

验证报告

编号: TAOEC2400470506 A02 日期: 2024年05月22日 第1页,共11页

客户名称: 深圳爱旭数字能源技术有限公司

客户地址: 广东省深圳市福田区福保街道福保社区桃花路6号腾飞工业大厦B栋6层607

样品名称: 光伏组件
检测基本型号: AIKO-A440-MAH54Db
检测扩展型号: AIKO-A615-MAH72Dw
客户参考信息: AIKO-Axxx-MAH54Dw ;AIKO-Axxx-MCE54Dw ;AIKO-Axxx-MAH54Db ;
AIKO-Axxx-MCH54Db ;AIKO-Axxx-MCE54Dw ;AIKO-Axxx-MAH72Dw ;
AIKO-Gxxx-MCH72Dw ;AIKO-Axxx-MAE72Dw ;AIKO-Axxx-MDE72Dw ;
AIKO-Axxx-MAH78Dw ;AIKO-Axxx-MAE78Dw ;AIKO-Gxxx-MDH72Dw ;
AIKO-Gxxx-GRH66Dw ;AIKO-Axxx-GTE66Dw ;AIKO-Axxx-MAH60Dw ;
AIKO-Axxx-MCE60Dw ;AIKO-Axxx-MAH60Db ;AIKO-Axxx-MCE60Db ;
AIKO-Gxxx-MCH60Dw ;AIKO-Gxxx-MCH60Db

以上样品及信息由客户提供。

此报告替代原来编号为TAOEC2400470504 A01的报告。

SGS工作编号: SHP24-005148 - QD

样品接收日期: 2024年02月27日

验证周期: 2024年02月27日 - 2024年04月29日

验证要求: 根据客户要求检测。

验证方法: 请参见后续页。

验证结果: 请参见后续页。

检测结果总结

检测项目	结论
铅, 汞, 镉, 六价铬, 多溴联苯(PBBs), 多溴二苯醚(PBDEs), 邻苯二甲酸二丁酯(DBP), 邻苯二甲酸丁苄酯(BBP), 邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP)	符合



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授权签名

Zhang Bo, Justin 张波
批准签署人

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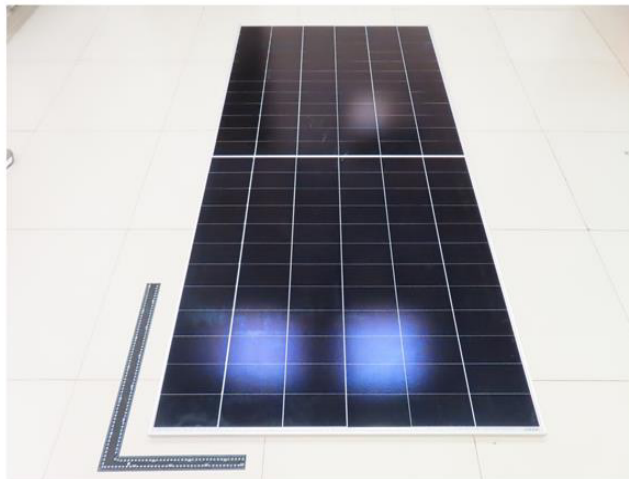
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样品照片



AIKO-A440-MAH54Db



AIKO-A615-MAH72Dw



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验证方法:

1. 参考IEC 62321-2:2021, 拆分申请者提供的成品。
2. 参考IEC 62321-1:2013, 仅对本报告照片中标识的样品进行了下列测试分析。
 - (1) 参考IEC 62321-3-1: 2013, 用能量色散型X射线荧光分析仪器进行筛选。
 - (2) 湿法化学检测方法: 参考IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, IEC 62321-7-2:2017, ISO 17075-1:2017, IEC 62321-6:2015和IEC 62321-8:2017, 采用ICP-OES, AAS, UV-Vis和GC-MS进行分析。

验证部件外观描述:

样品序号	样品编号	SGS 样品ID	样品描述
SN1	A1	TAO24-004705.001	黑色金属
SN2	A2	TAO24-004705.002	黑色胶带
SN3	A3	TAO24-004705.003	银色胶带
SN4	A4	TAO24-004705.004	黑色塑料
SN5	A5	TAO24-004705.005	黑色塑料
SN6	A6	TAO24-004705.006	白色胶
SN7	A7	TAO24-004705.007	黑色塑料
SN8	A8	TAO24-004705.008	白色胶
SN9	A9	TAO24-004705.009	黑色塑料线皮
SN10	A10	TAO24-004705.010	银色金属线芯
SN11	A11	TAO24-004705.011	黑色塑料
SN12	A12	TAO24-004705.012	黑色塑料
SN13	A13	TAO24-004705.013	银色金属
SN14	A14	TAO24-004705.014	红色橡胶
SN15	A15	TAO24-004705.015	黑色橡胶
SN16	A16	TAO24-004705.016	透明玻璃
SN17	A17	TAO24-004705.017	透明胶
SN18	A18	TAO24-004705.018	绿色固体
SN19	A19	TAO24-004705.019	黑色固体
SN20	B1	TAO24-004705.020	黑色塑料
SN21	B2	TAO24-004705.021	银色塑料标签
SN22	B3	TAO24-004705.022	银色塑料标签
SN23	B4	TAO24-004705.023	透明玻璃



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样品序号	样品编号	SGS 样品ID	样品描述
SN24	B5	TAO24-004705.024	透明胶
SN25	B6	TAO24-004705.025	银色金属
SN26	B7	TAO24-004705.026	绿色固体
SN27	B8	TAO24-004705.027	白色固体
SN28	B9	TAO24-004705.028	黑色橡胶
SN29	B10	TAO24-004705.029	黑色塑料
SN30	B11	TAO24-004705.030	黑色塑料
SN31	B12	TAO24-004705.031	灰色橡胶
SN32	B13	TAO24-004705.032	黑色塑料
SN33	B14	TAO24-004705.033	黑色塑料线皮



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验证结果:

(除特别标注, 单位均为: mg/kg)

检测项目	A1	A2	A3	A4	A5	A6	A7	A8
Pb	BL	BL	BL	BL	BL	BL	BL	BL
Cd	BL	BL	BL	BL	BL	BL	BL	BL
Hg	BL	BL	BL	BL	BL	BL	BL	BL
Cr(VI)▼	BL	BL	BL	BL	BL	BL	BL	BL
PBBs	---	BL	BL	BL	BL	BL	BL	BL
PBDEs	---	BL	BL	BL	BL	BL	BL	BL
DBP	---	BL	BL	BL	BL	BL	BL	BL
BBP	---	BL	BL	BL	BL	BL	BL	BL
DEHP	---	BL	BL	BL	BL	BL	BL	BL
DIBP	---	BL	BL	BL	BL	BL	BL	BL
结论	符合	符合	符合	符合	符合	符合	符合	符合

检测项目	A9	A10	A11	A12	A13	A14	A15	A16
Pb	BL	BL	BL	BL	BL	BL	BL	BL
Cd	BL	BL	BL	BL	BL	BL	BL	BL
Hg	BL	BL	BL	BL	BL	BL	BL	BL
Cr(VI)▼	BL	BL	BL	BL	ND	BL	BL	BL
PBBs	BL	---	BL	BL	---	BL	BL	BL
PBDEs	BL	---	BL	BL	---	BL	BL	BL
DBP	BL	---	BL	BL	---	BL	BL	---
BBP	BL	---	BL	BL	---	BL	BL	---
DEHP	BL	---	BL	BL	---	BL	BL	---
DIBP	BL	---	BL	BL	---	BL	BL	---
结论	符合	符合	符合	符合	符合	符合	符合	符合

检测项目	A17	A18	A19	B1	B2	B3	B4	B5
Pb	BL	BL	BL	BL	BL	BL	BL	BL
Cd	BL	BL	BL	BL	BL	BL	BL	BL
Hg	BL	BL	BL	BL	BL	BL	BL	BL
Cr(VI)▼	BL	BL	BL	BL	BL	BL	BL	BL
PBBs	BL	BL	BL	BL	BL	BL	BL	BL



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检测项目	A17	A18	A19	B1	B2	B3	B4	B5
PBDEs	BL	BL	BL	BL	BL	BL	BL	BL
DBP	BL	BL	BL	BL	BL	BL	---	BL
BBP	BL	BL	BL	BL	BL	BL	---	BL
DEHP	BL	BL	BL	BL	BL	BL	---	BL
DIBP	BL	BL	BL	BL	BL	BL	---	BL
结论	符合	符合	符合	符合	符合	符合	符合	符合

