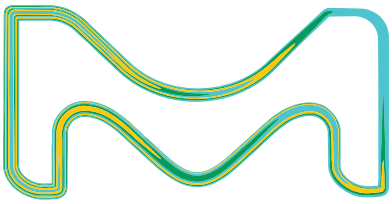
PROFICIENCY TESTING

Evaluation Report

Scheduled Study	**DMRQA 41**
Study Type	WPCHEM_MICRO
Open Date	2021-04-23
Close Date	2021-08-27
Report Generated	2021-09-09
Laboratory	Coastal Bioanalysts, Inc Pete DeLisle 6400 Enterprise Court Gloucester VA 23061 US
Account Number	49480494
US EPA Lab Code	VA01116



Supelco®
Analytical Products

Provider of the proficiency test

Sigma-Aldrich RTC, Inc.
2931 Soldier Springs Road
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ptservice@milliporesigma.com

Statistical analysis and reporting powered by

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Authorized release of the report

Alexus Horton
(PT coordinator)

Sign:

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Sigma-Aldrich RTC, Inc. is accredited by ANAB to provide PT programs for the scope of accreditation under ANAB Certificate # AP-1469.

All batch numbers of proficiency testing samples, including microbiological materials, are manufactured and tested in accordance with ISO/IEC 17043 requirements. For further information on proficiency testing samples, please check the PT product code information on each product detail page located on our website.

Accreditors

Evaluations of this study will be sent to the accreditor(s) listed below. If any of the information listed below is not correct, please contact Sigma-Aldrich RTC immediately.

Accrediting Agency

Commonwealth of Virginia DGS-DCLS

Agency lab code: 00067

Lab Certification
600 North 5th St.
Richmond VA 23219-3691 US

Accrediting Agency

Kentucky DEP

Agency lab code: VA01116

Laboratory Certification
300 Sower Blvd. 3rd floor
Frankfort KY 40601 US

Accrediting Agency

Maryland Department of the Environment

Agency lab code: VA01116

Ron Wicks
MDE - Water Supply Program
1800 Washington Blvd., Ste 450
Water Supply Program
Baltimore MD 21230-1708 US

Summary Results for DMRQA 41

WET019-1EA Ceriodaphnia Acute MHSF 25ºC

LRAC9689

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 2002.0 - Ceriodaphnia dubia, 48-hr Acute, renewal, MHSF 25°C (2002) 10214809				
Test Code 19 / EPA Method 2002				
Ceriodaphnia Acute MHSF 25° - LC50[1,2] 764 Analyst: LT Analysis Date: 2021-06-01	74.3 %	54.8 % *Evaluation Criteria – 5** *Parameters*: deviations:2*	13.0 - 96.7 %	**0.9** Acceptable
Group Analysis Summary	Acceptable: 1/1		**Score: 100% - Acceptable**	

* Evaluation parameters used for the statistical analysis: explanation at the end of report; a yellow highlighted results is acceptable but to be checked.

** Unable to calculate a study mean due to <4 data points being received, therefore an effective evaluation could not be performed.

[1] TNI Compliant, covered by Sigma-Aldrich RTC's ANAB Proficiency Testing Provider accreditation, Cert. AP-1469

[2] ISO/IEC 17043 Accredited, covered by Sigma-Aldrich RTC's ANAB Proficiency Testing Provider accreditation, Cert AP-1469

Summary Results for DMRQA 41

WET021-1EA Ceriodaphnia Chronic MHSF

LRAC9691

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 1002.0 - Ceriodaphnia dubia, 7-day Chronic, daily renewal, MHSF 25°C (2002) 10215006				
Test Code 21 / EPA Method 1002				
Ceriodaphnia Chronic MHSF - Survival NOEC[1,2] 766 Analyst: Arianna Krueger Analysis Date: 2021-06-01	25.0 %	12.5 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	6.25 - 25.0 %	Acceptable
Ceriodaphnia Chronic MHSF - Reproduction IC25[1,2] 767 Analyst: Arianna Krueger Analysis Date: 2021-06-01	2.629 %	11.0 % *Evaluation Criteria – 5** *Parameters*: deviations:2*	2.40 - 19.6 %	**-1.9** Acceptable
Ceriodaphnia Chronic MHSF - Reproduction NOEC[1,2] 768 Analyst: Arianna Krueger Analysis Date: 2021-06-01	<6.25 %	6.25 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	<6.25 - 12.5 %	Acceptable
Group Analysis Summary	Acceptable: 3/3		**Score: 100% - Acceptable**	

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Summary Results for DMRQA 41

WET032-1EA Daphnia Magna Acute MHSF 25ºC

LRAC9693

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 2021.0 - Daphnia magna, 48-hr Acute, nonrenewal, MHSF 25°C (2002) 10215415				
Test Code 32 / EPA Method 2021				
Daphnia Magna Acute MHSF 25° - LC50[1,2] 788 Analyst: CV Analysis Date: 2021-06-24	15.4 % *voluntary*	15.4 % *Evaluation Criteria – 5** *Parameters*: deviations:2*	0 - 37.7 %	**0.0** Acceptable
Group Analysis Summary	Acceptable: 1/1		**Score: 100% - Acceptable**	

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Summary Results for DMRQA 41

WET013-1EA Fathead Minnow Acute MHSF 25ºC

LRAC9685

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 2000.0 - Fathead minnow, 48-hr Acute, nonrenewal, MHSF 25°C (2002) 10213602				
Test Code 13 / EPA Method 2000				
Fathead Minnow Acute MHSF 25° - LC50[1,2] 754 Analyst: CV Analysis Date: 2021-06-14	35.4 %	32.0 % *Evaluation Criteria – 5** *Parameters*: deviations:2*	19.7 - 44.4 %	**0.5** Acceptable
Group Analysis Summary	Acceptable: 1/1		**Score: 100% - Acceptable**	

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Summary Results for DMRQA 41

WET015-1EA Fathead Minnow, 7Day, MHSF

LRAC9687

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 1000.0 - Fathead minnow, 7-day Chronic, daily renewal, MHSF 25°C (2002) 10214207				
Test Code 15 / EPA Method 1000				
Fathead Minnow Chronic MHSF - Survival NOEC[1,2] 756 Analyst: LT Analysis Date: 2021-07-06	50.0 %	25.0 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	12.5 - 50.0 %	Acceptable
Fathead Minnow Chronic MHSF - Growth IC25 (ON)[1,2] 808 Analyst: LT Analysis Date: 2021-07-06	10.7 %	25.5 % *Evaluation Criteria – 5** *Parameters*: deviations:2*	0 - 53.0 %	**-1.1** Acceptable
Fathead Minnow Chronic MHSF - Growth NOEC (ON)[1,2] 810 Analyst: LT Analysis Date: 2021-07-06	6.25 %	12.5 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	6.25 - 25.0 %	Acceptable
Group Analysis Summary	Acceptable: 3/3		**Score: 100% - Acceptable**	

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Summary Results for DMRQA 41

WET042-1EA Mysid Acute 40 Fathoms Seawater 25ºC

LRAC9695

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 2007.0 - Mysid, 48-hr Acute, nonrenewal, 40-fath SW, 25°C (2002) 10216009				
Test Code 42 / EPA Method 2007				
Mysid Acute 40 F 25° - LC50[1,2] 798 Analyst: CV Analysis Date: 2021-07-16	27.9 % 	20.6 % *Evaluation Criteria – 5* *Parameters*: deviations:2*	5.77 - 35.5 %	**1.0** Acceptable
Group Analysis Summary	Acceptable: 1/1		**Score: 100% - Acceptable**	

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Summary Results for DMRQA 41

WET043-1EA Mysid Chronic 40 Fathoms Seawater

LRAC9696

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 1007.0 - Mysid, 7-day Chronic, daily renewal, 40-fathoms SW 26°C (2002) 10254009				
Test Code 43 / EPA Method 1007				
Mysid Chronic 40 F Survival NOEC[1,2] 799 Analyst: LT Analysis Date: 2021-06-10	100 %	100 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	50.0 - >100 %	Acceptable
Mysid Chronic 40 F Growth IC25 (ON)[1,2] 816 Analyst: LT Analysis Date: 2021-06-10	>100 %	95.0 % *Evaluation Criteria – 7** *Parameters*: a:1, b:0, c:0.3333, d:0*	31.7 - >100 %	Acceptable
Mysid Chronic 40 F Growth NOEC (ON)[2] 818 Analyst: LT Analysis Date: 2021-06-10	100 %	50.0 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	25.0 - 100 %	Acceptable
Group Analysis Summary	Acceptable: 3/3		**Score: 100% - Acceptable**	

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** Unable to calculate a study mean due to <4 data points being received, therefore an effective evaluation could not be performed.

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Summary Results for DMRQA 41

WET046-1EA Sheepshead Minnow Acute 40 Fathoms Seawater 25ºC

LRAC9699

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 2004.0 - Sheepshead Minnow, 48-hr Acute, nonrenewal, 40-fathoms SW 25°C (2002) 10216623				
Test Code 46 / EPA Method 2004				
Sheepshead Minnow Acute 40 F 25° - LC50[1,2] 804 Analyst: LT Analysis Date: 2021-06-16	17.1 %	25.0 % *Evaluation Criteria – 7** *Parameters*: a:1, b:0, c:0.3333, d:0*	8.34 - 41.7 %	**-0.9** Acceptable
Group Analysis Summary	Acceptable: 1/1		**Score: 100% - Acceptable**	

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Summary Results for DMRQA 41

WET047-1EA Sheepshead Minnow Chronic 40 Fathoms Seawater

LRAC9700

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

Analyte	Reported Value	Assigned Value	Acceptance Window	z-score*
EPA 1004.0 - Sheepshead Minnow, 7-day Chronic, daily renewal, 40-fathoms SW 25°C (2002) 10216805				
Test Code 47 / EPA Method 1004				
Sheepshead Minnow Chronic 40 F - Survival NOEC[2] 805 Analyst: LT Analysis Date: 2021-06-01	12.5 %	25.0 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	12.5 - 50.0 %	Acceptable
Sheepshead Minnow Chronic 40 F - Growth IC25 (ON)[2] 820 Analyst: LT Analysis Date: 2021-06-01	18.1 %	30.0 % *Evaluation Criteria – 7** *Parameters*: a:1, b:0, c:0.3333, d:0*	10.0 - 50.0 %	**-1.2** Acceptable
Sheepshead Minnow Chronic 40 F - Growth NOEC (ON)[2] 822 Analyst: LT Analysis Date: 2021-06-01	12.5 %	25.0 % *Evaluation Criteria – 8** *Parameters*: ± 1 dilution*	12.5 - 50.0 %	Acceptable
Group Analysis Summary	Acceptable: 3/3			**Score: 100% - Acceptable**

