



## 阿克苏诺贝尔（中国）投资有限公司 粉末涂料技术中心实验室测试报告

签发日期: 2019-12-06  
任务编号: PTC/2019/10011

项目名称: 中性盐雾 (NSS) 测试

客户: 中驰

地址: 上海

联络人: 袁永康

收样日期: 2019-10-16

测试开始日期: 2019-10-16

样品描述: 抛丸+热镀锌+喷砂前处理钢结构样板 8 块;

产品名称: 4000USP+D2015; 4000USP+JL180CS; 670HS+D2015; 670HS+JL180CS

涂层表面良好, 无划痕。

样品来源: 客户送样。

测试要求 (测试标准&测试时间):

| 测试要求   |                                    | 测试标准                 | 评价                             |
|--------|------------------------------------|----------------------|--------------------------------|
| NSS 测试 | 破坏性测试。划 2mm<br>“一”, 720 小时&1000 小时 | ISO 12944-6-<br>2018 | 测试结束后根据 ISO 12944-6-2018 进行评价。 |

注: 涂层表面 2mm 划痕为客户操作。

\*\*\*\*\*To be continued\*\*\*\*\*

**测试结果:**

| 试样编号                        | 膜厚/ $\mu\text{m}$ | 测试时间<br>/hrs | 测试结果                     |                     |             |
|-----------------------------|-------------------|--------------|--------------------------|---------------------|-------------|
|                             |                   |              | 表面状况<br>(起泡; 锈蚀; 开裂; 剥落) | 平均单边腐蚀宽度<br>(剥) /mm | 7 天后<br>附着力 |
| (01)<br>4000USP<br>+D2015   | 304~358           | 707.2        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 1        |
| (02)<br>4000USP<br>+D2015   | 326~366           | 997.3        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 1        |
| (03)<br>4000USP<br>+JL180CS | 270~346           | 707.2        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 1        |
| (04)<br>4000USP<br>+JL180CS | 304~342           | 997.3        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 1        |
| (05)<br>670HS+<br>D2015     | 222~238           | 707.2        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 2        |
| (06)<br>670HS+<br>D2015     | 238~260           | 997.3        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 2        |
| (07)<br>670HS+<br>JL180CS   | 230~246           | 707.2        | 0(S0);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 2        |
| (08)<br>670HS+<br>JL180CS   | 254~286           | 997.3        | 1(S4);Ri0; 0(S0); 0(S0)  | 0 (划痕外无红锈)          | 等级 2        |

注: 测试时间误差: 720 小时; 12.8 小时; 1000 小时; 2.7 小时。(最大测试时间误差为 24 小时)

\*\*\*\*\*To be continued\*\*\*\*\*

测试图片:

(01) 4000USP+D2015; (03) 4000USP+JL180CS



\*\*\*\*\*To be continued\*\*\*\*\*

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(05) 670HS+D2015; (07) 670HS+JL180CS



\*\*\*\*\*To be continued\*\*\*\*\*

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(02) 4000USP+D2015; (04) 4000USP+JL180CS



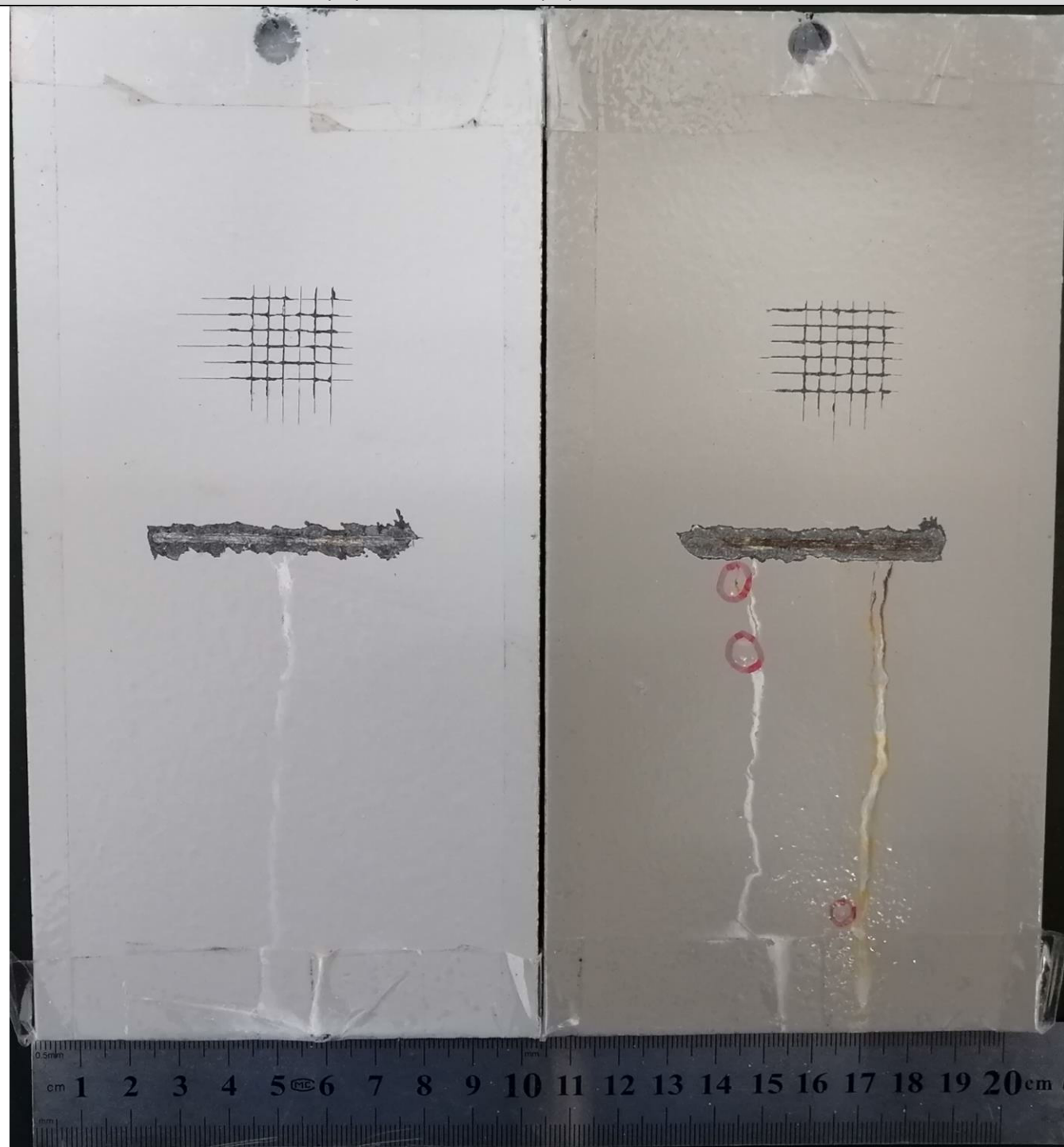
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(06) 670HS+D2015; (08) 670HS+JL180CS



