

## Verification Report No.: SHAEC24009612701

Date: Aug 09, 2024

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Client Name: Shanghai JA Solar Technology Co., Ltd.

Client Address: No 118,Lane 3111,West Huangcheng Road,Fengxian District, 201401 Shanghai,P.R.China.

Sample Name: Mono crystalline silicon photovoltaic (PV) modules

Tested Basic Model No.: JAM66D46-xxx/LB

Client Ref. Information: Please refer to remark (6)

The above sample(s) and information were provided by the client.

SGS Job No.: SHP24-014499

Sample Receiving Date: May 11, 2024

Verification Period: May 11, 2024 ~ Jun 11, 2024

Verification Requested: With reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU.

Verification Method(s): Please refer to next page(s).

Verification Result(s): Please refer to next page(s).

Signed for and on behalf of  
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Jessica Chen

Jessica Chen  
Approved Signatory

scan to see the report



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Photo of Submitted Sample



## Verification Method(s):

1. With reference to IEC 62321-2:2021, disassembly and disjointment were performed for the submitted samples.
2. With reference to IEC 62321-1:2013, tests were performed for the samples indicated by the photos in this report.
  - (1) With reference to IEC 62321-3-1:2013, screening by EDXRF spectroscopy.
  - (2) Wet chemical test method: With reference to IEC 62321-4:2013+A1:2017, IEC62321-5:2013, IEC 62321-7-1:2015, IEC 62321-7-2:2017, IEC 62321-12:2023, IEC 62321-6:2015 and IEC62321-8:2017 , analyzed by ICP-OES,UV-Vis and GC-MS.



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**Verification Part Description:**

| SN ID | Sample No. | SGS Sample ID           | Description                     |
|-------|------------|-------------------------|---------------------------------|
| SN1   | A1         | SHA24-0096127-0001.C001 | Colorful solid                  |
| SN2   | A2         | SHA24-0096127-0001.C002 | Silvery metal                   |
| SN3   | A3         | SHA24-0096127-0001.C003 | Silvery metal                   |
| SN4   | A4         | SHA24-0096127-0001.C004 | Colorful adhesive plastic       |
| SN5   | A5         | SHA24-0096127-0001.C005 | White plastic                   |
| SN6   | A6         | SHA24-0096127-0001.C006 | Black plastic                   |
| SN7   | A7         | SHA24-0096127-0001.C007 | White adhesive                  |
| SN8   | A8         | SHA24-0096127-0001.C008 | Black plastic                   |
| SN9   | A9         | SHA24-0096127-0001.C009 | Silvery metal                   |
| SN10  | A10        | SHA24-0096127-0001.C010 | Black IC (body)                 |
| SN11  | A11        | SHA24-0096127-0001.C011 | Black plastic                   |
| SN12  | A12        | SHA24-0096127-0001.C012 | Black rubber                    |
| SN13  | A13        | SHA24-0096127-0001.C013 | Black plastic                   |
| SN14  | A14        | SHA24-0096127-0001.C014 | Black plastic                   |
| SN15  | A15        | SHA24-0096127-0001.C015 | Silvery metal                   |
| SN16  | A16        | SHA24-0096127-0001.C016 | Silvery metal                   |
| SN17  | A17        | SHA24-0096127-0001.C017 | Red rubber                      |
| SN18  | A18        | SHA24-0096127-0001.C018 | Black plastic                   |
| SN19  | A19        | SHA24-0096127-0001.C019 | Yellow plastic                  |
| SN20  | A20        | SHA24-0096127-0001.C020 | Black plastic                   |
| SN21  | A21        | SHA24-0096127-0001.C021 | Black plastic                   |
| SN22  | A22        | SHA24-0096127-0001.C022 | Black plastic                   |
| SN23  | A23        | SHA24-0096127-0001.C023 | Silvery metal                   |
| SN24  | A24        | SHA24-0096127-0001.C024 | Black plastic                   |
| SN25  | A25        | SHA24-0096127-0001.C025 | Silvery metal                   |
| SN26  | A26        | SHA24-0096127-0001.C026 | Colorful adhesive plastic       |
| SN27  | A27        | SHA24-0096127-0001.C027 | White/Black adhesive plastic    |
| SN28  | A28        | SHA24-0096127-0001.C028 | Transparent plastic             |
| SN29  | A29        | SHA24-0096127-0001.C029 | White plastic                   |
| SN30  | A30        | SHA24-0096127-0001.C030 | Black plastic                   |
| SN31  | A31        | SHA24-0096127-0001.C031 | Black plastic                   |
| SN32  | A32        | SHA24-0096127-0001.C032 | Black plastic                   |
| SN33  | A33        | SHA24-0096127-0001.C033 | Brown rubber                    |
| SN34  | A34        | SHA24-0096127-0001.C034 | Black plastic                   |
| SN35  | A35        | SHA24-0096127-0001.C035 | Brown rubber                    |
| SN36  | A36        | SHA24-0096127-0001.C036 | Silvery metal                   |
| SN37  | A37        | SHA24-0096127-0001.C037 | Brown rubber                    |
| SN38  | A38        | SHA24-0096127-0001.C038 | Silvery metal (soldering strip) |
| SN39  | A39        | SHA24-0096127-0001.C039 | Silvery metal                   |