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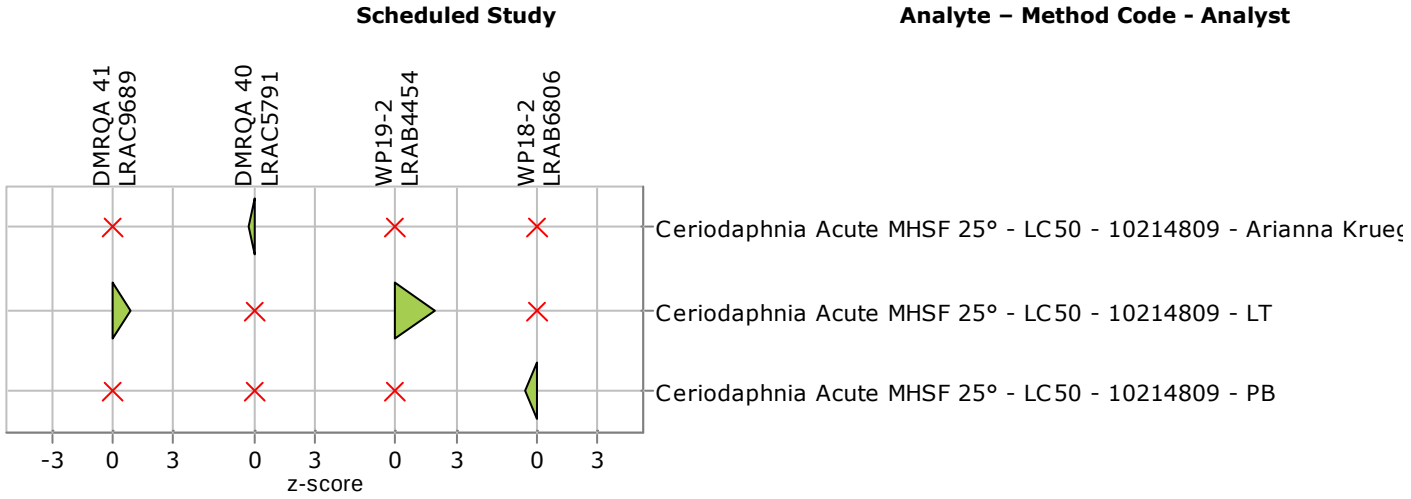
Graphical z-score Overview for DMRQA 41
WET019-1EA Ceriodaphnia Acute MHSF 25ºC

z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type

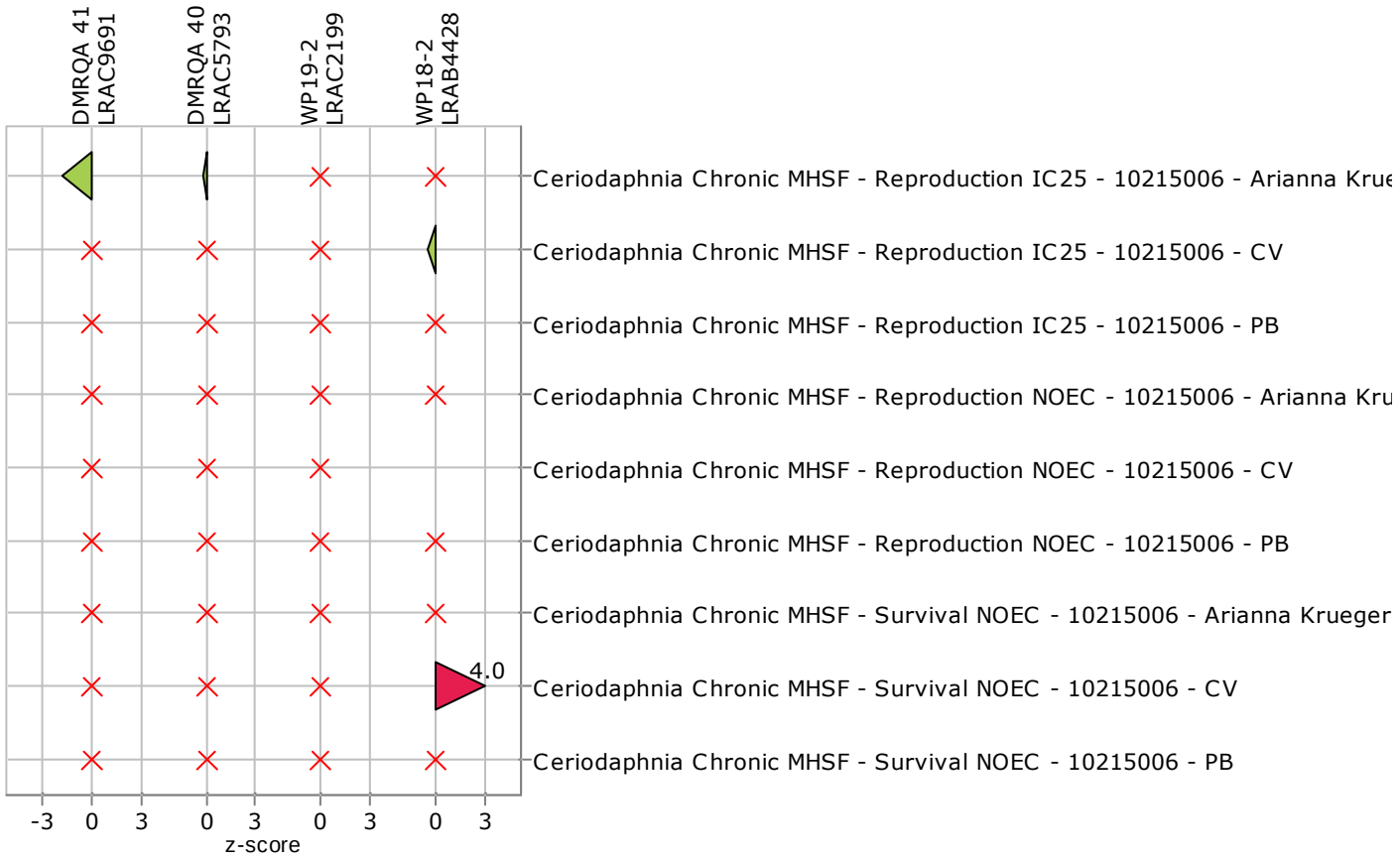


* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET021-1EA Ceriodaphnia Chronic MHSF

z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type

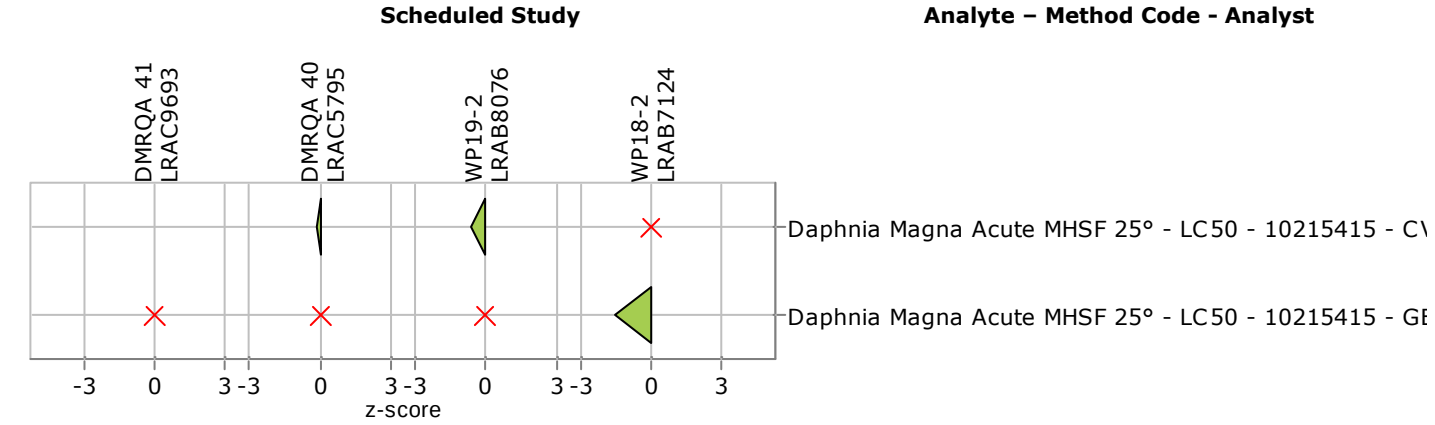
Scheduled Study **Analyte – Method Code - Analyst**



* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET032-1EA Daphnia Magna Acute MHSF 25ºC

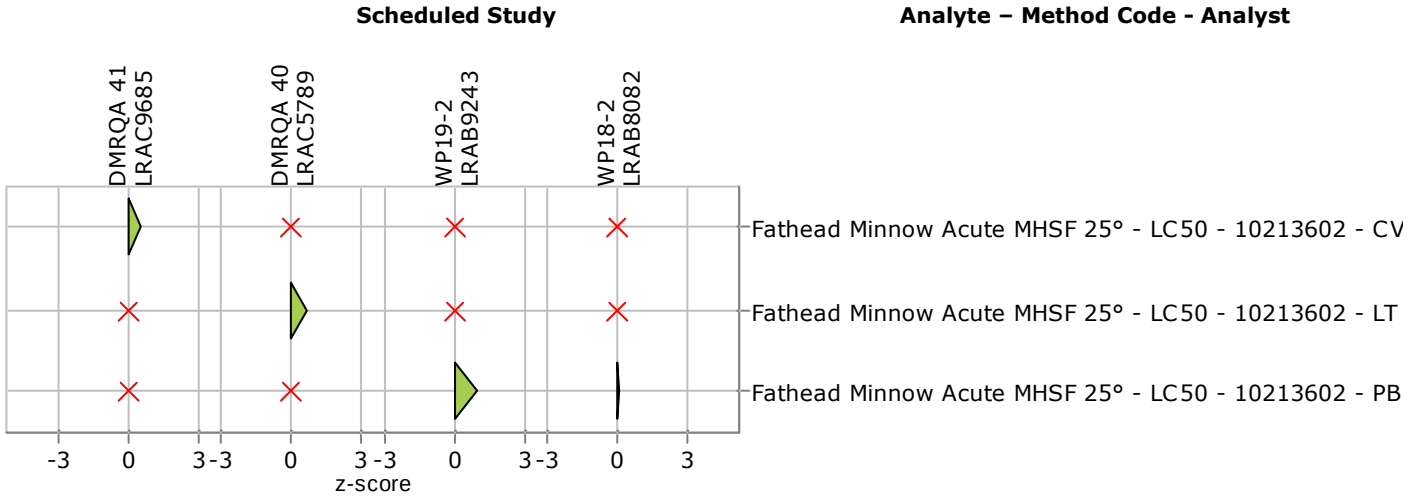
z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type



* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET013-1EA Fathead Minnow Acute MHSF 25ºC

z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type

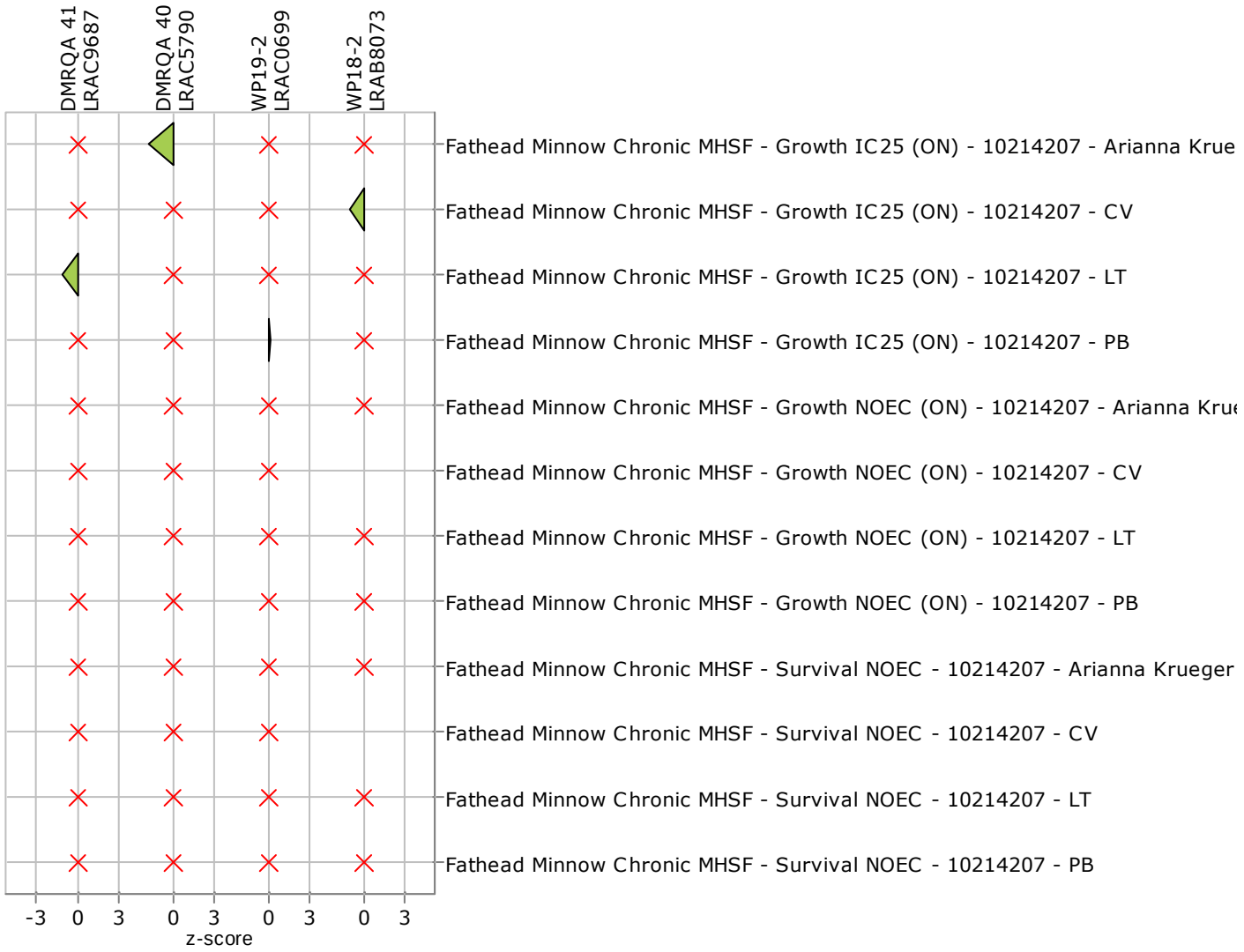


* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET015-1EA Fathead Minnow, 7Day, MHSF

z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type

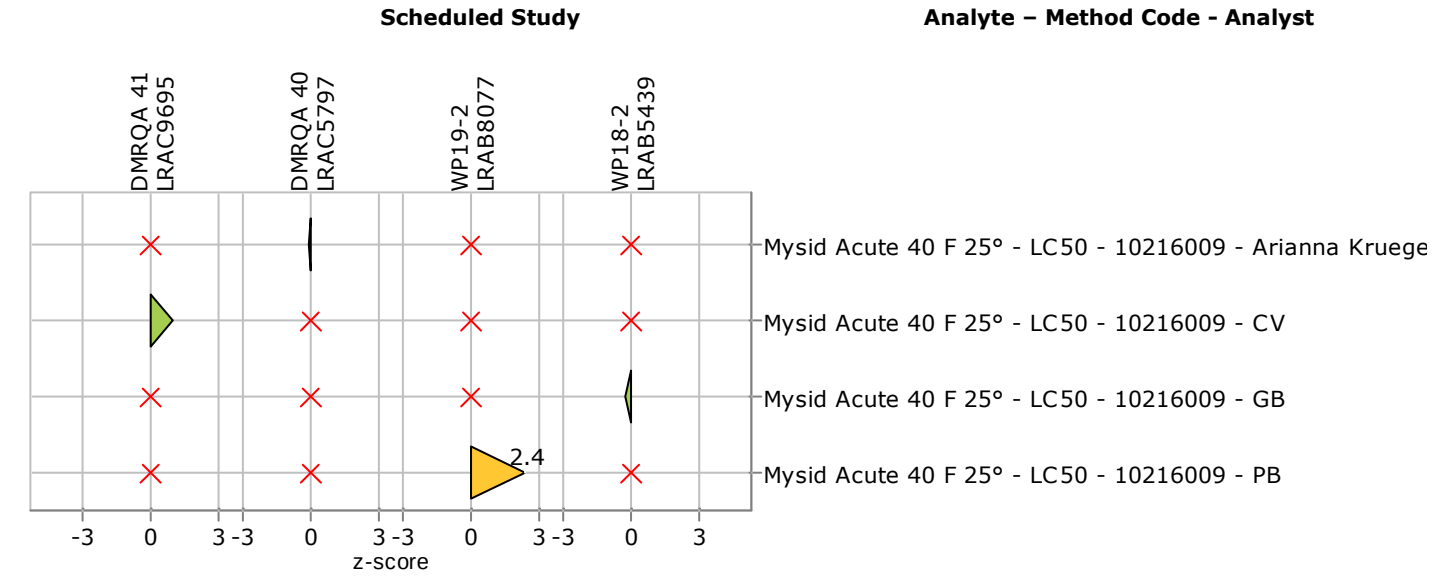
Scheduled Study **Analyte – Method Code - Analyst**



* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET042-1EA Mysid Acute 40 Fathoms Seawater 25ºC

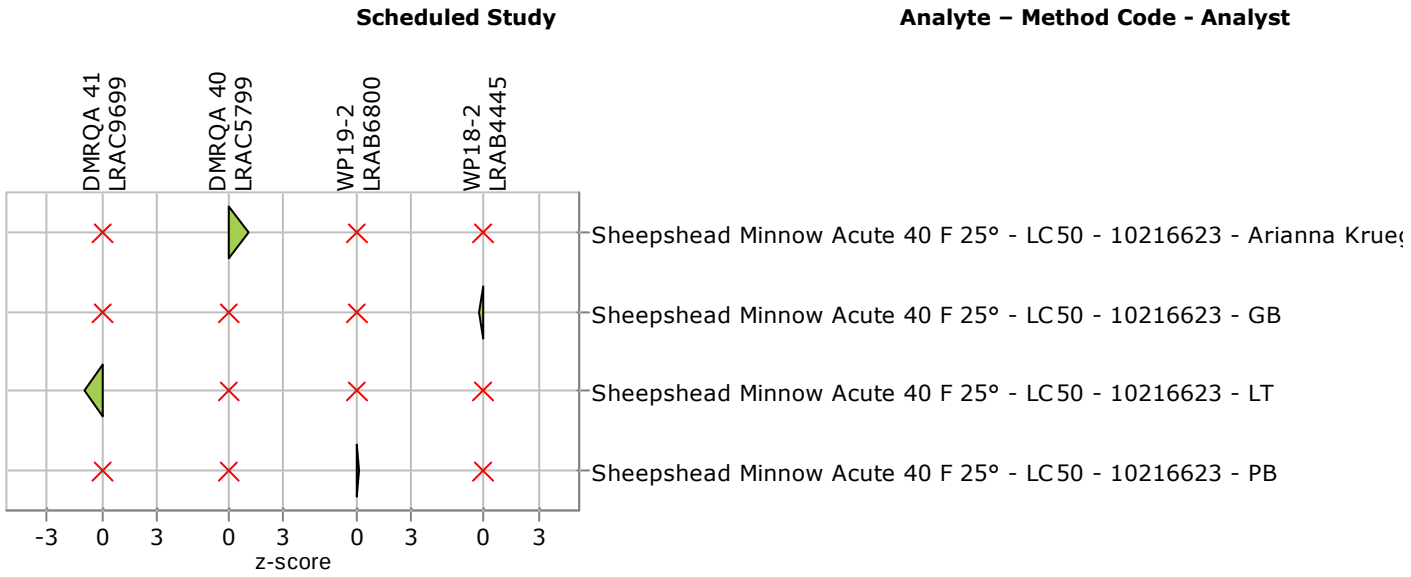
z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type



* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET046-1EA Sheepshead Minnow Acute 40 Fathoms Seawater 25ºC

z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type

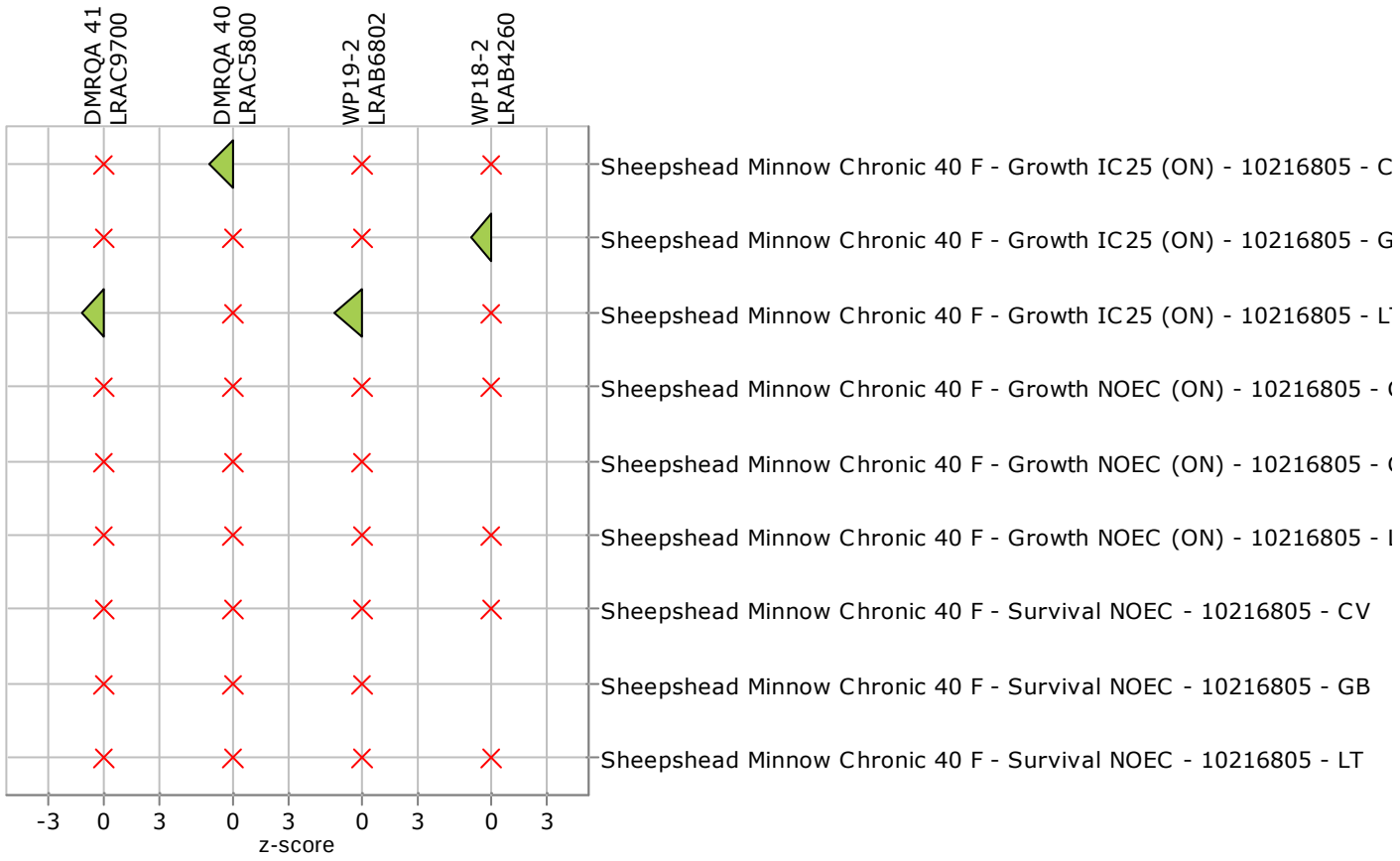


* Evaluation parameters used for the statistical analysis; explanation at the end of report

Graphical z-score Overview for DMRQA 41
WET047-1EA Sheepshead Minnow Chronic 40 Fathoms Seawater

z-score Overview* for DMRQA 41 and the Previous three Scheduled Studies of this Study Type

Scheduled Study **Analyte – Method Code - Analyst**



* Evaluation parameters used for the statistical analysis; explanation at the end of report

Contents

1 Aim of the Proficiency Test

This interlaboratory study is a proficiency test for the assessment of laboratory performance. It was conducted in the framework of external quality assurance and the report provides an external appraisal of the participant laboratories' competence in the particular testing field.

2 Sample Information

WET019-1EA Ceriodaphnia Acute MHSF 25ºC LRAC9689

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Ceriodaphnia Acute MHSF 25° - LC50 764	%	43.9	---	54.8	20.9

WET021-1EA Ceriodaphnia Chronic MHSF LRAC9691

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Ceriodaphnia Chronic MHSF - Survival NOEC 766	%	12.5	---	12.5	0
Ceriodaphnia Chronic MHSF - Reproduction IC25 767	%	10.8	---	11.0	4.29
Ceriodaphnia Chronic MHSF - Reproduction NOEC 768	%	6.25	---	6.25	0

WET032-1EA Daphnia Magna Acute MHSF 25ºC LRAC9693

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Daphnia Magna Acute MHSF 25° - LC50 788	%	12.5	---	15.4	11.1

WET013-1EA Fathead Minnow Acute MHSF 25ºC LRAC9685

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Fathead Minnow Acute MHSF 25° - LC50 754	%	33.5	---	32.0	6.17

* If there are not enough data available to provide Study mean and Study Std. Dev, this is indicated by "---".

WET015-1EA Fathead Minnow, 7Day, MHSF
LRAC9687

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Fathead Minnow Chronic MHSF - Survival NOEC 756	%	25.0	---	25.0	0
Fathead Minnow Chronic MHSF - Growth IC25 (ON) 808	%	27.5	---	25.5	13.7
Fathead Minnow Chronic MHSF - Growth NOEC (ON) 810	%	25.0	---	18.1	10.0

WET042-1EA Mysid Acute 40 Fathoms Seawater 25ºC
LRAC9695

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Mysid Acute 40 F 25° - LC50 798	%	25.0	---	20.6	7.43

WET043-1EA Mysid Chronic 40 Fathoms Seawater
LRAC9696

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Mysid Chronic 40 F Survival NOEC 799	%	100	---	88.2	22.7
Mysid Chronic 40 F Growth IC25 (ON) 816	%	95.0	---	---	---
Mysid Chronic 40 F Growth NOEC (ON) 818	%	50.0	---	50.0	33.7

WET046-1EA Sheepshead Minnow Acute 40 Fathoms Seawater 25ºC
LRAC9699

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Sheepshead Minnow Acute 40 F 25° - LC50 804	%	25.0	---	17.8	0.710

* If there are not enough data available to provide Study mean and Study Std. Dev, this is indicated by "---".

WET047-1EA Sheepshead Minnow Chronic 40 Fathoms Seawater LRAC9700

Analyte	Unit	Gravimetric Value	PTRL	Study Mean*	Study Std. Dev.*
Sheepshead Minnow Chronic 40 F - Survival NOEC 805	%	25.0	---	25.0	21.1
Sheepshead Minnow Chronic 40 F - Growth IC25 (ON) 820	%	30.0	---	---	---
Sheepshead Minnow Chronic 40 F - Growth NOEC (ON) 822	%	25.0	---	---	---

* If there are not enough data available to provide Study mean and Study Std. Dev, this is indicated by "---".

3 Data Availability

WET019-1EA Ceriodaphnia Acute MHSF 25ºC LRAC9689

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Ceriodaphnia Acute MHSF 25° - LC50 764	18	17	18	17

WET021-1EA Ceriodaphnia Chronic MHSF LRAC9691

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Ceriodaphnia Chronic MHSF - Survival NOEC 766	17	17	17	17
Ceriodaphnia Chronic MHSF - Reproduction IC25 767	17	17	17	17
Ceriodaphnia Chronic MHSF - Reproduction NOEC 768	17	16	17	16

WET032-1EA Daphnia Magna Acute MHSF 25ºC LRAC9693

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Daphnia Magna Acute MHSF 25° - LC50 788	10	10	10	10

WET013-1EA Fathead Minnow Acute MHSF 25ºC LRAC9685

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Fathead Minnow Acute MHSF 25° - LC50 754	21	21	21	21

* Only quantitative values are taken into account in the calculation of study mean and study std.dev. (i.e. without missing results, without less-than results, without larger-than results).

WET015-1EA Fathead Minnow, 7Day, MHSF
LRAC9687

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Fathead Minnow Chronic MHSF - Survival NOEC 756	17	17	17	17
Fathead Minnow Chronic MHSF - Growth IC25 (ON) 808	16	16	16	16
Fathead Minnow Chronic MHSF - Growth NOEC (ON) 810	16	16	16	16

WET042-1EA Mysid Acute 40 Fathoms Seawater 25ºC
LRAC9695

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Mysid Acute 40 F 25° - LC50 798	9	9	9	9

WET043-1EA Mysid Chronic 40 Fathoms Seawater
LRAC9696

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Mysid Chronic 40 F Survival NOEC 799	6	6	6	6
Mysid Chronic 40 F Growth IC25 (ON) 816	5	3	5	3
Mysid Chronic 40 F Growth NOEC (ON) 818	5	5	5	5

* Only quantitative values are taken into account in the calculation of study mean and study std.dev. (i.e. without missing results, without less-than results, without larger-than results).

WET046-1EA Sheepshead Minnow Acute 40 Fathoms Seawater 25ºC LRAC9699

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Sheepshead Minnow Acute 40 F 25° - LC50 804	5	5	5	5

WET047-1EA Sheepshead Minnow Chronic 40 Fathoms Seawater LRAC9700

Analyte	Number of participating laboratories		Number of data points	
	in total	with quantitative data points only*	in total	quantitative only*
Sheepshead Minnow Chronic 40 F - Survival NOEC 805	4	4	4	4
Sheepshead Minnow Chronic 40 F - Growth IC25 (ON) 820	3	3	3	3
Sheepshead Minnow Chronic 40 F - Growth NOEC (ON) 822	3	3	3	3

* Only quantitative values are taken into account in the calculation of study mean and study std.dev. (i.e. without missing results, without less-than results, without larger-than results).

