



# Design Appraisal Document

**Lloyd's Register EMEA**  
**Rotterdam Technical Support Office**  
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Date  
**28 November 2017**

Please quote this reference number on all future communications  
**RTS/ENG/161878/MPB**

**Producer** : Wouter Witzel Eurovalve B.V.  
**Place of Production** : Industrieterrein de Pol 12, Losser, The Netherlands  
**Subject** : BUTTERFLY VALVES, Type 'EV'-range  
**Type Approval Certificate No.** : 17/30005

Valid until 10 November 2022

The undernoted documents have been reviewed for compliance with the requirements of Lloyd's Register Type Approval System TA14, version June 2015 and the relevant Rules and Regulations, as stated on LR Type Approval Certificate;-

<u>PRODUCT TYPE &amp; SIZES:</u>					
EVS	Wafer type	DN40	to	1400	
EVL	Wafer type	DN80	to	300	
EVBS	Wafer semi-lugged type	DN50	to	300	
EVCS	Wafer type with centring lugs	DN50	to	300	
EVBSL	Wafer semi-lugged type	DN50	to	200	
EVTLS	Wafer lugged type	DN50	to	1200	
EVUS	Wafer U-section short type	DN600	to	2200	
EVMS	Mono flanged short type	DN350	to	1000	
EVML	Mono flanged long type	DN80	to	800	
EVFS	Double flanged short type	DN40	to	2000	
EVFL	Double flanged long type	DN50	to	1500	

<u>RATINGS:</u>			
Pressure Rating	:	PN10, PN16, Class 150	
Design Pressure	:	16 bar	
Temperatures	:	-10 °C to +200 °C ( dependant on applied materials )	
NBR	:	+90 °C	
EPDM	:	+120 °C	
FPM	:	+200 °C	

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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<u>MATERIALS:-</u>	Body	Ductile Iron	5.3106 (JS 1030)	EN 1563
		Ductile Iron	5.3103 (JS 1049)	EN 1563
		Ductile Iron	Grade 60-40-18	ASTM A-395
		Cast Steel	1.0619, Grade WCB	ASTM A-216
		Cast Iron	5.1301 (JL1040)	EN 1561
	Disc	Alu Bronze	Cu Al 10 Fe5 Ni 5-C (CC333G)	EN 1982
		Alu Bronze	2.1086.01 (G-Cu Sn 10 Zn)	DIN 1705
		Stainless Steel,	1.4057 (X17 CrNi 16-2)	EN 10088-3
		Stainless Steel	1.4462 (X2 CrNi Mo N 22-5-3)	EN 10088-3
		Stainless Steel	1.4469 (GX2 CrNi Mo N 26-7-4)	EN 10213
Shaft	Stainless Steel	1.4517 (GX2 CrNi Mo CuN 25-6-3-3)	EN 10213	
	Alu Bronze	Cu Al 10 Fe5 Ni 5-C (CC333G)	EN 1982	
	Stainless Steel,	1.4057 (X17 CrNi 16-2)	EN 10088-3	
	Stainless Steel	1.4462 (X2 CrNi Mo N 22-5-3)	EN 10088-3	
	Stainless Steel	1.4501 (X2 CrNi MoCu WN 25-7-4)	EN 10272	
Seat	Ethylene Propylene Diene Rubber (EPDM)	ISO 1629		
	Nitrile Butadien Rubber (NBR)	ISO 1629		
	Fluoro Rubber (FPM)	ISO 1629		

APPLICATIONS:-

The type 'EV' butterfly valves have been considered for following essential- and non-essential services:-

- Cargo Oil system (flammable liquids with f.p. < 60 deg.C );
  - Cargo lines; Crude oil washing; Cargo tank venting;
  - Cargo handling; Crude oil; Sludge system;
  - Oil recovery system; Base oil system.
- Inert Gas system;
  - Water seal effluent line; Scrubber effluent line;
  - Inert Gas Main line; Inert Gas Distribution lines.
- Fuel Oil systems (flammable liquids with f.p. > 60 deg.C );
  - Heavy Fuel Oil; Fuel Oil; Diesel Oil; Marine Diesel Oil (MDO);
  - Oil Fuel Bunkering system; Oil Fuel Transfer system..
- Bilge System;
- Fire Main Isolating valves.
- Ballast-, Ballast Transfer- and Anti-heeling system;
- Sea inlet, Overboard discharges and sea chest connections (only inside machinery spaces);

