers form. A cellular immune response occurs resulting in the presence of large numbers of polymorphonuclear phagocytes, which can be readily observed on microscopic examination of the stool.

Laboratory diagnosis of Shigella infection usually depends upon the isolation and identification of the causal organism from a specimen of the patient's blood or faeces. Microscopic examination of the specimen is normally conducted to be able to distinguish bacterial dysentery from amoebic dysentery and to note the cellular exudate. Further antigenic analysis of the organism is often needed to identify the species or strain for epidemiological purposes.

### b. Antigenic characterisation of Shigellae

Modern classification of Shigellae owe much to Ewing who built on the foundation of Murray, Andrews and Inman and Boyd whose recognition of type specific and group specific antigens introduced some system into the serological analysis of Shigellae. Shigellae are currently differentiated into four subgroups on the basis of their O (somatic) antigens and further differentiated into serotypes as detailed below:-

- Group A** - *Sh. dysenteriae*, contains 12 distinct antigenic serotypes.
- Group B** - *Sh. flexneri*, contains 6 serotypes (I-VI) that can be divided further into sub serotypes according to their possession of group factors designated 3,4; 4; 6; 7; and 7, 8 (see Table1).
- Group C** - *Sh. boydii*, contains 18 distinct antigenic serotypes.
- Group D** - *Sh. sonnei*, contains only one distinct serotype that may occur in two forms, phase I (smooth) and phase II (rough).

**Table 1 - Antigenic Structure of *Sh. flexneri***

Serotype	Sub serotype	Type antigen	Group antigen*
1	1a	I	4
1	1b	I	4,6
2	2a	II	3,4
2	2b	II	7,8
3	3a	III	(3,4),6,7,8
3	3b	III	(3,4),6
4	4a	IV	3,4
4	4b	IV	6
5	5a	V	3,4
5	5b	V	7,8
6		VI	(4)
X variant		-	7,8
Y variant		-	3,4

\* Not all group antigens are listed.

### c. MAST ASSURE™ Shigella Antisera: preparation and presentation.

MAST ASSURE™ Shigella Antisera are prepared from rabbit's hyperimmunised with standard strains of Shigella organisms possessing defined antigenic factors. All sera are heat inactivated at 56°C for 30 minutes, absorbed to remove cross-reacting agglutinins and filter sterilised. The MAST ASSURE™ Shigella Antisera are a comprehensive range of polyvalent and single specificity antisera for the agglutination of specific O serotype and group antigens of Shigellae. Antigens are identified normally by qualitative slide agglutination. Positive results may be confirmed by tube agglutination tests.

All MAST ASSURE™ Shigella Antisera are provided as 2ml amounts in vials with dropper attachments and contain 0.1% sodium azide as preservative. Supplied ready to use. This is sufficient for 50 slide agglutination tests or 20 tube agglutination tests. Supplied ready to use with no preservative is added.

## 2. Culture of Shigella - Preparation for Serology

Shigella belongs to the family *Enterobacteriaceae* and there is much cross-reaction and antigenic relationships between *Shigella* and other genera within this family especially between the genus *Escherichia*. Hence it is important that organisms undergoing serological classification should be correctly identified as Shigella by morphological and biochemical features first.

## 3. MAST ASSURE™ Shigella Typing and Grouping Antisera Products

Table 2 lists the MAST ASSURE™ Shigella Typing and Grouping Antisera available, including monovalent and polyvalent antisera, together with the product codes. Antisera are also available as convenient sets and comprise of individual bottles of antisera as stated.

**Table 2 - Mast Assure™ Shigella Grouping and Typing Antisera**

Order Code	Product	Serotype
M10109	<i>Sh. dysenteriae</i> Polyvalent A	Types 1, 2, 3, 4, 5, 6 and 7
M10110	<i>Sh. dysenteriae</i> Polyvalent A1	Types 8, 9, 10, 11 and 12
M10116	<i>Sh. dysenteriae</i> type 1	Type 1
M10117*	<i>Sh. dysenteriae</i> type 2	Type 2
M10118*	<i>Sh. dysenteriae</i> type 3	Type 3
M10119*	<i>Sh. dysenteriae</i> type 4	Type 4
M10120*	<i>Sh. dysenteriae</i> type 5	Type 5
M10121*	<i>Sh. dysenteriae</i> type 6	Type 6
M10122*	<i>Sh. dysenteriae</i> type 7	Type 7
M10123*	<i>Sh. dysenteriae</i> type 8	Type 8
M10124*	<i>Sh. dysenteriae</i> type 9	Type 9
M10125*	<i>Sh. dysenteriae</i> type 10	Type 10
M10152*	<i>Sh. dysenteriae</i> type 11	Type 11
M10153*	<i>Sh. dysenteriae</i> type 12	Type 12
M10111	<i>Sh. flexneri</i> Polyvalent B	Types I, II, III, IV, V, and VI and groups (3) 4, 6 and 7 (8)
M10126	<i>Sh. flexneri</i> type I	Type I
M10127	<i>Sh. flexneri</i> type II	Type II
M10128*	<i>Sh. flexneri</i> type III	Type III
M10129*	<i>Sh. flexneri</i> type IV	Type IV
M10130	<i>Sh. flexneri</i> type V	Type V
M10131	<i>Sh. flexneri</i> type VI	Type VI
M10132*	<i>Sh. flexneri</i> group (3)4	Group (3) 4
M10133*	<i>Sh. flexneri</i> group 6	Group 6
M10134*	<i>Sh. flexneri</i> group 7(8)	Group 7 (8)
M10112	<i>Sh. boydii</i> Polyvalent C	Types 1, 2, 3, 4, 5, 6, and 7
M10113	<i>Sh. boydii</i> Polyvalent C1	Types 8, 9, 10 and 11
M10114	<i>Sh. boydii</i> Polyvalent C2	Types 12, 13, 14 and 15
M10154	<i>Sh. boydii</i> Polyvalent C3	Types 16, 17 and 18
M10135*	<i>Sh. boydii</i> type 1	Type 1
M10136	<i>Sh. boydii</i> type 2	Type 2
M10137*	<i>Sh. boydii</i> type 3	Type 3
M10138*	<i>Sh. boydii</i> type 4	Type 4
M10139*	<i>Sh. boydii</i> type 5	Type 5
M10140*	<i>Sh. boydii</i> type 6	Type 6
M10141*	<i>Sh. boydii</i> type 7	Type 7
M10142*	<i>Sh. boydii</i> type 8	Type 8
M10143*	<i>Sh. boydii</i> type 9	Type 9
M10144*	<i>Sh. boydii</i> type 10	Type 10
M10145*	<i>Sh. boydii</i> type 11	Type 11
M10146*	<i>Sh. boydii</i> type 12	Type 12
M10147*	<i>Sh. boydii</i> type 13	Type 13
M10148*	<i>Sh. boydii</i> type 14	Type 14
M10149*	<i>Sh. boydii</i> type 15	Type 15
M10155*	<i>Sh. boydii</i> type 16	Type 16
M10156*	<i>Sh. boydii</i> type 17	Type 17
M10157*	<i>Sh. boydii</i> type 18	Type 18
M10115	<i>Sh. sonnei</i> Polyvalent D	Phase I and II

\* Denotes an eight week lead time.



**Table 2 - Mast Assure™ Shigella Grouping and Typing Antisera (CONTINUED)**

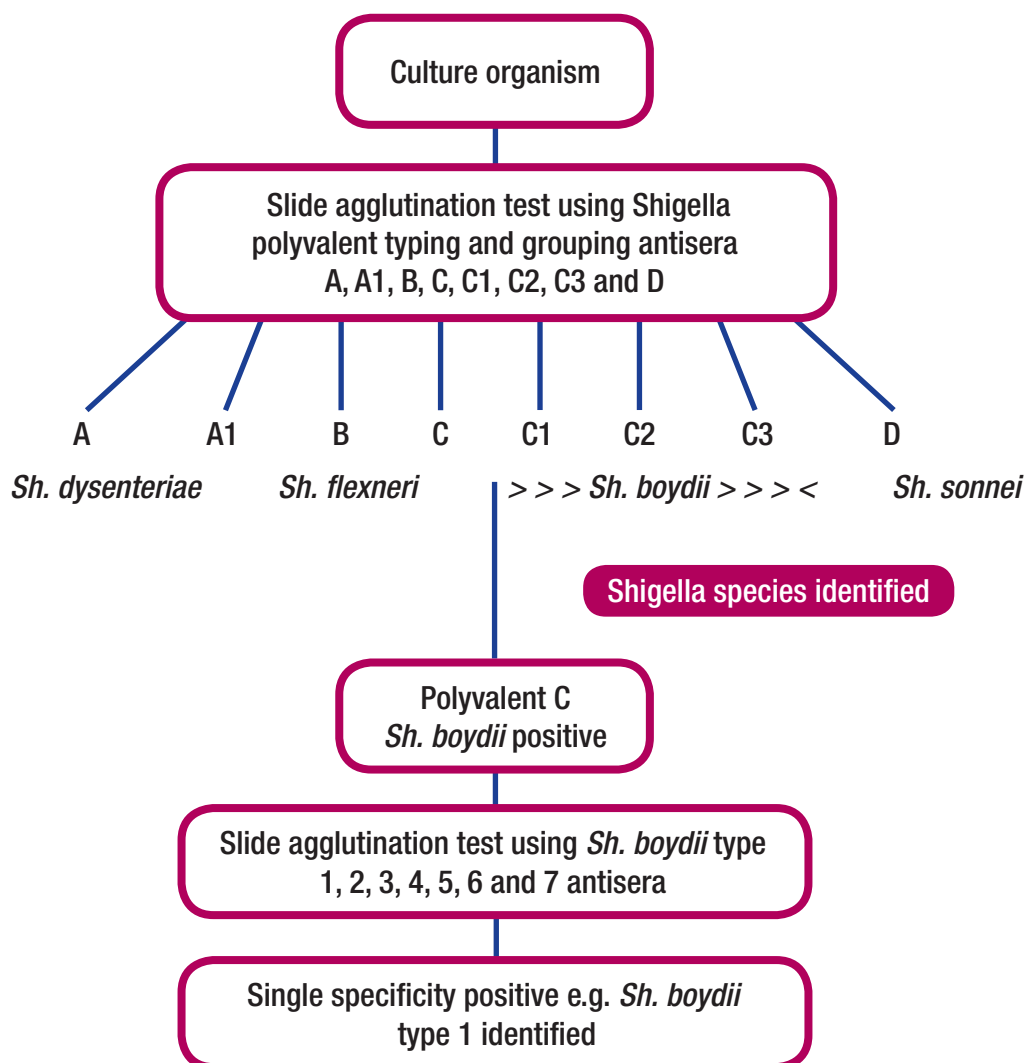
Order Code	Product	Serotype
M10150	<i>Sh. sonnei</i> phase I	Phase I
M10151	<i>Sh. sonnei</i> phase II	Phase II
M10104*	Shigella Antisera Set 1	8 Polyvalent - A, A1, B, C, C1, C2, C3, and D, and 41 monovalent sera constituting the above polyvalent sera.
M10105*	Shigella Antisera Set 2	8 Polyvalent - A, A1, B, C, C1, C2, C3, and D, and 11 monovalent sera covering all <i>Sh. flexneri</i> types and groups and <i>Sh. sonnei</i> phase I and II
M10106*	Shigella Antisera Set 3	8 Polyvalent sera - A, A1, B, C, C1, C2, C3, and D.

\* Denotes an eight week lead time.

MAST ASSURE™ Shigella Typing and Grouping Antisera are intended for use in the identification of O antigens by qualitative slide agglutination.

Cultures of organisms identified as *Shigella* by their morphological and biochemical features may be serotyped by the following procedures. To determine the Type, Group or Phase of Shigella species isolate, polyvalent antisera should be used initially to narrow down the range before specific sera are used. This is illustrated schematically in Figure 1.

**Figure 1 - Summary of Shigella Sero-grouping and Typing Procedures**



1. Place two drops of sterile 0.85% saline solution (saline) onto a carefully cleaned microscope slide. The slide may be partitioned into several parts using a chimograph or glass pencil. With an inoculation loop or wire emulsify into each drop of saline a live cell colony from a fresh agar plate or slope culture to produce a distinct and uniform turbidity.
2. Place a drop of polyvalent antiserum onto one of the drops of emulsified isolate and to the other a drop of saline as a control.

**Note:** allow the antiserum to freefall from the dropper provided with the bottle. Do not contaminate the antiserum with organism.

3. Mix the reagents by tilting the slide back and forth for 60 seconds and while viewing under indirect light against a dark background.
4. Distinct clumping or agglutination within this period, without clumping in the saline control (auto-agglutination) should be regarded as a positive result. Weak agglutination should be counted as negative.

An isolate producing a distinct positive reaction with a polyvalent antiserum is assumed to be a *Shigella* from the letters (A-D) represented by the antiserum. Using this information, further testing of the isolate should be conducted, as described in steps 1 - 4, with monovalent antisera. If the organism is identified as *Sh. flexneri* it should be typed and grouped separately.

5. If the live cells do not produce positive agglutination, prepare a dense cell suspension of the organism in 0.85% saline and heat the suspension to 100°C for 60 minutes or autoclave at 121°C for 15 minutes then repeat the agglutination tests as described in steps 1 - 3. Some *Shigellae* strains possess heat labile capsular (K) antigens, which mask the presence of the heat stable somatic (O) antigens.

## Bacterial Agglutinating Antisera

Order No	Product	Packsize
----------	---------	----------

**mastassure™**

**MAST ASSURE™ ANTISERA** AVAILABLE FROM STOCK

### SHIGELLA ANTISERA - MONOVALENT

M10116	<i>Shigella dysenteriae</i> Type 1	2ml
M10126	<i>Shigella flexneri</i> Type I	2ml
M10127	<i>Shigella flexneri</i> Type II	2ml
M10130	<i>Shigella flexneri</i> Type V	2ml
M10131	<i>Shigella flexneri</i> Type VI	2ml
M10136	<i>Shigella boydii</i> Type 2	2ml
M10150	<i>Shigella sonnei</i> Phase I	2ml
M10151	<i>Shigella sonnei</i> Phase II	2ml

### SHIGELLA ANTISERA - POLYVALENT

M10109	<i>S.dysenteriae</i> POLY A Types 1, 2, 3, 4, 5, 6, 7	2ml
M10110	<i>S.dysenteriae</i> POLY A1 Types 8, 9, 10, 11, 12	2ml
M10111	<i>S.flexneri</i> POLY B Types I, II, III, IV, V, VI, (Groups (3)4, 6 & 7 (8)	2ml
M10112	<i>S.boydii</i> POLY C Types 1, 2, 3, 4, 5, 6, 7	2ml
M10113	<i>S.boydii</i> POLY C1 Types 8, 9, 10, 11	2ml
M10114	<i>S.boydii</i> POLY C2 Types 12, 13, 14, 15	2ml
M10154	<i>S.boydii</i> POLY C3 Types 16, 17, 18	2ml
M10115	<i>S.sonnei</i> POLY D Phase I & II	2ml



**mastassure™**

**VIBRIO CHOLERAEE  
ANTISERA**

# A. MAST ASSURE™ *Vibrio cholerae* Antisera

## 1. Introduction

### a. *Vibrio cholerae* and Disease

*Vibrio cholerae* belongs to the genus *Vibrio* which are Gram negative aerobic or facultative anaerobic comma shaped rods, they are fermentative and nearly all are oxidase positive. They are motile possessing a single polar flagellum.

Cholera is typically characterised by the sudden onset of effortless vomiting and profuse watery diarrhoea. Although vomiting is a common feature the rapid onset of dehydration and hypovolaemic shock, which may cause death in 12 - 24 hours, are related mainly to the profuse, watery, colourless stools with flecks of mucus and a distinctive fishy smell ('rice-water' stools) which contain little protein and are very different from the mucopurulent blood-stained stools of bacillary dysentery. Anuria develops, muscle cramps occur and the patient quickly becomes weak with loss of skin turgor, low blood pressure and an absent or thready pulse. Symptoms vary in severity and milder cases cannot be easily distinguished from other secretory diarrhoeas. Symptomless infections are also common.

Laboratory diagnosis involves culturing the vibrios from stool specimens in alkaline peptone water followed by surface inoculation onto a suitable solid medium such as thiosulphate-citrate-bile salts-sucrose agar (TCBS). On this medium *Vibrio cholerae* strains appear as yellow sucrose-fermenting colonies. Colonies may subsequently be assessed for oxidase production, biochemical confirmatory tests and agglutination by antisera.

### b. Antigenic characterisation of *Vibrio cholerae*

Taxonomically *Vibrio cholerae* is a homogeneous species comprising of organisms that are similar to each other biochemically, share a common H (flagellar) antigen and are closely related genetically. The serology of *Vibrio cholerae* is based on the Somatic O antigen scheme of Sakazaki et al. Now more than 80 Serogroup have been identified within the species. Serogroup O1 organisms comprise the causal agents of most epidemic and pandemic cholera outbreaks. A series of pandemic outbreaks of O1 cholera originating in the Bengal basin ravaged the world in the 19th and early 20th centuries. The strain responsible for the seventh outbreak was labelled the El Tor biotype as it was isolated from pilgrims at the quarantine station known as El Tor. Other outbreaks have been attributed to the classical biotype strains.

Strains of *Vibrio cholerae* serotype O1 may be subdivided with absorbed antisera into serovars called Ogawa, Inaba and Hikojima. These serovars share three somatic antigens - a, b and c. Absorption of O1 antisera with Ogawa organisms produces a serum which agglutinates Inaba and Hikojima strains. Similarly, absorption of O1 antisera with Inaba organisms produces a serum which agglutinates Ogawa and Hikojima strains. Unabsorbed serum (containing a, b and c) called 'polyclonal *Vibrio cholerae* antiserum agglutinates all three O1 variants.

Non-O1 *Vibrio cholerae* cause mild, sometimes bloody diarrhoea, often accompanied by abdominal cramps. Symptoms may occasionally be severe in which case the disease resembles cholera. Also some non-O1 strains produce virulence factors including toxins. Hence it may be important for epidemiological purposes to serotype the strain in an isolate.

In the early 1990's a new serotype of *Vibrio cholerae* was found to be the causative agent of a pandemic in India and Bangladesh, and was named serotype O139. It gives rise to an infection as serious as those caused by serotype O1.

### c. MAST ASSURE™ *Vibrio cholerae* Antisera: preparation and presentation.

MAST ASSURE™ *Vibrio cholerae* antisera are prepared from rabbits hyperimmunised with standard strains of *Vibrio cholerae* O1 Inaba type and Ogawa type or O139 Bengal type organisms. All sera are heat inactivated at 56°C for 30 minutes, absorbed to remove cross-reacting agglutinins and filter sterilised.