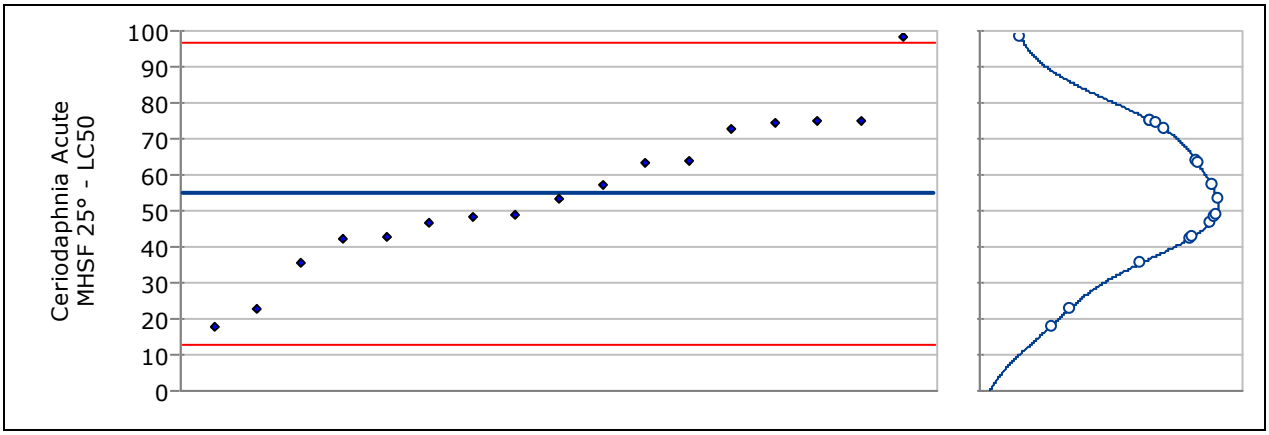
4 Results

4.1 WET019-1EA Ceriodaphnia Acute MHSF 25ºC / LRAC9689

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.1.1 Ceriodaphnia Acute MHSF 25° - LC50

No. of participating laboratories (in total / with quant. data points only)	18 / 17
No. of data points (in total / quantitative)	18 / 17
Assigned value	54.8 %
Proficiency std. dev.	20.9 %
Acceptance window	13.0 - 96.7 %

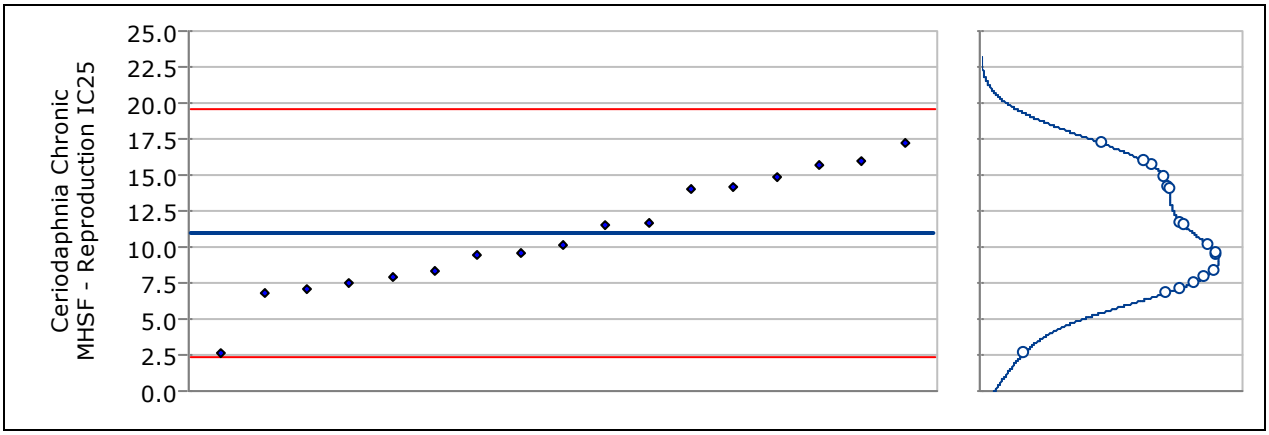


4.2 WET021-1EA Ceriodaphnia Chronic MHSF / LRAC9691

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

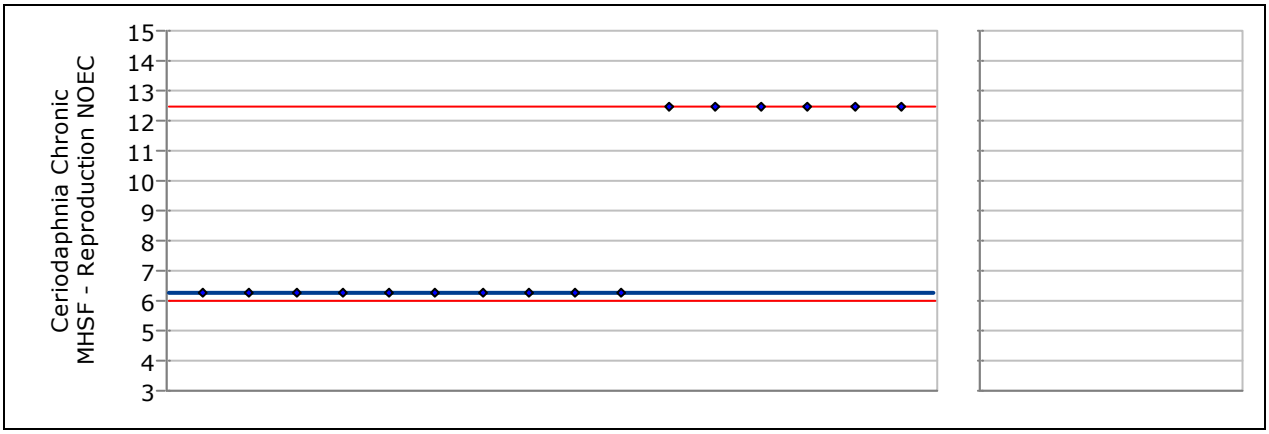
4.2.1 Ceriodaphnia Chronic MHSF - Reproduction IC25

No. of participating laboratories (in total / with quant. data points only)	17 / 17
No. of data points (in total / quantitative)	17 / 17
Assigned value	11.0 %
Proficiency std. dev.	4.29 %
Acceptance window	2.40 - 19.6 %



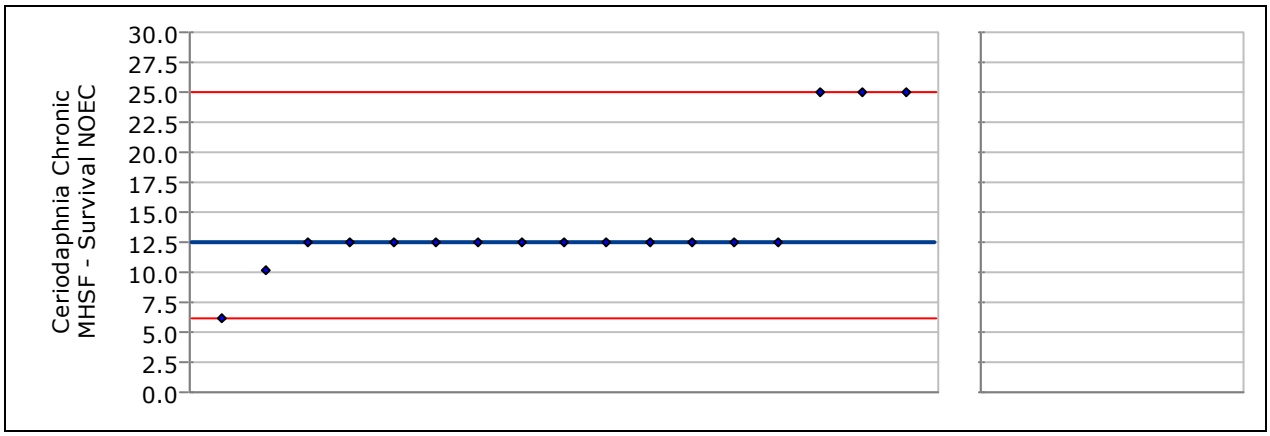
4.2.2 Ceriodaphnia Chronic MHSF - Reproduction NOEC

No. of participating laboratories (in total / with quant. data points only)	17 / 16
No. of data points (in total / quantitative)	17 / 16
Assigned value	6.25 %
Proficiency std. dev.	--- %
Acceptance window	6.00 - 12.5 %



4.2.3 Ceriodaphnia Chronic MHSF - Survival NOEC

No. of participating laboratories (in total / with quant. data points only)	17 / 17
No. of data points (in total / quantitative)	17 / 17
Assigned value	12.5 %
Proficiency std. dev.	--- %
Acceptance window	6.25 - 25.0 %

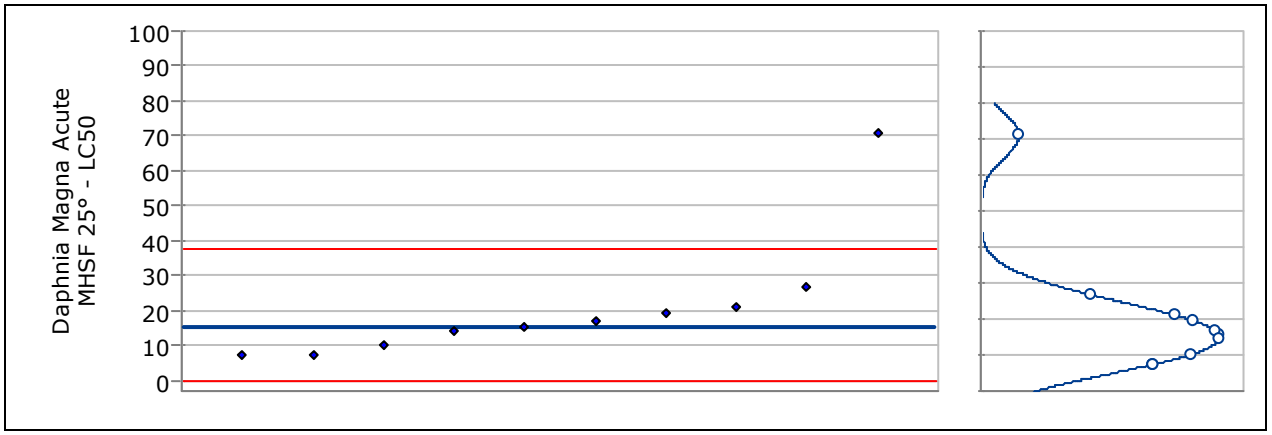


4.3 WET032-1EA Daphnia Magna Acute MHSF 25ºC / LRAC9693

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.3.1 Daphnia Magna Acute MHSF 25° - LC50

No. of participating laboratories (in total / with quant. data points only)	10 / 10
No. of data points (in total / quantitative)	10 / 10
Assigned value	15.4 %
Proficiency std. dev.	11.1 %
Acceptance window	0 - 37.7 %

