



COMMERCIAL - IN - CONFIDENCE

CERTIFICATE OF TESTING
CENTRE FOR WATER MANAGEMENT
PERFORMANCE TESTING OF WATER METER



Fluid Control Research Institute
Kanjikode West, Palakkad, Kerala 678 623
Phone: (0491) 2566206,2566120 Fax:(0491) 2566326

Report No : FCRI/CWM/2022/T/33

Certificate No. TC-7402

ULR-TC74022260000033F

Meter serial No.	: 001C3101
Make	: Kritsnam
Model	: Dhaara Smart
Type	: Ultrasonic
Meter specification	: MAP16, ΔP63, T50, H
Size	: 25 mm, Q3 6.3 m ³ /h, R40
Accuracy Class	: 2
Verification Scale interval	: 1 litre
Orientation (During Test)	: H
Location of Indicating Device	: Top of the meter

Customer	: Kritsnam Technologies Pvt Ltd.
Plot No.	: 347, Road No 22, Jubilee Hills ,Telengana.
Application/Ref. no.	: SRF dated 17.12.2022
Ref standards	: ISO 4064 - 1 : 2014
	: ISO 4064 - 2 : 2014
	Start End
Ambient Temperature (deg C)	34.6 34.5
Ambient Relative Humidity (%)	35.0 34.0
Ambient Atmospheric Pressure (bar)	0.9992 0.9992
Time	14:00 16:00
Date of testing	: 14.02.2022

I. Pressure tightness test	Result
1) Subjected to 1.6 MAP for 1 minute :	PASSED

II. Pressure loss test				
Sl. No.	Flow rate (m ³ /hr)	Pressure loss (kPa)	Permissible Pressure loss (kPa)	Result
1	6.300	51	63	PASSED

III. Resolution Error				
Sl. No	Accuracy Class	Resolution Error (%)	Permissible Error (%)	
1	2	0.42	0.5	

IV. Metering accuracy test					
Test Case :	Case B	Category for Testing :	8.1.8.4 (a)	Nominal pipe diameter before and after the meter :	25 mm
Method :	Gravimetric	Weighing Balance Used :	300 kg	Meter Upstream Straight Length :	15D
				Meter Downstream Straight Length :	15D


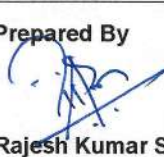
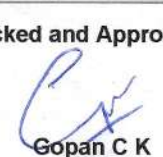
Sl. No	Nominal Flow rate (m ³ /hr)	Actual Flow rate (m ³ /hr)	Working Temperature (deg C)	Working Pressure (kPa)	Initial Reading Vi(i) (litre)	Final Reading Vi(f) (litre)	Indicated Volume (litre)	Actual Volume (litre)	Meter error %	Permissible Deviation	Result
1	0.158	0.158	32.1	125	4024	4099	75	73.62	1.88	+/-5%	PASSED
2	0.252	0.252	32.0	125	3919	4024	105	102.47	2.46	+/-3%	PASSED
3	2.293	2.293	32.2	620	4405	4673	268	267.11	0.33	+/-3%	PASSED
4	4.619	4.619	32.2	525	3632	3788	156	157.22	-0.78	+/-3%	PASSED
5	6.300	6.300	32.3	230	3271	3386	115	114.86	0.12	+/-3%	PASSED
6	7.875	7.875	32.1	475	2938	3118	180	181.29	-0.71	+/-3%	PASSED

Remarks:
-

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE

1. Test conducted does not include endurance test.
2. Results presented in this report relate only to the Item/s mentioned above. The test results are valid only at the time of testing.

<p>Tested by</p>  P. Guruvayurappan Technician Gr-II	<p>Prepared By</p>  Rajesh Kumar S	<p>Checked and Approved by</p>  Gopan C K Senior Research Engineer
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Report No : FCRI/CWM/2022/T/34