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**Verification Result(s):**

In accordance with the result of material risk assessment, the following disjointed parts in the submitted sample have been verified. (Unless otherwise specified, the unit is mg/kg).

| Test Item(s) | A1 | A2  | A3  | A4 | A5 | A6 | A7 | A8 |
|--------------|----|-----|-----|----|----|----|----|----|
| Pb           | BL | BL  | BL  | BL | BL | BL | BL | BL |
| Hg           | BL | BL  | BL  | BL | BL | BL | BL | BL |
| Cd           | BL | BL  | BL  | BL | BL | BL | BL | BL |
| Cr(VI)▼      | BL | BL  | BL  | BL | BL | BL | BL | BL |
| PBB          | BL | --- | --- | BL | BL | BL | BL | BL |
| PBDE         | BL | --- | --- | BL | BL | BL | BL | BL |
| DEHP         | BL | --- | --- | BL | BL | BL | BL | BL |
| BBP          | BL | --- | --- | BL | BL | BL | BL | BL |
| DBP          | BL | --- | --- | BL | BL | BL | BL | BL |
| DIBP         | BL | --- | --- | BL | BL | BL | BL | BL |

| Test Item(s) | A9     | A10 | A11 | A12 | A13 | A14 | A15 | A16 |
|--------------|--------|-----|-----|-----|-----|-----|-----|-----|
| Pb           | 183049 | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Hg           | BL     | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Cd           | BL     | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Cr(VI)▼      | BL     | BL  | BL  | BL  | BL  | BL  | ND  | ND  |
| PBB          | ---    | BL  | BL  | BL  | BL  | BL  | --- | --- |
| PBDE         | ---    | BL  | BL  | BL  | BL  | BL  | --- | --- |
| DEHP         | ---    | BL  | BL  | BL  | BL  | BL  | --- | --- |
| BBP          | ---    | BL  | BL  | BL  | BL  | BL  | --- | --- |
| DBP          | ---    | BL  | BL  | BL  | BL  | BL  | --- | --- |
| DIBP         | ---    | BL  | BL  | BL  | BL  | BL  | --- | --- |

| Test Item(s) | A17 | A18 | A19 | A20 | A21 | A22 | A23 | A24 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Pb           | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Hg           | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Cd           | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Cr(VI)▼      | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| PBB          | BL  | BL  | BL  | BL  | BL  | BL  | --- | BL  |
| PBDE         | BL  | BL  | BL  | BL  | BL  | BL  | --- | BL  |
| DEHP         | BL  | BL  | BL  | BL  | BL  | BL  | --- | BL  |
| BBP          | BL  | BL  | BL  | BL  | BL  | BL  | --- | BL  |
| DBP          | BL  | BL  | BL  | BL  | BL  | BL  | --- | BL  |
| DIBP         | BL  | BL  | BL  | BL  | BL  | BL  | --- | BL  |

| Test Item(s) | A25 | A26 | A27 | A28 | A29 | A30 | A31 | A32 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Pb           | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Hg           | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Cd           | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| Cr(VI)▼      | BL  | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| PBB          | --- | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| PBDE         | --- | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| DEHP         | --- | BL  | BL  | BL  | BL  | BL  | BL  | BL  |



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| Test Item(s) | A25 | A26 | A27 | A28 | A29 | A30 | A31 | A32 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|
| BBP          | --- | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| DBP          | --- | BL  | BL  | BL  | BL  | BL  | BL  | BL  |
| DIBP         | --- | BL  | BL  | BL  | BL  | BL  | BL  | BL  |

| Test Item(s) | A33 | A34 | A35 | A36 | A37 | A38    | A39   |
|--------------|-----|-----|-----|-----|-----|--------|-------|
| Pb           | BL  | BL  | BL  | BL  | BL  | 120338 | 70987 |
| Hg           | BL  | BL  | BL  | BL  | BL  | BL     | BL    |
| Cd           | BL  | BL  | BL  | BL  | BL  | BL     | BL    |
| Cr(VI)▼      | BL  | BL  | BL  | BL  | BL  | BL     | BL    |
| PBB          | BL  | BL  | BL  | --- | BL  | ---    | ---   |
| PBDE         | BL  | BL  | BL  | --- | BL  | ---    | ---   |
| DEHP         | BL  | BL  | BL  | --- | BL  | ---    | ---   |
| BBP          | BL  | BL  | BL  | --- | BL  | ---    | ---   |
| DBP          | BL  | BL  | BL  | --- | BL  | ---    | ---   |
| DIBP         | BL  | BL  | BL  | --- | BL  | ---    | ---   |