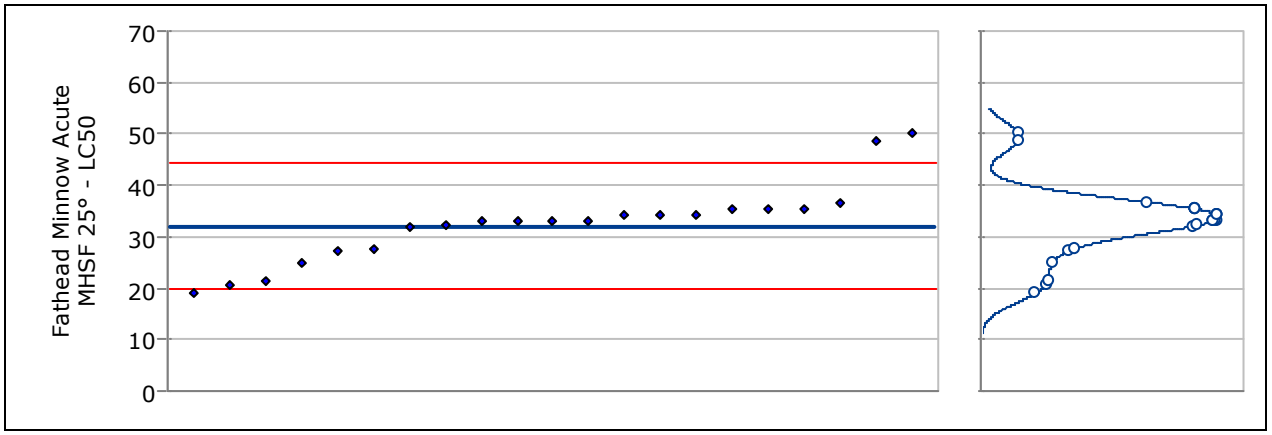


4.4 WET013-1EA Fathead Minnow Acute MHSF 25ºC / LRAC9685

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.4.1 Fathead Minnow Acute MHSF 25° - LC50

No. of participating laboratories (in total / with quant. data points only)	21 / 21
No. of data points (in total / quantitative)	21 / 21
Assigned value	32.0 %
Proficiency std. dev.	6.17 %
Acceptance window	19.7 - 44.4 %

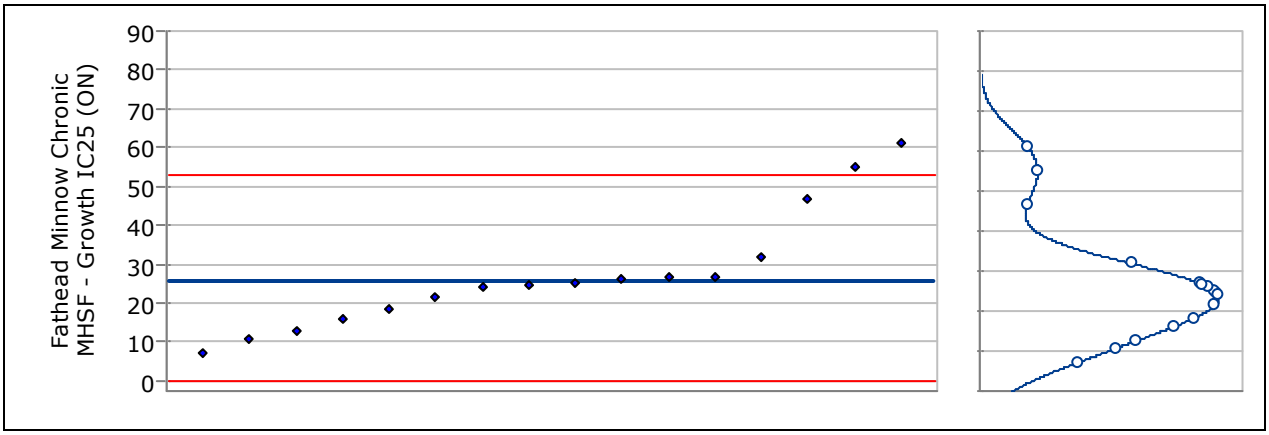


4.5 WET015-1EA Fathead Minnow, 7Day, MHSF / LRAC9687

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

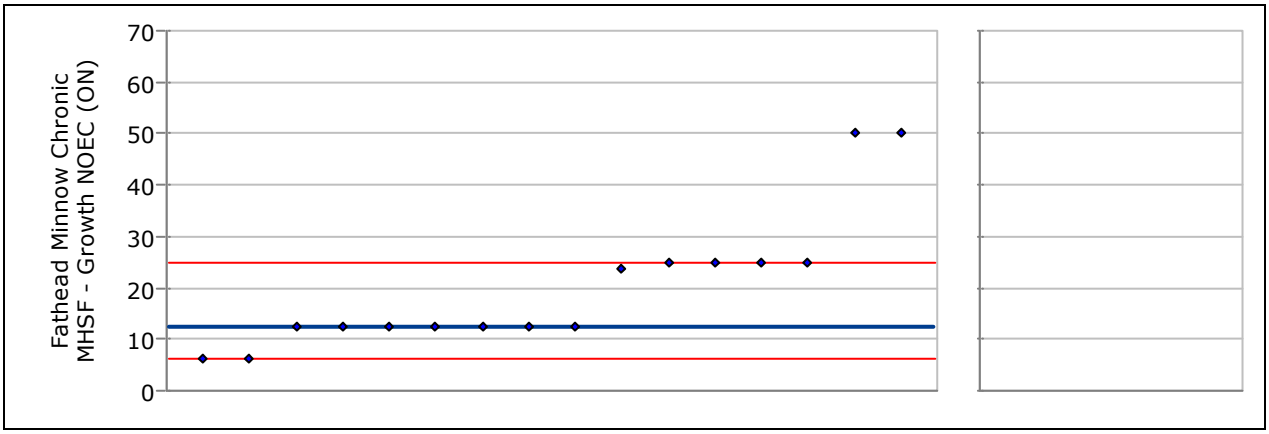
4.5.1 Fathead Minnow Chronic MHSF - Growth IC25 (ON)

No. of participating laboratories (in total / with quant. data points only)	16 / 16
No. of data points (in total / quantitative)	16 / 16
Assigned value	25.5 %
Proficiency std. dev.	13.7 %
Acceptance window	0 - 53.0 %



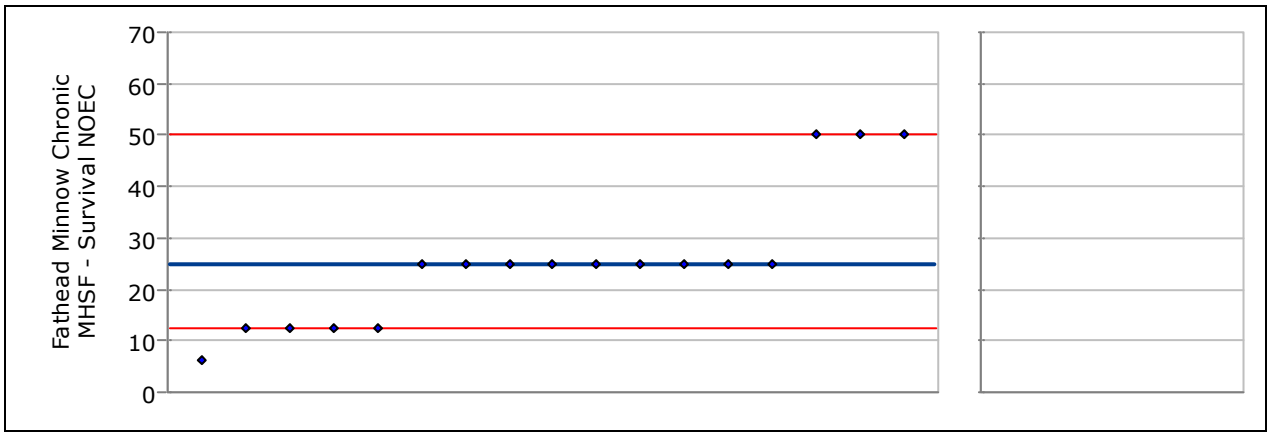
4.5.2 Fathead Minnow Chronic MHSF - Growth NOEC (ON)

No. of participating laboratories (in total / with quant. data points only)	16 / 16
No. of data points (in total / quantitative)	16 / 16
Assigned value	12.5 %
Proficiency std. dev.	--- %
Acceptance window	6.25 - 25.0 %



4.5.3 Fathead Minnow Chronic MHSF - Survival NOEC

No. of participating laboratories (in total / with quant. data points only)	17 / 17
No. of data points (in total / quantitative)	17 / 17
Assigned value	25.0 %
Proficiency std. dev.	--- %
Acceptance window	12.5 - 50.0 %

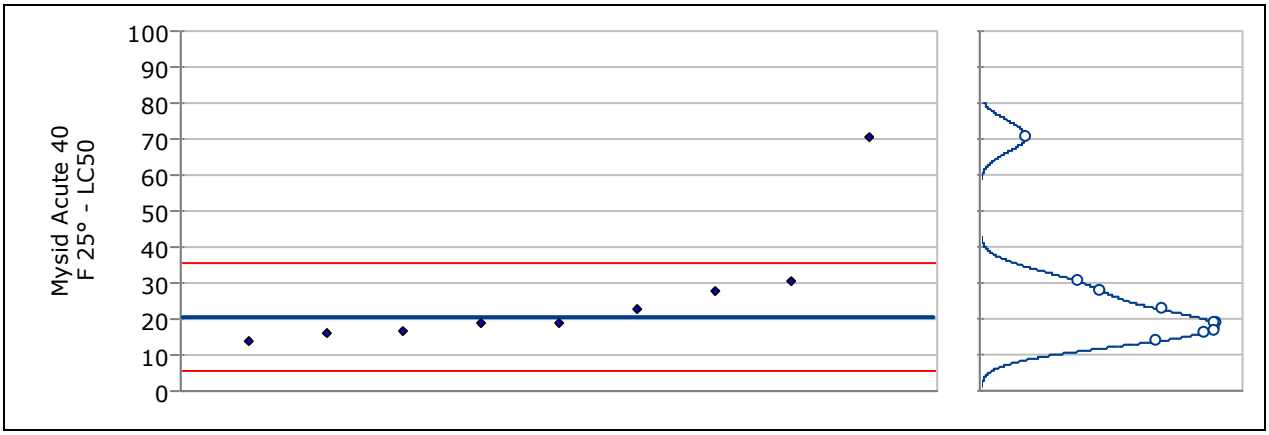


4.6 WET042-1EA Mysid Acute 40 Fathoms Seawater 25ºC / LRAC9695

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.6.1 Mysid Acute 40 F 25° - LC50