MAST ASSURE™ - VIBRIO CHOLERAEE Antisera are a set of antisera for the agglutination of specific *Vibrio cholerae* O1 antigens and the O139 (Bengal) antigen. Antigens are identified normally by qualitative slide agglutination. Positive results may be confirmed by tube agglutination tests.

All MAST ASSURE™ - VIBRIO CHOLERAEE Antisera are provided as 2ml amounts in vials with dropper attachments and contain 0.1% sodium azide as preservative. Supplied ready to use. This is sufficient for 50 slide agglutination tests or 20 tube agglutination tests. Supplied ready to use with no preservative is added.

## 2. Culture of *Vibrio cholerae* - Preparation for Serology

It is important that organisms undergoing serological classification should be correctly identified as *Vibrio cholerae* by morphological and biochemical features first.

## 3. MAST ASSURE™ *Vibrio cholerae* Antisera Products

Table 1 lists the MAST ASSURE™ *Vibrio cholerae* Antisera available, including monovalent and polyvalent antisera, together with the product codes.

**Table 1 - Mast Assure™ *Vibrio cholerae* Antisera**

Order Code	Product
M11002	<i>Vibrio cholerae</i> Polyvalent (O1) - Serovar Inaba and Ogawa
M11003	<i>Vibrio cholerae</i> (O1) - Serovar Inaba
M11004	<i>Vibrio cholerae</i> (O1) - Serovar Ogawa
M15001	<i>Vibrio cholerae</i> O139 "Bengal"
M11001*	<i>Vibrio cholerae</i> (O1) Antisera Set consisting of 1X Polyvalent antiserum - Serovar Inaba and Ogawa 2X Monovalent antisera - Serovar Inaba and serovar Ogawa

\* Denotes an eight week lead time.

## 4. Procedures for O Antigen Typing *Vibrio Cholerae* Isolates and Interpretation of Results

Cultures of organisms identified as *Vibrio cholerae* by their morphological and biochemical features may be serotyped by the following procedures.

1. Place two drops of sterile 0.85% saline solution (saline) onto a carefully cleaned microscope slide. The slide may be partitioned into several parts using a chimograph or glass pencil. With an inoculation loop or wire emulsify into each drop of saline a live cell colony from a fresh agar plate or slope culture to produce a distinct and uniform turbidity.
2. Place a drop of polyvalent antiserum onto one of the drops of emulsified isolate and to the other a drop of saline as a control.

**Note:** allow the antiserum to freefall from the dropper provided with the bottle. Do not contaminate the antiserum with organism.

3. Mix the reagents by tilting the slide back and forth for 60 seconds while viewing under indirect light against a dark background.
4. Distinct clumping or agglutination within this period, without clumping in the saline control (auto-agglutination) should be regarded as a positive result.
5. Specimens that show agglutination only with Inaba-type serum should be reported as *Vibrio cholerae* O1 serovar Inaba and specimens that show agglutination only with Ogawa-type serum should be reported as *Vibrio cholerae* O1 serovar Ogawa. Specimens that show agglutination both types of serum should be reported as *Vibrio cholerae* O1 serovar Hikojima. Specimens that show agglutination only with O139 Bengal serum should be reported as *Vibrio cholerae* O139 Bengal.

**Note:-** it should be remembered that El Tor biotype of *Vibrio cholerae* O1 cannot be distinguished from the classical biotype by serological means.

IVD solutions through partnership

**Mast Group** 

**mastassure™**

Bacterial Agglutinating Antisera  
and Febrile Antigens

*E. coli*  
*Salmonella*  
*Haemophilus*

*Shigella*  
*Vibrio*  
*Campylobacter*

*Bordetella*  
*Clostridium*  
*Legionella*  
*Pseudomonas*  
*Staphylococcus*  
*Listeria*  
*Streptococcus*  
*Yersinia*  
*Proteus*  
*Brucella*



- High quality performance
- Reliable identification
- Easy to read
- Extensive range available

V 1.0 SJW 10/16

**United Kingdom**  
Mast Group Ltd.  
Mast House  
Derby Road, Bootle  
Merseyside L20 1EA

Tel: + 44 (0) 151 933 7277  
Fax: + 44 (0) 151 944 1332  
e-mail: sales@mastgrp.com

**Germany**  
Mast Diagnostica GmbH  
Feldstrasse 20  
DE-23858 Reinfeld

Tel: + 49 (0) 4533 2007 0  
Fax: + 49 (0) 4533 2007 68  
e-mail: mast@mast-diagnostica.de

**France**  
Mast Diagnostic  
12 Rue Jean-Jacques Mention  
CS 91106  
80011 Amiens CEDEX 1

Tél. + 33 (0) 322 80 80 67  
Fax + 33 (0) 322 80 99 22  
e-mail: info@mast-diagnostic.fr

[www.mastgrp.com](http://www.mastgrp.com)

IVD solutions through partnership



**PRODUCT CATALOGUE**  
2021-2022

# Welcome

Welcome to the Mast Group Ltd product catalogue effective from January 1st 2021. The catalogue comprises ordering information on Mast Group Ltd's extensive portfolio of products available internationally and includes details of our revised Custom Manufacturing Policy (Page vi). This states the lead times and minimum order quantities for special order custom manufactured goods.

With an easy to use contents included, the product groups are categorised into application specific sections, and any new additions are highlighted to assist customers in finding products of interest.

## Quality

Mast Group Ltd is currently certified to ISO9001:2015 'Quality management systems - Requirements', ISO13485:2016 'Medical devices – Quality management systems – Requirements for regulatory purposes', European Directive 98/79/EC 'on in vitro diagnostic medical devices' for Annex II list B products and for ISO13485:2016 for the Canadian Medical Device Requirements (CMDCAS).



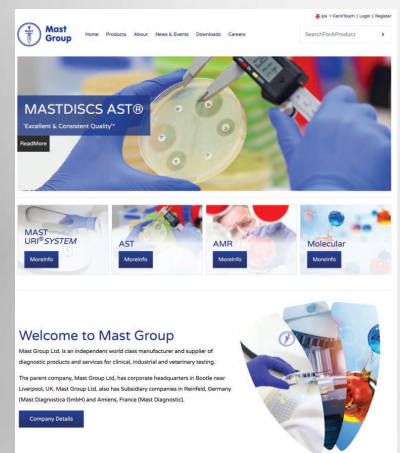
## Ethical Statement

Mast Group Ltd operates its business legally and ethically and complies with the British In Vitro Diagnostic Association (BIVDA) Code of Conduct. Mast Group Ltd is also dedicated to ensuring full compliance with the UK Bribery Act 2010, and this policy extends to all business associates, dealings and transactions. For more information go to [www.mast-group.com](http://www.mast-group.com)



## Website

This Catalogue is available electronically from our website:  
[www.mast-group.com](http://www.mast-group.com)





# Ordering Information | 2021

We are pleased to accept International orders by telephone, post, fax and e-mail. Please have the following information available when ordering:

1. **A valid order number for an approved Credit Account**
2. **Delivery address**
3. **Invoice address**
4. **Product code, description, packsize and quantity required**

Please direct all orders to:

**Mast Group Ltd**  
**Mast House**  
**Derby Road**  
**Bootle**  
**Merseyside**  
**UK**  
**L20 1EA**

**Tel: +44 151 472 1444 Customer Services**  
**Tel: +44 151 933 7277 Main Switchboard**

**e-mail: [orders@mast-group.com](mailto:orders@mast-group.com)**  
**Website: [www.mast-group.com](http://www.mast-group.com)**

## PRICING

Outside the UK Mast Group Ltd sells and distributes products via its Subsidiary Companies in Germany and France and an associate company in South Africa. The rest of the world is serviced by a network of Distributors.

Please contact your nearest Subsidiary or Distributor for pricing information.

Any prices quotes direct from Mast House are ex-works and exclude freight unless otherwise stated in a specific quotation.

Please note VAT at the current rate will be applied to all orders from UK based purchasers. This will also apply to other EU customers unless a VAT number is provided.

Products designated as Hazardous Goods will be subject to an additional handling charge dependent on destination and mode of transport.

## RETURNS

Should you need to return any items to Mast Group Ltd, please contact Mast Customer Services as detailed above.

**Goods supplied correctly may not be returned without prior written agreement and authorisation number, which may be obtained from Customer Services.**

Goods so returned must be consigned carriage paid, and a restocking and handling charge of 15% will be made on all goods returned for credit.

Credit will only be awarded once a full assessment of re-saleable condition has been made.

Goods may not be returned if the packaging has been defaced in any way.

## CANCELLATIONS

An order for products available from stock may be cancelled at any time prior to the despatch of the order without incurring any additional charges. Cancellation of an order which has been despatched will incur a 15% restocking fee.

Cancellation of products for Special order will be subject to a charge equivalent to 100% of the value of the Special order products if the order has been processed.

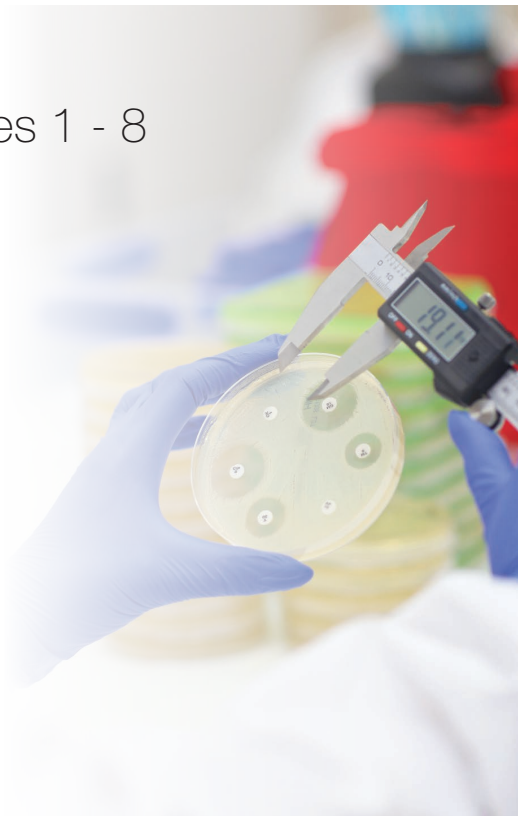
## CONDITIONS OF SALE

Mast Group Ltd's standard Terms and Conditions for Supply of Goods and/or Services apply to all transactions. A copy can be found on pages 43-44 of this publication and at [www.mast-group.com](http://www.mast-group.com)

## Antibiotic Susceptibility Testing | Pages 1 - 8

Mast Group Ltd has been a manufacturer of antibiotic susceptibility test products since 1957, and continues to be at the forefront of developments in this field. Mast Group Ltd's original product was the single antibiotic disc, but the expansion of the portfolio has resulted in the most comprehensive range available worldwide.

MAST® DISCMASTER 5 System  
MASTDISCS®  
ESβL & AmpC Discs  
Carbapenemase discs  
Antibiotic Strips  
MASTRING-S®  
ADATAB®



## MAST URI®SYSTEM | Page 9 - 10

The MAST URI®SYSTEM is a group of instrumentation, software and consumables that facilitates the rapid microbiological examination of urine samples to differentiate infected urines from those that are sterile or contaminated. The system will subsequently report bacterial identification and antibiotic susceptibility results on those specimens considered to be significant.

Comprising the MAST URI®PLUS analyser; MAST URI®WELL dispensing aid; MAST URI®PLATES and MAST URI®DOT inoculator with 96 well head and pins, the MAST URI®SYSTEM is designed to deliver results in a fast and cost-effective manner.

## MASTURI®PLATES

A standard range of antibiotic and identification media in 96-well microtitre plates for urine screening.



## Contents

### Culture Media and Supplements | Pages 11 - 17

As a specialist microbiology company, Mast Group Ltd has an extensive range of Dehydrated Culture Media, and selective supplements for the culture, examination, selection, isolation and transport of clinically significant organisms from patient specimens.

Dehydrated Culture Media  
MAST® SELECTATAB & MAST® SELECTAVIAL  
Selective Supplements  
MAST® ID CHROMagar® Candida  
REDIPREP® Prepared Egg media



### General Products | Page 18

Products for general laboratory use which may also be applicable in disciplines other than microbiology.

MAST® BACTERURITEST  
Reliable and inexpensive urine screening method.  
CRYOBANK® is a cryogenic storage system for QC organisms.



## Identification and Detection | Pages 19 - 30

Mast Group Ltd offers a range of products for identification and detection by a variety of methods, incorporating biochemical tests, latex agglutination, agglutinating antisera and molecular biology based assays.

MAST® ID Biochemical tests and reagents  
MAST® Rapid Slide Latex Kits  
MAST® ID Identification Strips and Rings  
Identification of *Haemophilus* spp.  
Identification of *Staphylococcus* spp.  
MAST® ID Discs  
Detection of ESβL & AmpC  
Detection of Carbapenemase  
Identification of MRSA  
Identification of *Candida* spp.  
MAST® ASSURE Bacterial Agglutinating Antisera  
MAST® ASSURE Stained Febrile Antigens

## Veterinary | Page 31

A range of products for the detection and identification of veterinary pathogens. This includes Mast Group Ltd's antibiotic susceptibility testing portfolio which offers custom manufacture to specifically address the causative agents of infectious disease in animals.

Eiken SAA Reagents  
Toxoplasma Detection  
Veterinary Pathogen EIA  
Antibiotic Susceptibility Testing  
Discs and Rings

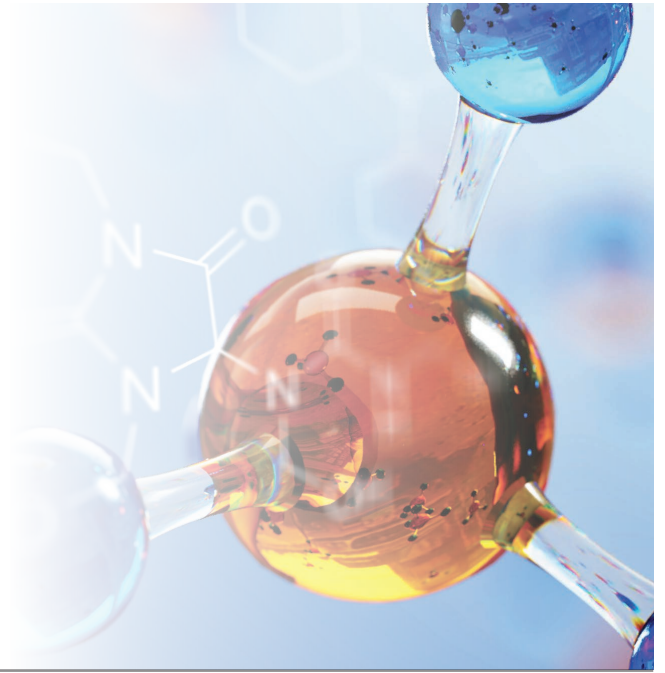
## Contents

### Molecular Biology | Page 32

Mast Group Ltd's molecular portfolio offers laboratories the ability to achieve rapid and reliable diagnosis by nucleic acid amplification.

#### MAST ISOPLEX®

A range of rapid Isothermal nucleic acid amplification tests.



## **Mast Group Ltd Immunodiagnostic Tests** | Pages 33 - 35

### Infectious Disease

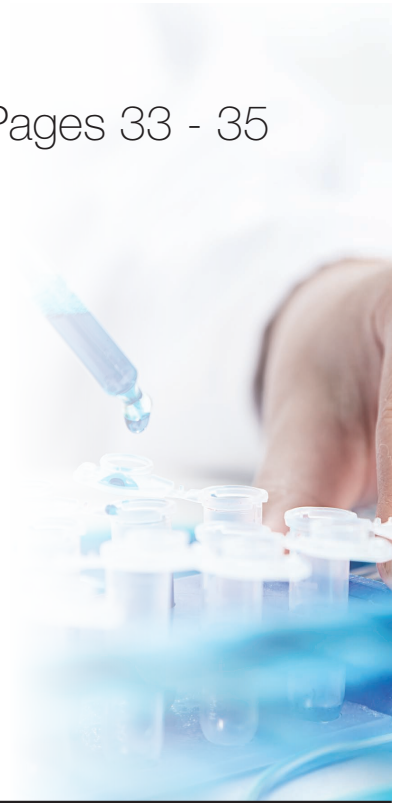
A range of immunofluorescence (IF), enzyme immunoassay (EIA) and Western Blot products for the identification and detection of a range of infectious organisms.

MASTAFLUOR® Kits, controls, slides and reagents

MASTAZYME® EIA kits

MASTABLOT® Lineblot Assays

MASTABLOT® Western Blot Assays



## **Mast Group Ltd Immunodiagnostic Tests** | Pages 36 - 38

### Autoimmune

A range of immunofluorescence (IF) and enzyme immunoassay (EIA) products for the diagnosis of autoimmune disease.

MASTAFLUOR® Kits, controls, slides and reagents

MASTAZYME® EIA kits



# Mast Group Ltd Custom Manufacturing Policy

Mast Group Ltd aims to provide customers with a high standard of product quality and customer service, and is an ISO9001 and ISO13485 certified company. Mast Group Ltd has an extensive range of products available from stock. Unique among diagnostic companies Mast Group Ltd also offers a renowned custom manufacturing service which guarantees to make products to customer specification with small minimum order requirements.

It is important that every customer understands the terms and conditions of this service, a summary of which covering the most popular products is provided in the table below. One important issue is that we specify the minimum order quantity for each type of product and while every attempt is made to achieve this actual number (or a higher quantity if ordered), the nature of the processes involved means the target quantity cannot be guaranteed – our guarantee is between 80 and 100% of the quantity ordered. The final quantity may also comprise more than one batch number. Exceptions though will be made for specific tenders if agreed in advance.

Mast Group Ltd. can only manufacture in certain increments above the minimum quantity, this is specified in the table below.

**When we accept your order for custom manufactured products you are committing to buy them with the associated minimum order quantities, lead-times and our 80-100% volume guarantee. No order cancellations will be permitted.**

Product	Min. order (packs)	Increments (packs)	Optimum (packs)	Lead time (weeks)
Cartridge discs	18	10	98	6*
Discs in vials	22	25	97	6*
Mastrings (number coded)	Initial order 10 Subsequent 10	10	100	6*
Mastrings (letter coded)	Initial order 20 Subsequent 10	10	100	6*
Adatab	14	15	44	6*
Selectavial/Selectatab	A	A	A	6*
Mast Assure	1	1	50	8
Media Stock Formulae (5kg packs)	1	N.A.	20	6
Media Non-Stock Formulae	25Kg	N.A.	75Kg	12*

N.A. = not applicable

\* Please note 6 week lead time refers to new strengths of currently used antibiotics or slight modifications of existing products. For products containing new antibiotics/materials which we have never worked with before, or there is a special cartridge variant, there is an evaluation process and review which has to be performed leading to a minimum 12 week lead time. Specific delivery dates will be provided by quotation for such new products.

