

测试报告

编号 : TJIN1909014955PS_CN

日期 : 2019-10-11

页码 : 1 of 25

客户名称: 深圳德克密封技术有限公司

客户地址:

样品名称 : O型圈

以上信息及样品由客户提供及确认, SGS 不承担证实客户提供信息的准确性、适当性和(或)完整性的责任。

SGS 参考号 : BJIN1909001328PS; TJIN1909014984MR_CN; GZIN1909052300MR_CN

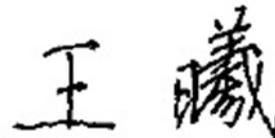
收样日期 : 2019-09-23

测试开始时间 : 2019-09-23

测试结束时间 : 2019-10-11

测试结果 : 请见下页 (除另有特别说明外, 此报告结果仅对测试样品负责)

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王曦

授权签字人



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结果总结:

序号	测试项目	测试方法	结果	结论
1	压缩永久变形	ISO 815-1:2014 方法 A	5%	合格
2	压缩永久变形	GB/T 7759.1:2015 方法 A & GB/T 1690-2010	详见结果	合格
3	耐液体试验	GB/T 1690-2010 & ISO 48-4:2018 & ISO 37:2017	详见结果	详见结果
4	热老化测试	ISO 188:2011 方法 B & ISO 48-4:2018 & ISO 37:2017	详见结果	详见结果
5	成分分析	FTIR、PGC-MS、GC-MS、XRF 和 TGA	详见结果	/
6	臭氧老化	ISO 1431-1:2012 程序 A	无裂纹	合格
7	压缩应力松弛	参照 ISO 3384-1:2011 Amd.1:2013 方法 A 和 客户要求	8.1%	合格
8	低温回缩	ISO 2921:2011	详见结果	/

备注: 合格: 达到要求
 不合格: 未达到要求
 /: 不下判定



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1. 测试项目: 压缩永久变形

样品描述: 橡胶件

测试方法: ISO 815-1:2014 方法 A

测试条件:

试样: A 型

试样厚度: 11.96mm

测试条件: 125°C, 24h

压缩率: 25%

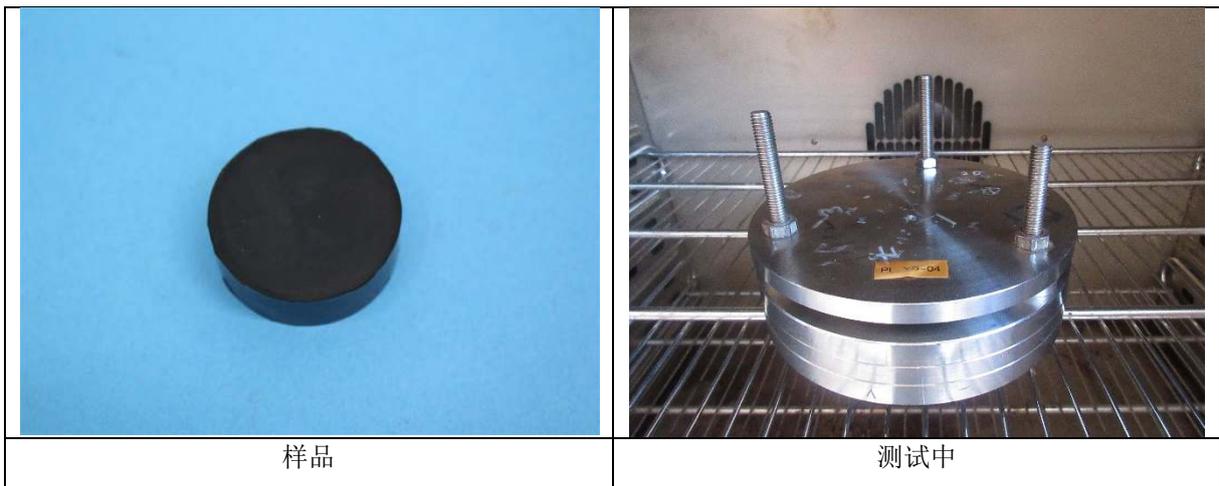
恢复条件: 23±2°C, 50±5%RH, 30min

实验室环境条件: 23±2°C, 50±5%RH

测试结果:

测试项目	测试结果	客户要求	结论
压缩永久变形	5%	≤20%	合格

测试照片:



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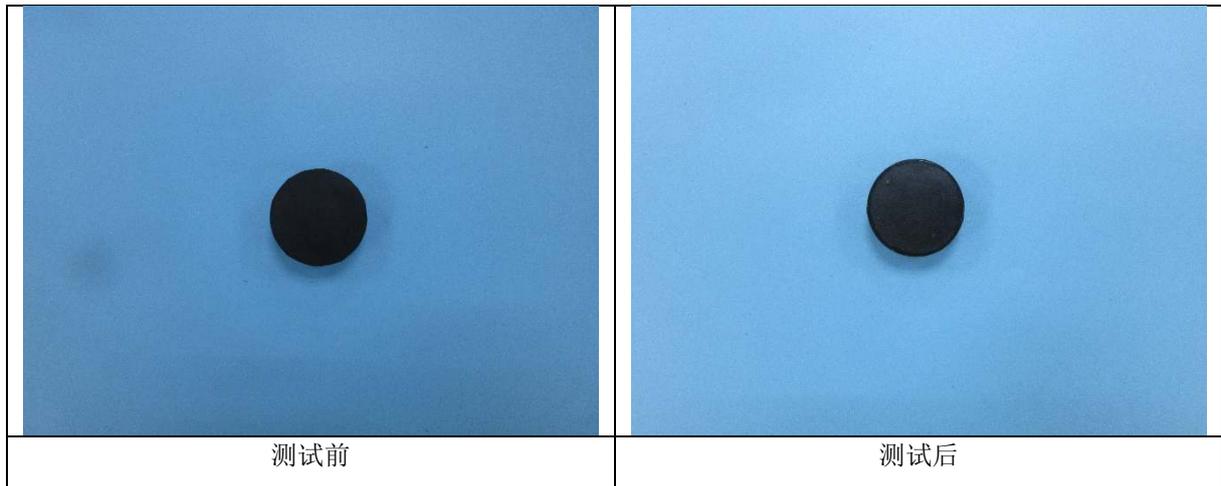
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设备信息:

设备	型号	设备编号	校准日期	下次校准日期
数显卡尺	CD-6"ASX	POL-221	2019-01-25	2020-01-24
电热鼓风烘箱	UF 260 Plus	POL-130	2019-05-29	2020-05-28



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2. 测试项目: 压缩永久变形

样品描述: 橡胶件

测试方法: GB/T 7759.1:2015 方法 A & GB/T 1690-2010

测试条件:

试样: A 型

试样厚度: 11.96mm

测试条件 1: 105°C, 72h

测试条件 2: 去离子水, 100°C, 72 h → 新去离子水, 23 ± 2 °C, 30min → 105°C, 72h

压缩率: 40%

恢复条件: 23±2°C, 50±5%RH, 30min

实验室环境条件: 23±2°C, 50±5%RH

测试结果:

测试项目	测试结果		客户要求	结论
压缩永久变形	条件 1	2%	≤50%	合格
压缩永久变形	条件 2	10%	≤38%	合格



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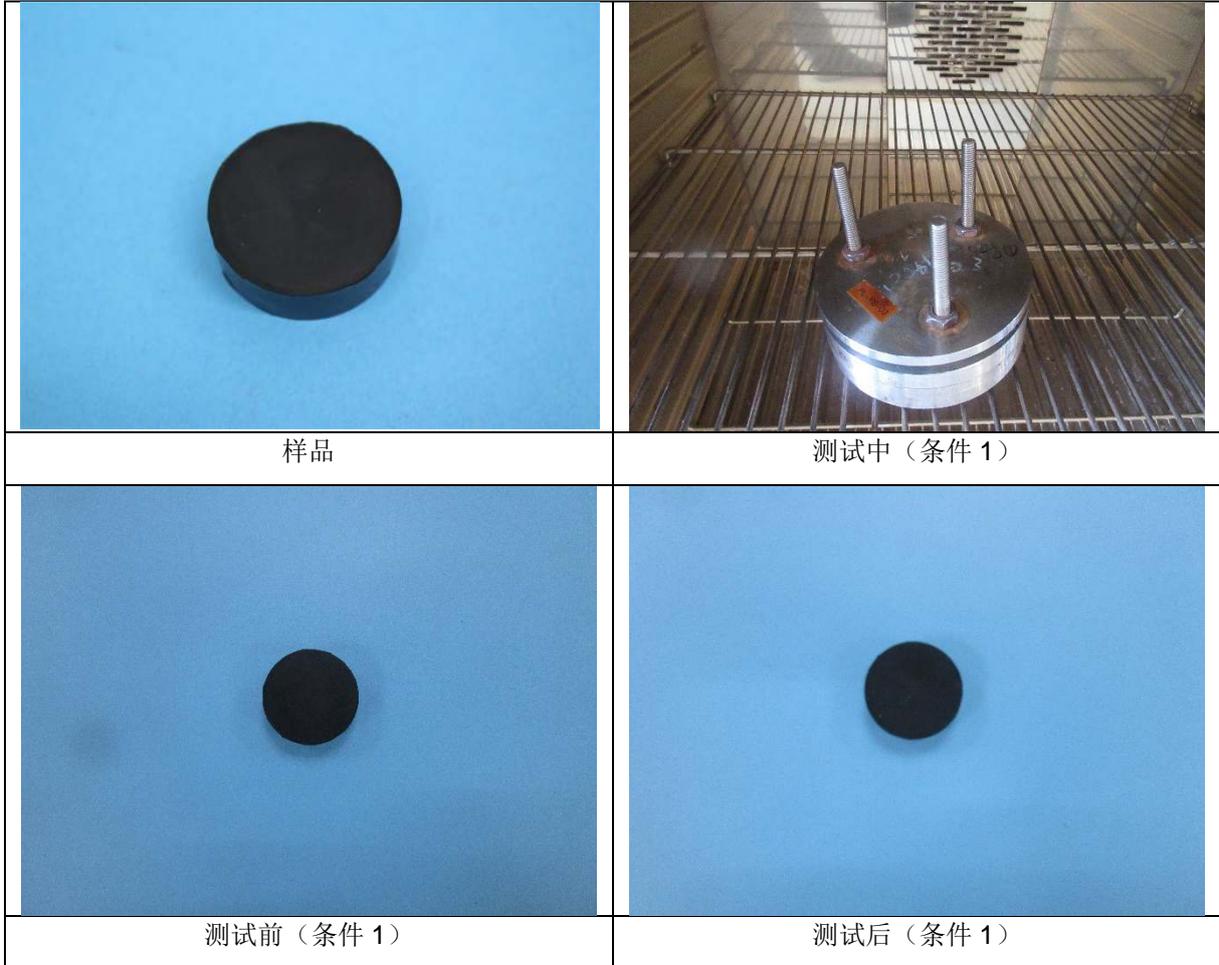
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测试照片:



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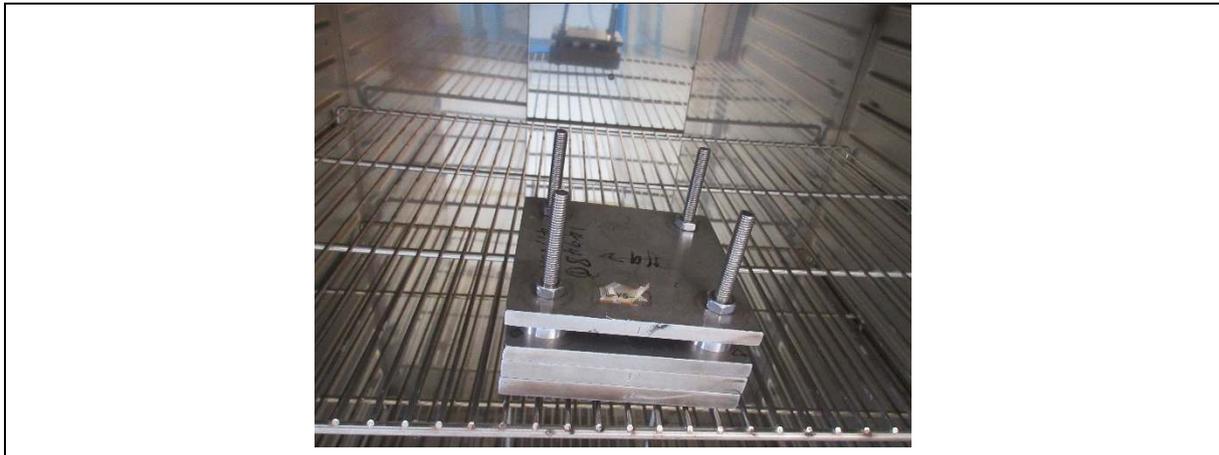
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测试中 (条件 2)



测试前 (条件 2)



测试后 (条件 2)

设备信息:

设备	型号	设备编号	校准日期	下次校准日期
电热鼓风烘箱	UF 260 Plus	POL-129	2019-05-10	2020-05-09
数显卡尺	CD-6"ASX	POL-221	2019-01-25	2020-01-24
烘箱	KS-9071GZ	POL-167	2018-11-05	2019-11-04
数显卡尺	CD-8"ASX	POL-181	2019-01-25	2020-01-24



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3. 测试项目: 耐液体测试

样品描述: 橡胶件

测试方法: GB/T 1690-2010 & ISO 48-4:2018 & ISO 37:2017

测试条件:

浸泡条件: 去离子水, 100°C, 72 h → 新去离子水, 23 ± 2 °C, 30min

实验室环境条件: 23 ± 2 °C, 50 ± 5 % RH

测试结果:

测试项目	测试条件	测试结果		客户要求	结论
		常态	浸泡后		
拉伸强度	试样: 1 型 试样厚度: 2.02 mm	常态	14.9MPa	≥10 MPa	合格
		浸泡后	14.9MPa	/	/
		变化率	0	≤5%	合格
断裂伸长率	测试速度: 500 mm/min 标距: 25 mm	常态	220%	≥250%	不合格
		浸泡后	250%	/	/
		变化率	13.6%	≤30%	合格
邵氏硬度	试样厚度: 6.14mm (3 层叠加)	常态	66 Shore A	70±5	合格
		浸泡后	66 Shore A	/	/
		变化值	0	<5	合格

备注:

1. 变化值 = 浸泡后的值 - 常态的值
2. 变化率, % = (浸泡后的值 - 常态的值) / 常态的值 × 100
3. 测试试样从样品中截取。



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样品



测试中-拉伸测试



测试中-硬度



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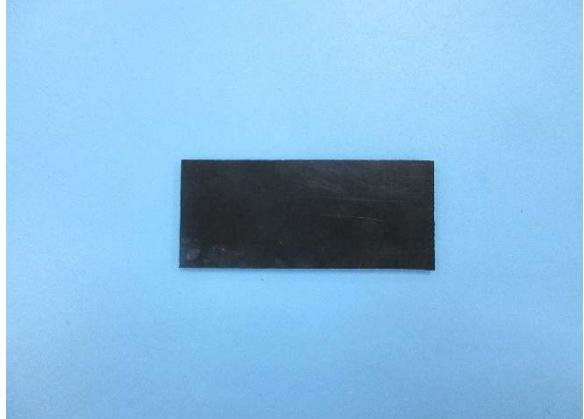
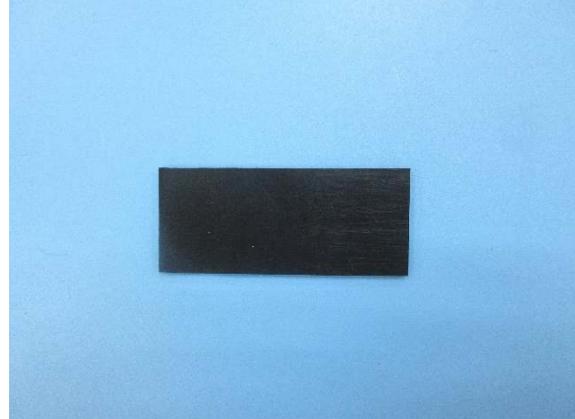
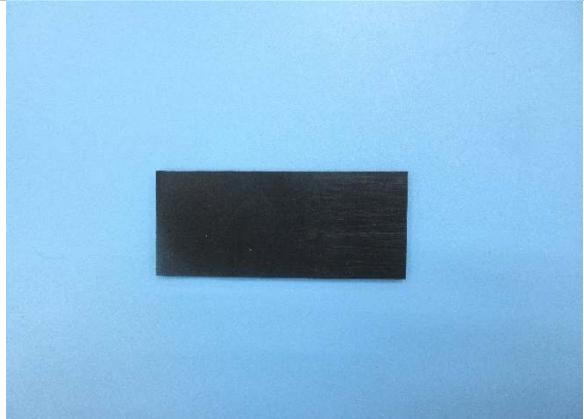
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<p>测试前-常态-硬度</p>	<p>测试后-常态-硬度</p>
	