No. of participating laboratories (in total / with quant. data points only)	9 / 9
No. of data points (in total / quantitative)	9 / 9
Assigned value	20.6 %
Proficiency std. dev.	7.43 %
Acceptance window	5.77 - 35.5 %

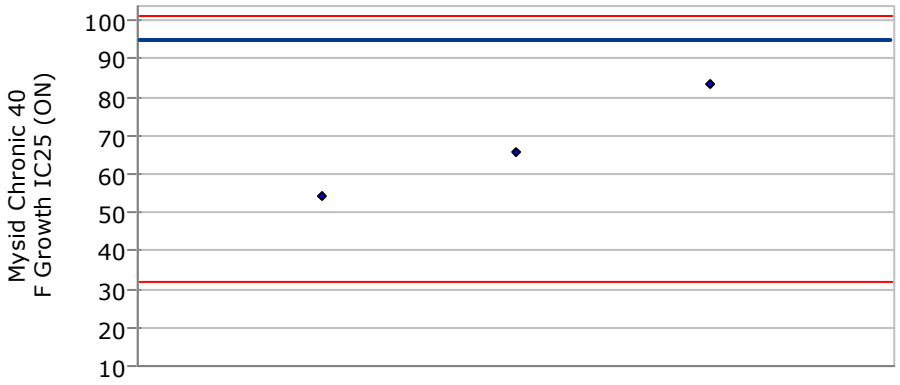


4.7 WET043-1EA Mysid Chronic 40 Fathoms Seawater / LRAC9696

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.7.1 Mysid Chronic 40 F Growth IC25 (ON)

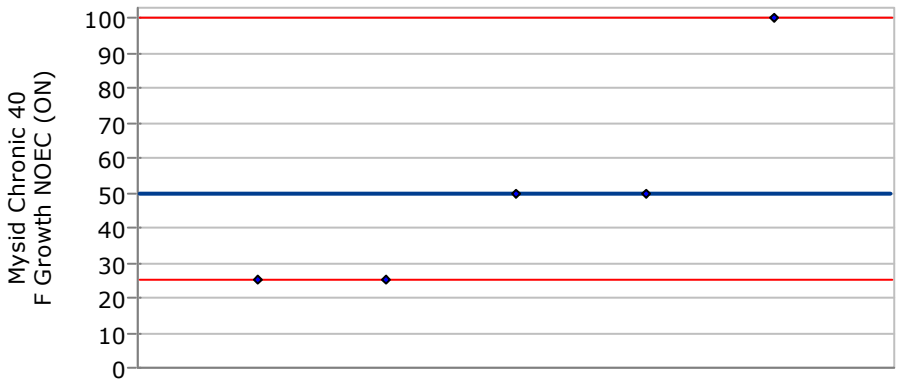
No. of participating laboratories (in total / with quant. data points only)	5 / 3
No. of data points (in total / quantitative)	5 / 3
Assigned value	95.0 %
Proficiency std. dev.	31.7 %
Acceptance window	31.7 - 101 %



Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

4.7.2 Mysid Chronic 40 F Growth NOEC (ON)

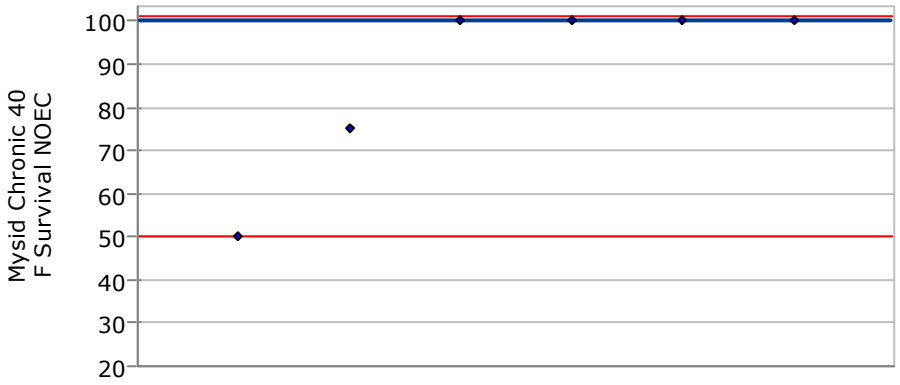
No. of participating laboratories (in total / with quant. data points only)	5 / 5
No. of data points (in total / quantitative)	5 / 5
Assigned value	50.0 %
Proficiency std. dev.	--- %
Acceptance window	25.0 - 100 %



Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

4.7.3 Mysid Chronic 40 F Survival NOEC

No. of participating laboratories (in total / with quant. data points only)	6 / 6
No. of data points (in total / quantitative)	6 / 6
Assigned value	100 %
Proficiency std. dev.	--- %
Acceptance window	50.0 - 101 %



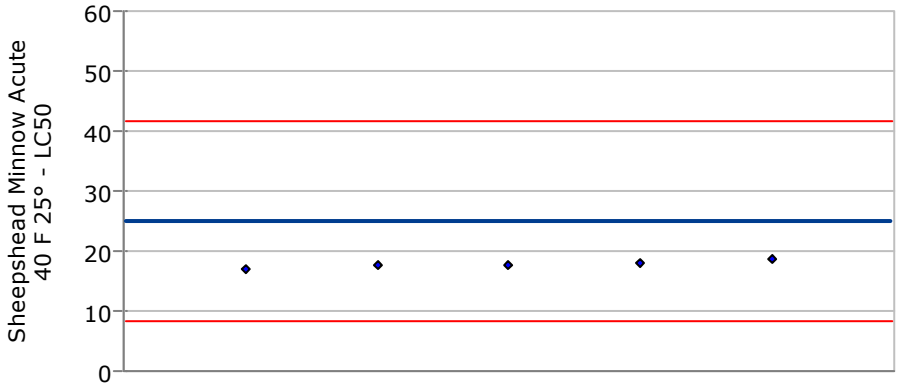
Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

4.8 WET046-1EA Sheepshead Minnow Acute 40 Fathoms Seawater 25ºC / LRAC9699

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.8.1 Sheepshead Minnow Acute 40 F 25° - LC50

No. of participating laboratories (in total / with quant. data points only)	5 / 5
No. of data points (in total / quantitative)	5 / 5
Assigned value	25.0 %
Proficiency std. dev.	8.33 %
Acceptance window	8.34 - 41.7 %



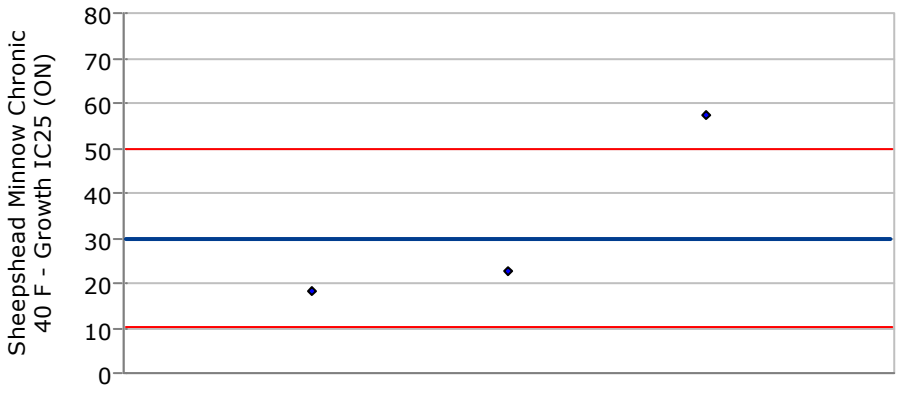
Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

4.9 WET047-1EA Sheepshead Minnow Chronic 40 Fathoms Seawater / LRAC9700

This proficiency testing sample was produced in accordance with ISO/IEC 17043:2010.

4.9.1 Sheepshead Minnow Chronic 40 F - Growth IC25 (ON)

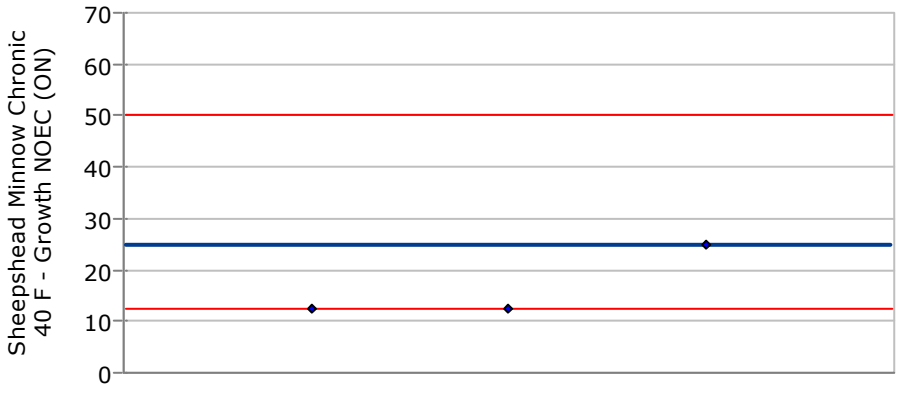
No. of participating laboratories (in total / with quant. data points only)	3 / 3
No. of data points (in total / quantitative)	3 / 3
Assigned value	30.0 %
Proficiency std. dev.	10.0 %
Acceptance window	10.0 - 50.0 %



Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

4.9.2 Sheepshead Minnow Chronic 40 F - Growth NOEC (ON)

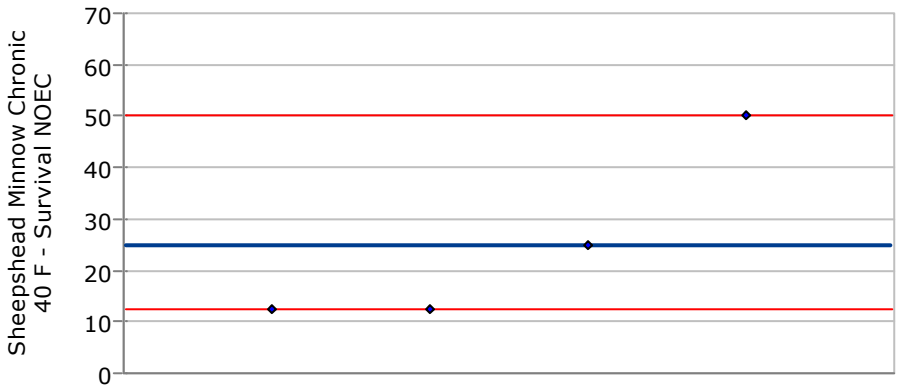
No. of participating laboratories (in total / with quant. data points only)	3 / 3
No. of data points (in total / quantitative)	3 / 3
Assigned value	25.0 %
Proficiency std. dev.	--- %
Acceptance window	12.5 - 50.0 %



Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

4.9.3 Sheepshead Minnow Chronic 40 F - Survival NOEC

No. of participating laboratories (in total / with quant. data points only)	4 / 4
No. of data points (in total / quantitative)	4 / 4
Assigned value	25.0 %
Proficiency std. dev.	--- %
Acceptance window	12.5 - 50.0 %



Number of laboratories with quantitative data points is less than 8. A reliable kernel density estimation cannot be guaranteed.