ULR-TC7402226000034F

Meter serial No. : 00220701	Customer : Kritsnam Technologies Pvt Ltd.
Make : Kritsnam	Plot No.347, Road No 22, Jubilee Hills ,Telengana.
Model : Dhaara Smart	Application/Ref. no. : SRF dated 17.12.2022
Type : Ultrasonic	Ref standards : ISO 4064 - 1 : 2014
Meter specification : MAP16, ΔP63, T50, H	ISO 4064 - 2 : 2014
Size : 40 mm, Q3 16 m3/h, R40	Start End
Accuracy Class : 2	Ambient Temperature (deg C) 32.1 33.5
Verification Scale interval : 1 litre	Ambient Relative Humidity (%) 39.0 33.0
Orientation (During Test) : H	Ambient Atmospheric Pressure (bar) 0.9992 0.9992
Location of Indicating Device : Top of the meter	Time 11:30 12:20
	Date of testing : 18.02.2022

I. Pressure tightness test	Result
1) Subjected to 1.6 MAP for 1 minute :	PASSED

II. Pressure loss test				
Sl. No.	Flow rate (m ³ /hr)	Pressure loss (kPa)	Permissible Pressure loss (kPa)	Result
1	16.000	38	63	PASSED

III. Resolution Error				
Sl. No	Accuracy Class	Resolution Error (%)	Permissible Error (%)	
1	2	0.17	0.5	

IV. Metering accuracy test

Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 40 mm
Method : Gravimetric Weighing Balance Used : 300 kg Meter Upstream Straight Length : 15D
Meter Downstream Straight Length : 15D

Sl. No	Nominal Flow rate (m ³ /hr)	Actual Flow rate (m ³ /hr)	Working Temperature (deg C)	Working Pressure (kPa)	Initial Reading Vi(i) (litre)	Final Reading Vi(f) (litre)	Indicated Volume (litre)	Actual Volume (litre)	Meter error %	Permissible Deviation	Result
1	0.400	0.400	33.0	130	2228	2345	117	117.55	-0.46	+/-5%	PASSED
2	0.640	0.640	33.0	129	2118	2228	110	109.66	0.31	+/-3%	PASSED
3	5.824	5.824	32.8	127	1862	2105	243	243.10	-0.04	+/-3%	PASSED
4	11.731	11.731	33.0	125	1510	1803	293	294.45	-0.49	+/-3%	PASSED
5	16.000	16.000	33.0	117	9853	11510	1657	1665.03	-0.48	+/-3%	PASSED
6	20.000	20.000	33.0	108	7334	9467	2133	2129.53	0.16	+/-3%	PASSED

Remarks:
-

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE

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<p>Tested by</p> <p>P. Guruvayurappan Technician Gr-II</p>	<p>Prepared By</p> <p>Rajesh Kumar S</p>	<p>Checked and Approved by</p> <p>Gopan C K Senior Research Engineer</p>
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PERFORMANCE TESTING OF WATER METER



Report No : FCRI/CWM/2022/T/35

ULR-TC74022260000035F

Meter serial No. : 00220501	Customer : Kritsnam Technologies Pvt Ltd.
Make : Kritsnam	Plot No.347, Road No 22, Jubilee Hills ,Telengana .
Model : Dhaara Smart	Application/Ref. no. : SRF dated 17.12.2022
Type : Ultrasonic	Ref standards : ISO 4064 - 1: 2014
Meter specification : MAP16, ΔP63, T50, H	ISO 4064 - 2 : 2014
Size : 50 mm, Q3 25 m3/h, R40	Start End
Accuracy Class : 2	Ambient Temperature (deg C) 33.8 34.8
Verification Scale interval : 1 litre	Ambient Relative Humidity (%) 34.0 21.0
Orientation (During Test) : H	Ambient Atmospheric Pressure (bar) 0.9992 0.9992
Location of Indicating Device : Top of the meter	Time 14:10 16:00
	Date of testing : 17.02.2022

I. Pressure tightness test	Result
1) Subjected to 1.6 MAP for 1 minute :	PASSED

II. Pressure loss test				
Sl. No.	Flow rate (m ³ /hr)	Pressure loss (kPa)	Permissible Pressure loss (kPa)	Result
1	25.000	15	63	PASSED

III. Resolution Error				
Sl. No	Accuracy Class	Resolution Error (%)	Permissible Error (%)	
1	2	0.11	0.5	

IV. Metering accuracy test
 Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 50 mm
 Method : Gravimetric Weighing Balance Used : 300 kg Meter Upstream Straight Length : 15D
 Meter Downstream Straight Length : 15D