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- Salt and Fresh Cooling Water systems for essential services;
  - HT-cooling system, LT-cooling system; Seawater cooling;
  - Auxiliary cooling system (electric drives), Condensate return
- Sea Water systems for non-essential services;
  - Jet water, Gland system, Dredging system;
  - High velocity water system; Scrubber system, UV system;
  - Anchor wash system, Ballast water treatment system.
- Fresh Water systems for non-essential services;
  - Air Conditioning system, Sanitary Supply services,
  - Waste water, Blackwater system, Greywater system;
  - Desalination system, Drinking water, Potable water;
  - Swimming pool system, Hydrophore system;
  - Fresh water chilled (HVAC) system, Technical water;
  - Wash water (fixed tank cleaning systems).
- Compressed air (non-essential service, < 7 bar);
- Pulper system (domestic waste);
- Bulkhandling system (dry cargo in bulk );
- Brines, Drilling fluids, Mud system and Liquid mud system.

**MANDATORY COMMENTS AND LIMITATIONS:-**

1. All relevant materials used (eg. body, disc) for pressure-retaining parts are to be tested and certified as per the "Rules for the Manufacture, Testing and Certification of Materials". Final acceptance remains to be to the attending Surveyor's satisfaction (Part 5, Chapter 12, 1.3.1 refers) AQS
2. For use in applications, where design temperature is below 0 deg.C and for other application where guaranteed impact properties are required, relevant materials used for pressure-retaining parts are subject to Charpy V-test requirements, as per the Rules for Materials. AQS

In addition the following product limitation(s) will be stated on the certificate:-

1. Grey Cast Iron valves are not permitted to be fitted in following positions (Part 5, Ch.12, Sec.4.2.3);- --
  - Ship's side, bottom plating and sea chest;
  - Bilge and ballast piping in tanks and inside tunnels in double bottom;
  - Piping systems subject to pressure shocks, excessive strains or vibrations-
  - Flammable oil systems with pressures and/or temperatures exceeding 7 bar or 60 deg.C;
  - Fitted to tanks containing flammable oil under static pressure.
2. Butterfly valves are not to be fitted on the collision bulkhead (Part 5, Ch.13, Sections 3.5.4, 3.5.5 refers )
3. Application of 'EV-type' butterfly valves as watertight-shell valves is limited to the machinery spaces and not applicable to scuppers or similar fittings. Proposals to use the EV-valves as ship-side valve outside machinery spaces will be specially considered.

