



Attachment No: 5

belongs to Test Report No:

B - 19 0003 - T

Design Verification Test Report List

1. Appendix A Original Certificate of Material and Check Analyses
2. Appendix B Cylinder Dimensions & Wall Thickness Measurements
3. Appendix C Heat treatment report and Curves report
4. Appendix D Original Tensile Test Records & Curve
5. Appendix E Original Burst Test Records
6. Appendix F Bent test report
7. Appendix G Cycling Test Report
8. Appendix H Hydraulic Test Record
9. Appendix I Hardness Test Record
10. Appendix j Leakage Test Record
11. Appendix K Screw and appearance inspection report

The Tests were conducted on production site and lab of Cixi Longfa

Aluminium Jar-making Co.,Ltd.





Attachment No: **3**

belongs to Test Report No:

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Appendix A

Original Certificate of Material and Check Analyses

Cixi Longfa Aluminium Jar-making Co.,Ltd.



超声波探伤报告

Ultrasonic testing report

LF/Z-01-01

B-190003-T

供应商 Supplier		品名 Part name	铝合金铸棒 Aluminum alloy casting rod
合金牌号 Standard	6061 & (6061A ISO7866)	规格 Specification	Φ59.5*6000
炉号 Heat No.	17-155-09-23-21	检验数量 Inspect quantity	154 根: Φ59.5*5000mm(7102KG) 154Pcs: Φ59.5*5000mm(7102KG)
检测部位 Inspect parts	棒材内部 100%超声波检查 100% ultrasonic inspection		
仪器型号 Instrument model	F1400242F	探测方法 method of Detection	直探头接触法 Diret contact method
探头规格 Probe specifications	2.5P14-D	对比试块 Reference block	6061 料Ø2.0 平底孔 6061 material Ø 2.0 flat bottom hole
耦合剂 Couplant	水 Water	灵敏度 Sensitivity	Ø2.0 平底孔的回波调至 80%高 Ø2.0 flat bottom intake of high echo adjusted to80%
表面补偿 Surface compensation	无/NO	扫查方式 Anti-verifiable	探头沿棒体扫查半个圆周 Probe scan half a circle around the rod body
检验数量 Inspect quantity	154 根: Φ59.5*5000mm(7102KG) 154Pcs: Φ59.5*5000mm(7102KG)	合格数量 Qualified quantity	154 根: Φ59.5*5000mm(7102KG) 154Pcs: Φ59.5*5000mm(7102KG)
验收标准 Acceptance criteria	GB/T6519-2000	探伤日期 Inspection date	2018.08.07
探伤结果及说明 Inspection results	Meet the requirement 合格		



操作者/日期 (Operator/Date):

杨学林 UT-II 2018.8.7

责任人/日期 (Responsible person/Date):

李强 UT-II 2018.8.7

产品质量证明书

PRODUCT QUALITY CERTIFICATE

ATCH NO (产品批号): 25-103

FURNACE NO (炉号): 18113061303

NO: 201810

PRODUCT (产品名称)	SPECIFICATION (型号规格)	ALLOY (合金牌号)	Customer number (客户编号)				WEIGHT (重量) Kg		MANUFACTURE MODE (制造方法)			
铝棒	∅59.5	6061	∅59.5				7102		EXTRUSION (挤/制)			
CHEMICAL COMPOSITION (化学成份) GB/T3190-2008	Item 项目	Al	Si	Fe	Cu	Mn	Mg	Cr	Bi	Pb	Zn	Ti
	Specification 要求值	余量	0.40- 0.80	0.70	0.15- 0.40	0.15	0.80- 1.20	0.04- 0.35	0.003	0.003	0.25	0.15
	Measurement 实测值	余量	0.61	0.15	0.16	0.098	0.83	0.077	0.002	0.002	0.0014	0.048
	Judgment 判定	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
MECHANICAL PROPERTIES (机械性能)	Item 项目	TENSILE STRENGTH (抗拉强度) Mpa			YIELD STRENGTH (屈服强度) Mpa		PERCENTAGE ELONGATION (伸长度) %		HARDNESS (硬度)			
									HW (韦氏)		HB (布氏)	
	Specification 要求值											
	Measurement 实测值											
Judgment 判定												
Appearance quality (外观质量)	GRAINSIZE (晶粒度)		MICRO STRUCTURE (显微组织)			MACRO STRUCTURE (低倍组织)		CONDITIONS (技术条件)				
材料表面无砂眼、夹层、 起皮等缺陷	一级		合格			合格		GB/T3191-2010				
DIMENSIONAL RESULTS 尺寸报告												
ITEM 序号	SPECIFICATION 要求尺寸		MEASUREMENT RESULTS 实际值				OK 合格		NOT OK 不合格			
1	59.5+0/-0.3		59.20-59.48				OK					
2												
3												
4												
5												
6												
7												
8												
9												
10												
*REMARK: (注释)												
1、In forty days, you can demur at the Product quality if you have dissidence. Exceeding the time limit, we should not accept and hear a case. (如对本产品质量提出异议者, 请于15天内提出, 逾期本厂不予受理)												
2、Show us the quality guarantee NO. When you demur. (在提出时请说明定单编号)												

CUSTOMER (用户单位): 慈溪龙发 20180709

INSPECTOR (检验员): 高柏金

Verifier (审核员): 周益春

DATE (日期): 2018.08.06



慈溪市龙发铝制罐有限公司
CIXI LONGFA ALUMINIUM JAR-MAKING CO.,LTD

原材料复检单
Incoming material review list

LF/Z-14-01

供应商 supplier											
材料 material	合金状态 Alloy temper			炉号 heat number			规格 (mm) Size		重量 (KG) Weight		
铝棒	6061& 6061A (ISO7866)			18113061303			Φ59.5		7102		
化学成分标准 Chemical composition of the standard						EN ISO 7866:2012					
化学成分% Chemical composition											
金属	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Bi	Al
标准值 standard	0.4- 0.8	0.7	0.15- 0.4	0.15	0.8- 1.2	0.04- 0.35	0.25	0.15	0.003	0.003	余量
实测值 Measurement	0.590	0.181	0.190	0.133	0.891	0.065	0.046	0.044	<0.002	0.000	97.734
结论 conclusion	对炉号18113061303 批次进行复检，符合成分要求 The furnace number 18113061303 batches were rechecked to meet the requirements of composition.										

操作人/日期: 郭发 2018.8.7
operator/Date:

确认人/日期: 郭发 2018.8.7
Confirmation person/Date



Attachment No: 3

belongs to Test Report No:

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belongs to Test Report No:

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Appendix B

Cylinder Dimensions & Wall Thickness Measurements



测厚原始记录

CIXI LONGFA ALUMINIUM JAR-MAKING CO., LTD

Thickness measurement Record

LF/Z-02

产品名称(Name of Product): Aluminum alloy seamless gas cylinders			产品型号(Product model): LW60-0.6-166-TPED			生产批号(Batch NO.): B011			设计最小壁厚(minimum wall thickness): 3.2mm			设计最小底厚(Minimum base thickness): 4.0mm							
001	360 444	002	362 446	003	370 455	004	366 462	005	363 454	006	381 444	007	375 448	008	374 446	009	382 455	010	377 461
011	366 462	012	368 456	013	377 455	014	390 446	015	364 454	016	376 444	017	361 455	018	377 461	019	366 454	020	375 455
021	364 455	022	376 458	023	381 456	024	385 448	025	377 458	026	366 445	027	376 448	028	371 455	029	368 448	030	371 449
031	372 452	032	371 454	033	364 462	034	381 453	035	379 455	036	382 451	037	372 454	038	375 460	039	372 445	040	381 456
041	385 444	042	364 448	043	369 458	044	371 448	045	465 447	046	367 455	047	368 454	048	375 456	049	368 444	050	382 458
051	375 446	052	375 457	053	380 455	054	390 461	055	384 457	056	375 455	057	381 446	058	381 461	059	377 455	060	379 457
061	381 446	062		063		064		065		066		067		068		069		070	
071		072		073		074		075		076		077		078		079		080	
081		082		083		084		085		086		087		088		089		090	
091		092		093		094		095		096		097		098		099		100	
101		102		103		104		105		106		107		108		109		110	
111		112		113		114		115		116		117		118		119		120	
121		122		123		124		125		126		127		128		129		130	
131		132		133		134		135		136		137		138		139		140	
141		142		143		144		145		146		147		148		149		150	
151		152		153		154		155		156		157		158		159		160	
161		162		163		164		165		166		167		168		169		170	
171		172		173		174		175		176		177		178		179		180	
181		182		183		184		185		186		187		188		189		190	
191		192		193		194		195		196		197		198		199		200	

操作人/日期:

Operator/Date

吴春 2018.11.12

确认人/日期:

Confirmation person/Date

2018.11.12

测试结果(test result): Meets the requirements.