Sl. No	Nominal Flow rate (m ³ /hr)	Actual Flow rate (m ³ /hr)	Working Temperature (deg C)	Working Pressure (kPa)	Initial Reading Vi(i) (litre)	Final Reading Vi(f) (litre)	Indicated Volume (litre)	Actual Volume (litre)	Meter error %	Permissible Deviation	Result
1	0.625	0.625	33.6	124	4922	5134	212	205.79	3.02	+/-5%	PASSED
2	1.000	1.000	33.6	120	5163	5381	218	216.56	0.66	+/-3%	PASSED
3	9.100	9.100	33.6	115	5717	5948	231	227.63	1.48	+/-3%	PASSED
4	18.330	18.330	33.8	105	9734	10728	994	998.38	-0.44	+/-3%	PASSED
5	25.000	25.000	33.6	102	8231	9482	1251	1266.41	-1.22	+/-3%	PASSED
6	31.250	31.250	33.6	88	6423	8045	1622	1635.22	-0.81	+/-3%	PASSED

Remarks:
-

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE
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Tested by P. Gurusurappan Technician Gr-II	Prepared By Rajesh Kumar S	Checked and Approved by Gopan C K Senior Research Engineer
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Report No : FCRI/CWM/2022/T/36



ULR-TC74022260000036F

Meter serial No. : 00220702
Make : Kritsnam Technologies
Model : Dhaara Smart
Type : Ultrasonic
Meter specification : MAP16, ΔP63, T50, H
Size : 65 mm, Q3 40 m³/h, R40
Accuracy Class : 2
Verification Scale interval : 1 litre
Orientation (During Test) : H
Location of Indicating Device : Top of the meter

Customer : Kritsnam Technologies Pvt Ltd.
Plot No.347, Road No 22, Jubilee Hills ,Telengana .
Application/Ref. no. : SRF dated 17.12.2022
Ref standards : ISO 4064 - 1 : 2014
ISO 4064 - 2 : 2014
Start End
Ambient Temperature (deg C) 34.5 33.8
Ambient Relative Humidity (%) 33.0 34.0
Ambient Atmospheric Pressure (bar) 0.9992 0.9992
Time 14:00 15:00
Date of testing : 16.02.2022

I. Pressure tightness test

1) Subjected to 1.6 MAP for 1 minute :

Result

PASSED

II. Pressure loss test

Sl. No.	Flow rate (m ³ /hr)	Pressure loss (kPa)	Permissible Pressure loss (kPa)	Result
1	40.000	16	63	PASSED

III. Resolution Error

Sl. No	Accuracy Class	Resolution Error (%)	Permissible Error (%)
1	2	0.07	0.5

IV. Metering accuracy test

Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 65 mm
Method : Gravimetric Weighing Balance Used : 3000,300 kg Meter Upstream Straight Length : 15D
Meter Downstream Straight Length : 15D

Sl. No	Nominal Flow rate (m ³ /hr)	Actual Flow rate (m ³ /hr)	Working Temperature (deg C)	Working Pressure (kPa)	Initial Reading Vi(i) (litre)	Final Reading Vi(f) (litre)	Indicated Volume (litre)	Actual Volume (litre)	Meter error %	Permissible Deviation	Result
1	1.000	1.000	33.3	124	907	1085	178	178.95	-0.53	+/-5%	PASSED
2	1.600	1.600	33.3	120	1097	1290	193	196.25	-1.66	+/-3%	PASSED
3	14.560	14.560	33.4	115	1345	1616	271	269.09	0.71	+/-3%	PASSED
4	29.328	29.328	33.3	105	1986	2732	746	742.95	0.41	+/-3%	PASSED
5	40.000	40.000	33.3	100	3037	4425	1388	1388.29	-0.02	+/-3%	PASSED
6	50.000	50.000	33.3	85	4795	6918	2123	2112.70	0.49	+/-3%	PASSED

Remarks:

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE

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Tested by

P. Guruvayurappan
Technician Gr-II

Prepared By

Rajesh Kumar S

Checked and Approved by

Gopah C K
Senior Research Engineer



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PERFORMANCE TESTING OF WATER METER



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Report No : FCRI/CWM/2022/T/37

ULR-TC74022260000037F

Table with 2 main columns: Meter details (serial No, Make, Model, Type, etc.) and Customer/Testing details (Customer, Plot No, Application/Ref. no., Ref standards, etc.).