5 Statistical Analysis

5.1 Definitions and Interpretation

Reported Value

The participant's result.

Assigned Value

Value attributed to a particular quantity and accepted, sometimes by convention, as having an uncertainty appropriate for a given purpose. See ISO/IEC 17043 for additional information. In general, the assigned value is the value used to assess proficiency and may or may not be the made to value (gravimetric value).

Acceptance Window

The range of values that constitute acceptable performance for a laboratory participating in this PT study.

z-score

A z-score shows how a single data point compares to normal data. A z-score says not only whether a point was above or below average, but how unusual the measurement is. Generally, a method result with a z-score less than |2| is considered to be in control and 'Acceptable'; a z-score between |2| and |3| is considered 'Questionable', but still within control and 'Acceptable' and a z-score greater than |3| is considered 'Not Acceptable' and the method is out of control. For WS studies, a z-score greater than |2| is not acceptable.

Calculated as z = (Reported Value - Assigned Value) / Proficiency Std. Dev.

A z-score cannot be provided

(1) for presence/absence data,
(2) for identification data and other categorial data,
(3) where the analyte is not present in the sample,
(4) for "less than" and "greater than" values,
(5) NOEC analytes (in the framework of WETT analysis).

In cases (1) to (3) the participant's result is only evaluated by "acceptable" if it matches with the assigned value. Otherwise the result is indicated as "not acceptable". In case the analyte is not present in the sample and a PTRL is available, the participant's result is indicated as "acceptable" as long the result is less than the PTRL.

In case (4) the following evaluation rules will be applied:

- "less than" values:
  - When the analyte is not present in the sample the result is always "acceptable".
  - When the analyte is truly present in the sample, the result is only "acceptable" if the "less than" value is greater than the lower limit of the acceptance window.
- "greater than" values:
  - When the analyte is not present in the sample the result is always "not acceptable".
  - When the analyte is truly present in the sample, the result is only "acceptable" if the "greater than" value is less than the upper limit of the acceptance window.

In case (5) the result is indicated as "acceptable" if it lies within the acceptance window, otherwise the result is indicated as "not acceptable".

Proficiency Std. Dev.

Standard deviation calculated based on Evaluation Criteria.

PTRL

Proficiency Testing Reporting Limit

Study Mean

Statistical study mean calculated using a robust statistical model. Robust statistical techniques are used to minimize the influence extreme results can have on estimates of the mean and standard deviation. NOTE - These techniques assign less weight to extreme results, rather than eliminate them from a data set.

Choice of statistical technique: In case of quantitative data points from at least 8 laboratories, Algorithm A (ISO 13528, Section C.3.1), and in case of quantitative data points of 4 to 7 laboratories, the Hampel estimator (ISO 13528, Section C.5.3) is applied. A study mean cannot be calculated in case there are quantitative data points from less than 4 laboratories available.

Study Std. Dev.

Standard deviation calculated from study data using robust statistics.

In case of quantitative data points from at least 8 laboratories, Algorithm A (ISO 13528, Section C.3.1), and in case of quantitative data points of 4 to 7 laboratories, the Q method (ISO 13528, Section C.5.2) is applied. A study standard deviation cannot be calculated in case there are quantitative data points from less than 4 laboratories available.

Gravimetric Value

The 'prepared to' value, determined by gravimetric means. The uncertainty associated with this value is the standard uncertainty and based on Sigma-Aldrich RTC's gravimetric tolerances.

Analytical Value

The measured value, determined after preparation. The uncertainty associated to this value is the standard uncertainty and based on the measurement process.

5.2 Evaluation Criteria

1 - Regression Equation

Acceptance windows based on TNI adopted equation of proficiency value +/- 3 proficiency standard deviations and check limits of proficiency value +/- 2 proficiency standard deviations. Proficiency value and proficiency standard deviation are calculated from gravimetric variables a, b, c & d as proficiency value = a * gravimetric + b and proficiency standard deviation = c * gravimetric + d.

2 - Study Robust Mean and c, d regression

Acceptance windows based on TNI adopted equation of proficiency value +/- 3 proficiency standard deviations and check limits of proficiency value +/- 2 proficiency standard deviations. Proficiency value and proficiency standard deviation calculated from robust study mean and variables c & d as proficiency value = robust mean and proficiency standard deviation = c *proficiency value + d.

3 - Fixed Limits

Acceptance windows based on span of gravimetric percentage from gravimetric as gravimetric +/- gravimetric * percentage.

4 - Adjustable Fixed Limits

Acceptance windows based on a span of gravimetric percentage from gravimetric as gravimetric +/- gravimetric * lowPercentage where gravimetric < break and gravimetric +/- gravimetric * highPercentage where gravimetric >= break.

5 - Study Statistics

Acceptance windows based on a number of standard deviations span from the study mean as study mean +/- (deviations * standard deviation).

6 - Log Transform Statistics

Acceptance windows based on lognormal distributed data. Acceptance windows = mean(lognormal) +/- span * standard deviation(lognormal).

7 - Regression Equation 2SD

Acceptance windows based on EPA equation of proficiency value +/- 2 proficiency standard deviations. Proficiency value and proficiency standard deviation are calculated from gravimetric variables a, b, c & d as proficiency value = a * gravimetric + b and proficiency standard deviation = c * gravimetric + d. Generally reserved for drinking water studies.

8 - Study Median and Dilution Levels

Acceptance windows based on study median ± 1 dilution. If the median falls between two test dilutions, then the assigned value is set at the higher value, and the lower acceptance limit is the second test dilution below the median, and the upper acceptance limit is the second test dilution above the median. Generally reserved for NOEC analytes (in the framework of WETT analysis).

9 - Fixed Limits based on Analytical Value

Acceptance windows based on span of analytical value from measurements.

6 Notes on the Interpretation of the Results

z score Overview

The z-scores are presented as colored triangles. For each item, the z-scores of all analytes of the current and the previous (up to three) scheduled studies of this study type. The z-scores depend on the lot, analytical method used, and analyst (if given). A red cross is shown if no z-score is available.

For the assessment of participants by means of z-scores according to ISO/IEC 17043:2010 [2], the triangles were colored as follows:

$\|z\| \leq 2$	green
$2 < \|z\| < 3$	yellow (WS studies, WETT samples: red)
$\|z\| \geq 3$	red.

For $|z| \geq 3$, the corresponding triangles are displayed as -3 or 3. For $|z| > 2$, the value of the z score is displayed next to the triangle (yellow or red). A z-score = 0 is shown as a light blue vertical bar.

Interpretation of the z-scores' overview:

A z-score < 0, i.e. the triangle points to the left, means that the measurement result is lower than the assigned value.

A z-score > 0, i.e. the triangle points to the right, means that the measurement result is higher than the assigned value.

A z-score = 0, i.e. a light blue vertical bar is shown, means that the measurement result coincides with the assigned value.

Figures per Combination of Item, Lot and Analyte

The *diagram on the left* shows the participant results by means of blue diamonds.

The horizontal blue line indicates the assigned value.

Both the acceptance and the check limits for the participant results are calculated based on z-scores.

The acceptance limits are displayed as solid lines and correspond to z-scores of ±3. For WS studies and non-NOEC analytes (in the framework of WETT analysis), the acceptance limits correspond to a z-score ±2. For NOEC analytes (in the framework of WETT analysis), the acceptance limits correspond to ±1 dilution.

The check limits are displayed as dashed lines and correspond to z-scores of ±2. They are only calculated if a rule is given by the evaluation criterion.

In case there are at least 8 laboratories with quantitative data points are available: The *diagram on the right* is a kernel density estimation of the distribution of the participant results. The measurement values are indicated as small circles. The kernel width is determined by the ISO 13528 formula from section 10.3.2 i) a).

7 Proficiency Test Item Preparation, Homogeneity and Stability Assessment

Sigma-Aldrich RTC uses proprietary and published methods for the manufacture, homogeneity and stability testing of proficiency test items. Sigma-Aldrich RTC's proficiency test materials meet the requirements of ISO 17034. For more information contact Sigma-Aldrich RTC. Additionally, Sigma-Aldrich RTC complies with the TNI Volume 3 'General Requirements for Environmental Proficiency Test Providers', EL-V3-2016, for all TNI Fields of Proficiency Testing analytes.

8 Metrological Traceability

All preparations are made using balances calibrated annually traceable to NIST standards. Where appropriate analytical measurements are traceable through an unbroken chain to NIST standards, or a Certified Reference Material manufactured under ISO 17034 in conjunction with ISO/IEC 17025.

9 Additional Information

Go to supelco-pt.com for additional information on summary statistics for specific methods, advice on the interpretation of the statistical analysis and additional comments/recommendations. Sigma-Aldrich RTC recommends that you contact your accreditation body for specific instruction.

10 References

[1] ISO 13528: Statistical methods for use in proficiency testing by interlaboratory comparison, August 2015

[2] ISO/IEC 17025:2017: General requirements for the competence of testing and calibration laboratories

[3] ISO/IEC 17043:2010: Conformity assessment - General requirements for proficiency testing, May 2010

[4] S. Uhlig und P. Henschel (1997): Limits of tolerance and z-scores in ring tests. Fresenius' J. Anal. Chem., Vol. 358, pp. 761-766.

[5] ISO 17034:2016: General requirements for the competence of reference material producers.

This section of the report is for informational purposes only. If you are unsure about specific accreditation requirements, please contact your state coordinator.

Unacceptable Analytes

No unacceptable analytes

[1] TNI Compliant, covered by Sigma-Aldrich RTC's ANAB Proficiency Testing Provider accreditation, Cert. AP-1469
[2] ISO/IEC 17043 Accredited, covered by Sigma-Aldrich RTC's ANAB Proficiency Testing Provider accreditation, Cert AP-1469

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