

检测报告

Test Report

报告编号
Report No. ROCKB202412051-1

产品名称
Product Name

石墨填料 M600
Graphite Packing M600

委托单位
Customer

浙江喜鹊密封件有限公司
Zhejiang Magpie Sealing Element Co., Ltd.

委托单位地址
Customer's Address

浙江省温州市永嘉县瓯北街道浦一村谢宅巷 9 号
No.9, Xiezhai Alley, Puyi Village, Oubei Street,
Yongjia County, Wenzhou City, Zhejiang Province

试验起始日期
Date Started

2024 年 12 月 10 日
December 10, 2024

试验结束日期
Date Finished

2024 年 12 月 25 日
December 25, 2024

浙江岩石机械检测有限公司
Zhejiang Rock Mechanical Inspection and Testing Co., Ltd.



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Address: Heyi Industrial Zone, Oubei, Yongjia, Wenzhou, Zhejiang.

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概述 Summary:

填料厂家 Manufacturer	浙江喜鹊密封件有限公司 Zhejiang Magpie Sealing Element Co., Ltd.		
填料描述 Description	石墨填料/4 个带金属丝加强编织石墨圈 + 6 个压制石墨圈 Graphite packing/ 4 nos. of metal-wire-reinforced braided graphite rings + 6 nos. of die-formed graphite rings		
填料材料 Material	石墨 Graphite	填料型号 Model No.	M600
填料图号 Packing Drawing No.	M600M800-20/32-01 REV.A	样品编号 Sample No.	ROCKP202412051-1
抽样方 Selected by	厂家 Manufacturer	送样日期 Collected Date	2024.12.10
阀门尺寸/压力/类型 Valve Size/Rating/Type	16" CL2500 截止阀 Globe Valve	阀门产品系列号 Valve Product SN	L240923
阀门总图号 Valve GA Drawing No.	16"J541Y-2500LB	设计标准 Design Standards	BS 1873
阀杆运动方式 Stem Motion	升降 Rising	执行器类型 Actuator type	手动 Manual
阀体材料 Body Material	ASTM A350 LF3	阀体密封描述 Body Seal Description	压力自密封圈 Pressure Seal Ring
阀杆材料 Stem Material	ASTM B637 N07718	阀杆直径 Stem Diameter	φ 140 mm
阀杆密封描述 Stem Seal Description	石墨填料 Graphite Packing	炉号 Heat No.	22E386 (阀体 Body) 22E386 (阀盖 Bonnet)
试验标准 Test Basis	DIN EN ISO 15848-1: 2017-07 工业阀门-逸散性排放的测量、试验和鉴定程序 第 1 部分: 用于阀门型式试验的分级体系和鉴定程序 DIN EN ISO 15848-1: 2017-07 Industrial valves – Measurement, test and qualification procedures for fugitive emissions – Part 1: Classification system and qualification procedures for type testing of valves		
试验场地 Test Facility	中国浙江省永嘉县瓯北镇和一工业区岩石阀门检测实验室 ROCK Valve Testing Lab, Heyi Industrial Zone, Oubei, Yongjia, Zhejiang, PRC		
检测项目 Test Item	密封性能试验 Sealing Performance	试验介质 Test medium	99.999% 氦气 99.999% Helium
阀门性能等级 Performance Class	ISO FE BH – CO1 – SSA0 – t(-50°C, 400°C) – CL2500 – ISO15848-1		
试验结论 Test Conclusion	是否符合试验要求? Did it pass test requirements?		