<sup>A</sup> Minimum order, Increments and Optimum quantities for MAST® SELECTATAB and MAST® SELECTAVIAL products are dependent on customer specifications and pack size. Minimum order quantity and prices will be confirmed by quotation.

# Disc Diffusion Susceptibility Testing

Order No

Product

Packsize

## MAST® DISCMASTER 5 DISPENSER

**A robust and reliable antimicrobial cartridge disc dispenser designed for use with MAST Antimicrobial Susceptibility Test Cartridges.**

MDD65	MAST® DISCMASTER 5 Dispenser - 6 place	1
SILICA63	Silica Gel Capsule For MDD63/MDD64/MDD65	1
SHD5	Single Cartridge Hand Dispenser	5
CANISTER	MAST® DISCMASTER Canister for MDD64 models and below	1
CANISTER65	MAST® DISCMASTER Canister for MDD65	1

## MASTDISCS® AST ANTIBIOTIC SUSCEPTIBILITY DISCS IN CARTRIDGES AND VIALS

### MASTDISCS® in Cartridges (5 × 50 discs per pack)

STOCKCART	Stock Susceptibility Cartridge Discs of a single type	1 pack
FUNGCART	Stock Antifungal Cartridge Discs of a single type	1 pack
SPECIALCART	Cartridge Discs made to special order*	Min 18 packs

### MASTDISCS® (99+/- 2 discs per vial)

STOCKDISC	Stock Susceptibility Discs of a single type	1 vial
FUNGDISC	Stock Antifungal Discs of a single type	1 pack
SPECIALDISC	Discs made to special order*	Min 22 packs
TOOL/C	*Set up charge for Special Discs in vials or cartridges A one off charge for customisation of each new specification	per new specification

## MASTDISCS® AST ANTIBIOTIC SUSCEPTIBILITY DISCS IN CARTRIDGES

### STOCK RANGE

Description Antibiotic & Content µg per disc (unless otherwise stated)	STANDARD		Order Code Cartridges 5 × 50 discs
	CLSI	EUCAST	
Amikacin 30	✓	✓	AK30C
Amoxicillin/clavulanic acid 2-1	-	✓	AUG3C
Amoxicillin/clavulanic acid 20-10	✓	✓	AUG30C
Ampicillin 2	-	✓	AP2C
Ampicillin 10	✓	✓	AP10C
Ampicillin/Sulbactam 10-10	✓	✓	SAM20C
Azithromycin 15	✓	-	ATH15C
Aztreonam 30	✓	✓	ATM30C
Bacitracin 10 units	-	-	BA10C
Cefaclor 30	✓	✓	CFC30C
Cefadroxil 30	-	✓	CDX30C
Cefalexin 30	-	✓	CFX30C
Cefalothin 30	✓	-	KF30C
Cefazolin 30	✓	-	CZ30C
Cefepime 30	✓	✓	CPM30C
Cefiderocol 30	✓	✓	FDC30C
Cefixime 5	✓	✓	CFM5C
Cefotaxime 5	-	✓	CTX5C
Cefotaxime 30	✓	-	CTX30C




# Disc Diffusion Susceptibility Testing

## MASTDISCS<sup>®</sup>AST

### ANTIBIOTIC SUSCEPTIBILITY DISCS IN CARTRIDGES

#### STOCK RANGE


Description Antibiotic & Content µg per disc (unless otherwise stated)	STANDARD		Order Code Cartridges 5 × 50 discs
	CLSI	EUCAST	
			
Cefoxitin 30	✓	✓	FOX30C
Cefpodoxime 10	✓	✓	CPD10C
Ceftaroline 5	-	✓	CPT5C
Ceftaroline 30	✓	-	CPT30C
Ceftazidime 10	-	✓	CAZ10C
Ceftazidime 30	✓	-	CAZ30C
Ceftazidime/avibactam 10-4	-	✓	CZA14C
Ceftazidime/avibactam 30-20	✓	-	CZA50C
Ceftibuten 30	✓	✓	CFB30C
Ceftolozane/tazobactam 30-10	✓	✓	C/T40C
Ceftriaxone 5	✓	-	CRO5C
Ceftriaxone 30	✓	✓	CRO30C
Cefuroxime 30	✓	✓	CXM30C
Chloramphenicol 30	✓	✓	C30C
Ciprofloxacin 5	✓	✓	CIP5C
Clarithromycin 15	✓	-	CLA15C
Clindamycin 2	✓	✓	CD2C
Delafloxacin 5	✓	-	DLX5C
Doripenem 10	✓	✓	DOR10C
Doxycycline 30	✓	-	DXT30C
Eravacycline 20	✓	✓	ERV20C
Ertapenem 10	✓	✓	ETP10C
Erythromycin 15	✓	✓	E15C
Fosfomycin/Glucose-6-Phosphate 200	✓	✓	FOT200C
Fusidic Acid 10	-	✓	FC10C
Gentamicin 10	✓	✓	GM10C
Gentamicin 30	-	✓	GM30C
Gentamicin 120	✓	-	GM120C
Imipenem 10	✓	✓	IMI10C
Imipenem/relebactam 10-25	✓	-	IMR35C
Kanamycin 30	✓	-	K30C
Levofloxacin 5	✓	✓	LEV5C
Lefamulin 20	✓	-	LMU20C
Linezolid 10	-	✓	LZD10C
Linezolid 30	✓	-	LZD30C
Mecillinam 10	✓	✓	MEC10C
Meropenem 10	✓	✓	MEM10C
Meropenem/Vaborbactam 20-10	✓	✓	MEV30C
Minocycline 30	✓	-	MN30C
Moxifloxacin 5	✓	✓	MXF5C
Mupirocin 200	-	✓	MUP200C
Nalidixic Acid 30	✓	✓	NA30C
Neomycin 10	-	✓	NE10C
Netilmicin 10	-	✓	NET10C
Netilmicin 30	✓	-	NET30C
Nitrofurantoin 100	-	✓	NI100C
Nitrofurantoin 300	✓	-	NI300C
Nitroxoline 30	-	✓	NIB30C
Norfloxacin 10	✓	✓	NOR10C
Novobiocin 5	-	-	NO5C
Ofloxacin 5	✓	✓	OFX5C
Oxacillin 1	✓	✓	OX1C
Pefloxacin 5	-	✓	PEF5C
Penicillin G 1 unit	-	✓	PG1C
Penicillin G 10 units	✓	-	PG10C

# Disc Diffusion Susceptibility Testing

**MASTDISCS<sup>®</sup>AST**

## ANTIBIOTIC SUSCEPTIBILITY DISCS IN CARTRIDGES

### STOCK RANGE

Description Antibiotic & Content µg per disc (unless otherwise stated)	STANDARD		Order Code Cartridges 5 × 50 discs
	CLSI	EUCAST	
			
Piperacillin 30	-	✓	PRL30C
Piperacillin 100	✓	-	PRL100C
Piperacillin/tazobactam 30-6	-	✓	PTZ36C
Piperacillin/tazobactam 100-10	✓	-	PTZ110C
Quinupristin/dalfopristin 15	✓	✓	SYN15C
Rifampicin 5	✓	✓	RP5C
Streptomycin 10	✓	-	S10C
Streptomycin 300	✓	✓	S300C
Tedizolid 2	✓	✓	TZD2C
Teicoplanin 30	✓	✓	TEC30C
Temocillin 30	-	✓	TEM30C
Tetracycline 30	✓	✓	T30C
Ticarcillin 75	✓	✓	TC75C
Ticarcillin/clavulanic acid 75-10	✓	✓	TIM85C
Tigecycline 15	✓	✓	TGC15C
Tobramycin 10	✓	✓	TN10C
Trimethoprim 5	✓	✓	TM5C
Trimethoprim/sulfamethoxazole 1.25/23.75	✓	✓	TS25C
Vancomycin 5	-	✓	VA5C
Vancomycin 30	-	✓	VA30C
Blank discs	-	-	BD0680W/C


### STOCK RANGE FORMER BSAC DISCS FOR IDENTIFICATION

Description Antibiotic & Content µg per disc (unless otherwise stated)	Order Code Cartridges 5 × 50 discs	Order Code Vials 99+/- 2 discs
Metronidazole 5	MZ5C	MZ5
Mupirocin 20	MUP20C	
Mupirocin 5	MUP5C	

# Disc Diffusion Susceptibility Testing

## MASTDISCS<sup>®</sup>AST


### ANTIBIOTIC SUSCEPTIBILITY DISCS IN CARTRIDGES - SPECIALIST STOCK RANGE

Description Antibiotic & Content µg per disc (unless otherwise stated)	STANDARD		Order Code Cartridges 5 × 50 discs
	EUCAST	CLSI	
			
Cefperazone/sulbactam 75-30	-	-	SPZ105C/NCE
Carbenicillin 100	-	✓	PY100C
Colistin Sulphate 10	-	-	CO10C/NCE
Colistin Sulphate 25	-	-	CO25C/NCE
Polymyxin B 300	-	-	PB300C/NCE

### SPECIALIST VETERINARY SUSCEPTIBILITY DISCS - STOCK RANGE

Antibiotic & Strength (unless otherwise stated)	Veterinary Cartridges 5 × 50 discs
Cefquinone 30	CEQ30C/NCE
Enrofloxacin 5	ENF5C/NCE
Florfenicol 30	FFC30C/NCE
Gamithromycin 15	GAM15C/NCE
Marbofloxacin 5	MAR5C/NCE
Neomycin 30	NE30C/NCE
Pradofloxacin 5	PRA5C/NCE
Tildipirison 60	TIP60C/NCE
Tylosin 30	TY30C/NCE

### STOCK RANGE

Description Antibiotic & Content µg per disc (unless otherwise stated)	STANDARD		Order Code Vials 99+/- 2 discs
	CLSI	EUCAST	
			
Amikacin 30	✓	✓	AK30
Bacitracin 8 units	-	-	BA8
Bacitracin 10 units	-	-	BA10
Cefpodoxime 10	✓	✓	CPD10
Chloramphenicol 30	-	✓	C30
Gentamicin 10	✓	✓	GM10
Metronidazole 2.5	-	-	MZ2.5
Nalidixic Acid 30	✓	✓	NA30
Novobiocin 5	-	-	NO5
Oxacillin 1	✓	-	OX1
Penicillin G 1 unit	-	✓	PG1
Vancomycin 5	-	✓	VA5
Blank discs	-	-	BD0638W

## MASTDISCS<sup>®</sup>AST

### ANTIFUNGAL SUSCEPTIBILITY DISCS IN CARTRIDGES - STOCK RANGE

Description Antibiotic & Content µg per disc (unless otherwise stated)	Order Code Cartridges 5 × 50 discs
Amphotericin B 20	AMB20C
Clotrimazole 10	CTM10C
Econazole 10	ECN10C
Fluconazole 10	FCN10C
Fluconazole 25	FCN 25C
Flucytosine 1	FY1C
Ketoconazole 10	KCA10C
Miconazole 10	MCL 10C
Nystatin 100	NY100C



# Disc Diffusion Susceptibility Testing

## MASTRING-S™

The same price applies to 6 and 8 antimicrobial rings.  
(100 rings per tin)

Systemic Gram Positive Rings			Systemic Gram Negative Rings			Urine Rings					
<b>M13/NCE</b>	<b>8 tips</b>	<b>1 tin</b>	<b>49.88</b>	<b>M14/NCE</b>	<b>8 tips</b>	<b>1 tin</b>	<b>49.88</b>	<b>M26/NCE</b>	<b>8 tips</b>	<b>1 tin</b>	<b>49.88</b>
C Chloramphenicol			25µg	AP Ampicillin			10µg	AP Ampicillin			25µg
E Erythromycin			5µg	KF Cephalothin			5µg	C Chloramphenicol			50µg
FC Fusidic acid			10µg	CO Colistin Sulphate			25µg	CO Colistin Sulphate			100µg
OX Oxacillin			5µg	GM Gentamicin			10µg	K Kanamycin			30µg
NO Novobiocin			5µg	S Streptomycin			10µg	NA Nalidixic acid			30µg
PG Penicillin G			1 unit	ST Sulphatriad			200µg	NI Nitrofurantoin			50µg
S Streptomycin			10µg	T Tetracycline			25µg	S Streptomycin			25µg
T Tetracycline			25µg	TS Cotrimoxazole			25µg	T Tetracycline			100µg
<b>M43/NCE</b>	<b>8 tips</b>	<b>1 tin</b>	<b>49.88</b>								
PG Penicillin G			1 unit								
CD Clindamycin			2µg								
GM Gentamicin			10µg								
FC Fusidic acid			10µg								
E Erythromycin			5µg								
TM Trimethoprim			1.25µg								
SMX Sulphamethoxazole			25µg								
T Tetracycline			10µg								

Special order rings are subject to 4-6 weeks lead time.

TOOL/M	*Set up charge for MASTRING SPECIAL: a one off charge for customisation of each new MASTRING SPECIAL (letter coded)	Per new specification
MASTRING SPECIAL	MASTRING-S® to individual specification. Minimum order 10 tins of 100 rings	

New Specification NUMBER coded MASTRING-S® are subject to an initial minimum order of 10 tins.

New Specification LETTER coded MASTRING-S® are subject to an initial minimum order of 20 tins.

Subsequent orders: minimums of 10 tins.

## ADATAB®

For agar dilution antibiotic susceptibility testing. Each tablet for addition to 100ml medium.

### STOCK ADATAB®

TAB/AK3.2	AMIKACIN 3.2mg	1 tablet per 100ml	25 tablets
TAB/A3.2	AMOXICILLIN 3.2mg	1 tablet per 100ml	25 tablets
TAB/AP0.8	AMPICILLIN 0.8mg	1 tablet per 100ml	25 tablets
TAB/AP3.2	AMPICILLIN 3.2mg	1 tablet per 100ml	25 tablets
TAB/AUG3.2	AMOXICILLIN/CLAVULANIC ACID 3.2mg	1 tablet per 100ml	25 tablets
TAB/CPD0.1	CEFPODOXIME 0.1mg	1 tablet per 100ml	25 tablets
TAB/CTX0.2	CEFOTAXIME 0.2mg	1 tablet per 100ml	25 tablets
TAB/CTX1.6	CEFOTAXIME 1.6mg	1 tablet per 100ml	25 tablets
TAB/FOX0.4	CEFOXITIN 0.4mg	1 tablet per 100ml	25 tablets
TAB/CAZ0.8	CEFTAZIDIME 0.8mg	1 tablet per 100ml	25 tablets
TAB/CAZ3.2	CEFTAZIDIME 3.2mg	1 tablet per 100ml	25 tablets
TAB/CXM3.2	CEFUROXIME 3.2mg	1 tablet per 100ml	25 tablets
TAB/CFX3.2	CEFALEXIN 3.2mg	1 tablet per 100ml	25 tablets
TAB/C0.8	CHLORAMPHENICOL 0.8mg	1 tablet per 100ml	25 tablets
TAB/CIP0.2	CIPROFLOXACIN 0.2mg	1 tablet per 100ml	25 tablets
TAB/CIP0.8	CIPROFLOXACIN 0.8mg	1 tablet per 100ml	25 tablets
TAB/CD0.1	CLINDAMYCIN 0.1mg	1 tablet per 100ml	25 tablets
TAB/CO0.8	COLISTIN 0.8mg	1 tablet per 100ml	25 tablets
TAB/E0.2	ERYTHROMYCIN 0.2mg	1 tablet per 100ml	25 tablets
TAB/FOT12.8	FOSFOMYCIN TROMETAMOL 12.8mg	1 tablet per 100ml	25 tablets
TAB/FC0.2	FUSIDIC ACID 0.2mg	1 tablet per 100ml	25 tablets
TAB/GM0.1	GENTAMICIN 0.1mg	1 tablet per 100ml	25 tablets
TAB/GM0.4	GENTAMICIN 0.4mg	1 tablet per 100ml	25 tablets
TAB/GM0.8	GENTAMICIN 0.8mg	1 tablet per 100ml	25 tablets
TAB/LZD0.4	LINEZOLID 0.4mg	1 tablet per 100ml	25 tablets
TAB/MEM0.4	MEROPENEM 0.4mg	1 tablet per 100ml	25 tablets
TAB/MEM1.6	MEROPENEM 1.6mg	1 tablet per 100ml	25 tablets
TAB/MUP0.4	MUPIROCIN 0.4mg	1 tablet per 100ml	25 tablets
TAB/NA3.2	NALIDIXIC ACID 3.2mg	1 tablet per 100ml	25 tablets
TAB/NI3.2	NITROFURANTOIN 3.2mg	1 tablet per 100ml	25 tablets
TAB/NI6.4	NITROFURANTOIN 6.4mg	1 tablet per 100ml	25 tablets
TAB/OX0.1	OXACILLIN 0.1mg	1 tablet per 100ml	25 tablets
TAB/OX0.2	OXACILLIN 0.2mg	1 tablet per 100ml	25 tablets
TAB/PG0.006	PENICILLIN G 0.006mg	1 tablet per 100ml	25 tablets
TAB/PG0.025	PENICILLIN G 0.025mg	1 tablet per 100ml	25 tablets
TAB/RP0.006	RIFAMPICIN 0.006mg	1 tablet per 100ml	25 tablets
TAB/RP0.2	RIFAMPICIN 0.2mg	1 tablet per 100ml	25 tablets
TAB/PTZ0.8	PIPERACILLIN /TAZOBACTAM 0.8mg	1 tablet per 100ml	25 tablets
TAB/PTZ1.6	PIPERACILLIN /TAZOBACTAM 1.6mg	1 tablet per 100ml	25 tablets
TAB/TEC0.8	TEICOPLANIN 0.8mg	1 tablet per 100ml	25 tablets
TAB/T0.1	TETRACYCLINE 0.1mg	1 tablet per 100ml	25 tablets
TAB/T0.4	TETRACYCLINE 0.4mg	1 tablet per 100ml	25 tablets
TAB/TN0.2	TOBRAMYCIN 0.2mg	1 tablet per 100ml	25 tablets
TAB/TM0.05	TRIMETHOPRIM 0.05mg	1 tablet per 100ml	25 tablets
TAB/TM0.2	TRIMETHOPRIM 0.2mg	1 tablet per 100ml	25 tablets
TAB/TM0.8	TRIMETHOPRIM 0.8mg	1 tablet per 100ml	25 tablets
TAB/VA0.4	VANCOMYCIN 0.4mg	1 tablet per 100ml	25 tablets

### ADATAB®S TO SPECIAL ORDER

Please contact your Mast Technical Representative for special order requests and pricing.  
Please also refer to Mast Group Ltd's Custom Manufacturing Policy for more information.