I. Pressure tightness test
1) Subjected to 1.6 MAP for 1 minute : PASSED

II. Pressure loss test
Table with columns: Sl. No, Flow rate (m³/hr), Pressure loss (kPa), Permissible Pressure loss (kPa), Result. Row 1: 1, 63.000, 16, 63, PASSED

III. Resolution Error
Table with columns: Sl. No, Accuracy Class, Resolution Error (%), Permissible Error (%). Row 1: 1, 2, 0.04, 0.5

IV. Metering accuracy test
Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 80 mm
Method : Gravimetric Weighing Balance Used : 300 kg Meter Upstream Straight Length : 15D
Meter Downstream Straight Length : 15D

Table with 12 columns: Sl. No, Nominal Flow rate (m³/hr), Actual Flow rate (m³/hr), Working Temperature (deg C), Working Pressure (kPa), Initial Reading Vi(i) (litre), Final Reading Vi(f) (litre), Indicated Volume (litre), Actual Volume (litre), Meter error %, Permissible Deviation, Result. Rows 1-6 show various flow rates and results, all PASSED.

Remarks: -

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE

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Tested by: P. Guruvayurappan, Technician Gr-II
Prepared By: Rajesh Kumar S
Checked and Approved by: Gopan C K, Senior Research Engineer



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Report No : FCRI/CWM/2022/T/38

ULR-TC74022260000038F

Meter serial No.	: 01221701
Make	: Kritsnam
Model	: Dhaara Smart
Type	: Ultrasonic
Meter specification	: MAP16, ΔP63, T50, H
Size	: 100 mm, Q3 100 m ³ /h, R40
Accuracy Class	: 2
Verification Scale interval	: 1 litre
Orientation (During Test)	: H
Location of Indicating Device	: Top of the meter

Customer	: Kritsnam Technologies Pvt Ltd.	
	Plot No.347, Road No 22, Jubilee Hills ,Telengana .	
Application/Ref. no.	: SRF dated 17.12.2022	
Ref standards	: ISO 4064 - 1 : 2014	
	ISO 4064 - 2 : 2014	
	Start	End
Ambient Temperature (deg C)	34.7	34.5
Ambient Relative Humidity (%)	26.0	25.0
Ambient Atmospheric Pressure (bar)	0.9992	0.9992
Time	15:10	16:10
Date of testing	: 18.02.2022	

I. Pressure tightness test

1) Subjected to 1.6 MAP for 1 minute :

Result

PASSED

II. Pressure loss test

Sl. No.	Flow rate (m ³ /hr)	Pressure loss (kPa)	Permissible Pressure loss (kPa)	Result
1	100.000	1	63	PASSED

III. Resolution Error

Sl. No	Accuracy Class	Resolution Error (%)	Permissible Error (%)
1	2	0.03	0.5

IV. Metering accuracy test

Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 100 mm
Method : Gravimetric Weighing Balance Used : 3000,300 kg Meter Upstream Straight Length : 15D
Meter Downstream Straight Length : 15D

Sl. No	Nominal Flow rate (m ³ /hr)	Actual Flow rate (m ³ /hr)	Working Temperature (deg C)	Working Pressure (kPa)	Initial Reading Vi(i) (litre)	Final Reading Vi(f) (litre)	Indicated Volume (litre)	Actual Volume (litre)	Meter error %	Permissible Deviation	Result
1	2.500	2.500	33.8	133	311	530	219	217.04	0.90	+/-5%	PASSED
2	4.000	4.000	33.5	133	5058	5265	207	206.06	0.46	+/-3%	PASSED
3	36.400	36.400	33.4	129	3793	4872	1079	1088.04	-0.83	+/-3%	PASSED
4	73.320	73.320	33.4	122	331	2376	2045	2047.08	-0.10	+/-3%	PASSED
5	100.000	100.000	33.3	112	4977	7241	2264	2252.61	0.51	+/-3%	PASSED
6	125.000	125.000	33.3	110	4977	7241	2264	2252.61	0.51	+/-3%	PASSED

Remarks:

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE

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Tested by

P. Guruvayurappan
Technician Gr-II

Prepared By

Rajesh Kumar S

Checked and Approved by

Gopan C K
Senior Research Engineer



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PERFORMANCE TESTING OF WATER METER