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### Notes:

(1) Interpretation of screening results by X-ray fluorescence spectrometry (XRF):

(a) Screening limits in mg/kg for regulated elements in various matrices according to IEC 62321-1:2013 Annex A as below table.

| Element | Polymers   | Metals   | Composite Materials                                  |
|---------|--|--|--|
| 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      | $BL \leq (300-3\sigma) < X$                          | Not applicable                                       | $BL \leq (250-3\sigma) < X$                          |
| Cr      | $BL \leq (700-3\sigma) < X$                          | $BL \leq (700-3\sigma) < X$                          | $BL \leq (500-3\sigma) < X$                          |

(b) If the maximum allowed level restricts PBB/PBDE and Cr(VI) rather than Br and Cr, the exceptions are the XRF determinations of Br and Cr. If the quantitative results for the elements Br and/or Cr are higher than the limit (for Br calculated based on the stoichiometry of Br in the most common congeners of PBB/PBDE), the sample is "inconclusive".

(c) Results are obtained by EDXRF for primary screening, LOD = Limit of Detection, BL = Below Limit, OL = Over Limit, IN (The symbol X marks the region) = Inconclusive, where further investigation is necessary, and further chemical testing by ICP-OES (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBB/PBDE) are recommended to be performed.

(d) The EDXRF screening test for elements – The reading may be different to the actual content in the sample be of non-uniformity composition.

(2) Screening results of Phthalates (PHTH) below the limits are shown as "BL". Further chemical testing by GC-MS is to be performed if the results exceed limits.

| Test Items                         | CAS No.  |
|------------------------------------|----------|
| Bis(2-ethylhexyl) phthalate (DEHP) | 117-81-7 |
| Butyl benzyl phthalate (BBP)       | 85-68-7  |
| Dibutyl phthalate (DBP)            | 84-74-2  |
| Diisobutyl phthalate (DIBP)        | 84-69-5  |

(3) Interpretation of results by chemical tests:

(a) mg/kg = 0.0001%, MDL = Method detection Limit, ND = Not Detected (<MDL), --- = Not Applicable.

(b) Unit and MDL in wet chemical test

| Test Items | Pb    | Hg    | Cd    | DEHP  | BBP   | DBP   | DIBP  |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Unit       | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| MDL        | 10    | 10    | 10    | 100   | 100   | 100   | 100   |

The MDL for single compound of PBB and PBDE is 100 mg/kg,

MDL of Cr(VI) for polymer, composite and leather sample is 10 mg/kg.

MDL of Cr(VI) for metal sample is 0.10 µg/cm².

(c) ▼ = Metal sample

a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 µg/cm². The sample coating is considered to contain Cr(VI).

b. The sample is negative for Cr(VI) if Cr(VI) is ND (concentration less than 0.10 µg/cm²). The coating is considered a non-Cr(VI) based coating

c. The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive-unavoidable coating variations may influence the determination

Information on storage conditions and production date of the tested sample is unavailable and thus



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Cr(VI) results represent status of the sample at the time of testing.

- (4) Restricted substances and maximum concentration values tolerated by weight in homogeneous materials under RoHS Directive: Cd: 0.01%, Pb/Hg/Cr(VI)/PBB/PBDE/DEHP/BBP/DBP/DIBP: 0.1%. The limit is quoted from RoHS Directive (EU) 2015/863.
- (5) IEC 62321 series is equivalent to EN 62321 series.

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule ( $w=0$ ) stated in ILAC-G8:09/2019.



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Attachment:

(6) Client Ref. Information:

JAM72D40-xxx/HB,xxx means STC output, xxx= 580 to 620 in step of 5

JAM54D40-xxx/HB,xxx means STC output, xxx= 430 to 465 in step of 5

JAM54D41-xxx/HB,xxx means STC output, xxx= 425 to 465 in step of 5

**Maximum System Voltage: 1500 V**

JAM66D46-680/LB, JAM66D46-685/LB, JAM66D46-690/LB, JAM66D46-695/LB,

JAM66D46-700/LB, JAM66D46-705/LB, JAM66D46-710/LB, JAM66D46-715/LB,

JAM66D46-720/LB, JAM66D46-725/LB, JAM66D46-730/LB

JAM60D46-610/LB, JAM60D46-615/LB, JAM60D46-620/LB, JAM60D46-625/LB,

JAM60D46-630/LB, JAM60D46-635/LB, JAM60D46-640/LB, JAM60D46-645/LB,

JAM60D46-650/LB, JAM60D46-655/LB, JAM60D46-660/LB, JAM60D46-665/LB

JAM66D45-590/LB, JAM66D45-595/LB, JAM66D45-600/LB, JAM66D45-605/LB,

JAM66D45-610/LB, JAM66D45-615/LB, JAM66D45-620/LB, JAM66D45-625/LB

JAM60D45-535/LB, JAM60D45-540/LB, JAM60D45-545/LB, JAM60D45-550/LB,

JAM60D45-555/LB, JAM60D45-560/LB, JAM60D45-565/LB, JAM60D45-570/LB

JAM54D45-480/LB, JAM54D45-485/LB, JAM54D45-490/LB, JAM54D45-495/LB,

JAM54D45-500/LB, JAM54D45-505/LB, JAM54D45-510/LB, JAM54D45-515/LB

JAM48D45-430/LB, JAM48D45-435/LB, JAM48D45-440/LB, JAM48D45-445/LB,

JAM48D45-450/LB, JAM48D45-455/LB, JAM48D45-460/LB

JAM72D42-605/LB, JAM72D42-610/LB, JAM72D42-615/LB, JAM72D42-620/LB,

JAM72D42-625/LB, JAM72D42-630/LB, JAM72D42-635/LB, JAM72D42-640/LB,

JAM72D42-645/LB, JAM72D42-650/LB

JAM66D42-540/MB, JAM66D42-545/MB, JAM66D42-550/MB, JAM66D42-555/MB,

JAM66D42-560/MB, JAM66D42-565/MB, JAM66D42-570/MB, JAM66D42-575/MB,

JAM66D42-580/MB, JAM66D42-585/MB, JAM66D42-590/MB, JAM66D42-595/MB,

JAM66D42-600/MB

JAM60D42-495/LB, JAM60D42-500/LB, JAM60D42-505/LB, JAM60D42-510/LB,

JAM60D42-515/LB, JAM60D42-520/LB, JAM60D42-525/LB, JAM60D42-530/LB,



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JAM60D42-535/LB, JAM60D42-540/LB, JAM60D42-545/LB

JAM54D42-450/LB, JAM54D42-455/LB, JAM54D42-460/LB, JAM54D42-465/LB,  
JAM54D42-470/LB, JAM54D42-475/LB, JAM54D42-480/LB, JAM54D42-485/LB,  
JAM54D42-490/LB

JAM60D43-495/LB, JAM60D43-500/LB, JAM60D43-505/LB, JAM60D43-510/LB,  
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JAM54D43-450/LB, JAM54D43-455/LB, JAM54D43-460/LB, JAM54D43-465/LB,  
JAM54D43-470/LB, JAM54D43-475/LB, JAM54D43-480/LB, JAM54D43-485/LB,  
JAM54D43-490/LB

JAM72D40-580/LB, JAM72D40-585/LB, JAM72D40-590/LB, JAM72D40-595/LB,  
JAM72D40-600/LB, JAM72D40-605/LB, JAM72D40-610/LB

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JAM60D40-510/LB

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JAM72D40-560/MB, JAM72D40-565/MB, JAM72D40-570/MB, JAM72D40-575/MB,  
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JAM72D40-600/MB

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JAM66D40-520/MB, JAM66D40-525/MB, JAM66D40-530/MB, JAM66D40-535/MB,  
JAM66D40-540/MB, JAM66D40-545/MB, JAM66D40-550/MB

JAM60D40-455/MB, JAM60D40-460/MB, JAM60D40-465/MB, JAM60D40-470/MB,  
JAM60D40-475/MB, JAM60D40-480/MB, JAM60D40-485/MB, JAM60D40-490/MB,  
JAM60D40-495/MB, JAM60D40-500/MB

JAM54D40-415/MB, JAM54D40-420/MB, JAM54D40-425/MB, JAM54D40-430/MB,



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JAM54D40-435/MB, JAM54D40-440/MB, JAM54D40-445/MB, JAM54D40-450/MB

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JAM72D40-620/HB



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JAM54D40-430/HB, JAM54D40-435/HB, JAM54D40-440/HB, JAM54D40-445/HB,  
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JAM48D44-450/LB, JAM48D44-455/LB, JAM48D44-460/LB

(7) According to the declaration from applicant, the materials of Model "JAM66D46-xxx/LB" are the same as those in Model of remark (6) and its results for support the results of Model in remark (6). The applicant will take the responsibility of all discrepancy and risk.