# Multipoint Technology

Order No	Product	Packsize
----------	---------	----------

---

## MAST ID®

**MAST ID® Biochemical tests in agar for microbial identification using multipoint inoculation. Each pack contains 10 × 200ml preweighed sachets.**

IDM1/A	Amygdalin Agar	1 pack
IDM23/A	Citrate Agar	1 pack
IDM25/A	H <sub>2</sub> S Agar	1 pack
IDM34/A	Indole Agar	1 pack
IDM26/A	LDC Agar	1 pack
IDM28/A	Motility Test Agar	1 pack
IDM31/A	Phenylalanine Agar	1 pack
IDM9/A	Sorbitol Agar	1 pack
IDM37/A	Beta-Glucuronidase Agar	1 pack

---

## MAST ID® REAGENTS

DM228S	Urea Solution (40% w/v) for use with Urea Agar Base (Multipoint) (DM228D)	10 × 10ml
--------	---	-----------

---

## MASTURI<sup>®</sup>DOT AUTOMATIC MULTIPPOINT INOCULATOR

**Subject to a lead time of 8 weeks**

SCANURIDOT	Mast Uri <sup>®</sup> Dot Automatic multipoint inoculator with footswitch and spares N.B. Appropriate equipment sets for 19, 36 or 96 point inoculation must also be ordered separately from the accessories list below.	1 unit
	Accessories (must be ordered separately)	
SCANES019	Equipment set for 19 point inoculation - Stainless steel inoculum pot and head, with 19 x 1.6mm inoculum pins	1 Set
SCANES019N	Equipment set for 19 point inoculation - Stainless steel inoculum pot and head, with 19 x 2.4mm inoculum pins	1 Set
SCANES036	Equipment set for 36 point inoculation - Stainless steel pot and head, with 36 x 1.6mm inoculum pins	1 Set
SCANES036N	Equipment set for 36 point inoculation - Stainless steel pot and head, with 36 x 2.4mm inoculum pins	1 Set
SCANES096	Equipment set for 96 point inoculation - stainless steel inoculum head & 96 x 1.6mm pins	1 Set
SCANES096N	Equipment set for 96 point inoculation - stainless steel inoculum head & 96 x 2.4mm pins	1 Set
SCAN 110	1.6mm Inoculum pin, stainless steel	1
SCAN 110N	2.4mm Inoculum pin, stainless steel	1
SCAN 111SS	Inoculum head, 19 pin (1.6mm), stainless steel	1
SCAN 112SS	Inoculum head, 36 pin (1.6mm), stainless steel	1
SCAN 113SS	Inoculum pot, 19 well, stainless steel	1
SCAN 114SS	Inoculum pot, 36 well, stainless steel	1
SCAN 496	Inoculum head, 96 pin (1.6mm), stainless steel	1
SCAN 496N	Inoculum head, 96 pin (2.4mm), stainless steel	1
SCAN 120	Marker Assembly	1
SCANURICADDY	Mast Uri <sup>®</sup> Caddy for sterilisation of pin heads used with the Mast Uri <sup>®</sup> Dot automatic multipoint inoculator	1





# Multipoint Technology

Order No

Product

Packsize

## MASTURI<sup>®</sup> SYSTEM

### Subject to a lead time of 8 weeks

The Mast **Uri**<sup>®</sup>System is a group of instrumentation, software and consumables that facilitates the rapid microbiological examination of urine samples to differentiate infected urines from those that are sterile or contaminated. The system will subsequently report bacterial identification and antibiotic susceptibility results on those specimens considered to be significant.

Comprising the Mast **Uri**<sup>®</sup>*Plus* analyser; Mast **Uri**<sup>®</sup>*Well* dispensing aid; Mast **Uri**<sup>®</sup>*Plates* and Mast **Uri**<sup>®</sup>*Dot* inoculator with 96 well head and pins, the Mast **Uri**<sup>®</sup>System is designed to deliver results in a fast and cost-effective manner.

### Testing is divided into four phases:

Inoculation of urine samples onto Mast **Uri**<sup>®</sup>*Plates*  
 18-24 hours incubation  
 Next day reading and analysis  
 Validation of results

This means that >95% of antibiotic and identification results can be reported the day after receipt

### Software Modules and Accessories

SCANURIPLUS	Mast <b>Uri</b> <sup>®</sup> <i>Plus</i> Analyser	1
SCANURIWELL	Mast <b>Uri</b> <sup>®</sup> <i>Well</i> Dispensing aid	1
SCANURIDOT	Mast <b>Uri</b> <sup>®</sup> <i>Dot</i> Inoculator	1
URIINTER	Mast <b>Uri</b> <sup>®</sup> <i>Plus</i> Interface Module	1
URIMAIN	Mast <b>Uri</b> <sup>®</sup> <i>Plus</i> Maintenance contract	1
SCANURILOLOCATE	Mast <b>Uri</b> <sup>®</sup> <i>locator</i> orientation marker pin 1.6mm	1
SCANURILOLOCATEN	Mast <b>Uri</b> <sup>®</sup> <i>locator</i> orientation marker pin 2.4mm	1
URILOLOCATE	Mast <b>Uri</b> <sup>®</sup> <i>Locate</i> reagent	14ml
SCANURIRACK	Mast <b>Uri</b> <sup>®</sup> <i>Rack</i> storage accessory	1
SCANURIPREP	Mast <b>Uri</b> <sup>®</sup> <i>Prep</i> (includes <b>Uri</b> <sup>®</sup> <i>Prep</i> tablet and barcode reader)	1
SCANURICADDY	Mast <b>Uri</b> <sup>®</sup> <i>Caddy</i> for sterilisation of pin heads used with the Mast <b>Uri</b> <sup>®</sup> <i>Dot</i> automatic multipoint inoculator	1

## MASTURI<sup>®</sup> PLATES

### CONSUMABLES

A standard range of antibiotic and identification media in 96-well microtitre plates for urine screening. Plates manufactured to customer specification depending on Mast's ability to produce.

Antibiotic and identification plates can be combined to constitute individual plate sets according to specific laboratory requirements. Price by quotation.

# Culture Media & Supplements

Order No      Product

---

## CLINICAL & INDUSTRIAL CULTURE MEDIA

**Stock range pack size 500g unless otherwise stated**

DM095D	Baird-Parker Medium	
DM100D	Blood Agar Base	
DM101D	Blood Agar Base-Special	
DM104D	Brain Heart Infusion Agar	
DM106D	Brain Heart Infusion Broth	
DM494D	Buffered Peptone Water	
DM253D	Burkholderia cepacia Medium	
DM470D/NCE	C.E.M.O. Agar	
DM110D	C.L.E.D. Medium	
DM111D	C.L.E.D. with Andrade's Indicator	
DM115D	Columbia Agar	
DM130D	D.C.A. (Hynes)	
DM215D	D.S.T. Agar (Sulphonamide Antagonist Free)	
DM132D	DNase Agar	
DM133D	Eosin Methylene Blue Agar	
DM136D	G.C. Agar Base	
DM134D	Hektoen Enteric Agar	
DM137D	Kligler's Iron Agar	
DM258D	Legionella BCYE Agar Base	
DM440D	M.S.R.V. (Salmonella) Medium	
DM141D	MacConkey Agar	
DM140D	MacConkey Agar (without salt)	
DM142D	MacConkey Agar No.2	
DM143D	MacConkey Agar No.3	
DM150D	MacConkey Broth	
DM160D	Mannitol Salt Agar	
DM170D	Mueller Hinton Agar	
DM179D	Nutrient Agar	
DM180D	Nutrient Broth	
DM185D	Peptone Water	
DM195D	Plate Count Agar	
DM251D	Preston Blood Free Campylobacter Agar Base	
DM205D	S.S. Agar	
DM200D	Sabouraud Dextrose Agar	
DM211D	Simmons Citrate Agar	
DM218D	T.C.B.S. Cholera Medium	
DM219S	Tetrathionate Broth	
DM221D	Thioglycollate Broth USP	
DM224D	Triple Sugar Iron Agar (TSI)	
DM225D	Tryptone Soy Agar	
DM226D	Tryptone Soy Broth	
DM228D	Urea Agar Base	
DM228S	Urea Solution (40% v/v)	10 x 10ml
DM235D	Wilkins Chalgren Agar	
DM230D	X.L.D. Agar	
DM252D	Yersinia Agar Base	

**5 Kg packs of media are available to Special order**

**Please refer to Mast Group Ltd's Custom Manufacturing Policy for more information**

---

# Culture Media & Supplements

Order No	Product	Usage	Packsize
<b>The following products are available to Special Order</b>			
<b>Lead time 4-6 weeks. Minimum order 1 pack.</b>			
<b>BASIC MEDIA RAW MATERIALS</b>			
RM10A	Agar A		100g
RM10B	Agar A		500g
RM10E	Agar A		5Kg
RM20A	Beef Extract, Neutralised Powder		100g
RM20B	Beef Extract, Neutralised Powder		500g
RM20E	Beef Extract, Neutralised Powder		5Kg
RM25A	Bile Salts		100g
RM25Q	Bile Salts		250g
RM25E	Bile Salts		5Kg
RM30A	Casein Hydrolysate, Acidic		100g
RM30Q	Casein Hydrolysate Acidic		250g
RM30E	Casein Hydrolysate, Acidic		5Kg
RM31A	Casein Hydrolysate, Enzymic		100g
RM31Q	Casein Hydrolysate, Enzymic		250g
RM31E	Casein Hydrolysate, Enzymic		5Kg
RM50A	Peptone, A, Neutralised		100g
RM50Q	Peptone A, Neutralised		250g
RM50E	Peptone, A, Neutralised		5Kg
RM51A	Peptone, B		100g
RM51Q	Peptone B		250g
RM51E	Peptone, B		5Kg
RM52A	Bacteriological Peptone		100g
RM52Q	Bacteriological Peptone		250g
RM52E	Bacteriological Peptone		5Kg
RM60A	Sodium Desoxycholate		100g
RM70A	Yeast Extract		100g
RM70B	Yeast Extract		500g
RM70E	Yeast Extract		5Kg
RM71A	Yeast Extract Special		100g
RM71B	Yeast Extract Special		500g
RM71E	Yeast Extract Special		5Kg

**Quotations for bulk orders obtainable on request.**

# Culture Media & Supplements

Order No	Product	Usage	Packsizes
----------	---------	-------	-----------

## SELECTIVE SUPPLEMENTS

**MAST® SELECTATAB and MAST® SELECTAVIAL**  
Lyophilised supplements in tablets and vials for the preparation of selective, differential or enrichment media.

**MAST® SELECTATAB, MAST® SELECTAVIAL and 500g packs of media** are available from stock.

**5Kg packs of media are available to Special order**  
Please refer to **MAST Custom Manufacturing Policy** for more information

<b>Actinomycete Selection</b>			
MS25	Actinomycete Selectatab	1 tab per 100ml	25 tablets
DM115D	Columbia Agar		500g
<b>Anaerobe Isolation</b>			
MS8A	Neomycin Selectatab	1 tab per 500ml	10 tablets
SV8	Neomycin Selectavial	1 vial per litre	10 vials
SV9	Nalidixic Acid Selectavial	1 vial per litre	10 vials
DM101D	Blood Agar Base Special		500g
DM115D	Columbia Agar		500g
<b>Bordetella Selection</b>			
MS10	Cefalexin Selectatab	1 tab per 100ml	25 tablets
<b>Burkholderia cepacia Selection</b>			
MS22	<i>Burkholderia cepacia</i> Selectatab	1 tab per 100ml	25 tablets
SV22	<i>Burkholderia cepacia</i> Selectavial	1 vial per 500ml	10 vials
DM253D	Burkholderia cepacia Medium		500g
<b>Campylobacter Selection</b>			
MS18	Camp Selectatab (Preston Blood Free)	1 tab per 250ml	25 tablets
SV18	Camp Selectavial (Preston Blood Free)	1 vial per litre	10 vials
MS26	Camp Selectatab (Modified Butzler Medium Virion)	1 tab per 500ml	10 tablets
DM101D	Blood Agar Base Special		500g
DM115D	Columbia Agar		500g
DM251D	Preston Blood Free Campylobacter Agar Base		500g
<b>Campylobacter Selective Enrichment</b>			
SV59	Campylobacter Selective Supplement (Exeter)	1 vial per 1.125 litre	10 vials
SV61	Campylobacter Growth Supplement (FBP)	1 vial per 1.125 litre	10 vials
<b>C.E.M.O Selection (<i>T. equigenitalis</i>)</b>			
MS31/NCE	C.E.M.O. 1 Selectatab	1 tab per 100ml	25 tablets
MS32/NCE	C.E.M.O. 2 Selectatab	1 tab per 100ml	25 tablets
MS60/NCE	C.E.M.O. Supplement Selectatab	1 tab per 500ml	10 tablets
DM470D/NCE	C.E.M.O Agar		500g
<b>Clostridium difficile Selection</b>			
SV23	Clostridium difficile Selectavial	1 vial per 500ml	10 vials

# Culture Media & Supplements

Order No	Product	Usage	Packsize
DM491D	<b>E.coli O157 Selection</b> Sorbitol MacConkey Agar		500g
DM494D	<b>E.coli O157 Enrichment</b> Buffered Peptone water		500g
SV30	Novobiocin Selectavial	1 vial per 2.25 litre	10 vials
DM115D	Columbia Agar		500g
MS15	<b>Gardnerella Selection</b> Gardnerella Selectatab	1 tab per 250ml	25 tablets
DM115D	Columbia Agar		500g
SV5	<b>G.C. Selection</b> G.C. Selectavial (V.C.T.)	1 vial per litre	10 vials
SV6	G.C. Selectavial (V.C.N.T.)	1 vial per litre	10 vials
SV16	G.C. Growth Selectavial	1 vial per litre	10 vials
SV20	G.C. Selectavial (L.C.A.T.)	1 vial per litre	10 vials
DM136D	G.C.Agar Base		500g
MS27	<b>Haemophilus Selection</b> Haemophilus Selectatab (Bacitracin)	1 tab per 100ml	25 tablets
SV27	Haemophilus Selectavial (Bacitracin)	1 vial per litre	10 vials
SV82	NAD Selectavial 	1 vial per litre	10 vials
DM115D	Columbia Agar		500g
SV36	<b>Legionella Selection</b> Legionella Selectavial (MWY)	1 vial per 500ml	10 vials
SV37	Legionella Selectavial (PNV)	1 vial per 500ml	10 vials
SV94	GVPN Selectavial	1 vial per 500ml	10 vials
DM258D	Legionella B.C.Y.E Agar Base		500g
SV35	<b>Legionella Enrichment</b> Legionella Growth Supplement (L-CYS)	1 vial per 500ml	10 vials
DM258D	Legionella B.Y.C.E Agar Base		500g
SV33	<b>Listeria Selection</b> Listeria Selectavial (Oxford) Formula	1 vial per 500ml	10 vials
DM256D	Listeria Selective Agar Base ( Oxford)		500g
SV34	<b>Listeria Enrichment</b> Listeria Selectavial (Selective Enrichment)	1 vial per 500ml	10 vials
MS24	<b>Mycobacteria Selection</b> Mycobacteria Selectatab (Kirchner)	1 tab per 500mls	10 tablets
SV40	Sputagest Selectavial	1 vial per 100ml	10 vials
MS2	<b>Proteus- Inhibition of Swarming</b> P.N.P.G. Selectatab	1 tab per 100ml	25 tablets
DM440D	<b>Salmonella Selection</b> M.S.R.V. (Salmonella) Medium		500g

# Culture Media & Supplements

Order No	Product	Usage	Packsizes
DM160D	Mannitol Salt Agar		500g
	<b><i>Staphylococcus aureus</i> <math>\beta</math>-lactamase induction</b>		
DM215D	D.S.T. Agar (Sulphonamide Antagonist Free)		500g
DM101D	Blood Agar Base Special		500g
DM115D	Columbia Agar		500g
	<b><i>Staphylococcus/Streptococcus</i> Selection</b>		
SV11	Staph/Strep Selectavial	1 vial per litre	10 vials
DM115D	Columbia Agar		500g
	<b><i>Yersinia</i> Selection</b>		
MS19	Yersinia Selectatab	1 tab per 250ml	25 tablets
DM252D	Yersinia Agar Base		500g
	<b>Yeast &amp; Mould Isolation</b>		
SV54	Chloramphenicol Selectavial	1 vial per 500ml	10 vials
DM200D	Sabouraud Dextrose Agar		500g
DM702D	Yeast Glucose Chloramphenicol Agar		500g

Supplements not listed here may be available to Special Order in either MAST® SELECTATAB or MAST® SELECTAVIAL format. Please refer to MAST Custom Manufacturing Policy for more information

# Culture Media & Supplements

Order No	Product	Packsizes
<b>MAST ID® CHROMagar® Candida</b>		
IDM40/L	MAST®ID CHROMagar® Candida For the detection and identification of <i>Candida albicans</i> , <i>Candida tropicalis</i> and other <i>Candida</i> spp.	10 × 100ml sachets
IDM40D	MAST®ID CHROMagar® Candida For the detection and identification of <i>Candida albicans</i> , <i>Candida tropicalis</i> and other <i>Candida</i> spp. (Available to Special Order only. Lead time 4 weeks)	500g
<b>MAST® POURITE</b> Anti-bubble Agent for Agar Based Media.		
MP1A	MAST® POURITE	60ml
<b>REDIPREP® PREPARED EGG MEDIA</b>		
Isolation Egg Media. Available from stock.		
EM100	Löwenstein-Jensen Medium	50 slopes
EM102	Löwenstein-Jensen Medium with Pyruvate	50 slopes

# Culture Media & Supplements

Order No

Product

Packsizes

## SELECTIVE SUPPLEMENTS

**MAST® SELECTATAB and MAST® SELECTAVIAL lyophilised supplements in tablets and vials for the preparation of selective, differential or enrichment media.**