<p>测试前-浸泡后-硬度</p>	<p>测试后-浸泡后-硬度</p>



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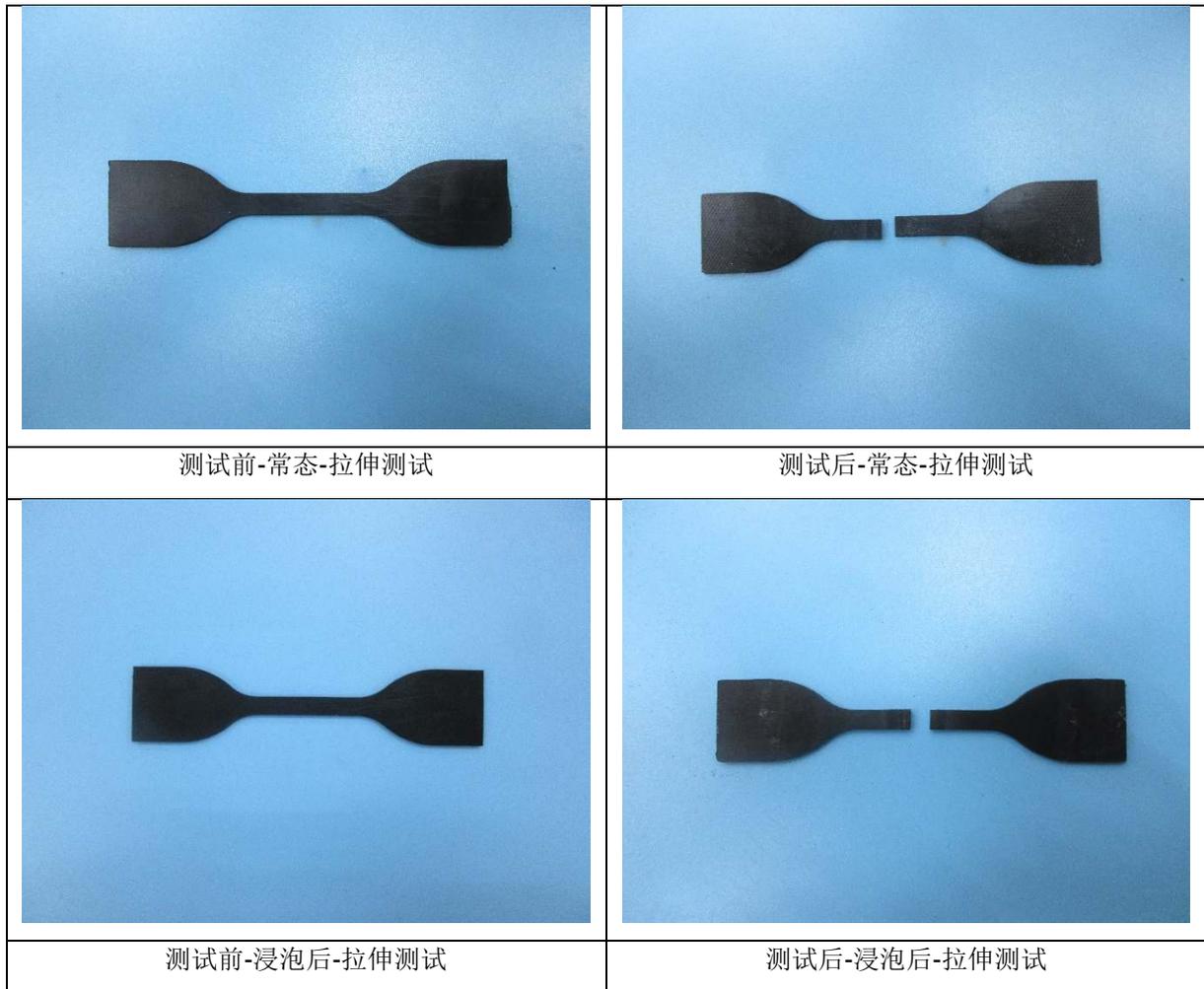
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设备信息:

设备	型号	设备编号	校准日期	下次校准日期
万能材料试验机	CMT4304	POL-116	2018-11-05	2019-11-04
邵氏 A 型硬度计	TH200	POL-004	2018-11-05	2019-11-04
电热鼓风烘箱	UF 260 Plus	POL-129	2019-05-10	2020-05-09



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测试报告

编号 : TJIN1909014955PS_CN

日期 : 2019-10-11

页码 : 12 of 25

4. 测试项目: 热老化测试

样品描述: 橡胶件

测试方法: ISO 188:2011 方法 B & ISO 48-4:2018 & ISO 37:2017

测试条件:

热老化条件: 100°C, 168h→23±2 °C, 50±5 % RH, 24 h

实验室环境条件: 23±2 °C, 50±5 % RH

测试结果:

测试项目	测试条件	测试结果		客户要求	结论
		常态	热老化后		
拉伸强度	试样: 1 型 试样厚度: 2.02 mm	常态	14.9MPa	≥10 MPa	合格
		热老化后	14.1MPa	/	/
		变化率	-5.4%	≤20%	合格
断裂伸长率	测试速度: 500 mm/min 标距: 25 mm	常态	220%	≥250%	不合格
		热老化后	220%	/	/
		变化率	0%	≤30%	合格
邵氏硬度	试样厚度: 6.14mm (3 层叠加)	常态	66 Shore A	70±5	合格
		热老化后	67 Shore A	/	/
		变化值	1	<10	合格

备注:

1. 变化率, % = (热老化后的值- 常态的值) / 常态的值×100
2. 变化值 = 热老化后的值-常态的值
3. 测试试样从样品中截取。
4. “-”表示变化方向



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测试报告

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测试照片:



样品



测试中-拉伸测试



测试中-硬度



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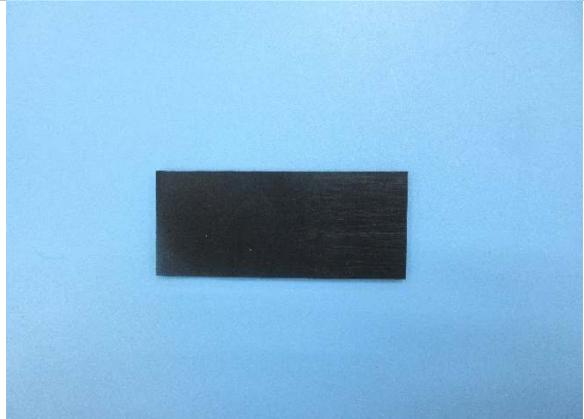
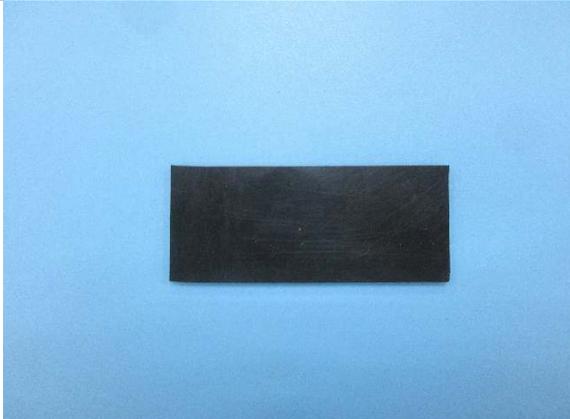
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<p>测试前-常态-硬度</p>	<p>测试后-常态-硬度</p>
	
<p>测试前-老化后-硬度</p>	<p>测试后-老化后-硬度</p>



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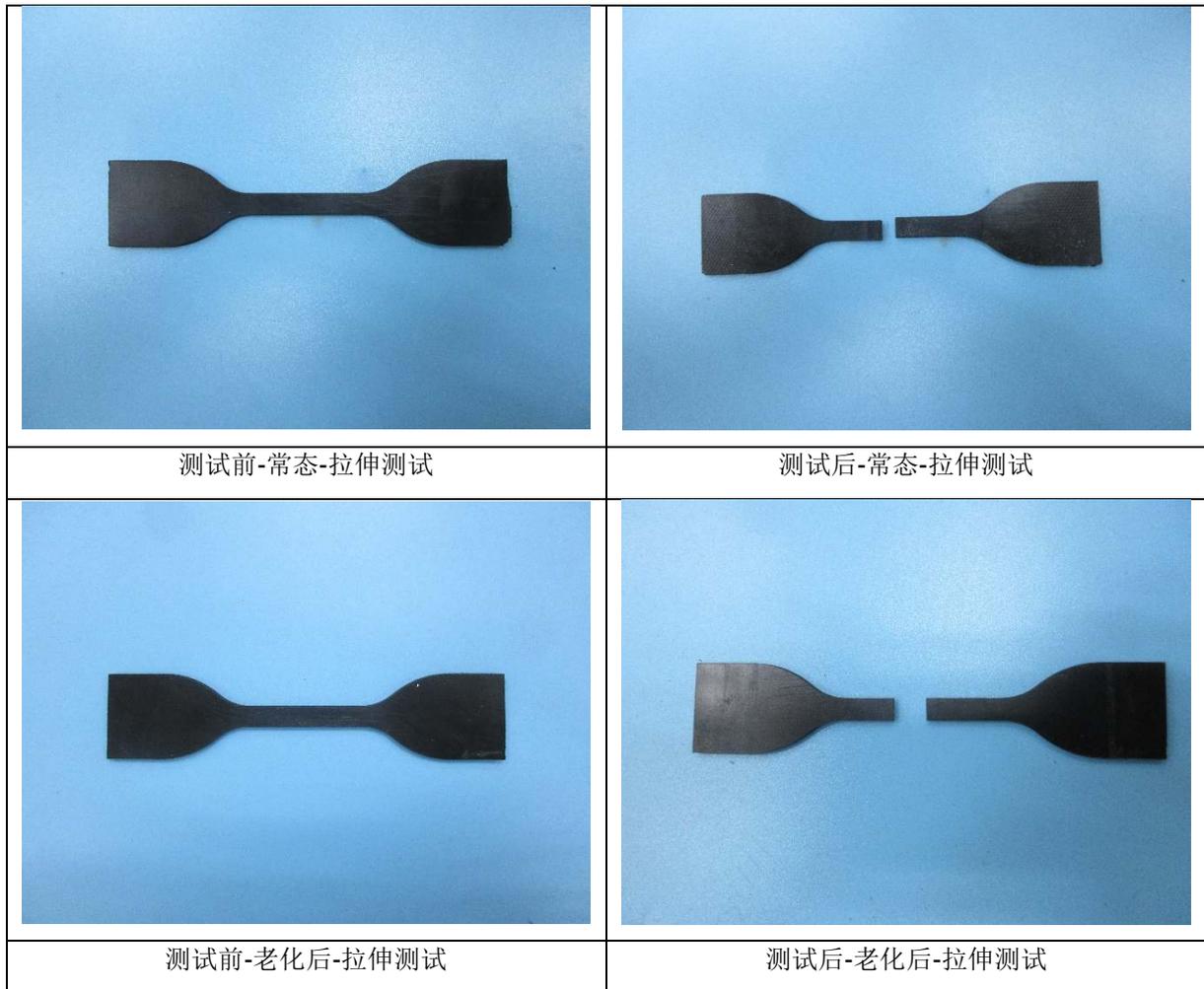
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设备信息:

设备	型号	设备编号	校准日期	下次校准日期
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邵氏 A 型硬度计	TH200	POL-004	2018-11-05	2019-11-04
电热鼓风烘箱	UF 260 Plus	POL-129	2019-05-10	2020-05-09



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测试报告

编号 : TJIN1909014955PS_CN

日期 : 2019-10-11

页码 : 16 of 25

5. 测试项目: 成分分析

样品描述: 橡胶件

测试方法:

傅立叶变换红外光谱仪 (FTIR)

裂解气相色谱-质谱仪 (PGC-MS)

气相色谱-质谱仪 (GC-MS)

X 射线荧光光谱仪 (XRF)

热重分析仪 (TGA)

测试结果:

编号	成分	含量, Wt%
1	三元乙丙橡胶(EPDM)	55
2	矿物油	5
3	脂肪酸酯	
4	二苯胺类防老剂	
5	碳酸钙	4
6	二氧化硅	
7	氧化锌	
8	炭黑	36

备注:

1.Wt% - 质量百分比。

2.定量数据仅供参考。



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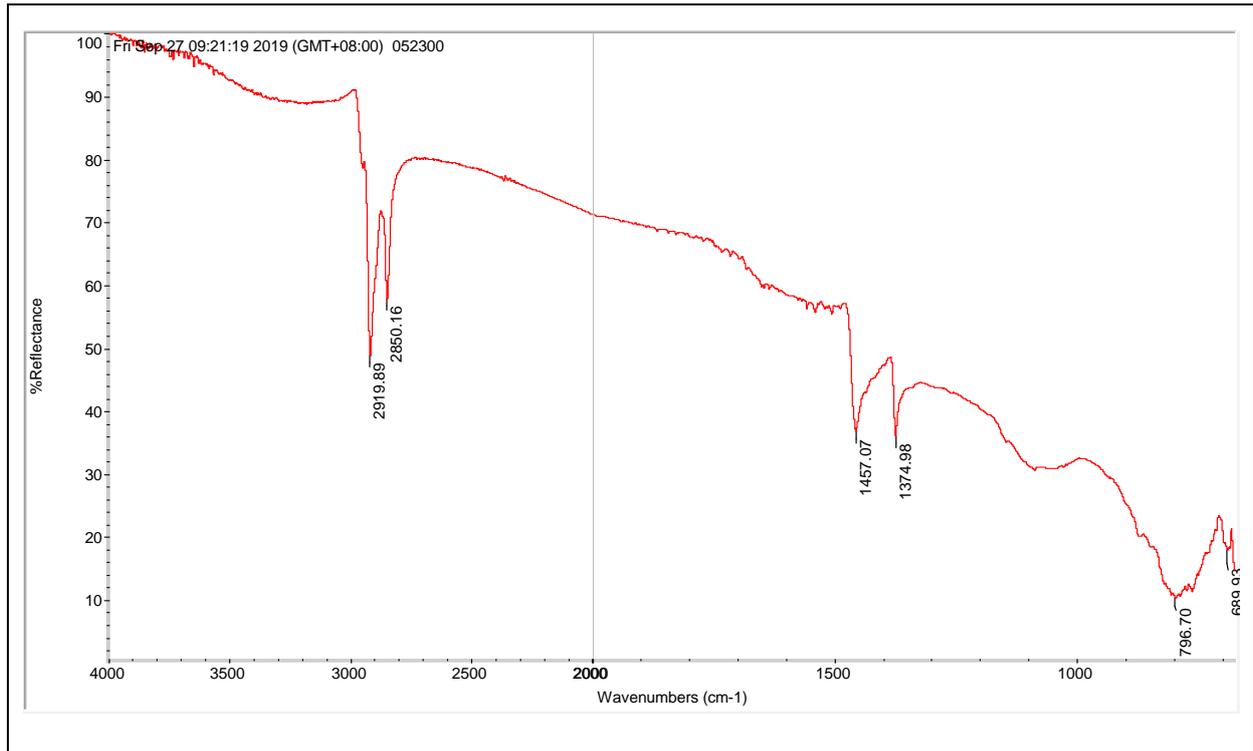
测试报告