注: 1、以上数字代表底部冷检号 2、同一只瓶号: 上格为实测最小壁厚, 下格为实测最小底厚

Notes: The number represents the bottom cold check number, The same bottle number: the upper case is the minimum wall thickness, and the bottom is the smallest.

Cold check record (Straightness and Out-of-roundness)

LF/Z-05.01

产品名称(Name of Product): Aluminum alloy seamless gas cylinders					产品型号(Product model): LW60-0.6-166-TPED					生产批号(Batch NO.): B011					操作人/日期(operator/Date): 吴春君 2018.11.12				
直线度(≤0.65mm) Straightness (≤0.65mm)										不圆度(≤1.2mm) Out-of-roundness (≤1.2mm)									
001	ok	051	ok	101		151		001	ok	051	ok	101		151					
002	ok	052	ok	102		152		002	ok	052	ok	102		152					
003	ok	053	ok	103		153		003	ok	053	ok	103		153					
004	ok	054	ok	104		154		004	ok	054	ok	104		154					
005	ok	055	ok	105		155		005	ok	055	ok	105		155					
006	ok	056	ok	106		156		006	ok	056	ok	106		156					
007	ok	057	ok	107		157		007	ok	057	ok	107		157					
008	ok	058	ok	108		158		008	ok	058	ok	108		158					
009	ok	059	ok	109		159		009	ok	059	ok	109		159					
010	ok	060	ok	110		160		010	ok	060	ok	110		160					
011	ok	061	ok	111		161		011	ok	061	ok	111		161					
012	ok	062		112		162		012	ok	062		112		162					
013	ok	063		113		163		013	ok	063		113		163					
014	ok	064		114		164		014	ok	064		114		164					
015	ok	065		115		165		015	ok	065		115		165					
016	ok	066		116		166		016	ok	066		116		166					
017	ok	067		117		167		017	ok	067		117		167					
018	ok	068		118		168		018	ok	068		118		168					
019	ok	069		119		169		019	ok	069		119		169					
020	ok	070		120		170		020	ok	070		120		170					
021	ok	071		121		171		021	ok	071		121		171					
022	ok	072		122		172		022	ok	072		122		172					
023	ok	073		123		173		023	ok	073		123		173					
024	ok	074		124		174		024	ok	074		124		174					
025	ok	075		125		175		025	ok	075		125		175					
026	ok	076		126		176		026	ok	076		126		176					
027	ok	077		127		177		027	ok	077		127		177					
028	ok	078		128		178		028	ok	078		128		178					
029	ok	079		129		179		029	ok	079		129		179					
030	ok	080		130		180		030	ok	080		130		180					
031	ok	081		131		181		031	ok	081		131		181					
032	ok	082		132		182		032	ok	082		132		182					
033	ok	083		133		183		033	ok	083		133		183					
034	ok	084		134		184		034	ok	084		134		184					
035	ok	085		135		185		035	ok	085		135		185					
036	ok	086		136		186		036	ok	086		136		186					
037	ok	087		137		187		037	ok	087		137		187					
038	ok	088		138		188		038	ok	088		138		188					
039	ok	089		139		189		039	ok	089		139		189					
040	ok	090		140		190		040	ok	090		140		190					
041	ok	091		141		191		041	ok	091		141		191					
042	ok	092		142		192		042	ok	092		142		192					
043	ok	093		143		193		043	ok	093		143		193					
044	ok	094		144		194		044	ok	094		144		194					
045	ok	095		145		195		045	ok	095		145		195					
046	ok	096		146		196		046	ok	096		146		196					
047	ok	097		147		197		047	ok	097		147		197					
048	ok	098		148		198		048	ok	098		148		198					
049	ok	099		149		199		049	ok	099		149		199					
050	ok	100		150		200		050	ok	100		150		200					

测试结果确认: Meets the requirement.
test result

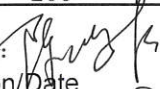


确认人/日期: [Signature] 2018.11.12

产品名称(Name of Product): Aluminum alloy seamless gas cylinders	产品型号 (Product model) : LW60-0.6-166-TPED	生产批号 (Batch NO.) : B011	操作人/日期 (operator/Date) 吴春香 2018.11.12
--	---	-----------------------------	---

外径公差 (±0.75mm)				Outside diameter tolerance (±0.75mm)			
001	ok	051	ok	101		151	
002	ok	052	ok	102		152	
003	ok	053	ok	103		153	
004	ok	054	ok	104		154	
005	ok	055	ok	105		155	
006	ok	056	ok	106		156	
007	ok	057	ok	107		157	
008	ok	058	ok	108		158	
009	ok	059	ok	109		159	
010	ok	060	ok	110		160	
011	ok	061	ok	111		161	
012	ok	062		112		162	
013	ok	063		113		163	
014	ok	064		114		164	
015	ok	065		115		165	
016	ok	066		116		166	
017	ok	067		117		167	
018	ok	068		118		168	
019	ok	069		119		169	
020	ok	070		120		170	
021	ok	071		121		171	
022	ok	072		122		172	
023	ok	073		123		173	
024	ok	074		124		174	
025	ok	075		125		175	
026	ok	076		126		176	
027	ok	077		127		177	
028	ok	078		128		178	
029	ok	079		129		179	
030	ok	080		130		180	
031	ok	081		131		181	
032	ok	082		132		182	
033	ok	083		133		183	
034	ok	084		134		184	
035	ok	085		135		185	
036	ok	086		136		186	
037	ok	087		137		187	
038	ok	088		138		188	
039	ok	089		139		189	
040	ok	090		140		190	
041	ok	091		141		191	
042	ok	092		142		192	
043	ok	093		143		193	
044	ok	094		144		194	
045	ok	095		145		195	
046	ok	096		146		196	
047	ok	097		147		197	
048	ok	098		148		198	
049	ok	099		149		199	
050	ok	100		150		200	

 测试结果确认: Meet the requirement.
 test result

 确认人/日期: 
 Confirmation person/Date 2018.11.12



Attachment No: 5

belongs to Test Report No:

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Appendix C
Heat treatment report and Curves report

Cixi Longfa Aluminium Jar-making Co.,Ltd.



慈溪市龙发铝制罐有限公司 Cixi Longfa Aluminium Jar-making Co.,Ltd.

热处理记录报告

Heat treatment record and report

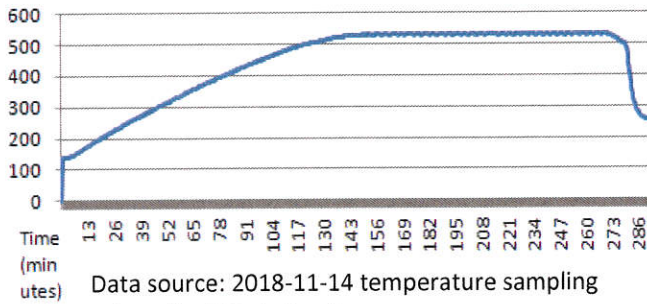
LF/Z-03-01

品名 (Part name)	铝合金气瓶 (aluminum alloy cylinder)	图号 (Drawing No)	LW60-V-166-TPED		规格 (Product Spec)	0.6L
热处理数量 (Quantity)	61	热处理方法 (Heat treatment method)	固溶+时效(Solution aging)		材料 (material)	6061A
生产批号 (Production lot No)	B011	移植号 (Transplant) :	189		操作者 (Operator)	许云通
时间 (Time)	进炉时间 (Time of enter furnace)		到温时间 (Arrival temperature time)		出炉时间 (Time of out furnace)	
	日期 (Date)	时间 (Time)	日期 (Date)	时间 (Time)	日期 (Date)	时间 (Time)
固溶处理 (Solution treatment)	2018/11/14 8:15		2018/11/14 11:14		2018/11/14 13:14	
530°C±10°C / 2h±0.5h						
时间 (Time)	进炉时间 (Time of enter furnace)		到温时间 (Arrival temperature time)		出炉时间 (Time of out furnace)	
	日期 (Date)	时间 (Time)	日期 (Date)	时间 (Time)	日期 (Date)	时间 (Time)
时效处理 (Artificial ageing treatment) :	2018/11/14 18:30		2018/11/14 20:04		2018/11/15 4:04	
165°C±5°C / 8h±1.5h						
结论 (Conclusion)	Heat treatment temperature and time meet requirements. OK					

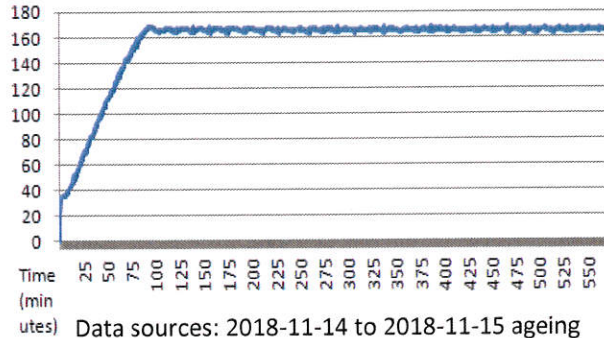
原始记录曲线:
(Original record curve)

Batch number of solid solution treatment temperature

curve: B011



Ageing treatment temperature curve: B011



检测/日期
(Inspector /date) : 许云通 2018.11.15

审核/日期
(Auditing/date) : 郑长明 2018.11.15日



慈溪市龙发铝制罐有限公司
Cixi Longfa Aluminium Jar-making Co.,Ltd.