MS25	Actinomycete Selectatab	1 tab per 100ml	25 tablets
MS22	Burkholderia cepacia Selectatab	1 tab per 100ml	25 tablets
SV22	Burkholderia cepacia Selectavial	1 vial per 500ml	10 vials
MS31/NCE	C.E.M.O. 1 Selectatab	1 tab per 100ml	25 tablets
MS32/NCE	C.E.M.O. 2 Selectatab	1 tab per 100ml	25 tablets
MS60/NCE	C.E.M.O Supplement Selectatab	1 tab per 500ml	10 tablets
MS26	Camp Selectatab (Modified Butzler)	1 tab per 500ml	10 tablets
MS18	Camp Selectatab (Preston Blood Free)	1 tab per 250ml	25 tablets
SV61	Campylobacter Growth Supplement	1 vial per 1.125 litres	10 vials
SV59	Campylobacter Selective Supplement	1 vial per 1.125 litre	10 vials
MS10	Cephalexin Selectatab	1 tab per 100ml	25 tablets
SV54	Chloramphenicol Selectavial	1 vial per 500ml	10 vials
SV23	Clostridium difficile Selectavial	1 vial per 500ml	10 vials
SV16	G.C. Growth Selectavial	1 vial per litre	10 vials
SV20	G.C. Selectavial (L.C.A.T.)	1 vial per litre	10 vials
SV6	G.C. Selectavial (V.C.N.T.)	1 vial per litre	10 vials
SV5	G.C. Selectavial (V.C.T.)	1 vial per litre	10 vials
MS15	Gardnerella Selectatab	1 tab per 250ml	25 tablets
SV94	GVPN Selectavial	1 vial per 500ml	10 vials
MS27	Haemophilus Selectatab (Bacitracin)	1 tab per 100ml	25 tablets
SV27	Haemophilus Selectavial (Bacitracin)	1 vial per litre	10 vials
SV35	Legionella Growth Supplement (L-CYS)	1 vial per 500ml	10 vials
SV36	Legionella Selectavial (MWY)	1 vial per 500ml	10 vials
SV37	Legionella Selectavial (PNV)	1 vial per 500ml	10 vials
MS24	Mycobacteria Selectatab (Kirchner)	1 tab per 500ml	10 tablets
SV82	NAD Selectavial	1 vial per litre	10 vials
SV9	Nalidixic Acid Selectavial	1 vial per litre	10 vials
MS8A	Neomycin Selectatab	1 tab per 500ml	10 tablets
MS2	P.N.P.G. Selectatab	1 tab per 100ml	25 tablets
SV40	Sputagest Selectavial	1 vial per 100ml	10 vials
SV11	Staph/Strep Selectavial	1 vial per litre	10 vials
MS19	Yersinia Selectatab	1 tab per 250ml	25 tablets
SV8	Neomycin Selectavial	1 vial per 100ml	10 vials



**Supplements not listed here may be available to custom manufacture in either MAST® SELECTATAB or MAST® SELECTAVIAL format. Please refer to MAST Custom Manufacturing Policy for more information**



# Miscellaneous Laboratory Products

Order No	Product	Packsize
<b>DETECTION OF BACTERIURIA</b>		
BTR1	MAST® BACTERURITEST Strips (5 × 200 sterile strips/pack)	1 pack
DM110D	C.L.E.D. Medium	500g
DM111D	C.L.E.D. Medium with Andrade's Indicator	500g
IDM37/A	Beta-Glucuronidase Agar	10 × 200ml

## PRESERVATION & STORAGE OF BACTERIA

### CRYOBANK®

#### Bacterial Preservation and Storage System

CRYO80/R	80 vials of red beads	1 box
CRYO80/B	80 vials of blue beads	1 box
CRYO80/Y	80 vials of yellow beads	1 box
CRYO80/G	80 vials of green beads	1 box
CRYO80/M	80 vials of mixed beads (16 of each colour)	1 box
CRYO80/BOX	Cryobank Box	1 box
CRYO/Z	18 well CRYOBLOCK	1

## PHOSPHATE BUFFERED SALINE\*

3057	PBS for serology pH7.0	20 litres
3058	PBS for serology pH7.0	12 litres

\* Delivery of this product can only be effected on a pallet.  
Minimum order level is one pallet - equivalent to 10 packs.

# Identification Products

Order No	Product	Packsize
<b>DENTIFICATION OF CAMPYLOBACTER SPP.</b>		
CAMP-ID	MAST® ID CAMP IDENTIFICATION SYSTEM A 3 test system for the presumptive identification of thermophilic <i>Campylobacter spp.</i>	10 tests
	<b>Available to Special Order. Lead time 6-8 weeks</b>	
ETO7	MAST® ID PYR Strips. For the detection of pyrrolidonyl amino peptidase activity.	25 strips
RST501	MAST® ALEX-MRSA Rapid latex test for the detection of Methicillin Resistant Staphylococcus aureus	48 tests
RST7001	MAST Toxoreagent- Toxoplasma test Complete kit for detection of Toxoplasma antibody comprising latex suspension, buffer and positive control serum.	50 tests
<b>RAPID DETECTION OF β-LACTAMASE PRODUCTION</b>		
ETO/1	MAST® ID Intralactam Strips	25 strips
D59	Nitrocefin Discs	50
<b>MAST® ID IDENTIFICATION STRIPS</b>		
ETO4	MAST® ID Oxidase Strips - for the performance of the oxidase reaction	25 strips
ETO7	MAST® ID PYR Strips - for the detection of pyrrolidonyl amino peptidase activity	25 strips
<b>IDENTIFICATION OF HAEMOPHILUS SPP.</b>		
MID/XV	MAST® ID XV Mirror ring. MASTRING-S® containing X+V factor tips.	50 rings
D43	X Factor Discs in vials	100 tests
D43C	X Factor Discs in cartridges	250 tests
D44	V Factor Discs in vials	100 tests
D44C	V Factor Discs in cartridges	250 tests
D45	X+V Factor Discs in vials	100 tests
D45C	X+V Factor Discs in cartridges	250 tests
DM184D	Peptone Agar	500g
<b>IDENTIFICATION OF NON-SPORING ANAEROBES</b>		
MID8	MASTRING® for identification of Gram negative non-sporing anaerobes.	50 rings
<b>IDENTIFICATION OF STAPHYLOCOCCUS SPP.</b>		
MID/STAPH	MASTRING® for the identification of coagulase negative staphylococci.	50 rings
SV78/3ML	Plasma Coagulase-EDTA	10 × 3ml
SV78/20ML	Plasma Coagulase-EDTA	6 × 20ml

# Identification Products

Order No	Product		Packsizes
<b>MASTDISCS® IDENTIFICATION DISCS IN VIALS</b>		<b>For presumptive Identification of:</b>	<b>Tests/Pack</b>
D40	Bacitracin Discs (0.04i.u.)	Group A streptococci	100
D41	Bacitracin Discs (0.1i.u.)	Group A streptococci	100
D42	Optochin Discs	<i>Strep. pneumoniae</i>	100
D43	X Factor Discs	<i>Haemophilus</i> spp.	100
D44	V Factor Discs	<i>Haemophilus</i> spp.	100
D45	X+V Factor Discs	<i>Haemophilus</i> spp.	100
D46	Metronidazole Discs	<i>Gardnerella vaginalis</i>	100
D48	Lysostaphin Discs	Staphylococci/micrococci	50
D57	Oxidase Discs	<i>Pseudomonas</i> spp.	100
D59	Nitrocefin Discs	β lactamase Detection	50

<b>MASTDISCS® ID IDENTIFICATION DISCS IN CARTRIDGES</b>		<b>For presumptive Identification of:</b>	<b>Tests/Pack</b>
D40C	Bacitracin Discs (0.04i.u.)	Group A streptococci	250
D41C	Bacitracin Discs (0.1i.u.)	Group A streptococci	250
D42C	Optochin Discs	<i>Strep.pneumoniae</i>	250
D43C	X Factor Discs	<i>Haemophilus</i> spp.	250
D44C	V Factor Discs	<i>Haemophilus</i> spp.	250
D45C	X+V Factor Discs	<i>Haemophilus</i> spp.	250
D46C	Metronidazole Discs	<i>Gardnerella vaginalis</i>	250
D47C	Sulphathiazole Discs	<i>Gardnerella vaginalis</i>	250
D51C	Nitrate Discs	Nitrate Reductase in anaerobes	250
D55C	SPS Discs	<i>P. anaerobius</i>	250
D57C	Oxidase Discs	<i>Pseudomonas</i> spp.	250
D71C	CAT™ID	Carbapenemase producers	250

## MASTDISCS® Combi

### COMBINATION DISC SETS FOR THE DETECTION OF ANTIBIOTIC RESISTANCE

D52C	Extended Spectrum β Lactamase Set (CPD 30)	ESβL	50 tests
D62C	Cefotaxime 30 & Cefotaxime 30/Clavulanic Acid 10	ESβL	150 tests
D63C	Cefepime 30 & Cefepime 30/Clavulanic Acid 10	ESβL	150 tests
D64C	Ceftazidime 30 & Ceftazidime 30/Clavulanic Acid 10	ESβL	150 tests
D66C	Cefpodoxime 10 & Cefpodoxime 10/Clavulanic Acid 1	ESβL	150 tests
D67C	Extended Spectrum β Lactamase Set (CPD10)	ESβL	50 tests
D68C	AmpC & ESβL Detection Set	AmpC/ESβL	50 tests
D69C	AmpC Detection Set	AmpCs	50 tests
D72C	AmpC, ESβL & Carbapenemase Detection Disc Set	AmpC/ESβLs/Carba	50 tests
D73C	MAST® Carba plus	MBL/KPC/OXA	50 tests
D75C	MAST® OXA Plus - Temocillin/avibactam set <b>NEW</b>	OXA-48 detection/MBL, KPC screen	50 tests
D76C	ESβL Detection Set (EUCAST)	ESβL	50 tests

#### Additional carbapenemase screening and identification tests

DNA/LYO5	Rapid molecular carbapenemase detection in Enterobacterales, <i>Pseudomonas</i> spp. and <i>Acinetobacter</i> spp.	10 tests
PACE-ID	Colorimetric test for the rapid detection of carbapenemase producing <i>Pseudomonas</i> spp., <i>Acinetobacter</i> spp. and Enterobacterales.	48 tests
D71C	MAST® CAT-ID - For presumptive identification of carbapenemase production	250 tests
D74	MAST® ICT - screening test for the detection of carbapenemase production in Enterobacterales, <i>Pseudomonas</i> and <i>Acinetobacter</i> spp.	25 tests
TEM30C	To aid presumptive identification of OXA-48 when used with D70C	5 × 50 discs

# Identification Products

Order No	Product	Tests/Pack
<b>IDENTIFICATION OF MRSA</b>		
RST501	MAST® ALEX-MRSA Rapid Latex Test for the detection of Methicillin resistant <i>Staphylococcus aureus</i>	48 Tests
STOX	Oxacillin Strips (50 per tin) (this product is a direct replacement for STMT methicillin strips)	1 tin
MS29	MRSA (Oxacillin) Selectatab™	25 × 100ml tabs
OX1 OX1C	Oxacillin Susceptibility Discs in Vials Oxacillin Susceptibility Discs in Cartridges	99+/- 2 discs/vial 5 × 50 discs
FOX10 FOX10C	Cefoxitin Susceptibility Discs in Vials Cefoxitin Susceptibility Discs in Cartridges	99+/- 2 discs/vial 5 × 50 discs
TAB/OX0.2 TAB/FOX0.4	Oxacillin 0.4 ADATAB® Cefoxitin 0.4 ADATAB®	25 × 100ml tabs 25 × 100ml tabs
DM160D	Mannitol Salt Agar	500g
DM170D	Mueller Hinton Agar	500g
DM215D	D.S.T. Agar	500g
DM115D	Columbia Agar	500g

## IDENTIFICATION OF CANDIDA SPP.

IDM40/L	MAST® ID CHROMagar® Candida For the detection and identification of <i>Candida albicans</i> , <i>Candida tropicalis</i> and other <i>Candida</i> spp.	10 × 100ml sachets
IDM40D	MAST® ID CHROMagar® Candida For the detection and 500g identification of <i>Candida albicans</i> , <i>Candida tropicalis</i> and other <i>Candida</i> spp.	

**(Available to Special Order only. Lead time 4 weeks)**

# Bacterial Agglutinating Antisera

Order No

Product

Packsize

## MAST<sup>®</sup> ASSURE

### E.COLI O ANTISERA - MONOVALENT

#### Stock items

M12014	<i>Escherichia coli</i> Factor O26		2ml
M12016	<i>Escherichia coli</i> Factor O111		2ml
M12017	<i>Escherichia coli</i> Factor O119		2ml
M12018	<i>Escherichia coli</i> Factor O127a		2ml
M12030	<i>Escherichia coli</i> Factor O157		2ml
M12013	<i>Escherichia coli</i> O1		2ml
M12015	<i>Escherichia coli</i> O86a		2ml
M12019	<i>Escherichia coli</i> O128		2ml
M12020	<i>Escherichia coli</i> O44		2ml
M12021	<i>Escherichia coli</i> O55		2ml
M12026	<i>Escherichia coli</i> O18		2ml
M12027	<i>Escherichia coli</i> O114		2ml
M12028	<i>Escherichia coli</i> O142		2ml
M12032	<i>Escherichia coli</i> O6		2ml
M12034	<i>Escherichia coli</i> O78		2ml
M12035	<i>Escherichia coli</i> O148		2ml
M12036	<i>Escherichia coli</i> O159		2ml
M12039	<i>Escherichia coli</i> O25		2ml
M12041	<i>Escherichia coli</i> O153		2ml
M12043	<i>Escherichia coli</i> O8		2ml
M12047	<i>Escherichia coli</i> O28ac		2ml
M12048	<i>Escherichia coli</i> O112ac		2ml
M12049	<i>Escherichia coli</i> O124		2ml
M12050	<i>Escherichia coli</i> O136		2ml
M12051	<i>Escherichia coli</i> O144		2ml
M12053	<i>Escherichia coli</i> O143		2ml
M12054	<i>Escherichia coli</i> O152		2ml
M12055	<i>Escherichia coli</i> O164		2ml
M15772/NCE	<i>Escherichia coli</i> As O 103	NO CE MARK	2ml
M15796/NCE	<i>Escherichia coli</i> As O 145	NO CE MARK	2ml

### E.COLI O ANTISERA MONOVALENT

#### Lead time 8 weeks

M12022	<i>Escherichia coli</i> O125		2ml
M12023	<i>Escherichia coli</i> O126		2ml
M12025	<i>Escherichia coli</i> O166		2ml
M12029	<i>Escherichia coli</i> O151		2ml
M12031	<i>Escherichia coli</i> O158		2ml
M12045	<i>Escherichia coli</i> O115		2ml
M12052	<i>Escherichia coli</i> O29		2ml
M12024	<i>Escherichia coli</i> O146		2ml
M12033	<i>Escherichia coli</i> O27		2ml
M12037	<i>Escherichia coli</i> O168		2ml
M12038	<i>Escherichia coli</i> O20		2ml
M12040	<i>Escherichia coli</i> O63		2ml
M12042	<i>Escherichia coli</i> O167		2ml
M12044	<i>Escherichia coli</i> O15		2ml
M12046	<i>Escherichia coli</i> O169		2ml
M15789/NCE	<i>Escherichia coli</i> O 121	NO CE MARK	2ml
M15802/NCE	<i>Escherichia coli</i> O 161	NO CE MARK	2ml
M15819/NCE	<i>Escherichia coli</i> O 165	NO CE MARK	2ml
M15758/NCE	<i>Escherichia coli</i> O 74	NO CE MARK	2ml
M15765/NCE	<i>Escherichia coli</i> O 91	NO CE MARK	2ml

# Bacterial Agglutinating Antisera

Order No

Product

Packsize

## MAST<sup>®</sup> ASSURE

### ESCHERICHIA COLI O ANTISERA - POLYVALENT

#### Stock items

M14263	<i>Escherichia coli</i> POLY 2 Factors O26, O55, O111, O119, O126	2ml
M14270	<i>Escherichia coli</i> POLY 3 Factors O86, O114, O125, O127, O128	2ml
M14287	<i>Escherichia coli</i> POLY 4 Factors O44, O112, O124, O142	2ml
M12005	<i>Escherichia coli</i> POLY D1 (O1, O26, O86a, O111, O119, O127a, O128)	2ml
M12006	<i>Escherichia coli</i> POLY D2 (O44, O55, O125, O126, O146, O166)	2ml
M12007	<i>Escherichia coli</i> POLY D3 (O18, O114, O142, O151, O157, O158)	2ml
M12008	<i>Escherichia coli</i> POLY D4 (O6, O27, O78, O148, O159, O168)	2ml
M12009	<i>Escherichia coli</i> POLY D5 (O20, O25, O63, O153, O167)	2ml
M12010	<i>Escherichia coli</i> POLY D6 (O8, O15, O115, O169)	2ml
M12011	<i>Escherichia coli</i> POLY D7 (O28ac, O112ac, O124, O136, O144)	2ml
M12012	<i>Escherichia coli</i> POLY D8 (O29, O143, O152, O164)	2ml
M15741/NCE	<i>E.coli</i> POLY D9 (O74, O91, O103, O121, O145, O161, O165) NO CE MARK	2ml

### E.COLI H ANTISERA MONOVALENT

#### Stock items

M12060	<i>Escherichia coli</i> H-7	5ml
--------	-----------------------------	-----

### ESCHERICHIA COLI H ANTISERA MONOVALENT

#### Lead time 8 weeks

M12056	<i>Escherichia coli</i> H-2	5ml
M12057	<i>Escherichia coli</i> H-4	5ml
M12058	<i>Escherichia coli</i> H-5	5ml
M12059	<i>Escherichia coli</i> H-6	5ml
M12061	<i>Escherichia coli</i> H-9	5ml
M12062	<i>Escherichia coli</i> H-10	5ml
M12063	<i>Escherichia coli</i> H-11	5ml
M12064	<i>Escherichia coli</i> H-12	5ml
M12065	<i>Escherichia coli</i> H-16	5ml
M12066	<i>Escherichia coli</i> H-18	5ml
M12067	<i>Escherichia coli</i> H-19	5ml
M12068	<i>Escherichia coli</i> H-20	5ml
M12069	<i>Escherichia coli</i> H-21	5ml
M12070	<i>Escherichia coli</i> As H-27	5ml
M12071	<i>Escherichia coli</i> As H-28	5ml
M12072	<i>Escherichia coli</i> As H-34	5ml
M12073	<i>Escherichia coli</i> As H-40	5ml
M12074	<i>Escherichia coli</i> As H-41	5ml
M12075	<i>Escherichia coli</i> AS H-42	5ml
M12076	<i>Escherichia coli</i> As H-45	5ml
M12077	<i>Escherichia coli</i> As H-51	5ml

### TOXIGENIC ESCHERICHIA COLI PILI ANTISERA

#### Lead time 8 weeks

M11601/NCE	Toxigenic <i>Escherichia coli</i> Pili Antisera Set This set consists of the following K88, K99 and 987P	No CE Mark	5ml x 3
M11602/NCE	<i>Escherichia coli</i> K88	No CE Mark	5ml
M11603/NCE	<i>Escherichia coli</i> K99	No CE Mark	5ml
M11604/NCE	<i>Escherichia coli</i> 987P	No CE Mark	5ml

# Bacterial Agglutinating Antisera

Order No	Product	Packsize
----------	---------	----------

## MAST<sup>®</sup> ASSURE

### HAEMOPHILUS INFLUENZAE ANTISERA

Lead time 8 weeks

Haemophilus influenzae type listed below

M11303	<i>Haemophilus influenzae</i> Type b	2ml
M11302	<i>Haemophilus influenzae</i> Type a	2ml
M11304	<i>Haemophilus influenzae</i> Type c	2ml
M11305	<i>Haemophilus influenzae</i> Type d	2ml
M11306	<i>Haemophilus influenzae</i> Type e	2ml
M11307	<i>Haemophilus influenzae</i> Type f	2ml