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4. The 'EV-valve' should be installed to the ship shell plating in such a way, that the section of pipe immediately inboard of the valve can be removed without affecting the watertight integrity of the hull. Application of flangeless types (wafer-, lug-type) is not allowed.
5. For shipside valves, the disc is not to extend outside the hull plating in open position.
6. Application in bilge system of passenger ships is not allowed.
7. Application in bilge main and bilge branch system is restricted as follows:-
  - Application in bilge system in machinery spaces is only allowed as pump suction valves in the main bilge line subject to bein located in immediate vicinity of the bilge pump and provided the butterfly valve is fitted in series with a metal seated non-return valve;
  - The non-return valve is to be fitted on the bilge main side of the butterfly valve;
  - Only allowed as branch bilge suction in holds of cargoships, when fitted in a pipe tunnel;
  - Application of 'fire-tested' EV-type butterfly valve is subject to identical restrictions.
8. Application of EV-type butterfly valves is only allowed as "in-line" valve in cargo piping systems on Oil Tanker vessels. In cargo system pump rooms only approved fire-resistant types are acceptable..
9. Following EV-type butterfly valves have been qualified as 'fire-tested' and will be only accepted when fitted as "in-line" valves for the essential services specifically mentioned in this document:-
  - Valve types: EVTLS, DN50 upto DN600, PN16;  
EVFS, DN125 upto DN250, PN16;  
EVUS, DN600 upto DN1200.
  - Valve body: EN-JS1030 (GGG40);
  - Disc material: 1.4462 or 1.4517; and Stem material; 1.4462.
  - Disc seat/liner: NBR
10. Application of 'fire-tested' EV-type butterfly valve, in positions where required to be capable of being closed remotely in case of fire (e.g. tank-isolating valve) is not allowed, as per Part 5 Ch12, Sec.6.1.4.
11. Application of 'fire-tested' EV-butterfly valve in flammable liquid systems (with f.p. > 60 deg.C ) is not allowed inside machinery spaces of Category A or accommodation spaces ( Part 5 Ch12, 6.1.3 refers).
12. Use of 'fire-tested' EV-type valve in flammable liquid systems (with f.p. > 60 deg.C ) in other machinery spaces is only allowed, when fitted as 'in-line' valve and located in easily visible and accessible positions  
The approved fire-tested EV-type butterfly valve in flammable liquid systems (with f.p. > 60 deg.C.) is:-
  - Valve type: EVFS, DN125 to DN250, PN16; with
  - Valve body: EN-JS1030 (GGG40);
  - Disc material: 1.4462 or 1.4517; and Stem material; 1.4462.
  - Disc seat/liner: NBR.
13. Use of any other EV-type valve in fuel oil systems is only allowed as suction valves on double bottom oil fuel tanks outside the machinery space (only when located in a closed pipe tunnel or duct keel).

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14. Application of EV-type butterfly valves is only allowed as "in-line" valve in inert gas piping systems on Oil Tanker vessels. In pump rooms or enclosed compartments only approved fire-resistant types are acceptable..
15. Application as Fire Main Isolating Valve is acceptable only to:-
  - Valve types: EVS, EVL, EVML, EVBS, EVTLS and EVFS;
  - Valve sizes from 50 mm to 400 mm bore;
  - Valve body to be a ductile material with min. elongation of 12% (Grey Cast Iron is not allowed);
  - NBR-liner (resilient seat / seals).
16. In all cases, the materials of valve body, disc, seat and seals are to be suitable for the proposed service (pressures / temperatures) and media.
17. Valves are to be installed to Manufacturer's instruction and the satisfaction of the attending Surveyor.
18. This Type Approval does not include the consideration and acceptance of any operating gear for the (remote) control of these types of valves. However for the applications listed above (paragraph 3 thru 14) mechanical stops to prevent swing-through should be incorporated into the valve body or the associated actuator.

*"When Rules and Standards mentioned in this Designs Appraisal Document are changed within the validity of this Designs Appraisal Document, than this Design Appraisal Document becomes no longer valid."*

*"This Design Appraisal Document is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Designs Appraisal Document."*



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## Appendix

1. The documents listed below have been examined

Document No.	Rev.	Title	Status	Date
PDS01.01.001	-	Product Data Sheet – Wouter Witzel - EVS	B	28 Nov. 2017
PDS01.03.001	-	Product Data Sheet – Wouter Witzel - EVCS	B	28 Nov. 2017
PDS01.04.001	-	Product Data Sheet – Wouter Witzel - EVBS	B	28 Nov. 2017
PDS01.05.001	-	Product Data Sheet – Wouter Witzel - EVCLS	B	28 Nov. 2017
PDS01.06.001	-	Product Data Sheet – Wouter Witzel - EVTLS	B	28 Nov. 2017
PDS01.07.001	-	Product Data Sheet – Wouter Witzel - EVUS	B	28 Nov. 2017
PDS01.08.001	-	Product Data Sheet – Wouter Witzel - EVMS	B	28 Nov. 2017
PDS01.09.001	-	Product Data Sheet – Wouter Witzel - EVML	B	28 Nov. 2017
PDS01.10.001	-	Product Data Sheet – Wouter Witzel - EVFS	B	28 Nov. 2017
PDS01.11.001	-	Product Data Sheet – Wouter Witzel - EVFL	B	28 Nov. 2017
PDS01.12.001	-	Product Data Sheet – Wouter Witzel - EVTLS	B	28 Nov. 2017
D-AAA269-A	04.04.17	Butterfly Valve – EV – DN50-2000	B	28 Nov. 2017
D-ADA112-A	15.12.14	Butterfly Valve – EV – DN50-2100 – ISO 19921 – EVTLS	B	28 Nov. 2017
D-AHA226-A	22.12.14	Butterfly Valve – EV – DN50-2200 – ISO 19921 – EVFS	B	28 Nov. 2017
D-AUA047-A	28.01.15	Butterfly Valve – EV – DN50-1200 – ISO 19921 – EVUS	B	28 Nov. 2017