TÜVRheinland®

Attachment No: 5

belongs to Test Report No:

B-190003-T

1.Requirements:

ISO 7866:2012

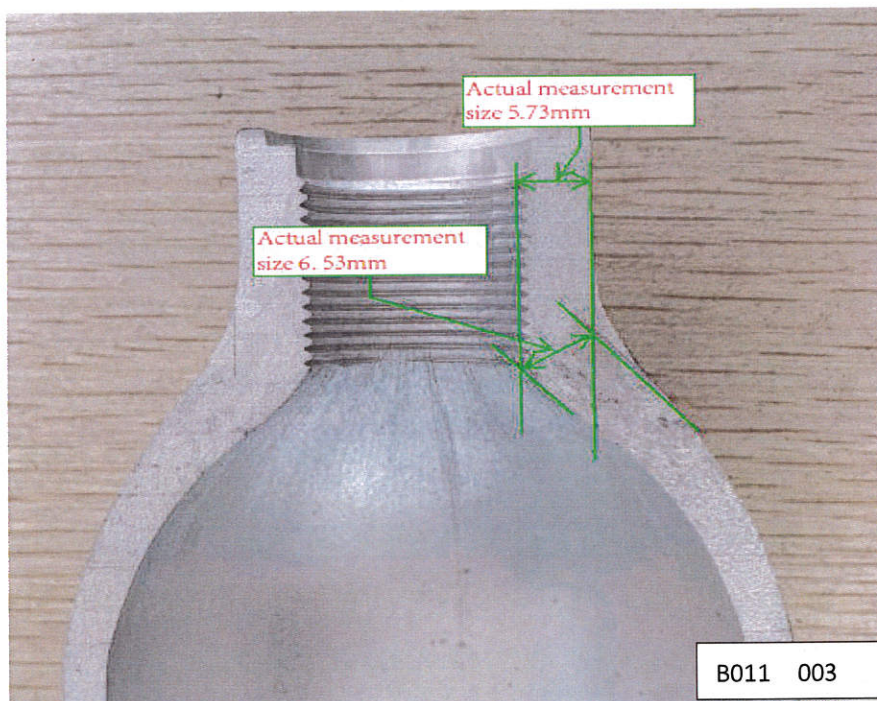
Annex B

B.2 General

.....

Gas cylinders with nominal neck and shoulder wall thicknesses ≤ 7 mm are exempt from sustained-load cracking tests. The Inspection Body shall ensure that the neck and shoulder wall thicknesses of the actual gas cylinders reasonably represents the quoted nominal figure. Figure B.1 illustrates the neck and shoulder thicknesses.

2.Test photo:



3. conclusions:

5.73 and 6.53<7mm, Gas cylinders are exempt from sustained-load cracking tests.

Inspector /date) : 王利超 /20181213

Auditing/Date) : 朱之正 /20181213



Attachment No: **6**

belongs to Test Report No:

B - 19 0003 - T

Appendix D
Original Tensile Test Records & Curve

Cixi Longfa Aluminium Jar-making Co.,Ltd.



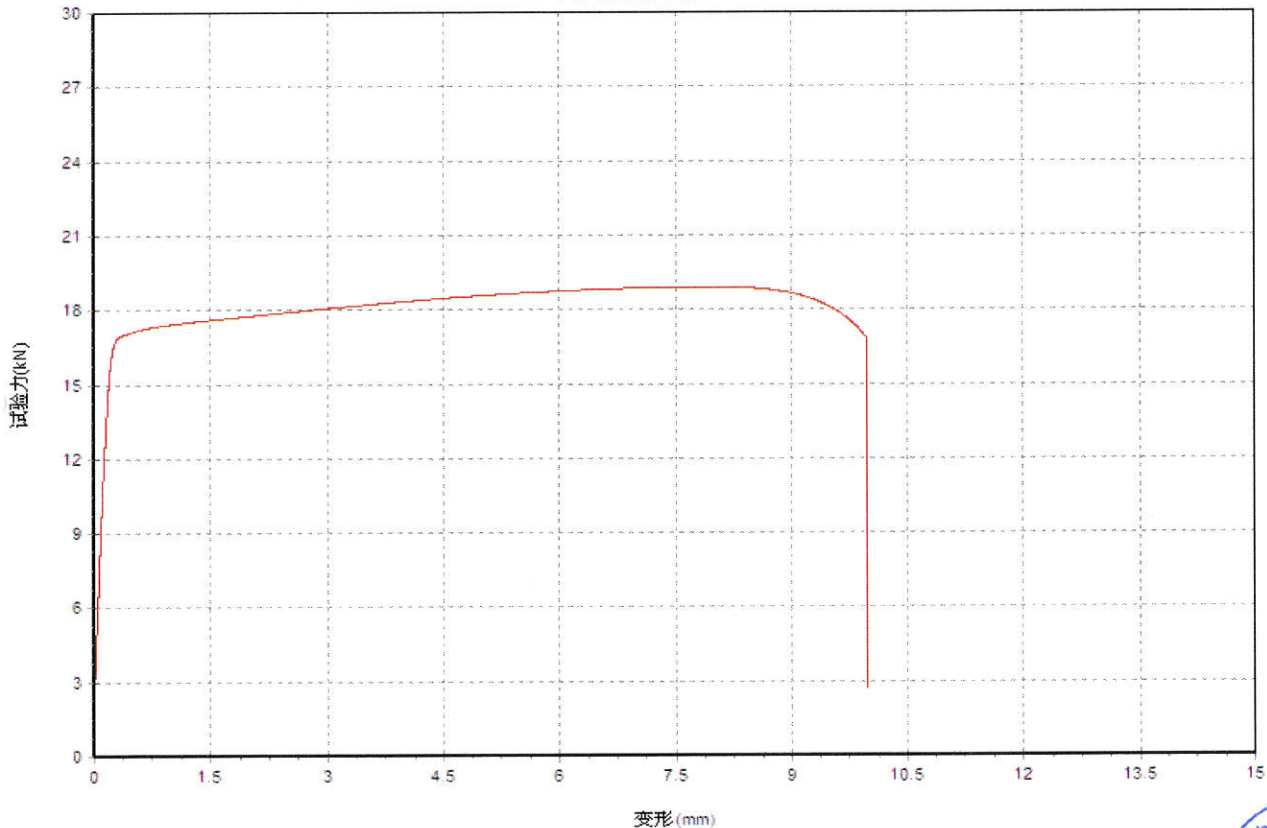
金属拉伸实验报告

Metal tensile test report

图号 (Cylinder Drawing No.) LW60-V-166-TPED瓶号 (Cylinder No.): B011-039试验标准 (Test standard): ISO7866原始标距 (Original mark distance)(Lo): 50 mm试样厚度 (Sample thickness)(a): 3.69 mm规定非比例延伸率 (Specified non proportional extension rate)(ϵ_p): 0.2 %规格 (Specification): LW60-0.6-166-TPED试样形状 (Test shape): 板材 (board)试验速度 (Test speed): 5 mm/min试样宽度 (Sample width)(b): 15.18 mm

	最大力 /Maximum force (F _m)	抗拉强度/ tensile strength (R _m)	断后标距/ After the gauge (L _u)	断后伸长率/ Elongation (A)	规定非比例延伸强度/ Specified non proportional extension strength (R _{p0.2})
单位 (Company)	KN	MPa	mm	%	MPa
标准 (standard)	/	≥330	/	≥12	≥280
样件 (Sample)	18875	337.0	59.98	20.0	300.0

试验力-变形曲线



结论 (conclusion): 合格 OK

 操作者/日期 (Operator/Date): 李松松 2018.12.13 责任人/日期 (Responsible person/Date): 郑宇 2018.12.13

金属拉伸实验报告 Metal tensile test report

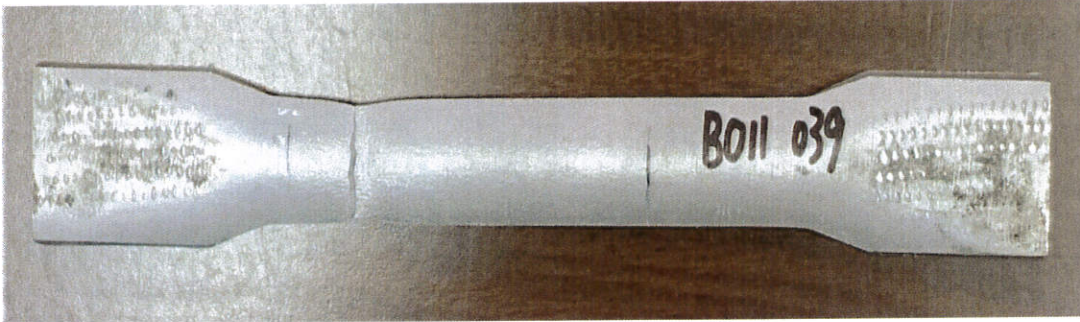
LF/Z-11-01

试样图片

图号 (Cylinder Drawing No.): LW60-V-166-TPED

规格 (Specification): LW60-V-166-TPED

瓶号 (Cylinder No.): B011 039



 TÜVRheinland®

Attachment No: 6

belongs to Test Report No:

B - 19 0003 - T



操作者/日期 (Operator/Date): 袁培培 2018.12.13 责任人/日期 (Responsible person/Date): 袁培培 2018.12.13

金属拉伸实验报告

Metal tensile test report

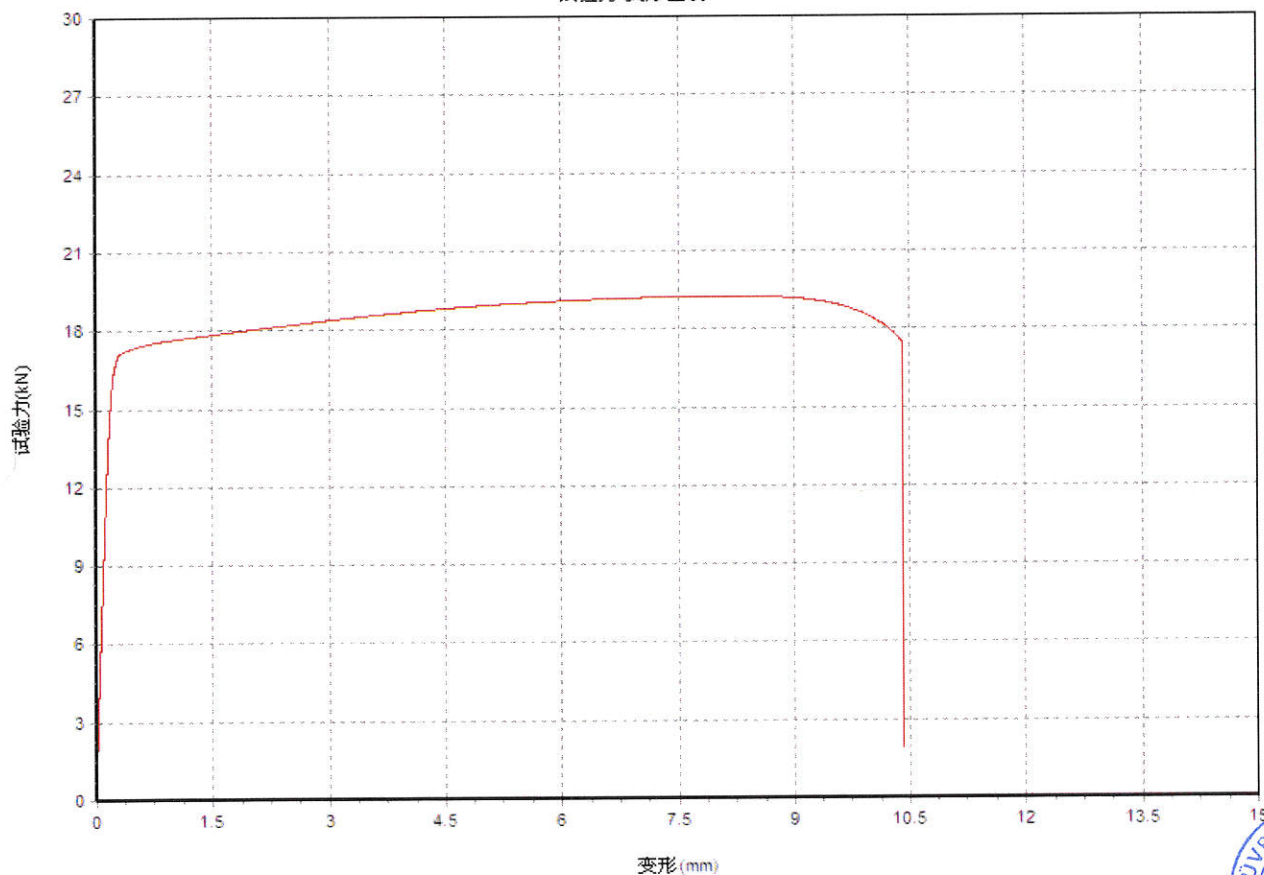
B-190003-T

LF/Z-11-01

图号 (Cylinder Drawing No.) LW60-V-166-TPED规格 (Specification): LW60-0.6-166-TPED瓶号 (Cylinder No.): B011-061试样形状 (Test shape): 板材(board)试验标准 (Test standard): ISO7866试验速度 (Test speed): 5 mm/min原始标距 (Original mark distance)(Lo): 50 mm试样宽度 (Sample width)(b): 15.20 mm试样厚度 (Sample thickness)(a): 3.73 mm规定非比例延伸率 (Specified non proportional extension rate)(ϵ_p): 0.2 %

	最大力 /Maximum force (F _m)	抗拉强度/ tensile strength (R _m)	断后标距/ After the gauge (L _u)	断后伸长率/ Elongation (A)	规定非比例延伸强度/ Specified non proportional extension strength (R _{p0.2})
单位(Company)	KN	MPa	mm	%	MPa
标准(standard)	/	≥330	/	≥12	≥280
样件(Sample)	19225	339.0	60.417	20.8	300.0

试验力-变形曲线



结论 (conclusion): 合格 OK

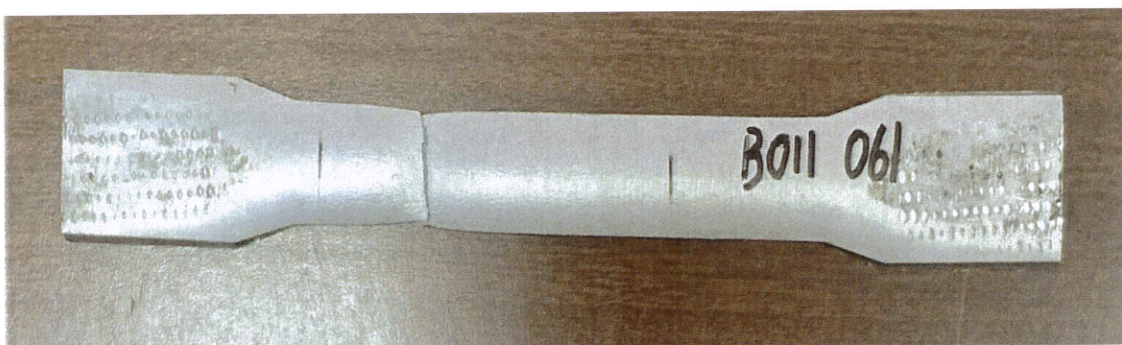
 操作者/日期 (Operator/Date): 郭发洪 2018.12.13 责任人/日期 (Responsible person/Date): 郭发洪 2018.12.13

金属拉伸实验报告 Metal tensile test report

LF/Z-11-01

试样图片

图号 (Cylinder Drawing No.): LW60-V-166-TPED
规格 (Specification): LW60-V-166-TPED
瓶号 (Cylinder No.): B011 061



 TÜVRheinland®
Attachment No: 6
belongs to Test Report No:
B - 19 0003 - T



操作者/日期 (Operator/Date): 郑子 / 2018.12.13 责任人/日期 (Responsible person/Date): 郑子 / 2018.12.13



Attachment No: **6**
belongs to Test Report No:

B - 19 0003 - T

Appendix E
Original Burst Test Records



Cixi Longfa Aluminium Jar-making Co.,Ltd.