### SALMONELLA O ANTISERA - MONOVALENT

Stock items

M10310	<i>Salmonella</i> Factor O 2	2ml
M10311	<i>Salmonella</i> Factor O 4	2ml
M10321	<i>Salmonella</i> Factor O 6,14	2ml
M10312	<i>Salmonella</i> Factor O 7	2ml
M10313	<i>Salmonella</i> Factor O 8	2ml
M10314	<i>Salmonella</i> Factor O 9	2ml
M10326	<i>Salmonella</i> Factor Vi	2ml
M10315	<i>Salmonella</i> O Factor O9,46	2ml
M10316	<i>Salmonella</i> O Factor O1, 3,10	2ml
M10318	<i>Salmonella</i> O Factor O1,3,19	2ml
M10319	<i>Salmonella</i> O Factor O11	2ml
M10320	<i>Salmonella</i> O Factor O13	2ml
M10323	<i>Salmonella</i> O Factor O18	2ml
M10324	<i>Salmonella</i> O Factor O21	2ml

### SALMONELLA O ANTISERA - MONOVALENT

Lead time 8 weeks

M10322	<i>Salmonella</i> O Factor O16	2ml	
M92575/NCE	<i>Salmonella</i> O Factor O17	NO CE MARK	2ml
M92582/NCE	<i>Salmonella</i> O Factor O28	NO CE MARK	2ml
M10325	<i>Salmonella</i> O Factor O35	2ml	
M92599/NCE	<i>Salmonella</i> O Factor O39	NO CE MARK	2ml

### SALMONELLA O ANTISERA - POLYVALENT

Stock items

M10308	POLY O Factor O2, O4, O7, O8, O9, O9, 46, O3, 10 and O1,3,19	2ml
M10309	POLY O1 Factor O11, O13, O6, 14, O16, O18, O21 and O35	2ml
M14294	POLY O A-G	2ml
M14300	POLY O A-S	2ml
M92537	Omnivalent (Kauffmann-White group A-067)	2ml

# Bacterial Agglutinating Antisera

Order No

Product

Packsizes

## MAST<sup>®</sup> ASSURE

### SALMONELLA H ANTISERA - MONOVALENT

#### Stock items

M10327	<i>Salmonella</i> H Factor a	2ml
M10328	<i>Salmonella</i> H Factor b	2ml
M10329	<i>Salmonella</i> H Factor c	2ml
M10330	<i>Salmonella</i> H Factor d	2ml
M10331	<i>Salmonella</i> H Factor e, h	2ml
M10332	<i>Salmonella</i> H Factor G	2ml
M14335	<i>Salmonella</i> H Factor E	2ml
M10333	<i>Salmonella</i> H Factor i	2ml
M10344	<i>Salmonella</i> H Factor 2	2ml
M10345	<i>Salmonella</i> H Factor 5	2ml
M10346	<i>Salmonella</i> H Factor 6	2ml
M10364	<i>Salmonella</i> H Factor f	2ml
M10365	<i>Salmonella</i> H Factor m	2ml
M10366	<i>Salmonella</i> H Factor p	2ml
M10367	<i>Salmonella</i> H Factor q	2ml
M10368	<i>Salmonella</i> H Factor s	2ml
M10369	<i>Salmonella</i> H Factor t	2ml
M10335	<i>Salmonella</i> H Factor L	2ml
M10337	<i>Salmonella</i> H Factor y	2ml
M10340	<i>Salmonella</i> H Factor v	2ml
M10341	<i>Salmonella</i> H Factor w	2ml
M10342	<i>Salmonella</i> H Factor z13	2ml
M10343	<i>Salmonella</i> H Factor z28	2ml
M10347	<i>Salmonella</i> H Factor 7	2ml
M10348	<i>Salmonella</i> H Factor z6	2ml
M10370	<i>Salmonella</i> H Factor u	2ml
M10372	<i>Salmonella</i> H Factor z23	2ml
M10373	<i>Salmonella</i> H Factor z24	2ml
M10376	<i>Salmonella</i> H Factor x	2ml
M10377	<i>Salmonella</i> H Factor a	2ml
M10379	<i>Salmonella</i> H Factor z4	2ml
M10334	<i>Salmonella</i> H Factor k	2ml
M10336	<i>Salmonella</i> H Factor r	2ml

### SALMONELLA H ANTISERA - MONOVALENT

#### Lead time 8 weeks

M91882/NCE	<i>Salmonella</i> H Factor g,p	No CE Mark	5ml
M10338	<i>Salmonella</i> H Factor e,n		2ml
M10378	<i>Salmonella</i> H Factor z		2ml
M10380	<i>Salmonella</i> H Factor z10		2ml
M10374	<i>Salmonella</i> H Factor z32		2ml
M10381	<i>Salmonella</i> H Factor z29		2ml

### SALMONELLA H ANTISERA - POLYVALENT

#### Stock items

M14317	POLYVALENT PHASE 1 & 2 (a-z29)	2ml
M10339	POLYVALENT PHASE 2 (H-1)	2ml
M14324	RAPID DIAGNOSTIC 1 Factors b, d, E, r	2ml
M14331	RAPID DIAGNOSTIC 2 Factors b, E, k, l	2ml
M14348	RAPID DIAGNOSTIC 3 Factors d, E, G, k	2ml



# Bacterial Agglutinating Antisera

Order No	Product	Packsizes
----------	---------	-----------

## MAST<sup>®</sup> ASSURE

### SALMONELLA H GROUP PHASE INDUCTION

Lead time 8 weeks

M10361/NCE	<i>Salmonella</i> Phase H 1	No CE Mark	5ml
M10352/NCE	<i>Salmonella</i> Phase H d	No CE Mark	5ml
M10353/NCE	<i>Salmonella</i> Phase H e,h	No CE Mark	5ml
M10360/NCE	<i>Salmonella</i> Phase H e,n	No CE Mark	5ml
M10355/NCE	<i>Salmonella</i> Phase H i	No CE Mark	5ml
M10357/NCE	<i>Salmonella</i> Phase H L	No CE Mark	5ml
M10358/NCE	<i>Salmonella</i> Phase H r	No CE Mark	5ml
M10359/NCE	<i>Salmonella</i> Phase H y	No CE Mark	5ml
M10350/NCE	<i>Salmonella</i> Phase H b	No CE Mark	5ml
M10356/NCE	<i>Salmonella</i> Phase H k	No CE Mark	5ml
M10383/NCE	<i>Salmonella</i> Phase H z4	No CE Mark	5ml
M10391/NCE	<b><i>Salmonella</i> Phase Induction Set</b>	No CE Mark	5ml × 17
	This set consists of a, b, c, d, eh, G, I, k, L, r, y, en, 1, z, z4, z10, z29		

### SHIGELLA ANTISERA - MONOVALENT

Stock items

M10136	<i>Shigella boydii</i>	Type 2	2ml
M10137	<i>Shigella boydii</i>	Type 3	2ml
M10116	<i>Shigella dysenteriae</i>	Type 1	2ml
M10126	<i>Shigella flexneri</i>	Type I	2ml
M10127	<i>Shigella flexneri</i>	Type II	2ml
M10128	<i>Shigella flexneri</i>	Type III	2ml
M10129	<i>Shigella flexneri</i>	Type IV	2ml
M10130	<i>Shigella flexneri</i>	Type V	2ml
M10131	<i>Shigella flexneri</i>	Type VI	2ml
M10132	<i>Shigella flexneri</i>	Group (3)4	2ml
M10133	<i>Shigella flexneri</i>	Group 6	2ml
M10134	<i>Shigella flexneri</i>	Group 7(8)	2ml
M10150	<i>Shigella sonnei</i>	Phase I	2ml
M10151	<i>Shigella sonnei</i>	Phase II	2ml

# Bacterial Agglutinating Antisera

Order No

Product

Packsize

## MAST<sup>®</sup> ASSURE

### SHIGELLA ANTISERA - MONOVALENT

Lead time 8 weeks

M10117	<i>Shigella dysenteriae</i>	Type 2	2ml
M10119	<i>Shigella dysenteriae</i>	Type 4	2ml
M10118	<i>Shigella dysenteriae</i>	Type 3	2ml
M10120	<i>Shigella dysenteriae</i>	Type 5	2ml
M10121	<i>Shigella dysenteriae</i>	Type 6	2ml
M10122	<i>Shigella dysenteriae</i>	Type 7	2ml
M10123	<i>Shigella dysenteriae</i>	Type 8	2ml
M10124	<i>Shigella dysenteriae</i>	Type 9	2ml
M10125	<i>Shigella dysenteriae</i>	Type 10	2ml
M10152	<i>Shigella dysenteriae</i>	Type 11	2ml
M10153	<i>Shigella dysenteriae</i>	Type 12	2ml
M10135	<i>Shigella boydii</i>	Type 1	2ml
M10138	<i>Shigella boydii</i>	Type 4	2ml
M10139	<i>Shigella boydii</i>	Type 5	2ml
M10140	<i>Shigella boydii</i>	Type 6	2ml
M10141	<i>Shigella boydii</i>	Type 7	2ml
M10142	<i>Shigella boydii</i>	Type 8	2ml
M10143	<i>Shigella boydii</i>	Type 9	2ml
M10144	<i>Shigella boydii</i>	Type 10	2ml
M10145	<i>Shigella boydii</i>	Type 11	2ml
M10146	<i>Shigella boydii</i>	Type 12	2ml
M10147	<i>Shigella boydii</i>	Type 13	2ml
M10148	<i>Shigella boydii</i>	Type 14	2ml
M10149	<i>Shigella boydii</i>	Type 15	2ml
M10155	<i>Shigella boydii</i>	Type 16	2ml
M10156	<i>Shigella boydii</i>	Type 17	2ml
M10157	<i>Shigella boydii</i>	Type 18	2ml

### SHIGELLA ANTISERA - POLYVALENT

Stock item

M10109	<i>S.dysenteriae</i> POLY A	Types 1, 2, 3, 4, 5, 6, 7	2ml
M10110	<i>S.dysenteriae</i> POLY A1	Types 8, 9, 10, 11, 12	2ml
M10111	<i>S.flexneri</i> POLY B	Types I, II, III, IV, V, VI, Groups (3)4, 6, 7(8)	2ml
M10112	<i>S.boydii</i> POLY C	Types 1, 2, 3, 4, 5, 6, 7	2ml
M10113	<i>S.boydii</i> POLY C1	Types 8, 9, 10, 11	2ml
M10114	<i>S.boydii</i> POLY C2	Types 12, 13, 14, 15	2ml
M10154	<i>S.boydii</i> POLY C3	Types 16, 17, 18	2ml
M10115	<i>S.sonnei</i> POLY D	Phase I & II	2ml

### VIBRIO ANTISERA

Stock items

M11002	<i>Vibrio cholerae</i> POLY (INABA, OGAWA)		2ml
M11003	<i>Vibrio cholerae</i> INABA		2ml
M11004	<i>Vibrio cholerae</i> OGAWA		2ml
M15001	<i>Vibrio cholerae</i> O139 (Bengal)		2ml

### BORDATELLA ANTISERA

Lead time 8 weeks

M11501/NCE	BORDATELLA PERTUSSIS ANTISERA This antiserum agglutinates Phase I <i>B.pertussis</i> but does not agglutinate Phase III <i>B.pertussis</i> , <i>B.parapertussis</i> , nor <i>B.bronchiseptica</i> .	No CE Mark	2ml
------------	--	------------	-----

# Bacterial Agglutinating Antisera

Order No	Product	Packsize
----------	---------	----------

## MAST<sup>®</sup> ASSURE

### LEGIONELLA ANTISERA

#### Stock items

M11702	<i>Legionella pneumophila</i> Group.1		2ml
M11703	<i>Legionella pneumophila</i> Group.2		2ml
M11704	<i>Legionella pneumophila</i> Group.3		2ml
M11705	<i>Legionella pneumophila</i> Group.4		2ml
M11706	<i>Legionella pneumophila</i> Group.5		2ml
M11707	<i>Legionella pneumophila</i> Group.6		2ml
M15727/NCE	<i>Legionella pneumophila</i> Group 7	No CE Mark	2ml
M15734/NCE	<i>Legionella pneumophila</i> Group 8	No CE Mark	2ml
M93572/NCE	<i>Legionella pneumophila</i> Group.9	No CE Mark	2ml
M93589/NCE	<i>Legionella pneumophila</i> Group.10	No CE Mark	2ml
M93626/NCE	<i>Legionella pneumophila</i> Group.11	No CE Mark	2ml
M93633/NCE	<i>Legionella pneumophila</i> Group.12	No CE Mark	2ml
M93640/NCE	<i>Legionella pneumophila</i> Group.13	No CE Mark	2ml
M93657/NCE	<i>Legionella pneumophila</i> Group.14	No CE Mark	2ml
M93664/NCE	<i>Legionella pneumophila</i> Group.15	No CE Mark	2ml
M11708	<i>Legionella bozemanii</i> Antisera		2ml
M11711	<i>Legionella micdadei</i> Antisera		2ml
M11710	<i>Legionella gormanii</i> Antisera		2ml
M11709	<i>Legionella dumoffii</i> Antisera		2ml

### LISTERIA ANTISERA

#### Stock items

M14379	Listeria O I/II antiserum		2ml
M14386	Listeria O I antiserum		2ml
M14393	Listeria O IV antiserum		2ml
M14409	Listeria O V/VI antiserum		2ml
M14416	Listeria O VI antiserum		2ml
M14423	Listeria O VII antiserum		2ml
M14430	Listeria O VIII antiserum		2ml
M14447	Listeria O IX antiserum		2ml
M14454	Listeria H-A antiserum		5ml
M14461	Listeria H-AB antiserum		5ml
M14478	Listeria H-C antiserum		5ml
M14485	Listeria H-D antiserum		5ml

# Bacterial Agglutinating Antisera

Order No

Product

Packsize

## MAST<sup>®</sup> ASSURE

### HAEMOLYTIC STREPTOCOCCUS GROUP-A TYPING ANTISERA

Lead time 8 weeks

M10510/NCE	Group-A Strept. Poly T: 1, 3, 13, B3264	No CE Mark	2ml
M10511/NCE	Group-A Strept. Poly U: 2, 4, 6, 28	No CE Mark	2ml
M10512/NCE	Group-A Strept. Poly W: 5/27/44, 11, 12	No CE Mark	2ml
M10513/NCE	Group-A Strept. Poly X: 8, 14/49, 25, Imp19	No CE Mark	2ml
M10514/NCE	Group-A Strept. poly Y	No CE Mark	2ml
M10515/NCE	Group-A Strept. T 1	No CE Mark	2ml
M10516/NCE	Group-A Strept. T-2	No CE Mark	2ml
M10523/NCE	Group-A Strept. T 11	No CE Mark	2ml
M10524/NCE	Group-A Strept. T 12	No CE Mark	2ml
M10525/NCE	Group-A Strept. T 13	No CE Mark	2ml
M10526/NCE	Group-A Strept. T 14/49	No CE Mark	2ml
M10527/NCE	Group-A Strept. T 18	No CE Mark	2ml
M10528/NCE	Group-A Strept. T 22	No CE Mark	2ml
M10529/NCE	Group-A Strept. T 23	No CE Mark	2ml
M10530/NCE	Group-A Strept. T 25	No CE Mark	2ml
M10531/NCE	Group-A Strept. T 28	No CE Mark	2ml
M10517/NCE	Group-A Strept. T 3	No CE Mark	2ml
M10518/NCE	Group-A Strept. T 4	No CE Mark	2ml
M10519/NCE	Group-A Strept. T 5/27/44	No CE Mark	2ml
M10520/NCE	Group-A Strept. T 6	No CE Mark	2ml
M10521/NCE	Group-A Strept. T 8	No CE Mark	2ml
M10522/NCE	Group-A Strept. T 9	No CE Mark	2ml
M10532/NCE	Group-A Strept. T B3264	No CE Mark	2ml
M10533/NCE	Group-A Strept. T Imp19	No CE Mark	2ml

### HAEMOLYTIC STREPTOCOCCUS GROUP-B TYPING ANTISERA

Lead time 8 weeks

M93350/NCE	Group-B Strept. As VI NT6	No CE Mark	2ml
M93374/NCE	Group-B Strept. As VII 7271	No CE Mark	2ml
M93367/NCE	Group-B Strept. As VIII JM9	No CE Mark	2ml

### RECEPTOR DESTROYING ENZYME (RDE II)

370013	RDE (II) Receptor Destroying Enzyme For use in the serodiagnosis test of Influenza virus	20 mL × 5
--------	---	-----------

### REAGENTS FOR PREPARING SENSITIZED BLOOD CELLS

M42201	Reagents for preparing Sensitized Blood Cells	50 tests
--------	---	----------

# Bacterial Agglutinating Antisera

Order No	Product	Packsize
----------	---------	----------

## MAST<sup>®</sup> ASSURE

### YERSINIA ENTEROCOLITICA O-GROUPING ANTISERA

#### Stock items

M11102	Polyvalent: Group O1, O2 Mixture	2ml
M11103	Group O3	2ml
M11104	Group O5	2ml
M11105	Group O9	2ml
M11106	Group O8	2ml

### YERSINIA PSEUDOTUBERCULOSIS ANTISERA

#### Lead time 8 weeks

M11801/NCE	<i>Yersinia pseudotuberculosis</i> Grouping Antisera Set This set consists of: Group 1-6 <i>Yersinia pseudotuberculosis</i> Group listed below	No CE Mark	2ml x 6
M11802/NCE	<i>Yersinia pseudotuberculosis</i> Group 1	No CE Mark	2ml
M11803/NCE	<i>Yersinia pseudotuberculosis</i> Group 2	No CE Mark	2ml
M11804/NCE	<i>Yersinia pseudotuberculosis</i> Group 3	No CE Mark	2ml
M11805/NCE	<i>Yersinia pseudotuberculosis</i> Group 4	No CE Mark	2ml
M11806/NCE	<i>Yersinia pseudotuberculosis</i> Group 5	No CE Mark	2ml
M11807/NCE	<i>Yersinia pseudotuberculosis</i> Group 6	No CE Mark	2ml

# Veterinary Tests

Order No	Product	Packsize
<b>EIKEN TESTS Available from stock</b>		
G-SZ71	Serum Amyloid A Protein Reagent 1 and 2	4 × 20ml
G-SZ75	Serum Amyloid A Protein Calibrator (Liquid)	6 × 1ml
E-XC33/NCE	QC control-SAA H (~100ug/ml) Research / Veterinary Use ONLY	5 × 2ml
E-XC32/NCE	QC control-SAA L (~20ug/ml) Research / Veterinary Use ONLY	5 × 2ml
V-SZ51/NCE	VET-SAA "Eiken" Reagent	R1 2 × 20mL / R2 2 × 20mL
V-SZ90/NCE	VET-SAA Calibrator Set	Calibrator 5 × 1mL / Lysis buffer 1 × 12mL
V-SZ91/NCE	VET-SAA-QC-Low	Calibrator 5 × 1mL / Lysis buffer 1 × 12mL
V-SZ92/NCE	VET-SAA-QC-High	Calibrator 5 × 1mL / Lysis buffer 1 × 12mL