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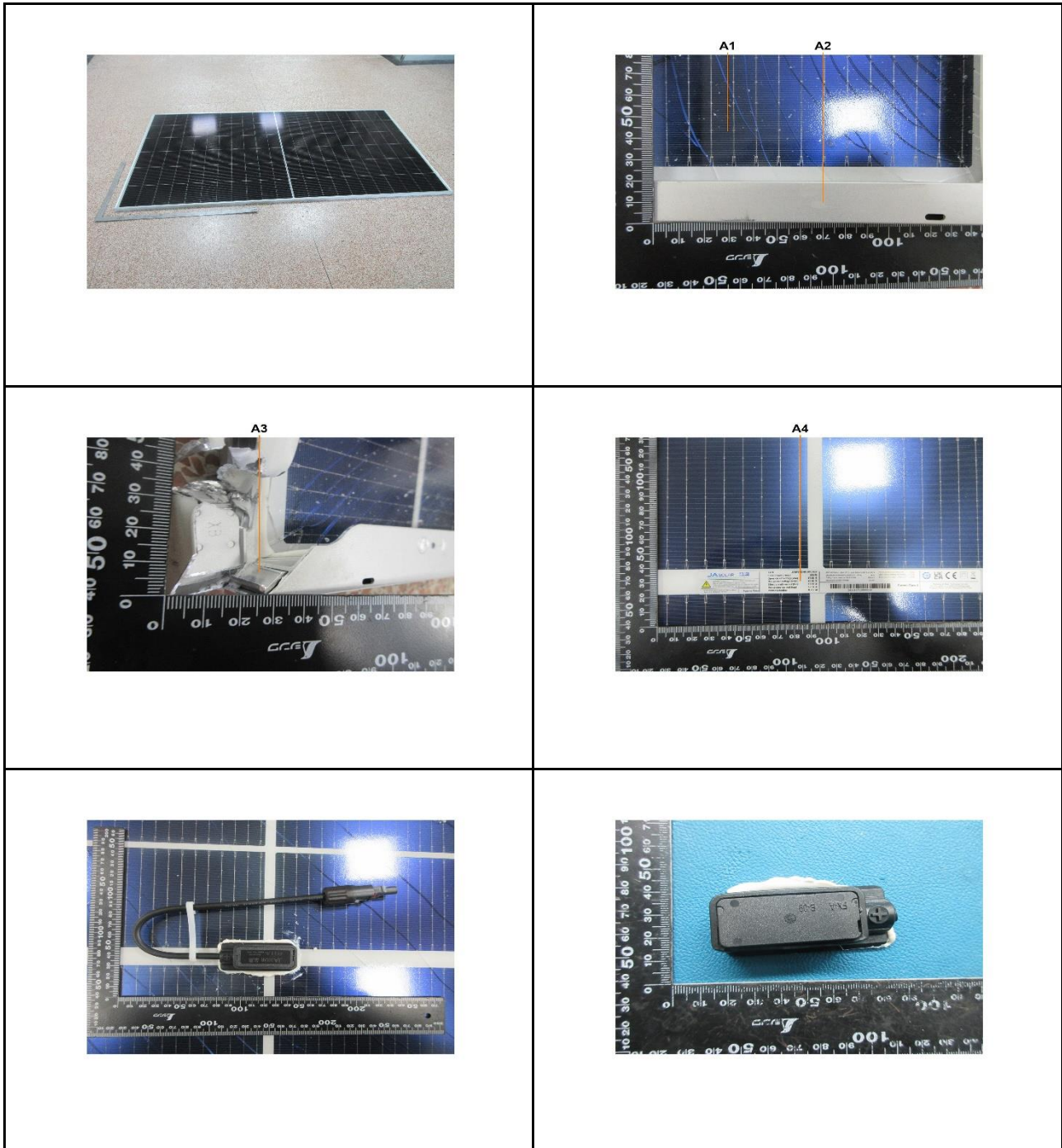
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**Sample photos:**



