



Project: --

Client: **Flowserve Flow Control (UK) Ltd., England**

Office: **Chennai**

Clients Order Number: **Signed Request for Services Signed by Audco India Ltd.,
dt. 03.03.2006**

Date: **13 March 2006**

Order Status: **Incomplete**

Inspection Dates

First: **13 March 2006**

Final: **13 March 2006**

This certificate is issued to **Flowserve Flow Control (UK) Ltd.**, to certify that the undersigned Surveyor to Lloyd's Register Asia did, at their request, attend their **MANAPAKKAM** works of **Audco India Limited**, on **13 March 2006** for the purpose of witnessing **Fire Test** on the following valve in accordance with **ISO 10497-2004 & API 607 5th Edition**.

Description:

Item : **WORCESTER F44 SERIES FLOATING BALL VALVE
ENDS SCREWED; SIZE : 2" (50mm); Class : 300**

Valve Sl. No. : **A00156**

Drg. No. : **F-44-1220-008 Rev.C**

As per the specification, the range of valves qualified is as under:

Size : **2" & below, 2 1/2", 3", 4"**



Pressure Class : **Cl.300, Cl.400, Cl.600.**

Enclosed manufacturer's Fire Test Report No.FFC-FBV/004 dated 13.03.2006 duly endorsed for test results.

Note: This certificate has been issued to **Flowserve Flow Control (UK) Ltd.** England at the request of the client **Audco India Ltd., Chennai**

Conclusion:

The results obtained during the Fire test were found to be in compliance to the requirements of the aforementioned specifications.

C.RAJU
Surveyor to Lloyd's Register Asia

A member of the Lloyd's Register Group

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Flow Control Division

Flowserve Flow Control (UK) Ltd.
 Burrell Road, Haywards Heath, W. Sussex RH16 1TL England
 Telephone +44 (0)1444 314400 Fax +44 (0)1444 314401
 www.flowserve.com

FIRE TEST REPORT

VALVE TYPE	: Floating Ball Valve	TEST REPORT NO	: FFC-FBV / 004
SIZE (DN,NPS)	: DN 50 mm (2 inch)	DATE	: 13/03/06
CLASS / PN RATING	: CLASS 300 (PN 40)	TEST VENUE	: Audco India Ltd
END CONNECTION	: Screwed		: Chennai 600089
GENERIC MATERIAL OF CONSTRUCTIO	: Stainless steel	ITEM ID	: A00156
GENERIC SEAT MATERIAL	: Virgin PTFE	VALVE GA DRAWING	: F-44-1220-008 Rev-C
GLAND PACKING	: Flexible graphite	PATTERN	: Reduced bore
FIRE TEST SPECIFICATION	: ISO 10497- 2004 & API 607 5 th Edition	VALVE PRODUCT CODE	: F44-6666TZSEPSEP
		WOECHESTER	: F44 Series valves

READINGS:

DETAILS	Test Pressure (bar)	Test Duration (min)	SIGHT GAUGE		TOTAL QTY	QTY Thro Relief	LEAKAGE (ml)	
			Calibration		(ml)	(ml)	Through Valve (c)	External a - (b+c)
			1 mm = 20 ml		a = 20 * (l-f)	(b)		
			INITIAL (i)	FINAL (f)				
Burn Period	2	30	385	-	-	-	-	-
Cool Down Period	2	10	-	415	-	-	-	-
Burn & Cool Down	2	40	415	408	-	-	-	-
SEAT TEST(low pressure)	2	5	-	-	-	-	-	-
Operational Test (Against Differential Pressure)			Fully opened against differential pressure of 38.2 bar , Operation was smooth					
External Leak (High pressure)	38.2	5	-	-	-	-	-	185

Time required for valve to cool to 100°C: 6 minutes
 Valve rated pressure 51 bar at 75 % it is 38.2bar

PERFORMANCE:

DETAILS	LEAK RATE (ml / min)	
	Actual	Allowable
Through Leakage - During Burn Period	NIL	200
External Leakage - During Burn and Cool-down Period	NIL	50
Through Leakage (low Test Pressure) - After cool down	NIL	80
Operation of Test Valve After Fire Test - Against Differential Pressure	Smooth	
External Leakage (High Test Pressure) - Open Position	37.0	200

All thermocouples , Temperature Recording Instruments and Pressure Monitoring Devices were verified to be with valid calibration.

Temperature readings taken during test are attached.

CONCLUSION : The Valve performance was normal throughout the tests and met the specification requirements fully. Fire test valve has passed all the required hydro static , air type production tests

QUALIFICATION :

Size	50 & below; 65;80;100 / (2 & below;21/2;3;4 inch)
Pressure Rating	300;400;600 (PN 40;63;100.)
Valve Pattern	FULL BORE , REDUCED BORE
Seat material	FILLED PTFE; PTFE
Body End Connection	SCREWED;BUTTWELD; FLANGED

TEST CONDUCTED BY : AIL	
N Thankappan	<i>N. Thankappan</i>
R Muruganantham	<i>R Muruganantham</i>

TEST WITNESSED BY : Lloyds Registrar asia
C.Raju

13/3/2006
 Chennai Office
 Lloyd's Register Asia

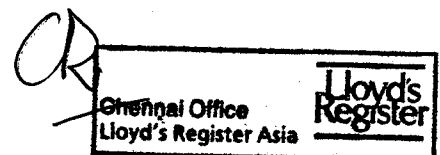
FIRETEST LOG SHEET
 DN-50 FFC- FLOATING BALL VALVE
 Pressure Rating : Class 300