## MAST VETERINARY PATHOGEN IDENTIFICATION PRODUCTS

RST7001	MAST TOXOREAGENT - Toxoplasma test , Complete kit for detection of Toxoplasma antibody comprising latex suspension, buffer and positive control serum.	50 tests
---------	--	----------

## MASTAZYME® ENZYME IMMUNOASSAYS

All products available to Special Order - Lead time 2-3 weeks  
Complete assays for the detection and confirmation of antibodies

680251	<i>Brucella abortus</i> IgG	12 × 8 tests
680252	<i>Brucella abortus</i> IgM	12 × 8 tests

## MASTDISCS® AST ANTIBIOTIC SUSCEPTIBILITY DISCS IN CARTRIDGES AND VIALS

### SPECIALIST VETERINARY SUSCEPTIBILITY DISCS

Antibiotic & Strength µg per disc (unless otherwise stated)

CEQ30C/NCE	Cefquinone 30	5 × 50 discs
ENF5C/NCE	Enrofloxacin 5	5 × 50 discs
FFC30C/NCE	Florfenicol 30	5 × 50 discs
GAM15C/NCE	Gamithromycin 15	5 × 50 discs
PRA5C/NCE	Pradofloxacin 5	5 × 50 discs
MAR5C/NCE	Marbofloxacin 5	5 × 50 discs
NE30C/NCE	Neomycin 30	5 × 50 discs
TIP60C/NCE	Tildipirison 60	5 × 50 discs
TY30C/NCE	Tylosin 30	5 × 50 discs

### MASTDISCS® in Cartridges (5 × 50 discs per pack)

STOCKCART	Stock Susceptibility Cartridge Discs of a single type	1 pack
FUNGCART	Stock Antifungal Cartridge Discs of a single type	1 pack
SPECIALCART	Cartridge Discs made to special order*	Min 18 packs

### MASTDISCS® in vials (100 discs per vial)

STOCKDISC	Stock Susceptibility Discs of a single type	1 vial
FUNGDISC	Stock Antifungal Discs of a single type	1 pack
SPECIALDISC	Discs made to special order*	Min 22 packs
TOOL/C	*Set up charge for Special Discs in vials or cartridges	per new specification
A one off charge for customisation of each new specification		

### MASTRING-S® (6 or 8 tipped, 100 rings per tin)

MASTRING	MASTRING-S® to individual specification.	10-19 tins
SPECIAL	Minimum order 10 tins of 100 rings	

TOOL/M \*Set up charge for MASTRING SPECIAL:  
a one off charge for customisation of each new letter coded ring

New Specification NUMBER coded MASTRING-S® are subject to an initial minimum order of 10 tins.  
New Specification LETTER coded MASTRING-S® are subject to an initial minimum order of 20 tins.  
Subsequent orders: minimums of 10 tins.

# Molecular Biology Tests

Order No	Product	Packsize
----------	---------	----------

---

## **MAST**ISOPLEX®

### **NUCLEIC ACID DETECTION PRODUCTS**

**Available from stock No dry ice shipment**

DNA/LYO5	MAST ISOPLEX® CRE ART kit - LAMP kit for molecular detection and characterisation of different strains of Carbapenem-resistant Enterobacterales	100 tests
----------	---	-----------

**Available to Special Order Lead time 6 weeks**

DNA/LYO3	MAST ISOPLEX® VTEC kit	20 tests
DNA/LYO4	MAST ISOPLEX® <i>E.coli</i> O157 kit	20 tests
DNA/LYO1	MAST ISOPLEX® DNA Lyo kit	100 tests
DNA/LYO2	MAST ISOPLEX® DNA Lyo Plus kit	100 tests

---

## MASTAFLUOR® IMMUNOFLUORESCENCE TESTS

All products available to Special Order- Lead time 2-3 weeks

630522	FTA-ABS-IgG Treponema pallidum complete test kit	10 × 10 tests
630525	FTA-ABS IgM Treponema pallidum complete test kit	10 × 10 tests
640522	FTA-ABS Treponema pallidum slides	10 × 10 wells
620521	FTA-ABS-Antibodies controls IgG positive	0.5 ml
620525	FTA-ABS-Antibodies controls IgM positive	0.5 ml
636325	Mumps-IgM-complete test kit	10 × 5 tests

Complete test kits contain slides, buffers, controls, mounting medium, conjugate & cover slips

## MASTAFLUOR® IMMUNOFLUORESCENCE TESTS

All products available to Special Order- Lead time 2-3 weeks

6631181	Toxoplasma Screen	10 × 5 tests
631182	Toxoplasma Screen	10 × 10 tests
631183	Toxoplasma-IgG-complete test kit	10 × 5 tests
641181	Toxoplasma slides	10 × 5 wells
641182	Toxoplasma slides	10 × 10 wells
621181	Toxoplasma controls IgG positive	0.5 ml
636332	Varicella Zoster-IgG (Herpes Zoster) complete test kit	10 × 5 tests
626256	Varicella Zoster (Herpes Zoster) controls IgM positive	0.5 ml

Complete test kits contain slides, buffers, controls, mounting medium, conjugate & cover slips

## MASTAFLUOR® IF ADDITIONAL REAGENTS

All products available to Special Order- Lead time 2-3 weeks

<b>Conjugates FITC labeled (ready for use)</b>		
626291	Anti-Human IgG	2.0 ml
626284	Anti-Human IgG	3.0 ml
626283	Anti-Human IgG	10.0 ml
626292	Anti-Human IgM (μ-chain)	2.0 ml
626285	Anti-Human IgM (μ-chain)	3.0 ml
626290	Anti-Human IgG, IgA, IgM	2.0 ml
626286	Anti-Human IgG, IgA, IgM	3.0 ml
<b>Other Reagents</b>		
620100	IFT Serumdiluent	2 × 10 ml
626298	Evans Blue (ready to use)	3.0 ml
626281SO	Sorbent for FTA-ABS	2 × 5ml
626280	Cover Slides (24 x 60 mm)	100 pc
<b>Rheumatic factor IgG absorbent for IgM tests</b>		
651003	MASTSORB	2 ml



# Mast Immunodiagnostic Tests | Infectious Disease

Order No	Product	Packsizes
<b>MASTAZYME® ENZYME IMMUNOASSAYS</b>		
<b>All products available to Special Order- Lead time 2-3 weeks</b>		
<b>Complete assays for the detection and confirmation of antibodies</b>		
680101	Aspergillus fumigatus IgG	12 × 8 tests
680102	Aspergillus fumigatus IgM	12 × 8 tests
680151	Bordetella pertussis IgG	12 × 8 tests
680152	Bordetella pertussis IgM	12 × 8 tests
680153	Bordetella pertussis IgA	12 × 8 tests
680201	Borrelia burgdorferi IgG	12 × 8 tests
680202	Borrelia burgdorferi IgM	12 × 8 tests
680251	Brucella abortus IgG	12 × 8 tests
680252	Brucella abortus IgM	12 × 8 tests
680301	Candida albicans IgG	12 × 8 tests
680302	Candida albicans IgM	12 × 8 tests
680303	Candida albicans IgA	12 × 8 tests
680351	Diphtheria IgG	12 × 8 tests
680401	EBV VCA IgG	12 × 8 tests
680402	EBV VCA IgM	12 × 8 tests
680411	EBV EA IgG	12 × 8 tests
680412	EBV EA IgM	12 × 8 tests
680421	EBV EBNA IgG	12 × 8 tests
680422	EBV EBNA IgM	12 × 8 tests
680501	FSME / TBEV IgG	12 × 8 tests
680502	FSME / TBEV IgM	12 × 8 tests
680601	Herpes 1 simplex IgG	12 × 8 tests
680602	Herpes 1 simplex IgM	12 × 8 tests
680621	Herpes 2 simplex IgG	12 × 8 tests
680622	Herpes 2 simplex IgM	12 × 8 tests
680623	Herpes 2 simplex IgA	12 × 8 tests
680643	Herpes 1/2 simplex IgA	12 × 8 tests
680702	Influenza A IgM	12 × 8 tests
680712	Influenza B IgM	12 × 8 tests
680751	Measles IgG	12 × 8 tests
680752	Measles IgM	12 × 8 tests
680753	Measles IgA	12 × 8 tests
680801	Mumps IgG	12 × 8 tests
680802	Mumps IgM	12 × 8 tests
680803	Mumps IgA	12 × 8 tests
680851	Mycobacterium tuberculosis IgG	12 × 8 tests
680852	Mycobacterium tuberculosis IgM	12 × 8 tests
680853	Mycobacterium tuberculosis IgA	12 × 8 tests
680901	Mycoplasma pneumoniae IgG	12 × 8 tests
680902	Mycoplasma pneumoniae IgM	12 × 8 tests
680903	Mycoplasma pneumoniae IgA	12 × 8 tests
680981	Parainfluenza 1/2/3 IgG	12 × 8 tests
680982	Parainfluenza 1/2/3 IgM	12 × 8 tests
681051	Poliomyelitis IgG	12 × 8 tests
681101	Respiratory syncytial virus (RSV) IgG	12 × 8 tests
681102	Respiratory syncytial virus (RSV) IgM	12 × 8 tests
681103	Respiratory syncytial virus (RSV) IgA	12 × 8 tests
681151	Tetanus Antitoxin IgG	12 × 8 tests
681251	Yersinia enterocolitica IgG	12 × 8 tests
681252	Yersinia enterocolitica IgM	12 × 8 tests
681253	Yersinia enterocolitica IgA	12 × 8 tests
<b>Chlamydia Antigen</b>		
695010	Mastazyme Chlamydia Ag	12 × 8 tests
695020	Mastazyme Chlamydia Ag Transport Media	95 tubes
695030	Mastazyme Chlamydia Ag Swabs	100 pc.

**Special prices are available for bulk purchase.**



# Mast Immunodiagnostic Tests | Autoimmune

Order No	Product	Packsizes
----------	---------	-----------

## MASTAFLUOR® IMMUNOFLUORESCENCE TESTS

All products available to Special Order. Lead time 2-3 weeks.

### COMPLETE TEST KITS

contains slides, controls, conjugate, mounting medium and buffer

Order No	Product	Packsizes
	<b>HEp-2-Cells</b>	
	Tissue Sections	
606023	ANA/AMA/ASMA/APCA/LKM	10 × 10 tests
606080	ASA/Rabbit Tongue	10 × 5 tests
606064	SKMA	10 × 5 tests
	<b>TISSUE SECTIONS</b>	
	<b>Single Tissues</b>	
	<b>Rabbit Tissue Sections</b>	
616180	Rabbit Tongue	10 × 5 wells
	Rat Tissue Sections	
616175	Rat Striated Muscle	10 × 5 wells
	<b>Combined Tissue Sections</b>	
	<b>Rat Tissue</b>	
616123	Rat Liver/-Kidney/-Stomach	10 × 10 wells



# Mast Immunodiagnostic Tests | Autoimmune

Order No	Product	Packsizes
<b>MASTAZYME® ENZYME IMMUNOASSAY</b>		
<b>All products available to Special Order. Lead time 2-3 weeks</b>		
<b>ANA</b>		
732020	Anti-dsDNA	12 × 8 tests
733026	ANA Profile 8	12 × 8 tests
733018	ANA Profile HJS	12 × 8 tests
<b>ENA</b>		
733023	Anti-ENA Screen 7	12 × 8 tests
733010	Anti-Jo 1	12 × 8 tests
733012	Anti-Scl-70	12 × 8 tests
733013	Anti-Sm	12 × 8 tests
733014	Anti-Sm/RNP	12 × 8 tests
733015	Anti-SS-A (Ro)	12 × 8 tests
733016	Anti-SS-B (La)	12 × 8 tests
<b>AMA</b>		
733017	Anti-Mitochondrial M2	12 × 8 tests
<b>Thyroid-Autoantibodies</b>		
731010	Anti-TG	12 × 8 tests
731011	Anti-Thyroid-Peroxidase (Anti-TPO)	12 × 8 tests
<b>ANCA</b>		
735013	Anti-Proteinase 3	12 × 8 tests
735012	Anti-Myeloperoxidase	12 × 8 tests
<b>Others</b>		
733011	Anti-Rib-P (ribosomal protein)	12 × 8 tests

**Special prices are available for bulk purchase**

# Terms and Conditions for Supply of Goods and/or Services

## 1. INTERPRETATION

- 1.1 In these Terms and Conditions the following words have the following meanings:
  - "Buyer": means the person(s), firm or company who accepts MAST's written quotation for the sale of the Goods and/or supply of the Services or whose written order for the Goods or Services is accepted by MAST;
  - "Contract": means any contract between MAST and the Buyer for the sale and purchase of Goods, incorporating these Terms;
  - "Goods": means any products and, test results and all documents and information arising from services agreed in the Contract to be supplied to the Buyer by MAST (including any part or parts thereof);
  - "MAST": means Mast Group Limited;
  - "Services" means the services which MAST is to supply in accordance with these Terms; and Terms, means the standard terms and conditions of sale set out in this document and (unless the context otherwise requires) includes any special terms agreed in writing between the Buyer and MAST pursuant to condition 2.3.
- 1.2 A reference in these Terms to a provision of a statute shall be construed as a reference to that provision as amended, re-enacted or extended at the relevant time.
- 1.3 In these Terms references to the masculine include the feminine and to the singular include the plural and vice versa as the context admits or requires.
- 1.4 In these Terms, the headings will not affect the construction of these Terms.

## 2. GENERAL

- 2.1 Subject to any variation under condition 2.3, the Contract will be subject to these Terms to the exclusion of all other terms and conditions (including any terms or conditions which the Buyer purports to apply under any purchase order, confirmation of order, specification or other document) and any course of dealing, and the acceptance of the supply of Goods or provision of Services shall be deemed conclusive evidence of the Buyer's acceptance of these Terms.
- 2.2 MAST's employees or agents are not authorised to make any representations concerning the Goods/Services unless confirmed by MAST in accordance with condition 2.3. In entering into the Contract the Buyer acknowledges that it does not rely on any such representations, which are not so confirmed, but nothing in these Terms affect the liability of either party for fraudulent misrepresentation.
- 2.3 Any variation to these Terms and representations about the Goods or Services shall have no effect unless expressly agreed in writing and signed by the Managing Director of MAST.
- 2.4 Any typographical, clerical or other error or omission in any sales literature, quotation, price list, acceptance of offer, invoice or other document or information issued by MAST shall be subject to correction without any liability on the part of MAST.

## 3. ORDERS AND SPECIFICATIONS

- 3.1 Orders may be made by post, telephone, fax or e-mail and shall be deemed to be in accordance with MAST's custom manufacturing policy as set out in MAST's price list from time to time available at [www.mast-group.com](http://www.mast-group.com). Each order for Goods or Services by the Buyer shall be deemed to be an offer by the Buyer to purchase Goods or Services subject to these conditions. Please order by catalogue number and product description. A Buyer order number is required for every order.
- 3.2 No order submitted by the Customer shall be deemed to be accepted by MAST unless and until confirmed in writing by MAST's authorised representative.
- 3.3 The Buyer shall be responsible to MAST for ensuring the accuracy of the terms of any order including where applicable, catalogue number and any applicable specification or design submitted by the Buyer. Buyer should note the provisions of condition 11.7.
- 3.4 Goods should be used in accordance with the manufacturer's instructions. MAST accepts no liability for the performance of Goods if used outside the manufacturer's instructions or where Goods are found to be faulty yet continue to be used.
- 3.5 MAST does not guarantee results arising from test/research Services provided by MAST will meet Buyer expectations and shall not be liable to the Buyer for such results. Any retesting required as a result of the Buyer providing incorrect or incomplete information or unsuitable material will be the subject of additional charges unless the retest is required solely as a result of MAST gross negligence.
- 3.6 An order for Goods available from stock may be cancelled at any time prior to the despatch of the order without incurring any additional charges. Cancellation of an order which has already been despatched will incur a 15% restocking fee. Goods returned in an unsealable condition (e.g. damage to or defacing of packaging, contents etc.) or where content has not been kept at the correct temperatures, whether or not performance is affected, will be charged in full. Cancellation of Goods for special order will be subject to a charge equivalent to 100% of the value of the special order Goods, once the order has been entered onto MAST's computer system.
- 3.7 Where an order confirmation is despatched from MAST to the Buyer, the Buyer should confirm the contents and is presumed to have accepted that confirmation as an accurate description of Goods, quantities and prices to be delivered.

## 4. NEW ACCOUNTS

Prospective customers wishing to open a credit account are requested to furnish two trade references and one banker's reference. Until the opening of a credit account has been confirmed, a remittance should accompany payment effected by cheque, banker's draft or electronic transfer; commencement of the services or production/delivery of the Goods will not be made until cleared funds have been credited to MAST's account. MAST reserves the right to make an additional charge to cover transaction costs in proportion to the costs associated with the chosen method of payment both before and after the references have proved satisfactory.

## 5. DESCRIPTION

- 5.1 The description of the Goods shall be as set out in MAST's quotation or price list.
- 5.2 All drawings, descriptive matter, specifications and advertising issued by MAST and any descriptions or illustrations contained in MAST's catalogues or brochures are issued or published for the sole purpose of giving an approximate idea of the Goods described in them. They will not form part of the Contract.