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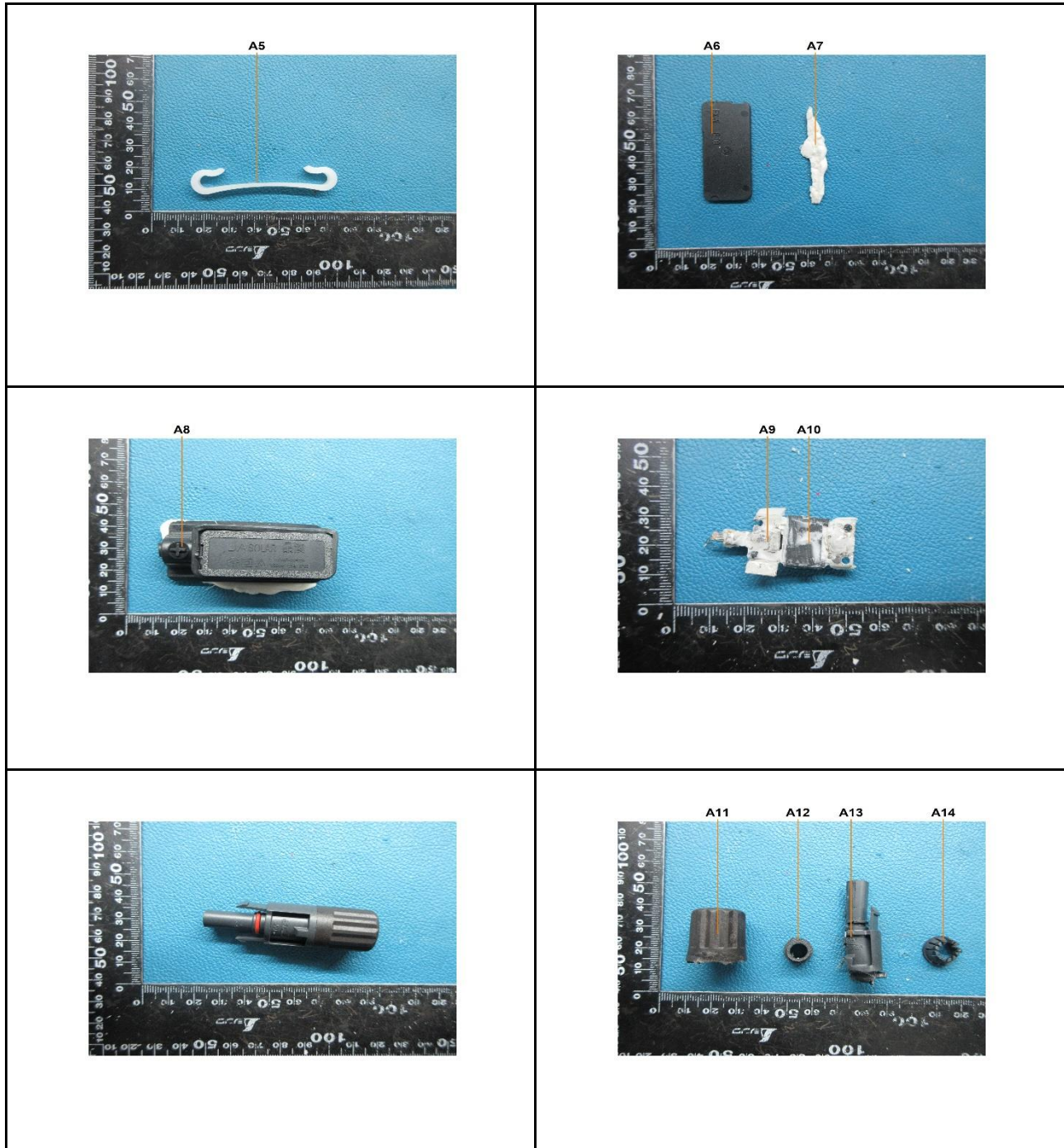
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t HL (86-21) 61402594 f HL (86-21) 61156899 e [sgs.china@sgs.com](mailto:sgs.china@sgs.com)