检测项目	B6	B7	B8	B9	B10	B11	B12	B13
Pb	BL	BL	BL	BL	BL	BL	BL	BL
Cd	BL	BL	BL	BL	BL	BL	BL	BL
Hg	BL	BL	BL	BL	BL	BL	BL	BL
Cr(VI)▼	BL	BL	BL	BL	BL	BL	BL	BL
PBBs	---	BL	BL	BL	BL	BL	BL	BL
PBDEs	---	BL	BL	BL	BL	BL	BL	BL
DBP	---	BL	BL	BL	BL	BL	BL	BL
BBP	---	BL	BL	BL	BL	BL	BL	BL
DEHP	---	BL	BL	BL	BL	BL	BL	BL
DIBP	---	BL	BL	BL	BL	BL	BL	BL
结论	符合	符合	符合	符合	符合	符合	符合	符合

检测项目	B14
Pb	BL
Cd	BL
Hg	BL
Cr(VI)▼	BL
PBBs	BL
PBDEs	BL
DBP	BL
BBP	BL
DEHP	BL
DIBP	BL
结论	符合



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备注:

(1) X 射线荧光光谱法(XRF)筛选结果说明:

(a) 下表为 IEC62321-3-1: 2013 附录 A 不同基体材料中以 mg/kg 表示的筛选元素限值:

元素	聚合物	金属	复合材料
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$	不适用	$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

(b) 现行法规限制的最大允许值是对 PBB/PBDE 和 Cr(VI) 而不是对 Br 和 Cr 的, 而 XRF 测定的是 Br 和 Cr。如果元素 Br 和或 Cr 的定量结果均高于限值(Br 计算基于在常见物质中 PBB/PBDE 的组成的理论计算), 则样品的筛选结果为“不确定”。

(c) EDXRF 的结果用于初步筛选, LOD=检出限, BL=低于限值, OL=超出限值, IN (符号“X”标记的区域)=不确定, 需要进一步研究, 我们建议客户用更精确的化学检测方法测试样品, 如用 ICP-OES 测试 Cd/Pb/Hg; 用 UV-Vis 测试 Cr(VI); 用 GC-MS 测试 PBBs/PBDEs。

(d) 对于复合材料, EDXRF 筛选测试 RoHS 元素所得数据可能与样品中实际含量不同。

(2) 邻苯二甲酸酯(PHTH)筛分结果只作初步筛选, 如果测试结果超出下表所规定的警戒范围, 我们采用更精确的化学检测方法测试样品, 用 GC-MS 测试 DBP、BBP、DEHP 和 DIBP (单位: mg/kg)。

测试项目	CAS No.	聚合物/复合材料
邻苯二甲酸二丁酯 (DBP)	84-74-2	$BL \leq 600 < X$
邻苯二甲酸丁苄酯 (BBP)	85-68-7	$BL \leq 600 < X$
邻苯二甲酸二(2-乙基己基)酯 (DEHP)	117-81-7	$BL \leq 600 < X$
邻苯二甲酸二异丁酯 (DIBP)	84-69-5	$BL \leq 600 < X$

(3) 化学检测方法结果说明

(a) mg/kg = 0.0001%, MDL=方法检测限, ND =未检出(低于 MDL), --- =不适用。

(b) 化学检测方法的表达单位和方法检测限

测试项目	Pb	Cd	Hg	DBP	BBP	DEHP	DIBP
单位	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
方法检测限	10	10	10	100	100	100	100

任何一种 PBBs 和 PBDEs 的方法检测限是 100mg/kg:

聚合物, 复合材料和皮革样品中 Cr(VI)的方法检测限是 10mg/kg。

金属样品中 Cr(VI)的方法检测限是 0.10μg/cm²。



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(c) ▼ = 金属样品中

- a. 当六价铬的浓度高于 $0.13\mu\text{g}/\text{cm}^2$ 时, 样品为阳性, 即含有六价铬;
- b. 当六价铬的浓度为 ND (低于 $0.10\mu\text{g}/\text{cm}^2$) 时, 样品为阴性, 即未检测到六价铬;
- c. 当六价铬的浓度介于 $0.10\mu\text{g}/\text{cm}^2$ 与 $0.13\mu\text{g}/\text{cm}^2$ 之间时, 无法直接判定是否检测到六价铬, 因不同个体的样品表面差异可能会影响测定结果;