## 6. TERMS OF PAYMENT

- 6.1 Unless otherwise agreed in writing terms of payment shall be net cash due, together with Value Added Tax where applicable, according to the terms printed on the invoice in respect of the Goods. Payment of the price shall be due within thirty (30) days of date of the invoice, unless otherwise agreed in writing.
- 6.2 Time for payment shall be of the essence.
- 6.3 MAST may submit its invoice either with its delivery note or as requested.
- 6.4 Invoices may be raised prior to Services being undertaken or dispatch of Goods for new accounts or in accordance with condition 6.5 as otherwise required by MAST.
- 6.5 Invoices may be raised in respect of a particular batch, consignment or part orders being delivered. MAST reserves the right to require payment in advance where the Buyer has a previous history of late payment or in the opinion of MAST represents a credit risk.
- 6.6 The Buyer shall make all payments due under the Contract without any deduction whether by way of set-off, counterclaim, discount, abatement or otherwise unless the Buyer has a valid court order requiring an amount equal to such deduction to be paid by MAST to the Buyer.
- 6.7 Where the Contract is to be or may be fulfilled in separate deliveries or instalments payment for each such delivery or instalment will be as if the same constituted a separate Contract.
- 6.8 If the Buyer fails to make any payment on the due date then, without limiting any other right or remedy available to MAST, MAST may:
  - (a) cancel the Contract or suspend any further deliveries/Services to the Buyer;
  - (b) appropriate any payment made by the Buyer to such of the Goods or Services (or the goods/services supplied under any other Contract between the Buyer and MAST) as MAST may think fit (notwithstanding any purported appropriation by the Buyer);
  - (c) withhold and/or offset amounts due from MAST to the Buyer under any other contract against amounts due from the Buyer to MAST (notwithstanding any terms of the Buyer to the contrary); and
  - (d) charge interest on amounts outstanding beyond the time specified in condition 6.1. The rate of interest shall be 5% per annum over the National Westminster Bank plc base-lending rate accruing on a daily basis from the payment due date and compounded quarterly. MAST may exercise this right in addition to any other rights it may have in respect of the Goods, Services or the non-payment, until payment in full is made (a part of a month being treated as a full month for the purpose of calculating interest). The parties agree that this constitutes a substantial remedy in terms of the Late Payment of Commercial Debts (Interest) Act 1998.
- 6.9 MAST may withdraw credit facilities at any time and without notice.

## 7. PRICES

- 7.1 Unless otherwise agreed in writing, all orders are executed subject to prices and any relevant discounts running at the date of despatch. Any price list of MAST whether published or not shall not affect the right of MAST to charge for Goods in accordance with this condition 7.
- 7.2 Prices quoted in a particular currency shall be invoiced and payable in that currency. The Buyer will be liable to MAST for any shortfall in the price payable or loss arising (including conversion costs) from payment being received in a different currency or which is converted on receipt.
- 7.3 All prices unless otherwise stated are ex-works (Incoterms 2010) and exclusive of Value Added Tax.
- 7.4 Where any form of international delivery is agreed, the Buyer shall remain liable for any customs or excise duties or tariffs imposed on export or import whether or not such duties were known to the parties at the time of contract.
- 7.5 Any special negotiated prices will only be applied if MAST has received written acceptance of a quotation or the order states a valid quote reference. If no acceptance has been received list prices will be applied. Quotations, unless specifically stated otherwise shall remain valid for ninety (90) days from the date of the quotation, unless earlier withdrawn or varied by MAST.
- 7.6 Special prices for volume breaks apply to individual orders received on the same day for planned delivery as one order and are not cumulative. Special prices for volume breaks will similarly not apply when the order is planned to be delivered on more than one delivery date.
- 7.7 MAST reserves the right to adjust quoted prices if the Buyer does not fulfil its obligation of purchasing the required quantities indicated in the quotation.
- 7.8 MAST reserves the right, by giving written notice to the Buyer at any time before delivery of the Goods or provision of the Services, to increase the price of the Goods/Services to reflect any increase in the cost to MAST which is due to any factor beyond the control of MAST (such as, without limitation, any foreign exchange fluctuation, currency regulation, alteration or introduction of duties or tariffs, significant increase in the costs of labour, materials or other costs of manufacture (utilities)), any change in delivery dates, quantities or specifications for the Goods/Services which is requested by the Buyer, or any delay caused by any instructions of the Buyer or failure of the Buyer to give MAST adequate information or instructions.
- 7.9 If, by mistake, MAST has under priced any Goods, it will not be liable to supply those Goods to the Buyer at the stated price, provided that it notifies the Buyer before despatch of the Goods. In those circumstances, MAST will notify the correct price to the Buyer so the Buyer can decide whether or not it wishes to order the Goods at that price.

## 8. CARRIAGE AND DELIVERY

- 8.1 Unless otherwise agreed, prices quoted exclude delivery and insurance charges. Where any alternative arrangement is agreed in writing by MAST, the Buyer shall be liable to pay MAST charges for transport, packaging, insurance, duties and tariffs and other costs where applicable.
- 8.2 An order comprising both stock and specially manufactured Goods will be subject to separate charges for each delivery.
- 8.3 Any dates quoted for delivery of the Goods or provision of the Services are approximate only and MAST shall not be liable for a delay however caused. Any dates specified for delivery of the Goods are intended to be an estimate only and time for delivery shall not be made "of the essence". If no dates are so specified, delivery will be in a reasonable time. The Goods may be delivered/Services performed by MAST in advance of the quoted delivery date on giving reasonable notice to the Buyer.
- 8.4 Where the Goods are to be delivered in instalments, or Service to be carried out in phases, each delivery date or phase completion shall constitute a separate Contract and failure by MAST to deliver or complete any one or more of the instalments in accordance with these Terms or any claim by the Buyer in respect of any one or more instalments shall not entitle the Buyer to treat the Contract as a whole as repudiated.
- 8.5 Where delivery of the Goods is to be made to the Buyer's specified address, the Buyer shall make all arrangements necessary to take delivery of the Goods (including offloading) whenever they are tendered for delivery. The Buyer shall be liable, on a full indemnity basis, for any costs incurred by MAST, arising from undelivered Goods being returned, stored and re-delivered.
- 8.6 A handling charge will apply on all orders in the UK mainland. An additional charge applies to Northern Ireland, and the Isle of Man, and the Scottish Islands. MAST reserves the right to apply a small order supplement. Products designated as "Hazardous Goods" will be shipped separately and subject to an additional charge per delivery. Any such charges shall be published on MAST's website from time to time, or otherwise notified to the Buyer.

## 9. RISK AND TITLE

- 9.1 The Goods shall be at the Buyer's risk as from delivery (including any attempted delivery by MAST).
- 9.2 Title in the results from the provision of any research or test Service shall belong to the Buyer but all other intellectual property rights, including know how, in how those results are achieved will remain with MAST and the Buyer shall not be entitled to such information or to any licence to use such intellectual property or know how.
- 9.3 Where any Goods require the use of integral software, such Goods are provided with a licence to use such software for the life of the Goods and subject to any specific restrictions on such use. The Buyer solely shall be liable for ensuring interfacing with its own software and that of the Goods. Title to software will remain with MAST. The Buyer shall be responsible for maintaining software security, regardless of whether it uses its own security software or that issued by the manufacturer, and shall install all software updates when issued by the manufacturer and otherwise maintain security in keeping with good industry practice.
- 9.4 MAST and the Buyer expressly agree that, in spite of delivery having been made, property in the Goods shall not pass from MAST until the Buyer shall have paid the invoice in full and no other sums whatsoever shall be due from the Buyer to MAST.
- 9.5 Until property in the Goods passes to the Buyer in accordance with condition 8.2 the Buyer shall hold the Goods as bailee for MAST. The Buyer shall store the Goods in accordance with MAST's instructions (at no cost to MAST) and good industry practice separately from all other goods in its possession and so that they are clearly identified as MAST's property.
- 9.6 Notwithstanding that the Goods (or any part thereof) remain the property of MAST, the Buyer has the right to dispose of the Goods or such other products in the normal course of its business for the account of MAST and to pass title to the Goods or products to his customer being a bona fide purchaser for value without notice of MAST's rights. Any such dealings shall be a sale or use of MAST's property by the Buyer on the Buyer's own behalf and the Buyer shall deal as principal when making such sales or dealings. MAST shall be entitled to recover the invoice value notwithstanding the property and any of the Goods have not passed from MAST.
- 9.7 Until such time as property in the Goods passes from MAST the Buyer shall upon request deliver up such of the Goods that are still in existence or resold to MAST. If the Buyer fails to do so MAST or its appointed representative may enter the premises owned, occupied or controlled by the Buyer where the Goods are situated and repossess the Goods. On the making of such request the rights of the Buyer under condition 9.6 shall cease.
- 9.8 The Buyer shall insure and keep insured the goods to their full value against "all risks" to the reasonable satisfaction of MAST until the date that property in the Goods passes from MAST and indemnifies MAST against any cost claim or loss howsoever suffered or incurred.

Continued

## 10. DAMAGE IN TRANSIT AND SHORTAGES

- 10.1 MAST will, when the price quoted includes delivery, repair or replace free of charge goods damaged in transit provided that the Buyer adheres to the provisions of this condition 10. The obligation to repair or replace, shall be MAST's entire liability for shortfall, faulty, damaged or undelivered Goods.
- 10.2 It is the Buyer's responsibility to inspect the Goods on receipt and to report to the delivery driver and to MAST promptly any damage to, or shortfall in the Goods which is apparent from reasonable inspection. Where appropriate, photo evidence should be taken and provided to MAST upon request. Goods received in a damaged or unsatisfactory condition must be signed for as such and must not be used.
- 10.3 The Buyer shall be deemed to have accepted the Goods three (3) days after delivery to the Buyer and after acceptance, the Buyer shall not be entitled to reject Goods which are not in accordance with the Contract.
- 10.4 MAST shall be entitled on reasonable notice to the Buyer to arrange an inspection of any damaged Goods at the Buyers premises and the Buyer shall afford the inspector all reasonable assistance.
- 10.5 Goods should not be returned to MAST without a valid returns material authorisation number. If authorisation is received the Buyer shall return goods, packaging and a copy of the delivery note. Goods must be returned in accordance with manufacturer instructions and good industry practice.
- 10.6 Any liability of MAST for non-delivery of the Goods shall be limited to replacing the Goods within a reasonable time or issuing a credit note at the pro rata Contract rate against any invoice raised for such Goods.

## 11. WARRANTY

- 11.1 MAST warrants that subject to the other provisions of these Conditions upon delivery, the Goods will comply with the written specification and on provision of the Services, the Services shall have been undertaken in accordance with any Statement of Works.
- 11.2 MAST shall not be liable for any breach of the warranty in condition 11.1 unless:
- (a) the Buyer gives written notice of the defect to MAST and (if the defect is as a result of damage in transit) to the carrier within 3 days of the time when the Buyer discovers or ought reasonably to have discovered the defect; or in respect of services, MAST has failed to comply with the Statement of Works;
  - (b) MAST is given a reasonable opportunity after receiving notice of examining such Goods at the Buyers premises or the Buyer (if asked to do so by MAST) returns such Goods and products of any Services to MAST's place of business at the Buyer's cost for such examination to take place.
- 11.3 MAST shall not be liable for a breach of warranty if:
- (a) the Buyer makes any further use of the Goods after giving such notice; or
  - (b) the defect arises because the Buyer failed to follow MAST's oral or written instructions as to the storage, installation, commissioning, use or maintenance of the Goods or (if there are none) good industry practice; or
  - (c) the Buyer alters or repairs such Goods without the written consent of MAST.
- 11.4 Subject to conditions 11.2 and 11.3, if any of the Services do not conform with the warranty contained in condition 11.1 as a result of MAST's default, MAST may at its entire discretion re-perform Services which do not conform to condition 11.1.
- 11.5 Subject to conditions 11.2 and 11.3, if any of the Goods do not conform with the warranty in condition 11.1, MAST shall at its option repair or replace such Goods (or the defective part) provided that the Buyer shall return the Goods (or the defective part), if MAST so requests, to MAST at the Buyer's expense.
- 11.6 Where MAST re-performs the services or repairs or replaces the defective Goods, MAST shall have no further liability for a breach of warranty in condition 11.1 in respect of such Goods or Services.
- 11.7 The Buyer warrants and represents that where Goods are made to Buyer's design or specification, or where the Buyer provides material from which MAST is to work, the Buyer holds all necessary rights and licenses to authorise MAST to produce the Goods using such specification or materials. The Buyer will indemnify and keep indemnified MAST on demand against all costs claims and liabilities arising out of any third party claim that in producing the Goods MAST has infringed a third party's intellectual property rights.

## 12. LIMITATION OF LIABILITY

- 12.1 Subject to condition 11, the following provisions set out the entire financial liability of MAST (including any liability for the acts or omissions of its employees, agents and sub-contractors) to the Buyer in respect of:
- (a) any breach of these Terms; and
  - (b) any representation, statement or tortious act or omission including negligence arising under or in connection with the Contract.
- 12.2 All warranties, conditions and other terms implied by statute or common law (save for the conditions implied by section 12 of the Sale of Goods Act 1979) are, to the fullest extent permitted by law, excluded from the Contract.
- 12.3 Nothing in these Terms excludes or limits the liability of MAST for death or personal injury caused by MAST's negligence or for fraudulent misrepresentation.
- 12.4 Subject to conditions 12.2 and 12.3 MAST's total liability in contract, tort (including negligence or breach of statutory duty), misrepresentation, restitution or otherwise, arising in connection with the performance or contemplated performance of the Contract shall be limited to the refund of the price of the Goods and Services plus up to ten percent (10%) of the price.
- 12.5 MAST shall not be liable to the Buyer for any pure economic loss, loss of profit, loss of business opportunity, depletion of goodwill or otherwise, in each case whether direct, indirect or consequential, or any claims for consequential compensation whatsoever (howsoever caused) which arise out of or in connection with the Contract.
- 12.6 MAST shall not be liable for any loss or liability arising from virus, Trojans, ransomware, malware, scanners, spyware or other similar attacks on equipment or software.

## 13. CONFIDENTIALITY AND DATA PROTECTION

- 13.1 A party (Receiving Party) shall keep in strict confidence all technical or commercial know-how, specifications, inventions, processes or initiatives which are of a confidential nature and have been disclosed to the Receiving Party by the other party (Disclosing Party), its employees, agents or subcontractors, and any other confidential information concerning the Disclosing Party's business or its products or its services which the Receiving Party may obtain. The Receiving Party shall restrict disclosure of such confidential information to such of its employees, agents or subcontractors as need to know it for the purpose of discharging the Receiving Party's obligations under the Contract, and shall ensure that such employees, agents or subcontractors are subject to obligations of confidentiality corresponding to those which bind the Receiving Party. This condition 13 shall survive termination of the Contract.
- 13.2 The Buyer may not without the prior written approval of MAST issue or cause to be issued any press release or publish any journal publication or notice regarding the Products, or details relating to the supply by MAST to the Buyer.
- 13.3 The Buyer hereby warrants and represents that it has and where applicable for future persons involved in the purchase of MAST Goods or Services, will obtain written consent from such persons whose personal details are provided to (or independently obtained by) MAST for the purposes of this supply of Goods or Services (including all officers, employees, agents and contractors of Buyer) "Buyer Personnel" that allows MAST to hold and process "Personal Data" (as defined in applicable data protection Law), relating to such Buyer Personnel, anywhere in the world, both manually and electronically, for all purposes relating to:
- (a) the supply of the Goods and/or performance of the Services;
  - (b) administering and managing the business activities of MAST; and
  - (c) compliance with applicable policies and procedures and laws, rules and regulations.
- 13.4 Where personal data is supplied solely for the purpose of fulfilment of the contract, the parties shall rely on "legitimate purpose" in order to hold personal data relating to individuals involved in the contract.
- 13.5 Subject to condition 13.4, MAST shall only hold Personal Data for the limited purpose of the supply (and any continuing supplies), and for so long as is reasonably necessary. MAST may share such personal Data with its officers and employees who have a need to know the Personal Data for the performance of the contract but shall not otherwise share the Personal Data with any third parties.
- 13.6 MAST hereby confirms that any provision by MAST of any officer and employees Personal Data is obtained and provided in compliance with the terms of the applicable data protection Law.
- 13.7 MAST's full Privacy and Data Protection Policy, which is hereby incorporated, is available at [www.mast-group.com](http://www.mast-group.com).

## 14. TERMINATION

- 14.1 MAST shall be entitled to cancel the Contract or suspend any further deliveries under the Contract without any liability to the Buyer if any of the following occur (without prejudice to any other right or remedy available to MAST):
- (a) the Buyer being in material breach of an obligation under the Contract (including an obligation to make payment) which (if capable of remedy) it fails to remedy within 30 days starting on the day after receipt of notice from MAST giving particulars of the breach;
  - (b) the Buyer passing a resolution for its winding-up or a court of competent jurisdiction making an order for the Buyer's winding-up or dissolution;
  - (c) the making of an administration order in relation to the Buyer or the appointment of a receiver over, or the taking possession or sale by an encumbrance taking possession of or selling an asset of the Buyer; or
  - (d) the Buyer making an arrangement or composition with its creditors generally or making an application to a court of competent jurisdiction for protection from its creditors generally; or
  - (e) the buyer being unable to pay its debts as they fall due.
- 14.2 If MAST cancels or suspends any further deliveries under the Contract under condition 14.1 and if the Goods have been delivered but not paid for the price shall become immediately due and payable regardless of previous agreement or arrangement to the contrary.

## 15. FORCE MAJEURE

MAST reserves the right to defer the delivery or to cancel the Contract or reduce the volume of the Goods ordered, or Services requested by the Buyer (without liability to the Buyer) if it is prevented from or delayed in the carrying on of its business due to circumstances beyond the reasonable control of MAST.

## 16. MISCELLANEOUS

- 16.1 Each right or remedy of MAST under the Contract is without prejudice to any other right or remedy of MAST whether under the Contract or not.
- 16.2 If any provision of the Contract is found by any court, tribunal or administrative body of competent jurisdiction to be wholly or partly illegal, invalid, void, voidable, unenforceable or unreasonable it shall to the extent of such illegality, invalidity, voidness, voidability, unenforceability or unreasonableness be deemed severable and the remaining provisions of the Contract and the remainder of such provision shall continue in full force and effect.
- 16.3 Failure to delay by MAST in enforcing any provision of the Contract will not be construed as a waiver of any of its rights under the Contract.
- 16.4 Any waiver by MAST of any breach of, or any default under, any provision of the Contract by the Buyer will not be deemed a waiver of any subsequent breach or default and will in no way affect the other terms of the Contract.
- 16.5 The parties to this Contract do not intend that any term of this Contract will be enforceable by virtue of the Contracts (Rights of Third Parties) Act 1999 by any person that is not a party to it.
- 16.6 The formation, existence, construction, performance, validity and all aspects of the Contract shall be governed by English law and the parties submit to the exclusive jurisdiction of the English courts.

**United Kingdom**  
Mast Group Ltd.  
Mast House  
Derby Road, Bootle  
Merseyside L20 1EA

Tel: + 44 (0) 151 933 7277

e-mail: [sales@mast-group.com](mailto:sales@mast-group.com)

**Germany**  
Mast Diagnostica GmbH  
Feldstrasse 20  
DE-23858 Reinfeld

Tel: + 49 (0) 4533 2007 0  
Fax: + 49 (0) 4533 2007 68

e-mail: [mast@mast-diagnostica.de](mailto:mast@mast-diagnostica.de)

**France**  
Mast Diagnostic  
12 Rue Jean-Jacques Mention  
CS 91106  
80011 Amiens CEDEX 1

Tél. + 33 (0) 322 80 80 67  
Fax + 33 (0) 322 80 99 22

e-mail: [info@mast-diagnostic.fr](mailto:info@mast-diagnostic.fr)

**[www.mast-group.com](http://www.mast-group.com)**