编制/日期: 陈克峰
PRPD/DATE: 2024.12.27审核/日期: 金亦纪
CHKD/DATE: 2024.12.27

批准/日期:

APPD/DATE:



阀门密封设计信息 Valve Sealing Design Information:

阀杆密封描述 Stem Seal Description		石墨填料 Graphite Packing		
填料参数 Packing Parameter	厂家 / 型号 (若有) Mfr. / Model (if have)	浙江喜鹊密封件有限公司 / M600 Zhejiang Magpie Sealing Element Co. Ltd. / M600		
	填料材料 Packing Material.	石墨 Graphite	填料圈数 Ring Qty.	10
	尺寸(内径×外径×总高) Size (ID×OD×TH)	φ 140mm× φ 170mm×150mm		
	填料压盖螺母拧紧扭矩 Gland Bolt Tightening Torque	400 N·m		
阀体密封描述 Body Seal Description		压力自密封圈 Pressure Seal Ring		
垫片参数 Gasket Parameter	厂家 / 型号 (若有) Mfr. / Model (if have)	/		
	材料 Material.	Inconel 625	数量 Qty.	1
	尺寸(内径×外径×总高) Size (ID×OD×TH)	φ 450mm× φ 493mm×15mm		
	螺栓拧紧扭矩 Bolt Tighten Torque	/		
其它位置的密封设计及描述 Sealing Design and Description of other locations		/		

试验装置图 Test Rig Diagram:

Key

1 helium at 97 % purity

2 pressure control

3 actuator

4 sealed volume or bag

5 helium

6 standard calibrated leak

7 helium mass spectrometer

8 data acquisition

注 Note: 上图所示试验阀门仅为示意，并非代表此次试验阀门结构。Valve image in above picture are for reference, does not represent the structure of test valve.

泄漏测量设备 Leakage Detection Equipment

设备名称 Device Name	氦质谱检漏仪 Helium mass spectrometer	品牌/型号/系列号 Brand / Model / SN	Leybold / PHOENIX Vario / 90001653510
设备ID Device ID	J002	灵敏度 Sensitivity	5E-12 mbar•l•s ⁻¹
真空氦漏孔编号 Helium Standard Leak SN	D210732	真空氦漏孔有效期 Helium Standard Leak Validity	2025-02-06

试验条件 Test Conditions:

最大允许泄漏量 Maximum Allowable Measured Leakage	阀杆密封Stem seals: ≤2.50E-04 mbar•l•s ⁻¹	试验压力/升温温度 Test Pressure / Elevated Temperature	42.55MPa@RT 28.93MPa@+400°C 42.55MPa@-50°C
	阀体密封Body seals: ≤50 ppmv		
总温度循环数 Total Thermal Cycles	2 (RT~+400°C) + 2 (-50°C~RT)	总机械循环数 Total Mechanical Cycles	205 (RT~+400°C) + 205 (-50°C~RT)

试验结果 Test Results:

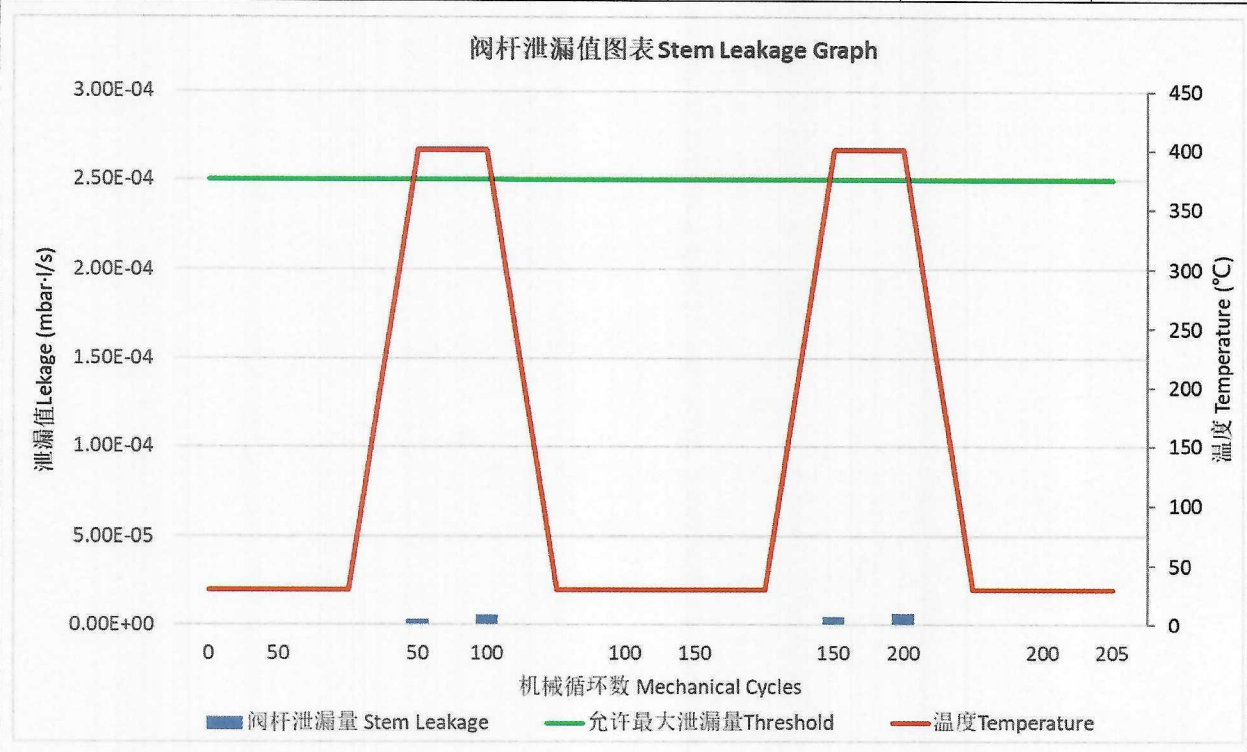
完成温度循环数 Number of Thermal Cycles Completed	2 (RT~+400°C) + 2 (-50°C~RT)	完成机械循环数 Number of Mechanical Cycles Completed	205 (RT~+400°C) + 205 (-50°C~RT)
阀杆处最大泄漏量 Maximum Leakage Through Stem, mbar•l•s ⁻¹	5.22E-05	阀体密封最大泄漏量 Max. Body Seal Leakage, ppmv	5.30
阀门泄漏量是否低于允许值? Was Valve Leakage Below Allowable?			是 YES

阀门操作扭矩 Valve Operating Torque:

试验温度 Test Temperature	RT~+400°C	-50°C~RT
第一次循环开启方向起始扭矩 BTO @ 1 st cycle (N·m)	20.5	22.1
第一次循环关闭方向起始扭矩 BTC @ 1 st cycle (N·m)	24.0	24.2
最后一次循环开启方向起始扭矩 BTO @ last cycle (N·m)	21.7	22.1
最后一次循环关闭方向起始扭矩 BTC @ last cycle (N·m)	25.3	29.3
齿轮箱齿比 Gearbox Ratio	143.5:1	
备注Remark: 记录扭矩为向齿轮箱的输入扭矩。Recorded torque values are input torque to gearbox.		

试验数据 Test Data:

循环数 Cycle Number	试验温度 Test Temperature			压力 Pressure MPa	阀杆净泄漏量 Net Stem Leakage mbar·l·s ⁻¹	阀体净泄漏量 Net Body Leakage ppmv	判定 Evaluation
	TC1-°C	TC2-°C	TC3-°C				
0	RT	RT	RT	42.59	1.43E-07	1.48	合格 Pass
50	RT	RT	RT	42.59	4.65E-07	/	合格 Pass
50	400.8	400.8	400.8	28.95	3.52E-06	/	合格 Pass
100	401.1	401.1	401.1	28.95	5.63E-06	/	合格 Pass
100	RT	RT	RT	42.57	8.44E-07	/	合格 Pass
150	RT	RT	RT	42.57	7.67E-07	/	合格 Pass
150	402.3	402.2	402.3	28.98	4.85E-06	/	合格 Pass
200	401.0	401.0	401.0	28.98	6.52E-06	/	合格 Pass
200	RT	RT	RT	42.56	6.96E-07	/	合格 Pass
205	RT	RT	RT	42.56	8.47E-07	2.80	合格 Pass