B-190003-7 Hydraulic Burst Test Report of Gas Cylinders

制造单位(Unit): 慈溪市龙发铝制罐有限公司(CIXI LONGFA ALUMINIUM JAR-MAKING CO., LTD)

试验日期(Test Date): 2018年12月12日

1. 试验瓶号(Test bottle number): B011 044

出厂编号(Factory number):

2.1 气瓶参数 (Gas cylinder parameters)

气瓶类型 Cylinder type	LW60-V-0.6-TPED	气瓶规格 Cylinder size	LW60-0.6-166-TPED
气瓶材料 Material	6061	热处理工艺 HT process	Solution + ageing
公称工作压力 (MPa) Nom. work press.	16.6	水压试验压力 (MPa) Hydraulic test pressure	25
实测容积 (L) Water capacity	0.621	实测瓶重 (kg) Actual weight	0.642
公称外径 (mm) Nominal diameter	60	设计壁厚 (mm) Design thickness	≥3.2
试验水温 (°C) Water temperature	25	最小设计爆破压力 Min. d. bs. press./MPa	40
试验标准 Test standard	EN ISO7866:2012		

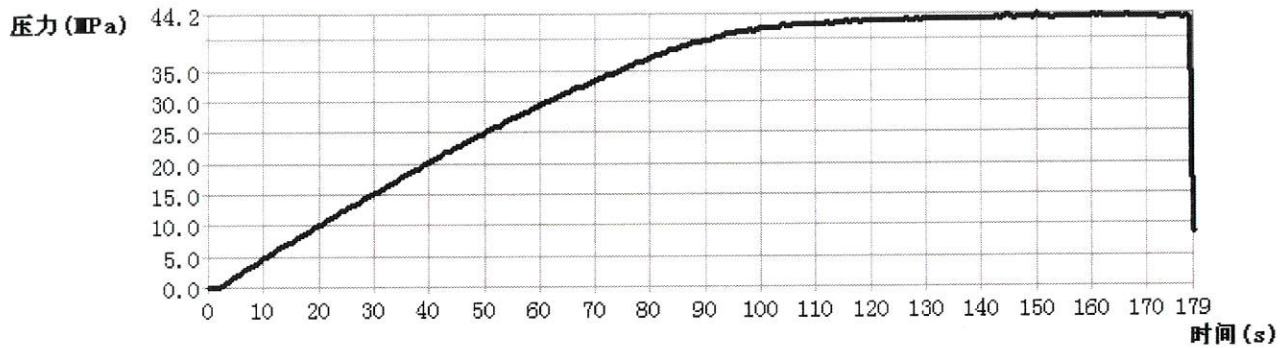
2.3 试验结果记录 (Record of results)

破口长度 (mm) Break length	118	破口宽度 (mm) Break width	14
破口位置 Break position	Middle lean down	破口特征 Break feature	Longitudinal deformation
屈服压力 (MPa) Yield pressure	35.63	实际爆破压力 (MPa) Actual burst press.	44.17
容积变形值 ΔV (L) Total expansion	0.05	容积变形率 E (%) Volume expansion ratio	7.7
总升压时间 (s) Total press. rising time	2'59"	总压入水量 A (L) Total pressed water	0.05

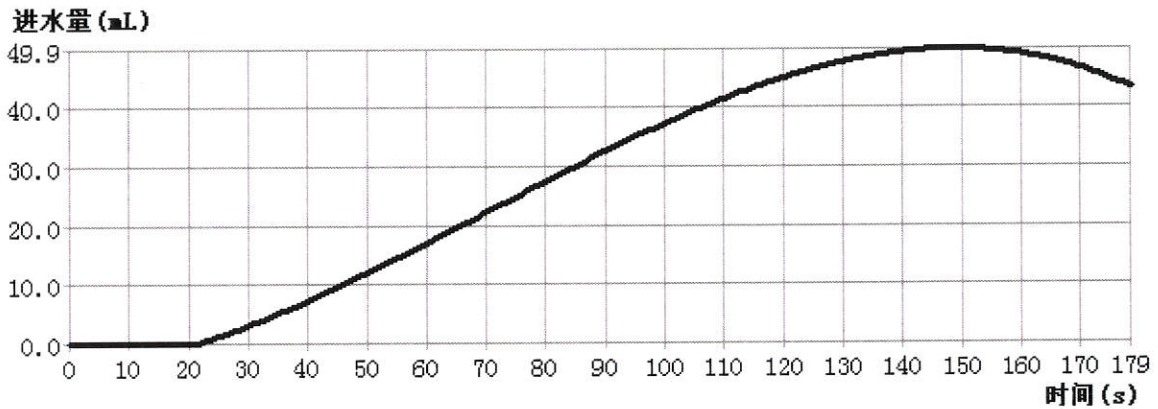
2.4 水压爆破试验曲线破口位置示意图 (Figure of break position and burst test curve) :



2.5 时间-压力曲线(Time-pressure curve)



2.6 时间-进水量曲线(Time-Water amount curve)



结论 (conclusion):

1. Hydraulic Burst Test pressure 44.17MPa . OK.
2. The fracture is longitudinal plastic fracture, no debris, no obvious metal defects on the break. OK.



Attachment No: 6

belongs to Test Report No:

B-190003-T



操作人/日期(Operator/Date):

郑建 2018.12.12

责任人/日期 (Responsible person/Date):

沈君 2018.12.12

气瓶水压爆破试验报告

Hydraulic Burst Test Report of Gas Cylinders

制造单位(Unit): 慈溪市龙发铝制罐有限公司(CIXI LONGFA ALUMINIUM JAR-MAKING CO., LTD)

试验日期(Test Date): 2018年12月12日



Attachment No: 6

belongs to Test Report No:

B-190003-T

1. 试验瓶号(Test bottle number): B011 050

出厂编号(Factory number):

2.1 气瓶参数 (Gas cylinder parameters)

气瓶类型 Cylinder type	LW60-V-0.6-TPED	气瓶规格 Cylinder size	LW60-0.6-166-TPED
气瓶材料 Material	6061	热处理工艺 HT process	Solution + ageing
公称工作压力 (MPa) Nom. work press.	16.6	水压试验压力 (MPa) Hydraulic test pressure	25
实测容积 (L) Water capacity	0.621	实测瓶重 (kg) Actual weight	0.642
公称外径 (mm) Nominal diameter	60	设计壁厚 (mm) Design thickness	≥3.2
试验水温 (°C) Water temperature	15	最小设计爆破压力 Min. d. bs. press./MPa	40
试验标准 Test standard	EN ISO7866:2012		

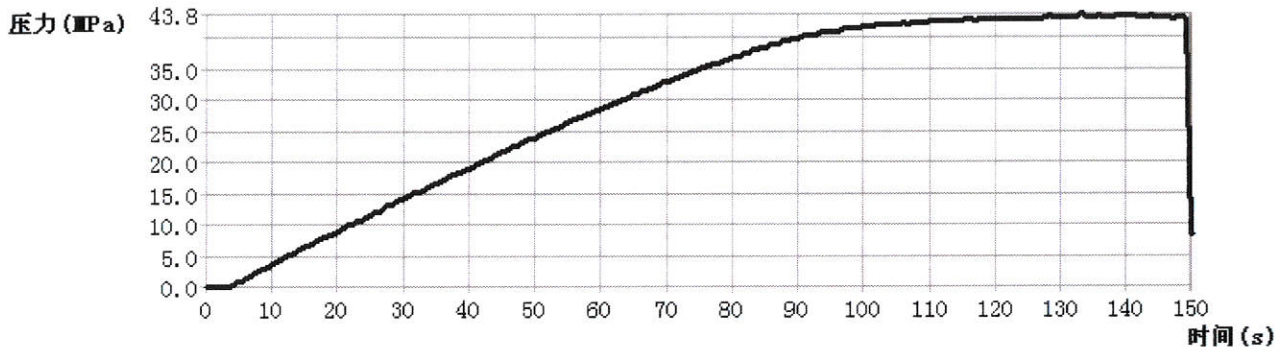
2.3 试验结果记录 (Record of results)

破口长度 (mm) Break length	116	破口宽度 (mm) Break width	12
破口位置 Break position	Middle lean down	破口特征 Break feature	Longitudinal deformation
屈服压力 (MPa) Yield pressure	34.97	实际爆破压力 (MPa) Actual burst press.	43.80
容积变形值 ΔV (L) Total expansion	0.06	容积变形率 E (%) Volume expansion ratio	10.3
总升压时间 (s) Total press. rising time	2'30"	总压入水量 A (L) Total pressed water	0.07

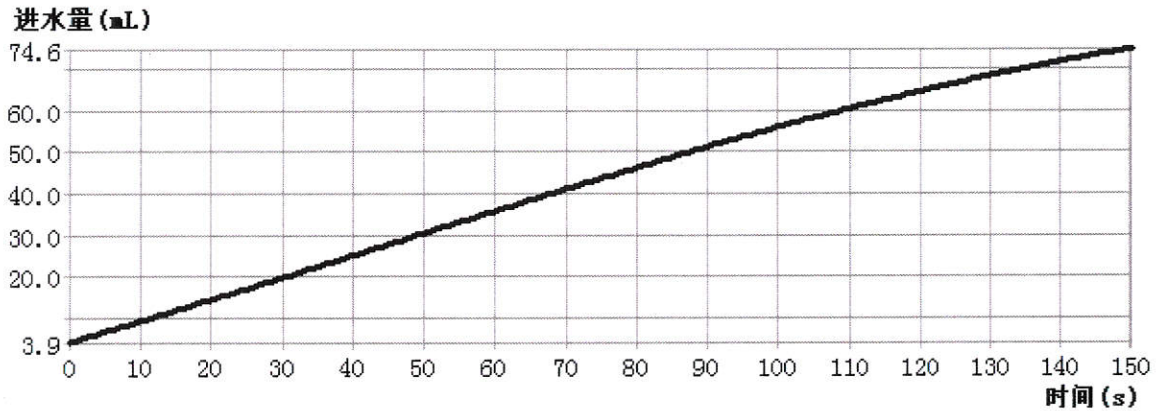
2.4 水压爆破试验曲线破口位置示意图 (Figure of break position and burst test curve) :



2.5 时间-压力曲线(Time-pressure curve)



2.6 时间-进水量曲线(Time-Water amount curve)



结论 (conclusion) :

1. Hydraulic Burst Test pressure 43.80MPa , OK.
2. The fracture is longitudinal plastic fracture, no debris, no obvious metal defects on the break. OK.