Report No : FCRI/CWM/2022/T/39



Certificate No. TC-7402

ULR-TC74022260000039F

Meter serial No.	: 01221702	Customer	: Kritsnam Technologies Pvt Ltd.
Make	: Kritsnam	Plot No.347, Road No 22, Jubilee Hills ,Telengana ,500033	
Model	: Dhaara Smart	Application/Ref. no. : SRF dated 17.12.2022	
Type	: Ultrasonic	Ref standards	: ISO 4064 - 1 : 2014
Meter specification	: MAP16, ΔP63, T50, H	ISO 4064 - 2 : 2014	
Size	: 125 mm, Q3 160 m ³ /h, R40	Start	End
Accuracy Class	: 2	Ambient Temperature (deg C)	34.5 33.5
Verification Scale interval	: 1 litre	Ambient Relative Humidity (%)	60.0 58.0
Orientation (During Test)	: H	Ambient Atmospheric Pressure (bar)	0.9992 0.9992
Location of Indicating Device	: Top of the meter	Time	13:30 15:20
		Date of testing	: 18.02.2022

I. Pressure tightness test

1) Subjected to 1.6 MAP for 1 minute :

Result**PASSED****II. Pressure loss test**

Sl. No.	Flow rate (m ³ /hr)	Pressure loss (kPa)	Permissible Pressure loss (kPa)	Result
1	160.000	1	63	PASSED

III. Resolution Error

Sl. No	Accuracy Class	Resolution Error (%)	Permissible Error (%)
1	2	0.02	0.5

IV. Metering accuracy test

Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 125 mm
Method : Gravimetric Weighing Balance Used : 300 kg Meter Upstream Straight Length : 15D
Meter Downstream Straight Length : 15D

Sl. No	Nominal Flow rate (m ³ /hr)	Actual Flow rate (m ³ /hr)	Working Temperature (deg C)	Working Pressure (kPa)	Initial Reading Vi(i) (litre)	Final Reading Vi(f) (litre)	Indicated Volume (litre)	Actual Volume (litre)	Meter error %	Permissible Deviation	Result
1	4.000	4.000	33.4	133	5343	5575	232	235.84	-1.63	+/-5%	PASSED
2	6.400	6.400	33.3	130	5071	5306	235	240.30	-2.21	+/-3%	PASSED
3	58.240	58.240	33.3	127	2824	4956	2132	2119.20	0.60	+/-3%	PASSED
4	117.312	117.312	33.2	120	9827	12239	2412	2446.38	-1.41	+/-3%	PASSED
5	160.000	160.000	33.2	110	6585	9016	2431	2448.45	-0.71	+/-3%	PASSED
6	200.000	200.000	33.3	108	1389	3952	2563	2524.84	1.51	+/-3%	PASSED

Remarks:**Tests witnessed by:** Mr. Neeraj Rai, Kritsnam Technologies.**NOTE**

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Tested by

P. Guruswamyurappan
Technician Gr-II

Prepared By

Rajesh Kumar S

Checked and Approved by

Gopan C K
Senior Research Engineer



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Report No : FCRI/CWM/2022/T/40

ULR-TC74022260000040F

Table with 2 main columns: Meter details (serial No, Make, Model, Type, etc.) and Customer/Testing details (Customer, Plot No, Application/Ref. no., Ref standards, etc.)

I. Pressure tightness test
1) Subjected to 1.6 MAP for 1 minute : Result PASSED

II. Pressure loss test
Table with 5 columns: Sl. No, Flow rate (m³/hr), Pressure loss (kPa), Permissible Pressure loss (kPa), Result

III. Resolution Error
Table with 4 columns: Sl. No, Accuracy Class, Resolution Error (%), Permissible Error (%)

IV. Metering accuracy test
Test Case : Case B Category for Testing : 8.1.8.4 (a) Nominal pipe diameter before and after the meter : 150 mm
Method : Gravimetric Weighing Balance Used : 300 kg Meter Upstream Straight Length : 15D
Meter Downstream Straight Length : 15D

Table with 12 columns: Sl. No, Nominal Flow rate (m³/hr), Actual Flow rate (m³/hr), Working Temperature (deg C), Working Pressure (kPa), Initial Reading Vi(i) (litre), Final Reading Vi(f) (litre), Indicated Volume (litre), Actual Volume (litre), Meter error %, Permissible Deviation, Result

Remarks:

Tests witnessed by: Mr. Neeraj Rai, Kritsnam Technologies.

NOTE

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