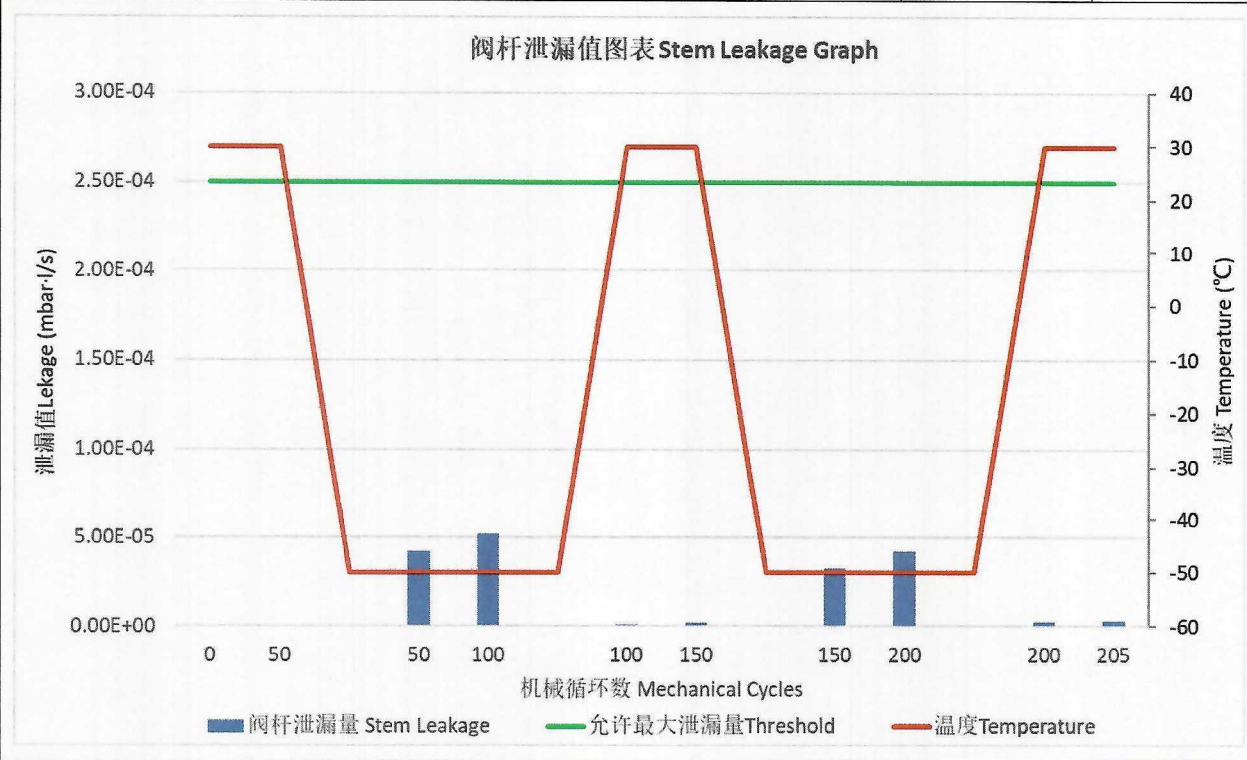


备注 Note:

- RT 温度范围为+5℃至+40℃。RT is in the range of +5℃ to +40℃.
- TC1 位置: 流道; TC2 位置: 阀体表面; TC3 位置: 填料函表面。
TC1 Location: flow path; TC2 Location: valve body surface; TC3 Location: stuffing box surface.
- 阀体净泄漏测量值为各处阀体密封泄漏测量值中最大值。
Net Body Leakage measurement is the maximum value of measurements on all body seals.