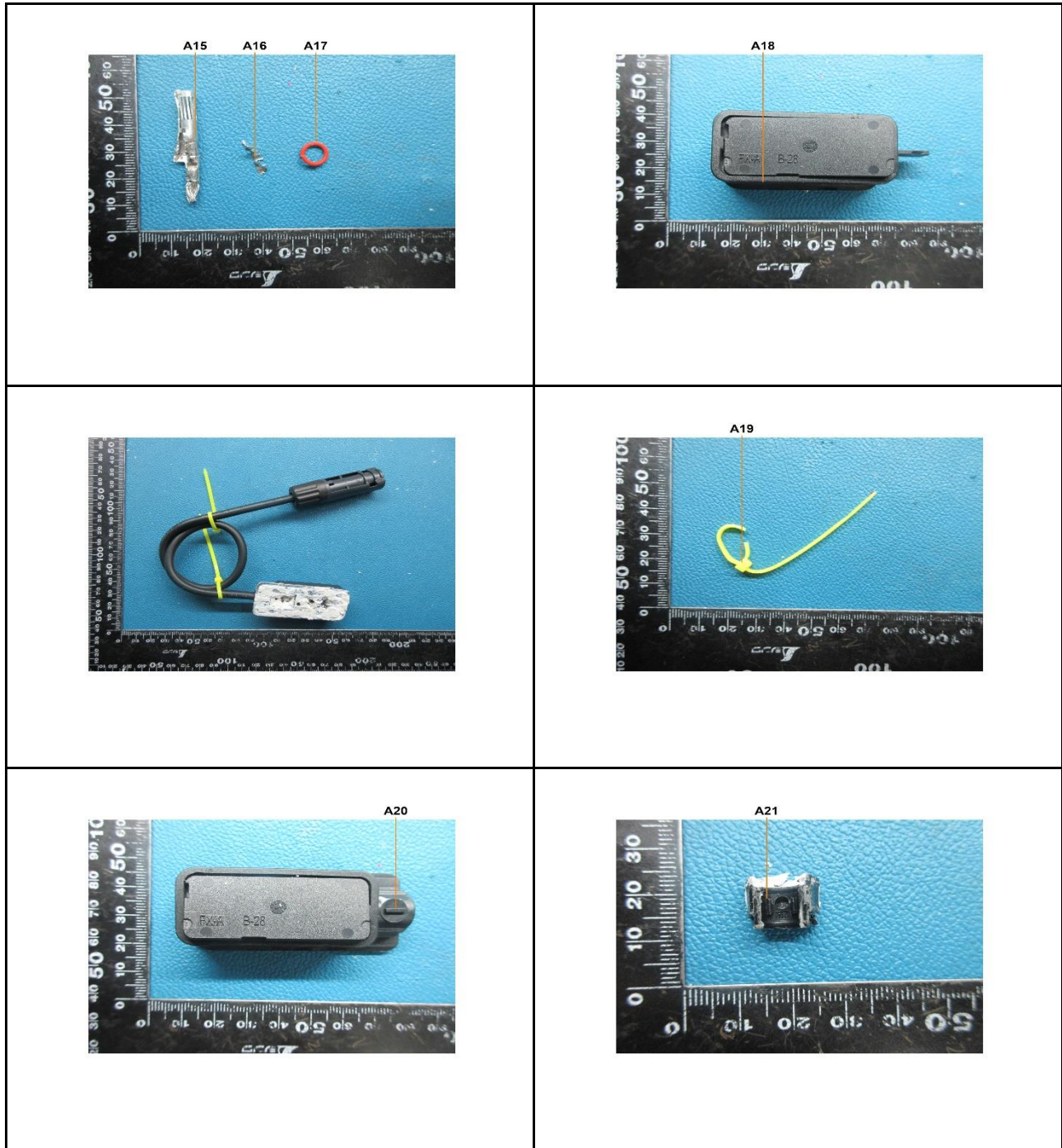
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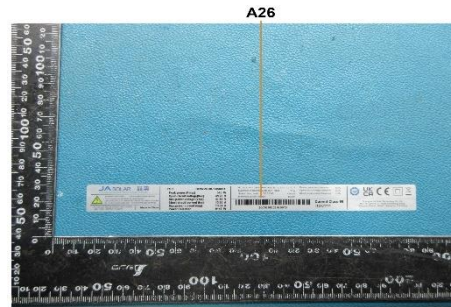
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