Stainless steel

REPORT NO-004
 DATE: 13/03/06

Time in min	Test Pressure in bar	ChannelTemp in Deg C						Average of Body & stem calorimeter is greater than 650° c	Average of Body & stem flame is greater than 750° c
		Stem calorimeter	Body calorimeter	Body thermo couple	Stem thermo couple	Body flame	Stem flame		
0.0	2.0	37	36	38	36	36	37	NA	NA
0.5	2.0	40	40	60	80	45	51	NA	NA
1.0	2.0	80	80	180	504	520	480	NA	NA
1.5	2.0	397	490	412	734	981	1025	NA	TRUE
2.0	2.0	413	498	420	732	981	1025	NA	TRUE
2.5	2.0	413	505	420	732	981	1024	NA	TRUE
3.0	2.0	476	551	419	737	977	1023	NA	TRUE
3.5	2.0	525	586	622	740	969	1016	NA	TRUE
4.0	2.0	526	619	624	749	973	1016	NA	TRUE
4.5	2.0	529	642	624	754	970	1014	NA	TRUE
5.0	2.0	508	664	623	756	975	1018	NA	TRUE
5.5	2.0	530	678	623	756	975	1017	NA	TRUE
6.0	2.0	540	691	622	765	972	1017	NA	TRUE
6.5	2.0	500	701	615	765	973	1012	NA	TRUE
7.0	2.0	525	711	566	761	968	1011	NA	TRUE
7.5	2.0	530	717	573	763	969	1009	NA	TRUE
8.0	2.0	545	721	571	765	963	1006	NA	TRUE
8.5	2.0	603	724	568	765	971	1013	TRUE	TRUE
9.0	2.0	620	726	572	774	960	1001	TRUE	TRUE
9.5	2.0	698	730	576	784	970	1016	TRUE	TRUE
10.0	2.0	701	730	579	786	970	1016	TRUE	TRUE
10.5	2.0	703	731	586	785	970	1011	TRUE	TRUE
11.0	2.0	714	735	590	781	964	1009	TRUE	TRUE
11.5	2.0	722	739	589	782	965	1005	TRUE	TRUE
12.0	2.0	722	739	587	788	965	1009	TRUE	TRUE
12.5	2.0	717	742	579	788	967	1006	TRUE	TRUE
13.0	2.0	717	744	571	780	960	994	TRUE	TRUE
13.5	2.0	717	745	573	776	973	1007	TRUE	TRUE
14.0	2.0	718	752	590	778	968	1009	TRUE	TRUE
14.5	2.0	719	752	591	780	968	1009	TRUE	TRUE
15.0	2.0	720	755	592	788	958	996	TRUE	TRUE
15.5	2.0	721	757	594	788	965	998	TRUE	TRUE
16.0	2.0	722	757	598	788	962	1008	TRUE	TRUE
16.5	2.0	772	759	597	788	963	1009	TRUE	TRUE
17.0	2.0	724	760	596	787	962	1009	TRUE	TRUE
17.5	2.0	724	760	596	796	962	1003	TRUE	TRUE
18.0	2.0	725	760	600	796	966	1007	TRUE	TRUE

N. J. Thappa



18.5	2.0	726	762	601	803	976	1012	TRUE	TRUE
19.0	2.0	728	764	601	814	968	1009	TRUE	TRUE
19.5	2.0	730	768	600	811	959	998	TRUE	TRUE
20.0	2.0	729	768	600	787	944	996	TRUE	TRUE
20.5	2.0	729	767	598	775	948	983	TRUE	TRUE
21.0	2.0	727	763	600	784	949	997	TRUE	TRUE
21.5	2.0	729	763	600	784	949	985	TRUE	TRUE
22.0	2.0	729	761	600	783	945	985	TRUE	TRUE
22.5	2.0	726	758	598	782	929	977	TRUE	TRUE
23.0	2.0	724	758	590	782	929	992	TRUE	TRUE
23.5	2.0	724	755	596	798	944	992	TRUE	TRUE
24.0	2.0	724	757	589	787	938	989	TRUE	TRUE
24.5	2.0	723	753	590	792	916	989	TRUE	TRUE
25.0	2.0	722	752	594	793	946	994	TRUE	TRUE
25.5	2.0	720	770	595	792	946	993	TRUE	TRUE
26.0	2.0	722	772	600	796	950	994	TRUE	TRUE
26.5	2.0	723	768	610	795	958	995	TRUE	TRUE
27.0	2.0	721	775	615	796	960	996	TRUE	TRUE
27.5	2.0	720	772	620	799	979	998	TRUE	TRUE
28.0	2.0	718	771	628	800	985	995	TRUE	TRUE
28.5	2.0	720	773	640	802	980	996	TRUE	TRUE
29.0	2.0	725	770	642	805	993	1000	TRUE	TRUE
29.5	2.0	728	774	645	810	995	1005	TRUE	TRUE
30.0	2.0	730	780	650	815	1000	1010	TRUE	TRUE

Average of stem calorimeter & body calorimeter should reach 650° C with in 15 minutes & to be maintained.

Average of stem flame & body flame should reach 750° C with in 2 minutes & to be maintained.

Body thermocouple shall maintain 590° C for atleast 5 minutes- maintained

Stem thermocouple shall maintain 650° C for atleast 15 minutes-maintained

N:Thapa