由于未获知样品的存储条件和生产日期, 样品的六价铬测试结果仅能代表测试时样品含六价铬的状态。

(4) IEC 62321 系列等同于 EN 62321 系列。

(5) 客户所规定的各项的限值为: 铅、汞、六价铬、多溴联苯(PBBs)、多溴二苯醚(PBDEs) 为1000 mg/kg, 镉的限值为100 mg/kg。

(6) 仅对样品照片中的选定部分进行了测试 并得出结论。

(7) 本报告更新了客户参考信息。

除非另有说明, 参照ILAC-G8:09/2019, 使用简单接受 ($w=0$) 的二元判定规则进行符合性判定。

除非另有说明, 此报告结果仅对检测的样品负责。本报告未经本公司书面许可, 不可部分复制。

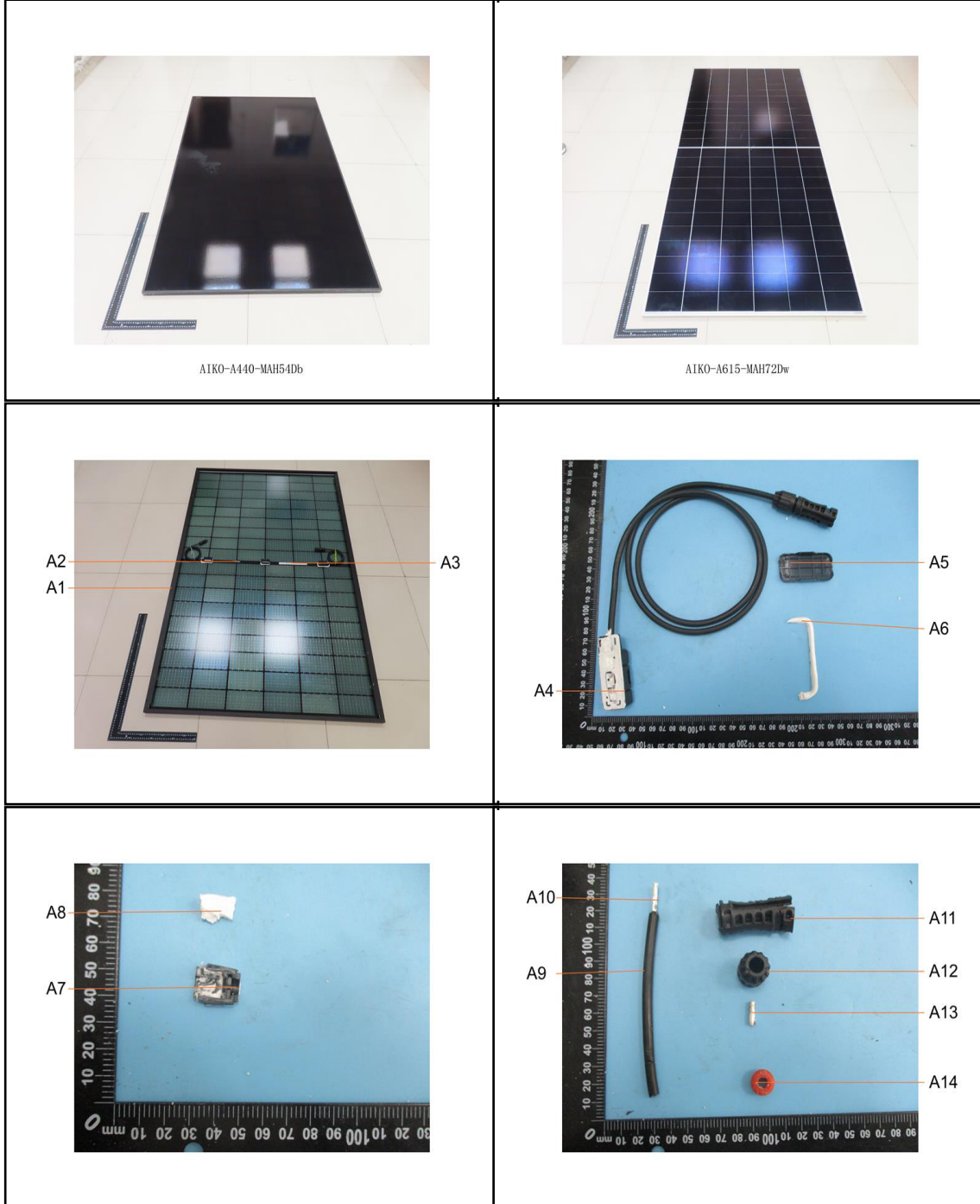
检测报告仅用于客户科研、教学、内部质量控制、产品研发等目的, 仅供内部参考。



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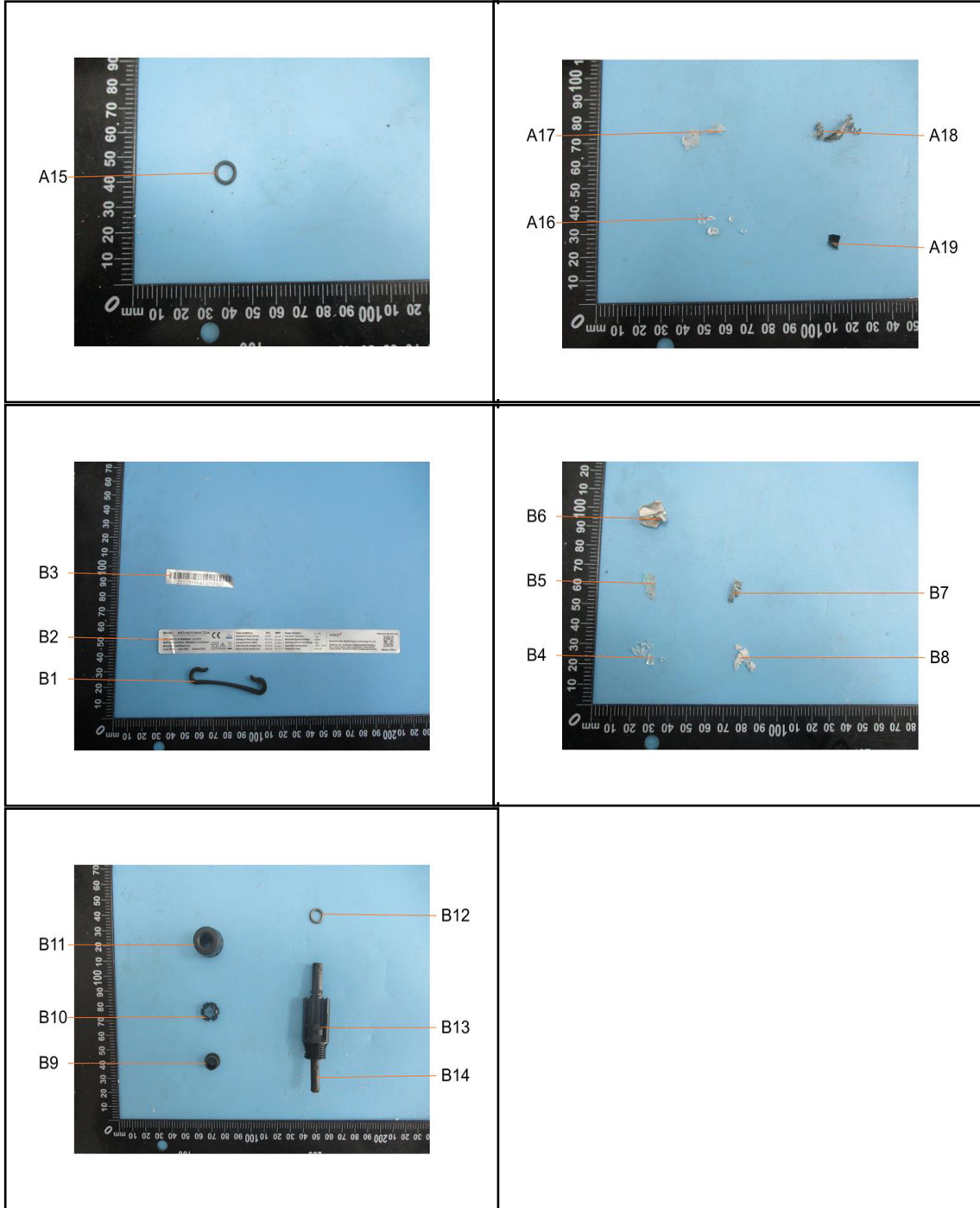
样品照片:



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