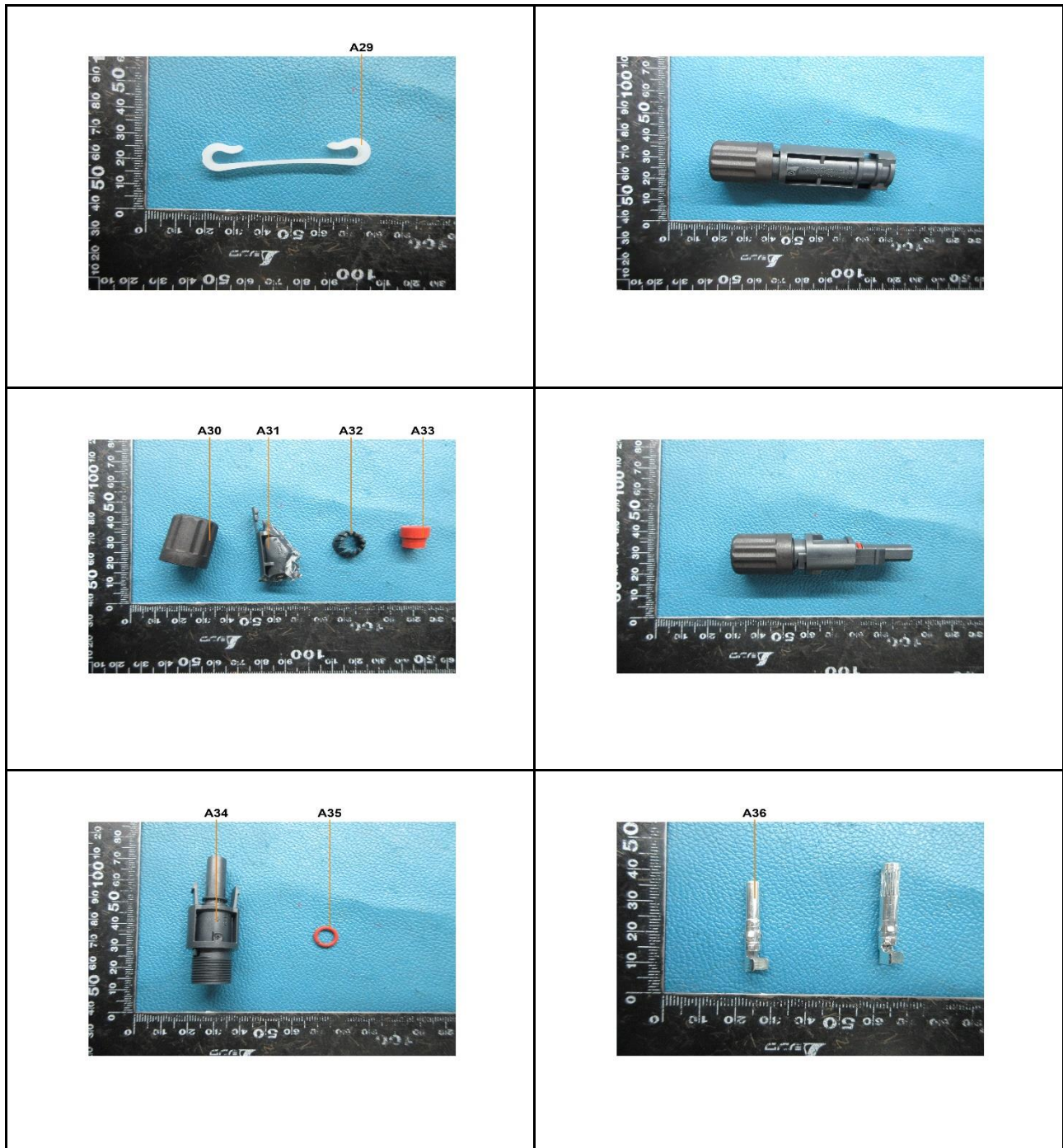
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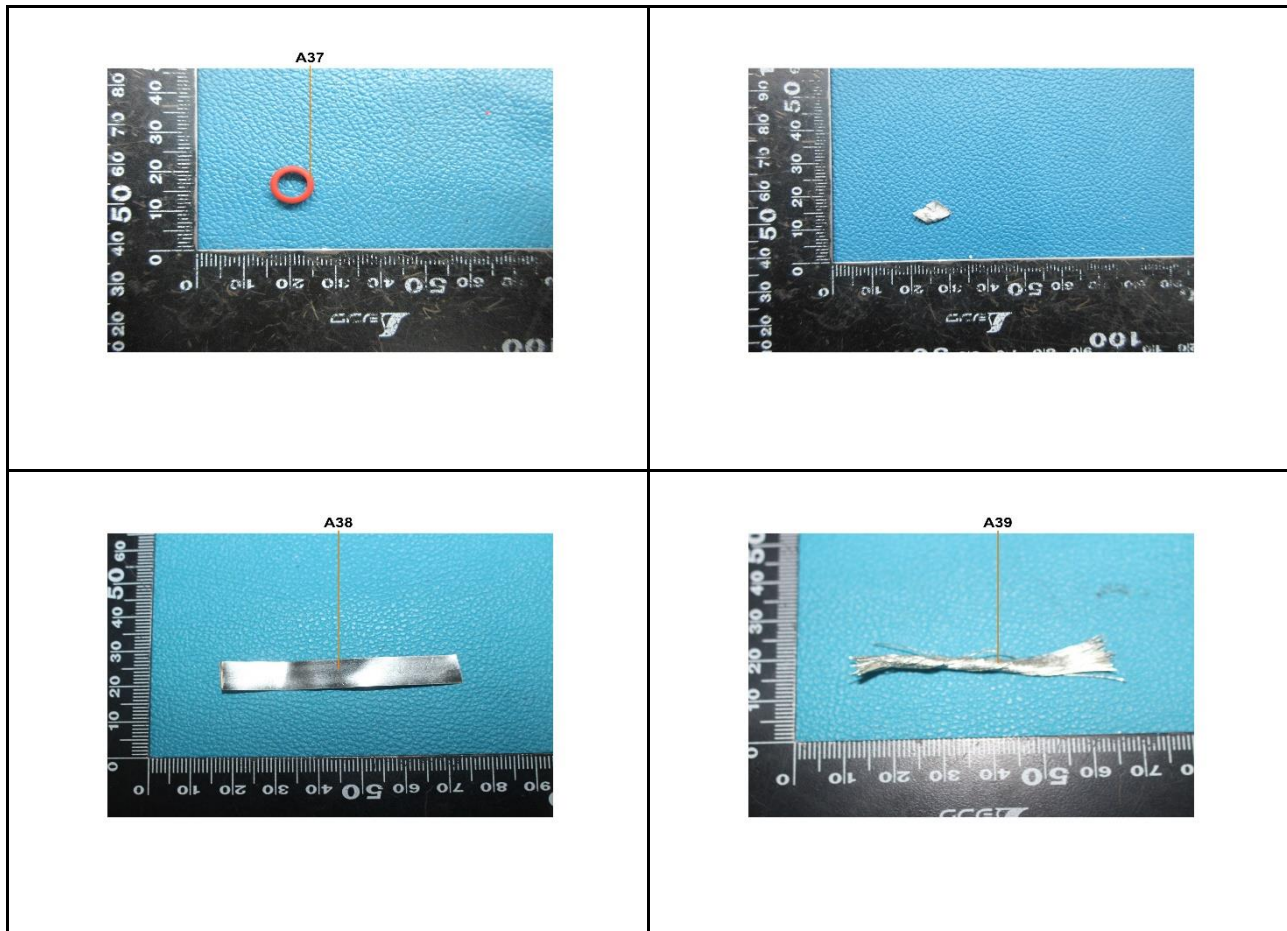
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