Centre for Water Management

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CERTIFICATE OF TESTING

on

Three 15 mm Water meters

of make 'FEDREL' from

M/s. V.A Valves.,

JALANDHAR.

CERTIFICATE NUMBER

FCRI/CWM/2015/T/1535

Dated

20.01.2016

एफ.सी.आर.आई.

FCRI

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M/s. V.A. Valves, Jalandhar.

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DATE OF RECEIPT	DATE OF TESTING	DATE OF ISSUE
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AUTHORIZED SIGNATORY

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SUMMARY

Test on three 15mm, Class B, Multijet domestic water meters, of make 'FEDREL', from M/s. V.A Valves, Jalandhar, was conducted at Centre for Water Management Laboratory of Fluid Control Research Institute, Palakkad.

The tests were carried out as per the procedure described in this document which is based on IS 779:1994. All the meters were initially subjected to pressure and flow tests. After the initial tests, meters were subjected to temperature suitability test and again pressure and flow tests were carried out. Then the meters were subjected to accelerated endurance testing as per the procedure described in section 3.0 of this report and again proceeded to pressure and flow tests. The regulations and permitted tolerances in the measurement of physical quantities associated with the water meter test methods and equipments as per IS 6784: 1996 were fully followed during testing.

The meters supplied have **PASSED** the endurance test and the test results are given in Table 1 and Table 2 of this report.

Tested by:	Report prepared by:	Checked by:
P.Guruvayoorappan, Lab Assistant	U.Muthukumar, S R E	C.K.Gopan, R E

CONTENTS

1.0 Introduction

Tests on three Multijet domestic water meters of, make FEDREL, size 15 mm were conducted at Centre for Water Management Laboratory of FCRI. The tests were carried out as per the procedure described below which is based on IS 779:1994. The regulations and permitted tolerances in the measurement of physical quantities associated with the water meter test methods and equipments as per IS 6784: 1996 were fully followed during testing.

2.0 Test set up

A schematic diagram of the test rig used for flow tests such as metering accuracy and loss of pressure is shown in fig. 2. The meters were accommodated in the test rig with suitable upstream and downstream straight lengths. Calibrated electromagnetic flow meter was used as reference flow meter to adjust the flow rates. Constant head tank was used to supply water to the test rig. Metering accuracy of the test meters was checked against weighing system of 300 kg capacity having resolution of 2 g. The desired flow rates were achieved by adjusting the valve provided in the downstream side of the meters. RTD was used for measuring the temperature of water. A high precision pressure gauge was used to measure the loss of pressure as shown in fig.2.

A schematic diagram of the test rig used for accelerated endurance test is shown in fig.3. Water meters were accommodated in series as shown in the figure. A solenoid valve fitted at the downstream with a dedicated electronic circuit was used to facilitate discontinuous flow at fixed time interval. An electro-mechanical counter was used to count the number of interruptions. Constant head tank was used to provide supply of water to this endurance test rig. Upstream control valve was used to control the flow rate.

3.0 Test Procedure

Initially, water meters were checked for dimensional verification, verification scale interval and marking. Then the meters were subjected to pressure tightness test. For this, the meters were subjected to continuous water pressure of 1.6 MPa for 15 minutes and afterwards 2.0 MPa for 1 minute. Then the meters were subjected to flow tests. Flow test consists of determination of measurement error and pressure loss. Measurement error was determined at different flow rates like maximum (Q_{max}), nominal (Q_n), transitional (Q_t) and minimum (Q_{min}) flow rates. In addition to these four flow rates, accuracy was determined at three more additional flow rates as given in table 1. The permissible metering accuracy is ± 5 % from Q_{min} (inclusive) to Qt (exclusive) and ± 2 % from Q_t (inclusive) to Q_{max} (inclusive). Head losses across the meters were measured at Q_n and Q_{max}.