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Attachment No: 6

belongs to Test Report No:

B-190003-T



操作人/日期(Operator/Date):  2018.12.12 责任人/日期 (Responsible person/Date) :  2018.12.12



Attachment No: 6

belongs to Test Report No:

B - 19 0003 - T

Appendix F
Bent test report



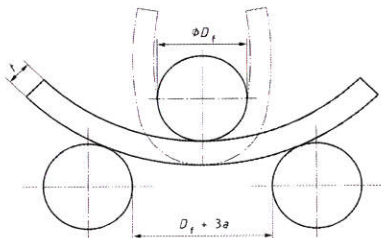
Cixi Longfa Aluminium Jar-making Co.,Ltd.

慈溪市龙发铝制罐有限公司
压弯试验报告

CIXI LONGFA ALUMINIUM JAR-MAKING CO., LTD
Bending test report

LF/Z-07

产品名称 Name of Sample	Aluminum alloy seamless gas cylinders	报告日期 Report date	2018.12.13
产品型号 Sample mode	LW60-V-166-TPED	产品规格 Specification	LW60-0.6-166-TPED
试样厚度t Test specimen thickness	t=3.7mm	最小计算厚度a Calculated minimum thickness	3.2mm
样品号 Sample NO.	B011 039	弯心直径 Df Bending diameter	$D_f = n * t = 7 * 3.7 = 25.9 \text{mm}$
样品宽度 Sample width	25mm	样品数量 Sample quantity	2
检验目的 Inspection purpose	According to EN ISO7866 :2012 , The test specimen shall not crack when bent inwards around the former until the inside surfaces are not further apart than the diameter of the former		



结论
test
result

Visual specimen surface without crack. OK



操作人/日期

(operator/Date) : 郑月 2018.12.13

责任人/日期

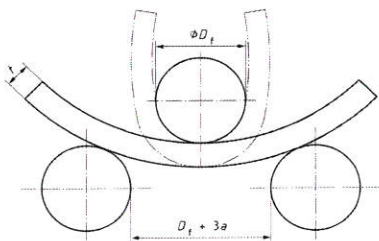
(Responsible person/Date) : 郑月 2018.12.13

慈溪市龙发铝制罐有限公司
压弯试验报告

CIXI LONGFA ALUMINIUM JAR-MAKING CO., LTD
Bending test report

LF/Z-07

产品名称 Name of Sample	Aluminum alloy seamless gas cylinders	报告日期 Report date	2018.12.13
产品型号 Sample mode	LW60-V-166-TPED	产品规格 Specification	LW60-0.6-166-TPED
试样厚度t Test specimen thickness	t=3.8mm	最小计算厚度a Calculated minimum thickness	3.2mm
样品号 Sample NO.	B011 061	弯心直径 Df Bending diameter	$Df=n*t=7*3.8=26.6mm$
样品宽度 Sample width	25mm	样品数量 Sample quantity	2
检验目的 Inspection purpose	According to EN ISO7866 :2012 , The test specimen shall not crack when bent inwards around the former until the inside surfaces are not further apart than the diameter of the former		



结论
test
result

Visual specimen surface without crack. OK



操作人/日期
(operator/Date) : 郑健 2018.12.13

责任人/日期
(Responsible person/Date) : 郑健 2018.12.13



Attachment No: **b**

belongs to Test Report No:

B - 19 0003 - T

Appendix G
Cycling Test Report



Cixi Longfa Aluminium Jar-making Co.,Ltd.

气瓶循环试验报告

Cycling test report of cylinder

LF/Z-15-01

试验日期 (Test Date) : 2018-12-12~2018-12-14

试验标准(Test Standard): EN ISO7866:2012

试验气瓶编号(Test cylinder No.): B011 007 / B011 029 / B011 031



1 试验要求 (Test requirements)

压力循环试验方法按照 EN ISO7866:2012 标准 9.2.3 的要求进行; 气瓶需经历压力循环 12000 次, 循环压力上限为水压试验压力, 循环压力下限不应超过上限压力的 10%, 且不大于 30bar, 试验期间瓶体不应破坏, 加压循环速率不应超过每分钟 15 次循环。压力循环试验后检查瓶底中心壁厚不得大于设计最小壁厚的 15%。

Pressure cycling test shall be carried out in accordance with EN ISO7866:2012 paragraph 9.2.3. The cylinders must be subjected to 12000 pressure reversal cycles without failure. The upper cyclic pressure is hydraulic test pressure, and the lower cyclic pressure shall not exceed 10% of upper cyclic pressure, but with an absolute maximum of 3MPa. The frequency of reversals of pressure shall not exceed 15 cycles/min. After the test, the cylinder base shall be sectioned in order to measure the thickness and to ensure the thickness is no more than 15% above the minimum base thickness prescribed in the design.

2 试验结论 (Test conclusions)

根据 EN ISO7866:2012 标准 9.2.3 的要求进行压力循环试验, 编号为 B011 007 、B011 029、B011 031 的气瓶经 12000 次常温压力循环试验后无泄露, 且无任何宏观可见的变形和损伤, 试验后检查底部中心厚度小于设计最小壁厚的 15%, 试验结果符合 EN ISO7866:2012 的相关要求。

The test cylinders with serials No. B011 007 , B011 029 and B011 031 were cycle tested in accordance with paragraph 9.2.3 in EN ISO7866:2012. The cylinders had no leak, rupture or visual distortion after 12000 pressure cycles. After the test, the cylinder base be sectioned to measure the thickness is no more the 15% above the minimum base thickness prescribed in the design. The test results meet the requirements of pressure cycling test in EN ISO7866:2012.



气瓶循环试验报告

Cycling test report of cylinder

LF/Z-15-01

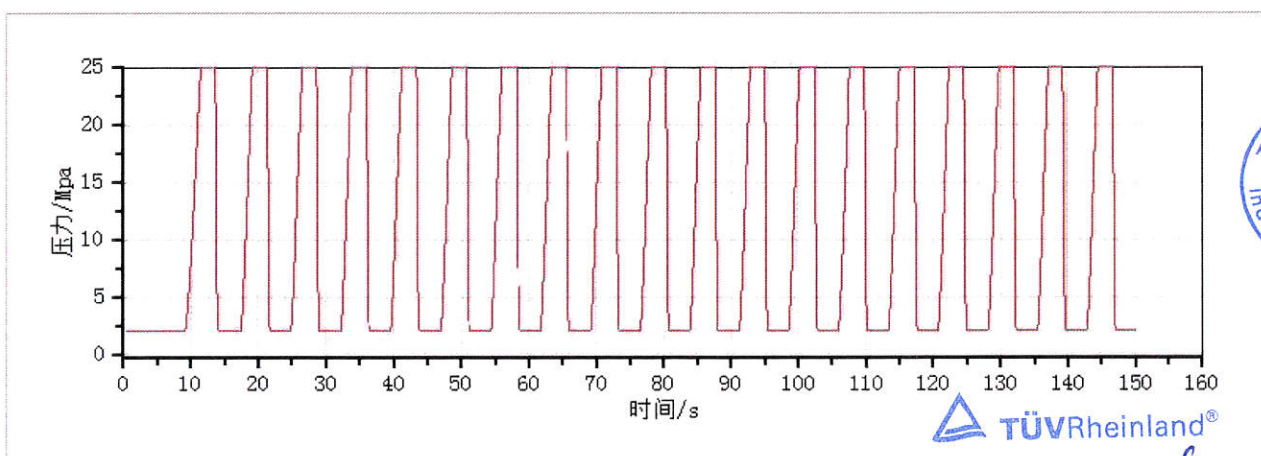

2.1 气瓶信息 (Cylinder information)

气瓶图号 Cylinder drawing No.	LW60-V-166-TPED	气瓶规格 Size of cylinder	LW60-0.6-166-TPED
气瓶瓶号 Cylinder No.	B011 007 B011 029 B011 031	气瓶批号 Batch No.	B011
试验压力(MPa) Test pressure	25	工作压力(MPa) Work pressure	16.6
公称容积(L) Normal Vol.	0.6	设计壁厚 (mm) Design thickness	3.2

2.2 试验信息 (Test information)