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图 1: 原样的 FTIR 谱图



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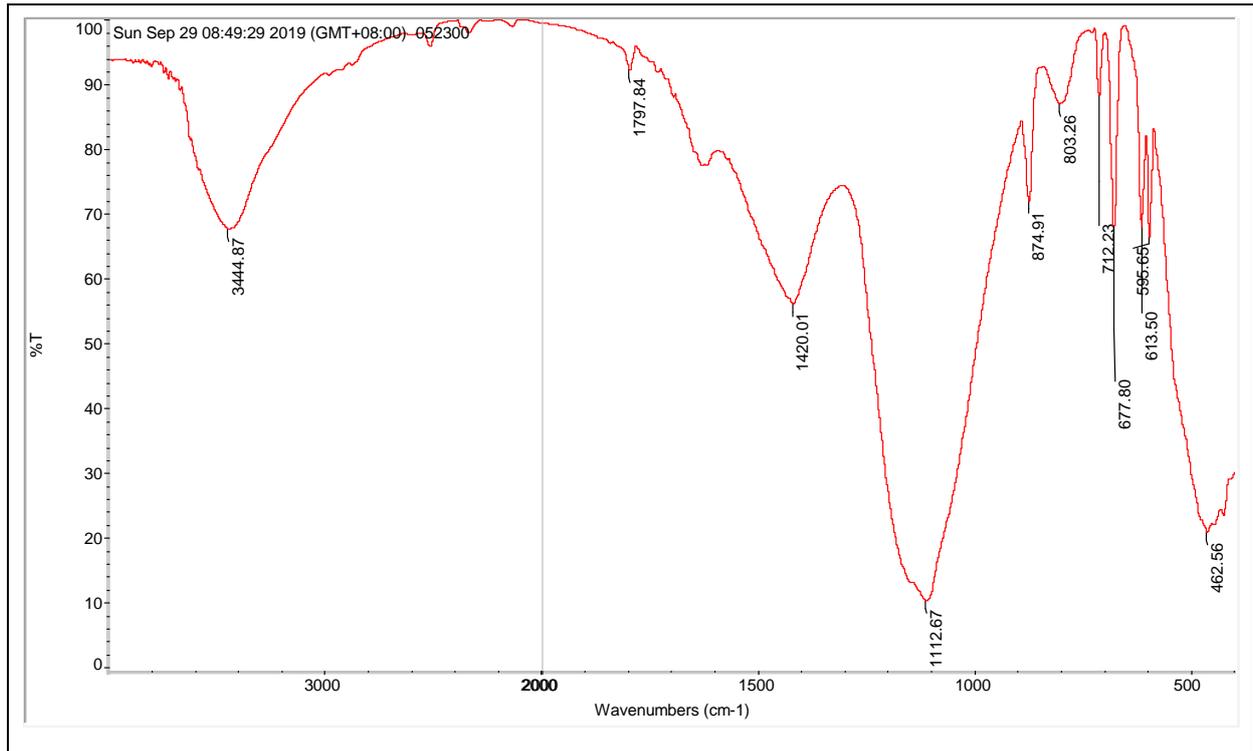
测试报告

编号 : TJIN1909014955PS_CN

日期 : 2019-10-11

页码 : 18 of 25

图 2: 灼烧残余的 FTIR 谱图



设备信息:

设备	型号	设备编号	校准日期	下次校准日期
傅立叶变换红外光谱仪	NICOLET 5700	GZMR-PL-E028	2019-08-15	2020-08-14
傅立叶变换红外光谱仪	NICOLET IS50	GZMR-PL-E216	2019-04-09	2020-04-08
裂解气相色谱-质谱仪	Shimadzu GCMS-QP2010	Chem-019-P	2019-04-03	2021-04-02
气相色谱-质谱仪	5977B-7890B	CHEM-019-CA	2017-10-24	2019-10-23
X 荧光光谱仪	EDX-720	CHEM-036-E	2019-04-03	2021-04-02
热重分析仪	Discovery TGA	GZMR-PL-E194	2017-12-08	2019-12-07



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测试报告

编号 : TJIN1909014955PS_CN

日期 : 2019-10-11

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6. 测试项目: 臭氧老化

样品描述: 橡胶片

测试方法: ISO 1431-1:2012 程序 A

试验条件:

伸长率: 20%

预处理温度: (23±2)°C

预处理时间: 48h

测试温度: (40±2)°C

臭氧浓度: (50±5)pphm

暴露时间: 72h

测试结果:

测试项目	外观	客户要求	结论
臭氧老化	无裂纹	无裂纹	合格

备注: 用 7X 放大镜检查。



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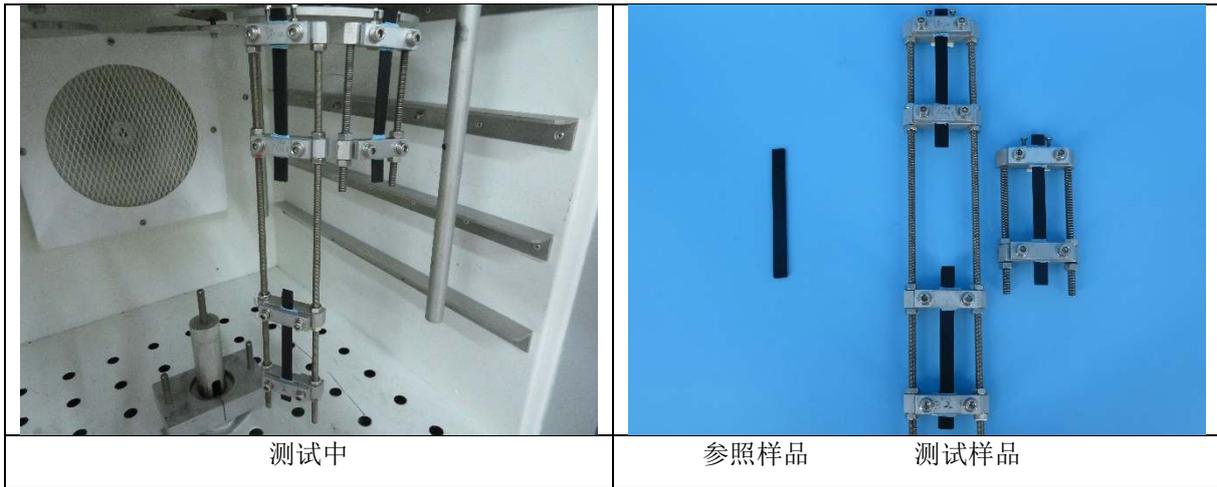
测试报告

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测试照片:



设备信息:

设备	型号	设备编号	校准日期	下次校准日期
703 臭氧试验箱	703	GZMR-AG-E068	2019-01-14	2020-01-13



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7. 测试项目: 压缩应力松弛

样品描述: 橡胶件

测试方法: 参照 ISO 3384-1:2011 Amd.1:2013 方法 A 和客户要求

测试条件:

试样内径: 24.0mm

径向宽度: 2.99mm

试样厚度: 5.32mm

预处理条件: 70°C, 3h→(23±2)°C,(50±5)%RH, 24h→25%压缩率, 5个循环

→(23±2)°C,(50±5)%RH, 24h

测试条件: 72°C, 48h

压缩率: 25%

实验室环境条件: (23±2)°C,(50±5)%RH

测试结果:

测试项目	测试结果	客户要求	结论
压缩应力松弛	8.1%	≤20%	合格



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Materials Laboratory

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测试报告

编号 : TJIN1909014955PS_CN

日期 : 2019-10-11

页码 : 22 of 25

测试照片:



设备信息:

设备	型号	设备编号	校准日期	下次校准日期
橡胶应力松弛试验机	TG-9311	GZMR-PL-E123	2019-04-22	2020-04-21



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8. 测试项目: 低温回缩

样品描述: 橡胶片

测试方法: ISO 2921:2011

测试条件:

试样: 哑铃型

试样厚度: 2.01mm

预处理条件: -70 °C, 10 min

升温速率: 1 °C/min

标距: 50 mm

伸长率: 120 %

实验室环境条件: 23 ± 2 °C, 50 ± 5 %RH

测试结果:

测试项目	测试结果	
低温回缩	TR10	-52°C
	TR30	-46°C
	TR50	-43°C
	TR70	-38°C

原始数据:

试样		#1	#2	#3
低温回缩, °C	TR10	-51.2	-51.6	-51.6
	TR30	-45.7	-46.0	-45.9
	TR50	-42.4	-42.9	-42.6
	TR70	-38.0	-38.6	-38.2

备注: 测试试样从样品中裁取。



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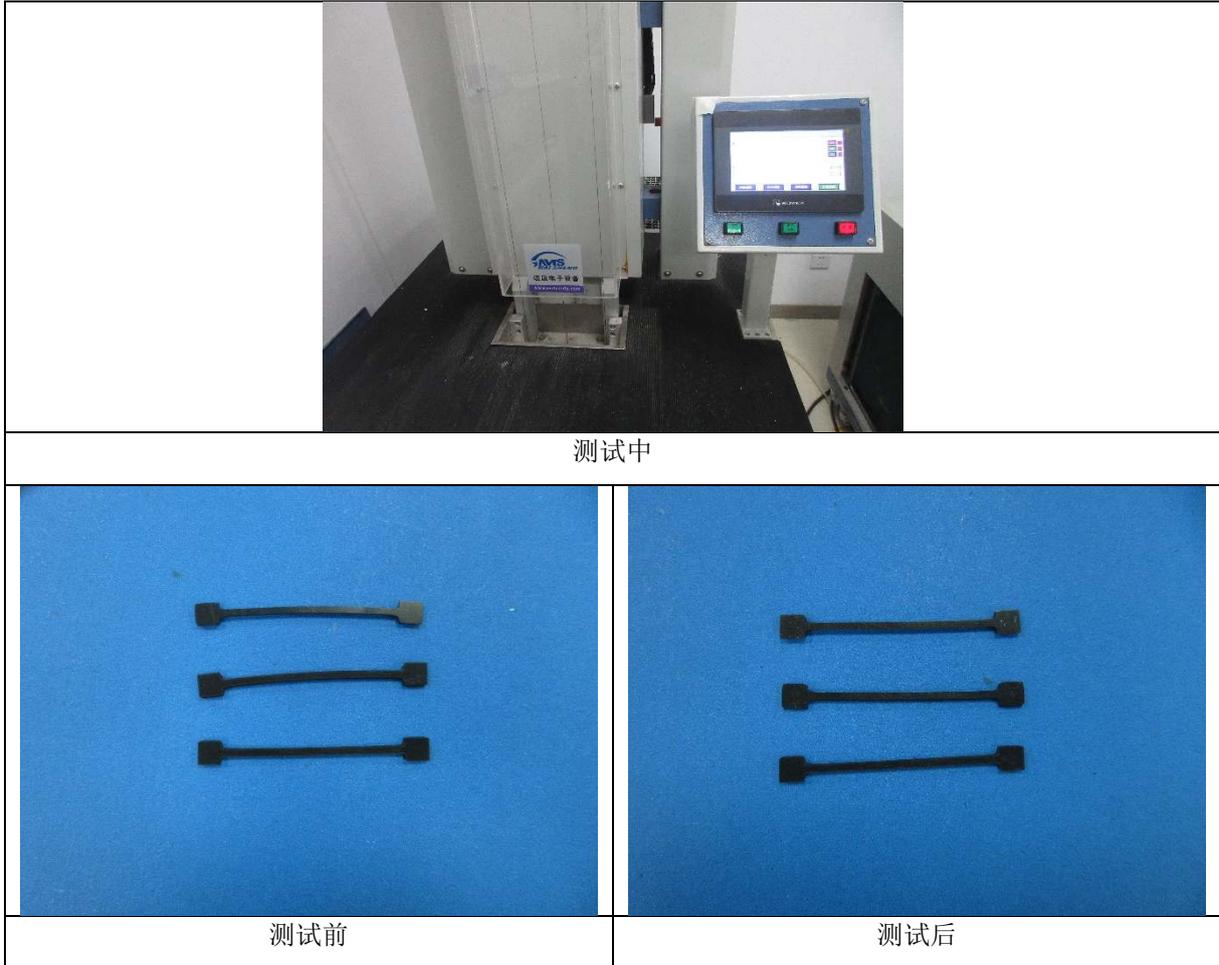
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设备信息:

设备	型号	设备编号	校准日期	下次校准日期
低温回缩试验仪	TG-7213-TR	GZMR-PL-E157	2019-07-16	2020-07-15

备注:

1. 以上测试项目 5-8 被分包。
2. 此测试报告是报告编号 TJIN1909014955PS 的中文译本，中英文版本如有歧义，概以英文版为准。

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