2. The documents listed below have been considered together with the submitted documents in the appraisal

Document No.	Date	Title
GRO1605085/1	26.09.16	Product Quality Assessment Form – ‘Wouter Witzel Eurovalve - “EV” Valves’
DTM 1489855/1	03-02-15	Inspection Certificate – Fire testing of Butterfly Valves, EVTLS DN 300, PN16
DTM 1489855/2	03-02-15	Inspection Certificate – Fire testing of Butterfly Valves, EVTLS DN 125, PN16
DTM 1489855/3	03-02-15	Inspection Certificate – Fire testing of Butterfly Valves, EVTLS DN 50, PN16
DTM 1489855-4	03-02-15	Inspection Certificate - Fire testing of Butterfly Valves, EVFS DN 125, PN16
DTM 1489855-5A3	05-05-15	Inspection Certificate - Fire testing of Butterfly Valves, EVUS DN 600, PN16
DTM 1489855-6A4	05-05-15	Inspection Certificate - Fire testing of Butterfly Valves, EV-Series
IBB 1340	19-12-14	TEST Report – Flame resistance tests acc. ISO 19921, EVTLS DN 300 PN16
IBB 1342	19-12-14	TEST Report – Flame resistance tests acc. ISO 19921, EVTLS DN 125 PN16
IBB 1344	19-12-14	TEST Report – Flame resistance tests acc. ISO 19921, EVTLS DN 50 PN16
IBB 1346	22-12-14	TEST Report – Flame resistance tests acc. ISO 19921, EVFS DN 125 PN16
IBB 1356	04-02-15	TEST Report – Flame resistance tests acc. ISO 19921, EVUS DN 600 PN16

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Document No.	Date	Title
SAS F010039	24.01.01	LR Certificate of Fire Approval – Fire Main Isolating Valve (EVS,EVL,EVML, EVBS, EVTLS and EVFS)
SAS F010039	24.01.01	LR Design Appraisal Document – Attachment to Certificate of Type Approval
SAS F060063	24.01.06	LR Certificate of Fire Approval – Fire Main Isolating Valve (EVS,EVL,EVML, EVBS, EVTLS and EVFS)
SAS F060063	24.01.06	LR Design Appraisal Document – Attachment to Certificate of Type Approval
B-84-290(E)	May '84	TNO-Report – Behaviour of Butterfly Valve Type EVS 150
SwRI No.01.13537.01.407	28.01.08	Fire Performance Evaluation of Fire Main Valves in acc. UK DOT Appendix D (EVS 200)
--	--	Binder_'EV.. + ECV – VK007796 POANMAT 54013 20170703'.pdf (103 pages)
--	--	Binder_'EV.. + ECV – VK003904'.pdf (78 pages)
--	--	Binder_'EVFS – VK004029 GRO1604208'.pdf (42 pages)
--	--	Binder_'EVFS – VK008511 incl. 3.2 mat. Certificates'.pdf (77 pages)

### Appraisal Status Key

- AQS Details to be submitted by the client to the local surveyor's Office responsible for surveying the building and the arrangements verified in accordance with the Rule/Regulations requirements by the surveyor.
- B Examined for compliance with the design and testing requirements of the Rules / Standards listed above and considered in order.

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