试验标准 Test standard	ISO 7866:2012	试验介质 Test medium	Water
设定循环次数 Set cycle times	12000	实际循环次数 Act. Cycle times	12000
升压时间(s) Hold time	2.9	上限压力(MPa) Upper pressure	25MPa
上限保压时间(s) Upper pressure holding time	2.0	降压时间(s) Pressure release time	1.4
下限压力(MPa) Lower pressure	2.0	下限保压时间(s) Lower pressure holding time	1.0
循环速率(次/分) Cycling rate	8.3	试验介质温度(°C) Test medium temperature	12~19
试验气瓶温度(°C) Cylinder temperature	12~20	试验日期 Test time	2018.12.12~12.14

试验曲线 Testing curve


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Attachment No: G
belongs to Test Report No:

B-190003-T

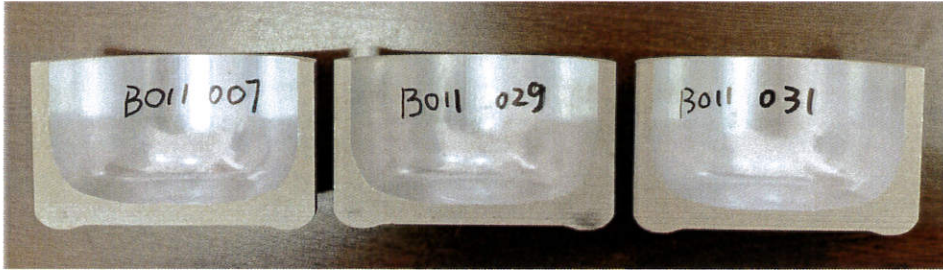
气瓶循环试验报告

Cycling test report of cylinder

LF/Z-15-01

2.3 底部中心厚度 (The base thickness)

试验气瓶编号 Test cylinder No.	设计最小底部厚度(mm) The design minimum base thickness	实测底部厚度 (mm) The actual base thickness
B011 007	4.0	4.48
B011 029	4.0	4.48
B011 031	4.0	4.52



2.4 试验照片 (Test photo)



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 Attachment No: 6
 belongs to Test Report No:
B-19 0003-T



试验员/时间 (Test by/date): 郑瑞峰 218 12.14 审核员/时间 (Check by/date): 沈晨 218.12.14



Attachment No: 6
belongs to Test Report No:

B - 19 0003 - T

Appendix H
Hydraulic Test Record

Cixi Longfa Aluminium Jar-making Co.,Ltd.





慈溪市龙发铝制罐有限公司

Cixi Longfa Aluminium Jar-making Co., Ltd.

铝合金无缝气瓶水压试验记录表

Attachment No: 6

belongs to Test Report No:

B-190003-T

Seamless steel gas cylinders hydraulic test record

LFZ-08-04

瓶体编号 Cylinder No	空瓶重量 Empty cylinder weight (kg)		测量前重量 Weight before test (kg)		测量前容积 Volume before test (L)		漏泄及变形情况 Leakage and deformation No Leakage and deformation <input checked="" type="checkbox"/>	瓶体编号 Cylinder No	空瓶重量 Empty cylinder weight (kg)		测量前重量 Weight before test (kg)		测量前容积 Volume before test (L)		漏泄及变形情况 Leakage and deformation No Leakage and deformation <input checked="" type="checkbox"/>
	(kg)	(kg)	(kg)	(kg)	(L)	(L)			(kg)	(kg)	(L)	(L)	(kg)	(kg)	
B011 001	0.634	1.251	1.253	0.617	0.617	0.617	✓	B011 021	0.637	1.249	1.249	0.612	0.612	0.612	✓
B011 002	0.636	1.253	1.253	0.617	0.617	0.617	✓	B011 022	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 003	0.635	1.251	1.251	0.616	0.616	0.616	✓	B011 023	0.637	1.249	1.249	0.612	0.612	0.612	✓
B011 004	0.635	1.252	1.252	0.617	0.617	0.617	✓	B011 024	0.635	1.251	1.251	0.616	0.616	0.616	✓
B011 005	0.637	1.249	1.249	0.612	0.612	0.612	✓	B011 025	0.634	1.251	1.251	0.617	0.617	0.617	✓
B011 006	0.636	1.253	1.253	0.617	0.617	0.617	✓	B011 026	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 007	0.635	1.251	1.251	0.616	0.616	0.616	✓	B011 027	0.637	1.249	1.249	0.612	0.612	0.612	✓
B011 008	0.635	1.252	1.252	0.617	0.617	0.617	✓	B011 028	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 009	0.634	1.252	1.252	0.615	0.615	0.615	✓	B011 029	0.634	1.251	1.251	0.617	0.617	0.617	✓
B011 010	0.637	1.249	1.249	0.615	0.615	0.615	✓	B011 030	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 011	0.637	1.249	1.249	0.612	0.612	0.612	✓	B011 031	0.634	1.251	1.251	0.617	0.617	0.617	✓
B011 012	0.634	1.251	1.251	0.617	0.617	0.617	✓	B011 032	0.637	1.249	1.249	0.612	0.612	0.612	✓
B011 013	0.636	1.253	1.253	0.617	0.617	0.617	✓	B011 033	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 014	0.635	1.252	1.252	0.617	0.617	0.617	✓	B011 034	0.634	1.251	1.251	0.617	0.617	0.617	✓
B011 015	0.634	1.251	1.251	0.617	0.617	0.617	✓	B011 035	0.634	1.251	1.251	0.617	0.617	0.617	✓
B011 016	0.635	1.252	1.252	0.617	0.617	0.617	✓	B011 036	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 017	0.637	1.249	1.249	0.612	0.612	0.612	✓	B011 037	0.635	1.251	1.251	0.616	0.616	0.616	✓
B011 018	0.635	1.252	1.252	0.617	0.617	0.617	✓	B011 038	0.635	1.251	1.251	0.616	0.616	0.616	✓
B011 019	0.637	1.249	1.249	0.612	0.612	0.612	✓	B011 039	0.635	1.252	1.252	0.617	0.617	0.617	✓
B011 020	0.635	1.251	1.251	0.616	0.616	0.616	✓	B011 040	0.634	1.251	1.251	0.617	0.617	0.617	✓

生产批号 (Production lot No): B011 移植号 (Transplant): 189 客户 (Customer): --

图号 (Drawing No): LW60-V-166-TPED 产品规格 (Product Spec): LW60-0.6-166-TPED 执行标准 (Standards): EN ISO 7866:2012

试验压力 (Test Pressure): 25MPa 保压时间 (Pressure time): 30s

检测员/日期: [Signature] 2018.11.16
审核/日期: [Signature] 2018.11.16

Inspector/Date: [Signature] 2018.11.16
Auditing/Date: [Signature] 2018.11.16





慈溪市龙发铝制罐有限公司
Cixi Longfa Aluminium Jar-making Co., Ltd.
铝合金无缝气瓶水压试验记录表

Attachment No: 6
belongs to Test Report No:
B-190003-T

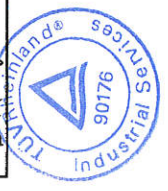
LF/Z-08-04

Seamless steel gas cylinders hydraulic test record

生产批号 (Production lot No):		移植号 (Transplant):		客户 (Customer):		图号 (Drawing No):		产品规格 (Product Spec):		执行标准 (Standards):	
B011		189				LW60-V-166-TPED		LW60-0.6-166-TPED		EN ISO 7866:2012	
试验压力 (Test Pressure):		保压时间 (Pressure time):		空瓶重量 (kg)		测量前重量 (kg)		测量前容积 (L)		漏泄及变形情况	
25MPa		30s		Empty cylinder weight (kg)		Weight before test (kg)		Volume before test (L)		Leakage and deformation	
瓶体编号 Cylinder No	空瓶重量 (kg)	测量前重量 (kg)	测量前容积 (L)	漏泄及变形情况		瓶体编号 Cylinder No	空瓶重量 (kg)	测量前重量 (kg)	测量前容积 (L)	漏泄及变形情况	
				Leakage and deformation	No Leakage and deformation					Leakage and deformation	No Leakage and deformation
B011 041	0.635	1.25	0.616	✓	<input checked="" type="checkbox"/>	B011 061	0.636	1.252	0.616	✓	<input checked="" type="checkbox"/>
B011 042	0.634	1.25	0.617	✓	<input checked="" type="checkbox"/>						
B011 043	0.635	1.25	0.616	✓	<input checked="" type="checkbox"/>						
B011 044	0.636	1.252	0.616	✓	<input checked="" type="checkbox"/>						
B011 045	0.634	1.25	0.617	✓	<input checked="" type="checkbox"/>						
B011 046	0.636	1.253	0.617	✓	<input checked="" type="checkbox"/>						
B011 047	0.636	1.253	0.617	✓	<input checked="" type="checkbox"/>						
B011 048	0.636	1.253	0.617	✓	<input checked="" type="checkbox"/>						
B011 049	0.635	1.25	0.616	✓	<input checked="" type="checkbox"/>						
B011 050	0.635	1.252	0.617	✓	<input checked="" type="checkbox"/>						
B011 051	0.637	1.249	0.612	✓	<input checked="" type="checkbox"/>						
B011 052	0.635	1.25	0.616	✓	<input checked="" type="checkbox"/>						
B011 053	0.635	1.252	0.617	✓	<input checked="" type="checkbox"/>						
B011 054	0.634	1.25	0.617	✓	<input checked="" type="checkbox"/>						
B011 055	0.635	1.25	0.616	✓	<input checked="" type="checkbox"/>						
B011 056	0.635	1.252	0.617	✓	<input checked="" type="checkbox"/>						
B011 057	0.637	1.249	0.612	✓	<input checked="" type="checkbox"/>						
B011 058	0.634	1.25	0.617	✓	<input checked="" type="checkbox"/>						
B011 059	0.635	1.252	0.617	✓	<input checked="" type="checkbox"/>						
B011 060	0.635	1.25	0.616	✓	<input checked="" type="checkbox"/>						

检测员/日期: 邵集 2018.11.16
Inspector/Date

审核/日期: 沈平 2018.11.16
Auditing/Date





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belongs to Test Report No:

B-190003-T

Appendix I
Hardness Test Record

Cixi Longfa Aluminium Jar-making Co.,Ltd.