The meters were then subjected to temperature suitability test in which they are placed in a hot water bath of 45 ± 1° C for 10 hours. After temperature suitability test the meters were again subjected to pressure and flow test. Then the meters were subjected to accelerated endurance test (life test). Life test consists of two phases, continuous flow test at Q_{max} for 100 hours and discontinuous flow test consisting 1,00,000 cycles of operation. Each interruption consists of flow at Q_n for 15 sec. and a pause time of next 15 sec. After the continuous and discontinuous tests, pressure and flow tests were repeated. The flow rate was ensured using an electro-magnetic flow meter.

4.0. Results

All the three water meters were tested according to the test procedure mentioned above which is based on the standards IS 779:1994 / 6784: 1996. The details of the test results are produced in Table 1 and Table 2.

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TABLE. 1 : Test Results

Make : FEDREL
Size : 15mm Class B
Type : Multi jet

	Meter Sl.No.	Pressure Tightness Test		Accuracy Test (% Mean Error) Flow Rate							Pressure Loss (Kpa)	
		1.6 Mpa	2.0 Mpa	0.03 m^3/hr	0.12 m^3/hr	0.3 m^3/hr	0.75 m^3/hr	1.125 m^3/hr	1.5 m^3/hr	3 m^3/hr	1.5 m^3/hr	3 m^3/hr
Before Temperature Test	150200008	PASSED	PASSED	-2.32	-0.79	-0.90	-0.91	-0.64	-0.61	-1.18	15	58
	15-6-00165	PASSED	PASSED	-1.00	0.41	0.33	-0.39	-0.50	-0.41	-0.48	13	52
	15-6-00392	PASSED	PASSED	-3.63	1.37	0.21	-0.46	-0.35	-0.41	-0.66	15	56
Permissible Deviation				**+/-5%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**25**	**100**
After Temperature Test	150200008	PASSED	PASSED	-1.52	-0.93	-1.11	-1.02	-0.65	-0.79	-1.13	15	60
	15-6-00165	PASSED	PASSED	-3.51	0.13	-0.23	-0.44	-0.40	-0.48	-0.42	13	53
	15-6-00392	PASSED	PASSED	-4.84	0.66	-0.62	-1.12	-0.65	-0.57	-0.77	15	57
Permissible Deviation				**+/-5%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**25**	**100**
After Continuous Test	15-6-00165	PASSED	PASSED	-4.51	-0.19	-0.14	-0.20	-0.21	-0.17	0.11	11	54
	15-6-00392	PASSED	PASSED	-4.04	-0.39	-0.31	-0.13	-0.15	-0.06	-0.57	14	57
Permissible Deviation				**+/-5%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**25**	**100**
After Dis-continuous Test	15-6-00165	PASSED	PASSED	-4.39	1.20	1.51	1.70	1.79	1.56	1.28	13	47
	15-6-00392	PASSED	PASSED	-4.15	-1.88	-0.28	1.70	1.60	1.37	0.49	13	51
Permissible Deviation				**+/-5%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**+/-2%**	**25**	**100**

TABLE. 2: Confirmity with standard.

Make : FEDREL

Size : 15mm Class B

Type : Multi jet

	Meter Sl.No	Pressure Tightness Test	Accuracy Test – Flow Rate 0.03 m³/hr	0.12 m³/hr	0.3 m³/hr	0.75 m³/hr	1.125 m³/hr	1.5 m³/hr	3 m³/hr	Pressure Loss Test 1.5 m³/hr	3 m³/hr
Before Temperature Test	150200006	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
	15-6-00165	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
	15-6-00392	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
After Temperature Test	150200008	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
	15-6-00165	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
	15-6-00392	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
After Continuous Test	15-6-00165	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
	15-6-00392	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
After Dis-continuous Test	15-6-00165	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED
	15-6-00392	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED	PASSED

Top view of the meter

Front view of the meter

(Fig-1.Water meter)