试验数据 Test Data:

循环数 Cycle Number	试验温度 Test Temperature			压力 Pressure MPa	阀杆净泄漏量 Net Stem Leakage mbar·l·s ⁻¹	阀体净泄漏量 Net Body Leakage ppmv	判定 Evaluation
	TC1-°C	TC2-°C	TC3-°C				
0	RT	RT	RT	42.56	8.41E-07	2.63	合格 Pass
50	RT	RT	RT	42.56	7.85E-07	/	合格 Pass
50	-50.2	-50.1	-50.2	42.51	4.27E-05	/	合格 Pass
100	-50.8	-50.7	-50.8	42.51	5.22E-05	/	合格 Pass
100	RT	RT	RT	42.55	1.04E-06	/	合格 Pass
150	RT	RT	RT	42.55	2.18E-06	/	合格 Pass
150	-51.1	-51.0	-51.1	42.53	3.29E-05	/	合格 Pass
200	-50.9	-50.9	-50.9	42.53	4.20E-05	/	合格 Pass
200	RT	RT	RT	42.54	2.77E-06	/	合格 Pass
205	RT	RT	RT	42.54	3.05E-06	5.30	合格 Pass



备注 Note:

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TC1 Location: flow path; TC2 Location: valve body surface; TC3 Location: stuffing box surface.
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照片记录 Photographic Record

阀门拆解后零部件 Post-disassembly Valve Components



石墨填料 Graphite packing



阀杆 Stem

照片记录 Photographic Record

阀门拆解后零部件 Post-disassembly Valve Components

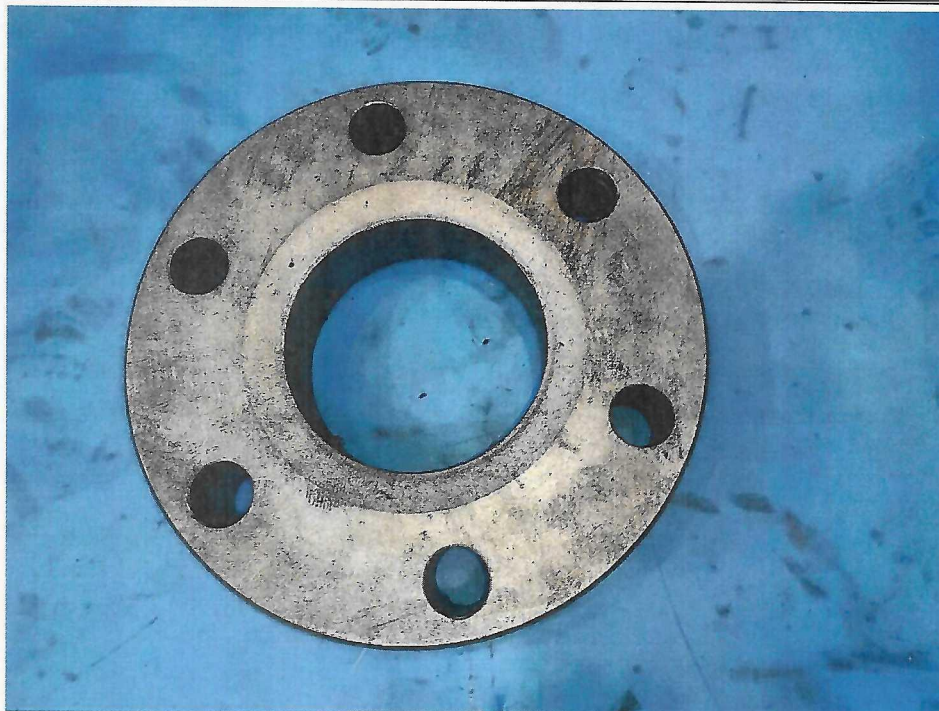


阀杆 Stem



填料压套 Packing gland

阀门拆解后零部件 Post-disassembly Valve Components



填料压盖 Gland flange



填料函 Packing sealing chamber