硬度检查记录
CIXI LONGFA ALUMINIUM JAR-MAKING CO., LTD
Hardness inspection record

LF/Z-04

产品名称(Name of Product): Aluminum alloy seamless gas cylinders	产品型号(Product model): <u>LW60-0.6-166-TPED</u>	生产批号(Batch NO.): <u>B011</u>
操作者(Operator): <u>史霞</u>	检查日期: (Inspection date) <u>2018.11.14</u>	硬度要求:HRB≥48 Hardness requirements:HRB≥48

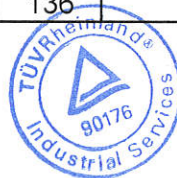
编号 number	硬度值 Hardness value	编号 number	硬度值 Hardness value	编号 number	硬度值 Hardness value	编号 number	硬度值 Hardness value	编号 number	硬度值 Hardness value	编号 number	硬度值 Hardness value
001	60	035	61	069		103		137		171	
002	63	036	61	070		104		138		172	
003	62	037	62	071		105		139		173	
004	64	038	61	072		106		140		174	
005	63	039	60	073		107		141		175	
006	62	040	61	074		108		142		176	
007	59	041	60	075		109		143		177	
008	61	042	59	076		110		144		178	
009	62	043	62	077		111		145		179	
010	63	044	61	078		112		146		180	
011	61	045	60	079		113		147		181	
012	62	046	61	080		114		148		182	
013	60	047	62	081		115		149		183	
014	58	048	61	082		116		150		184	
015	59	049	60	083		117		151		185	
016	62	050	62	084		118		152		186	
017	60	051	61	085		119		153		187	
018	61	052	60	086		120		154		188	
019	61	053	59	087		121		155		189	
020	62	054	59	088		122		156		190	
021	61	055	60	089		123		157		191	
022	59	056	61	090		124		158		192	
023	60	057	60	091		125		159		193	
024	62	058	61	092		126		160		194	
025	59	059	60	093		127		161		195	
026	60	060	61	094		128		162		196	
027	58	061		095		129		163		197	
028	61	062		096		130		164		198	
029	61	063		097		131		165		199	
030	62	064		098		132		166		200	
031	59	065		099		133		167			
032	58	066		100		134		168			
033	59	067		101		135		169			
034	60	068		102		136		170			

测试结果确认: Meet the requirements
 test result



Attachment No: 6

belongs to Test Report No:



确认人/日期: [Signature]
 Confirmation person/Date 2018.11.14

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Appendix J
Leakage Test Record

Cixi Longfa Aluminium Jar-making Co.,Ltd.



慈溪市龙发铝制罐有限公司
Cixi Longfa Aluminium Jar-making Co., Ltd.
铝合金无缝气瓶气密性测试记录

Seamless Aluminium Gas Cylinders Leakage Test Record


LFZ-08-05

图号 (Drawing No): LW60-V-166-TPED 产品规格 (Product Spec): LW60-0.6-166-TPED

生产批号 (Production lot No): B011 执行标准 (Standards): EN ISO 7866:2012

试验压力 (Test Pressure): 16.6MPa 保压时间 (Pressure time): 30s

瓶体编号 Cylinder No	Leakage record	瓶体编号 Cylinder No	Leak record	瓶体编号 Cylinder No	Leak record
	Leakage <input checked="" type="checkbox"/> No Leakage <input checked="" type="checkbox"/>		Leak <input checked="" type="checkbox"/> Not Leak <input checked="" type="checkbox"/>		Leakage <input checked="" type="checkbox"/> No Leakage <input checked="" type="checkbox"/>
B011 001	✓	B011 037	✓		
B011 002	✓	B011 038	✓		
B011 003	✓	B011 039	✓		
B011 004	✓	B011 040	✓		
B011 005	✓	B011 041	✓		
B011 006	✓	B011 042	✓		
B011 007	✓	B011 043	✓		
B011 008	✓	B011 044	✓		
B011 009	✓	B011 045	✓		
B011 010	✓	B011 046	✓		
B011 011	✓	B011 047	✓		
B011 012	✓	B011 048	✓		
B011 013	✓	B011 049	✓		
B011 014	✓	B011 050	✓		
B011 015	✓	B011 051	✓		
B011 016	✓	B011 052	✓		
B011 017	✓	B011 053	✓		
B011 018	✓	B011 054	✓		
B011 019	✓	B011 055	✓		
B011 020	✓	B011 056	✓		
B011 021	✓	B011 057	✓		
B011 022	✓	B011 058	✓		
B011 023	✓	B011 059	✓		
B011 024	✓	B011 060	✓		
B011 025	✓	B011 061	✓		
B011 026	✓				
B011 027	✓				
B011 028	✓				
B011 029	✓				
B011 030	✓				
B011 031	✓				
B011 032	✓				
B011 033	✓				
B011 034	✓				
B011 035	✓				
B011 036	✓				

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belongs to test Report No:
B-190003-T



检测员/日期: 沈建 2018.11.19
Inspector/Date

审核/日期: 沈建 2018.11.19
Auditing/Date



Attachment No: 6
belongs to Test Report No:

B - 19 0003 - T

Appendix K
Screw and Appearance Inspection Record

Cixi Longfa Aluminium Jar-making Co.,Ltd.



螺纹、外观全检报告

LF/Z-09-01

Screw and appearance inspection report

图号 (Drawing No) : LW60-V-166-TPED

产品规格 (Product Spec) : LW60-V-166-TPED

生产批号 (Production lot No): B011

移植号 (Transplant) : 189

No.	Screw	appearance	No.	Screw	appearance
001	✓	✓	051	✓	✓
002	✓	✓	052	✓	✓
003	✓	✓	053	✓	✓
004	✓	✓	054	✓	✓
005	✓	✓	055	✓	✓
006	✓	✓	056	✓	✓
007	✓	✓	057	✓	✓
008	✓	✓	058	✓	✓
009	✓	✓	059	✓	✓
010	✓	✓	060	✓	✓
011	✓	✓	061	✓	✓
012	✓	✓	062		
013	✓	✓	063		
014	✓	✓	064		
015	✓	✓	065		
016	✓	✓	066		
017	✓	✓	067		
018	✓	✓	068		
019	✓	✓	069		
020	✓	✓	070		
021	✓	✓	071		
022	✓	✓	072		
023	✓	✓	073		
024	✓	✓	074		
025	✓	✓	075		
026	✓	✓	076		
027	✓	✓	077		
028	✓	✓	078		
029	✓	✓	079		
030	✓	✓	080		
031	✓	✓	081		
032	✓	✓	082		
033	✓	✓	083		
034	✓	✓	084		
035	✓	✓	085		
036	✓	✓	086		
037	✓	✓	087		
038	✓	✓	088		
039	✓	✓	089		
040	✓	✓	090		
041	✓	✓	091		
042	✓	✓	092		
043	✓	✓	093		
044	✓	✓	094		
045	✓	✓	095		
046	✓	✓	096		
047	✓	✓	097		
048	✓	✓	098		
049	✓	✓	099		
050	✓	✓	100		



Attachment No. 6
belongs to Test Report No:

B-190003-T

测试结果 (Test results) : Meet the requirement.

检测/日期 (Inspector /date) : 李莉玲, 2018.11.18 审核/日期 (Auditing/Date) : [Signature], 2018.11.18

Note

1. Is there a crack in the thread? "qualified" ✓, or "unqualified" X.
2. Any scratches, pits, deformations, etc. "Qualified" ✓, "not qualified" X. Unqualified indication of content, such as scratches, pits, deformations, etc.
3. The inner surface was examined by endoscope.

- 注: 1. 螺纹有无开裂。合格打✓, 不合格打X.
2. 外观有无划痕、凹坑, 变形等。合格打✓, 不合格打X. (不合格注明内容, 如划痕、凹坑, 变形等)。
3. 内表面采用内窥镜检查。