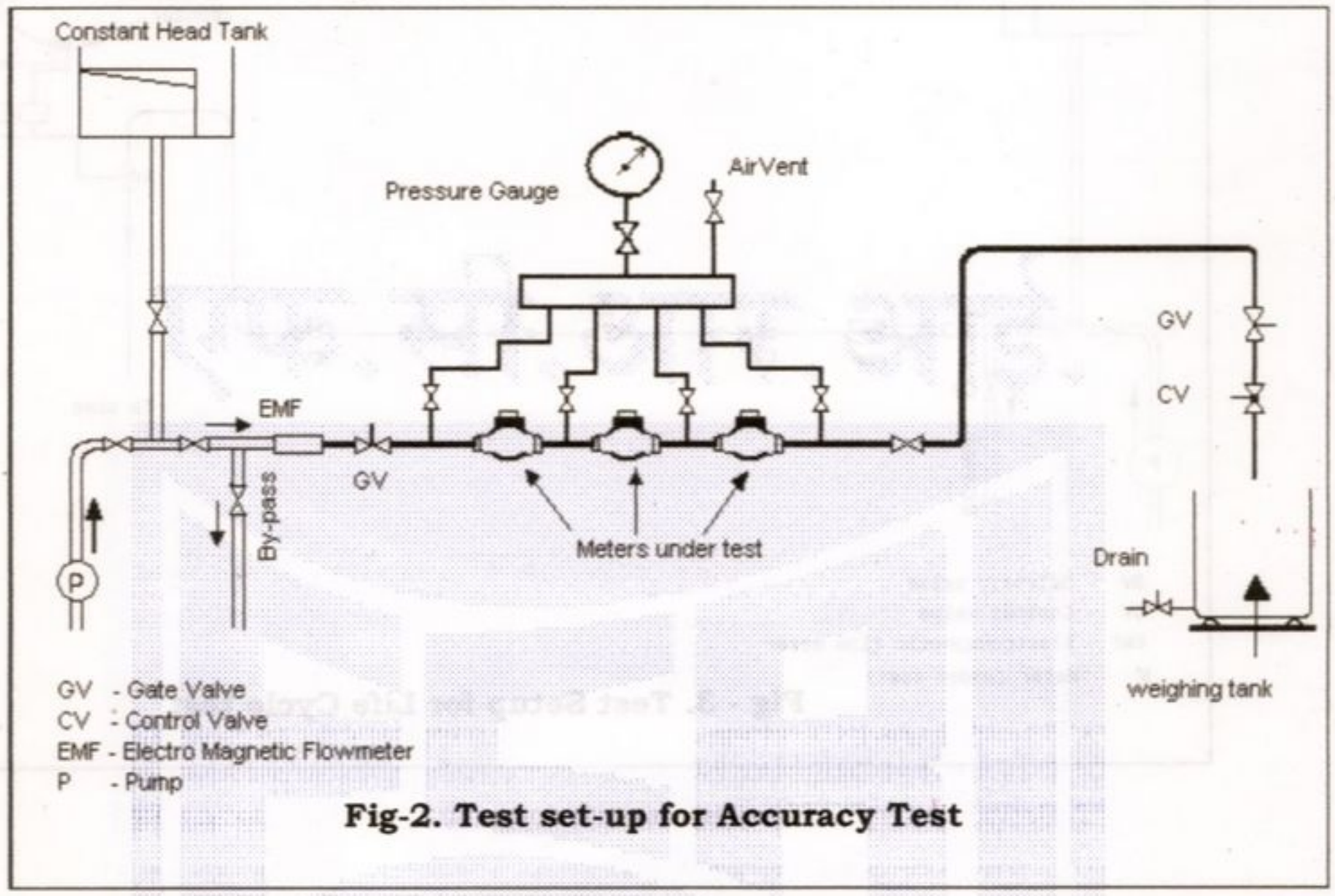

Fig-2. Test set-up for Accuracy Test

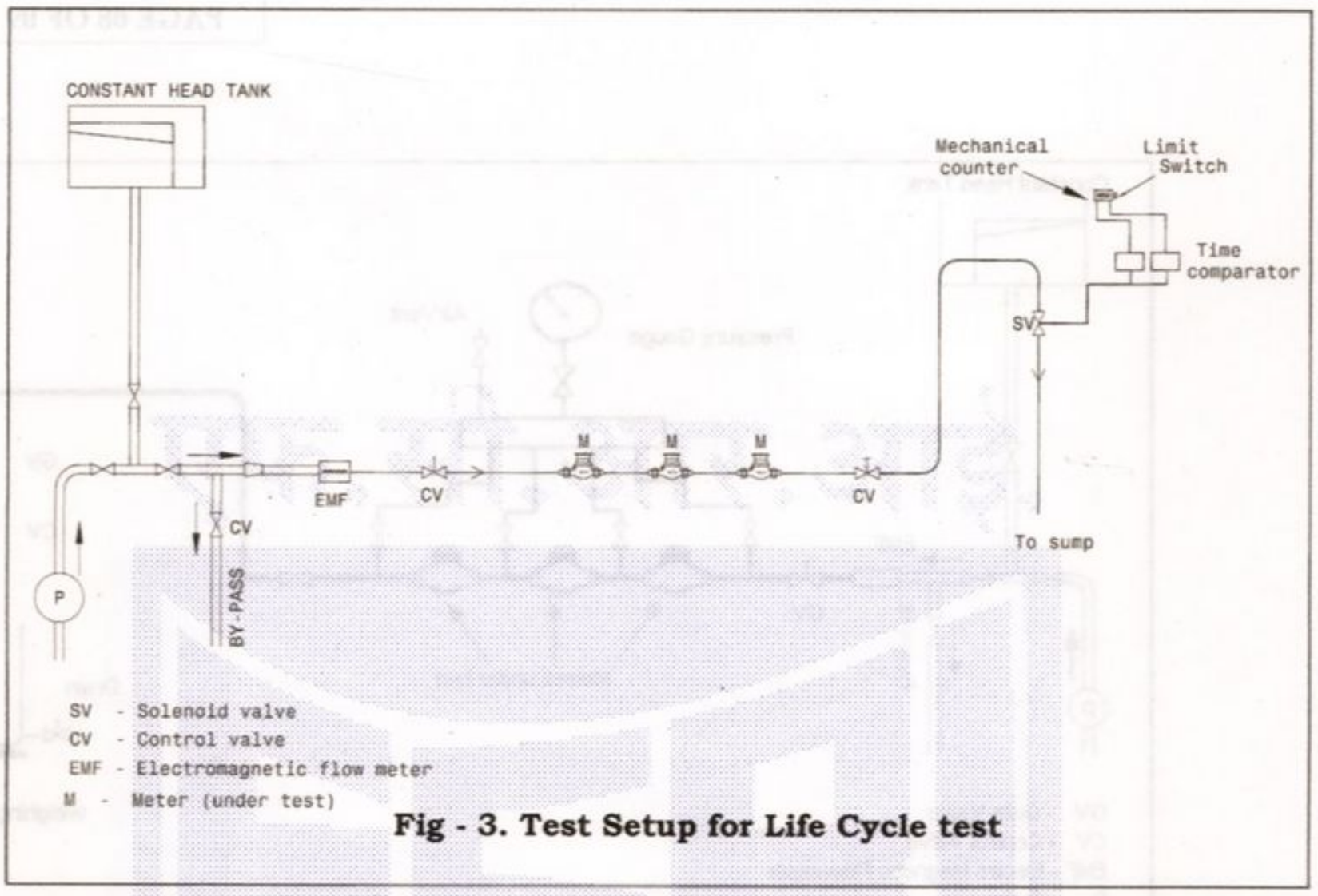

Fig - 3. Test Setup for Life Cycle test