注：照片中红色圆圈处为起泡区域。

\*\*\*\*\*To be continued\*\*\*\*\*

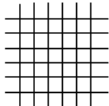
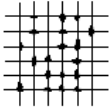
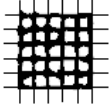
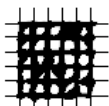
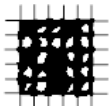
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附录:

1. 根据 ISO 2409: 2013 对附着力测试进行评级:

**Table 1 — Classification of test results**

| Classification | Description                                                                                                                                                                                                                                | Appearance of surface of cross-cut area from which flaking has occurred <sup>a</sup><br>(Example for six parallel cuts) |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 0              | The edges of the cuts are completely smooth; none of the squares of the lattice is detached.                                                                                                                                               |                                      |
| 1              | Detachment of small flakes of the coating at the intersections of the cuts. A cross-cut area not greater than 5 % is affected.                                                                                                             |                                      |
| 2              | The coating has flaked along the edges and/or at the intersections of the cuts. A cross-cut area greater than 5 %, but not greater than 15 %, is affected.                                                                                 |                                      |
| 3              | The coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different parts of the squares. A cross-cut area greater than 15 %, but not greater than 35 %, is affected. |                                     |
| 4              | The coating has flaked along the edges of the cuts in large ribbons and/or some squares have detached partly or wholly. A cross-cut area greater than 35 %, but not greater than 65 %, is affected.                                        |                                    |
| 5              | Any degree of flaking that cannot even be classified by classification 4.                                                                                                                                                                  | —                                                                                                                       |

<sup>a</sup> The figures are examples for a cross-cut within each step of the classification. The percentages stated are based on the visual impression given by the pictures and the same percentages will not necessarily be reproduced with digital imaging.

\*\*\*\*\*To be continued\*\*\*\*\*

2.根据标准 ISO 4628-1:2016 对缺陷数量、尺寸评级如下:

**Table 1 — Rating scheme for designating the quantity of defects**

| Rating | Quantity of defect                                         |
|--------|------------------------------------------------------------|
| 0      | none, i.e. no detectable defects                           |
| 1      | very few, i.e. small, barely significant number of defects |
| 2      | few, i.e. small but significant number of defects          |
| 3      | moderate number of defects                                 |
| 4      | considerable number of defects                             |
| 5      | dense pattern of defects                                   |

**Table 2 — Rating scheme for designating the size of defects**

| Rating | Size of defect <sup>a</sup>                                                    |
|--------|--------------------------------------------------------------------------------|
| 0      | not visible under ×10 magnification                                            |
| 1      | only visible under magnification up to ×10                                     |
| 2      | just visible with normal corrected vision (up to 0,2 mm) <sup>b</sup>          |
| 3      | clearly visible with normal corrected vision (larger than 0,2 mm up to 0,5 mm) |
| 4      | larger than 0,5 mm up to 5 mm                                                  |
| 5      | larger than 5 mm                                                               |

<sup>a</sup> Unless otherwise specified in subsequent parts of ISO 4628.

<sup>b</sup> Typically, defects larger than 0,2 mm are visible with normal corrected vision.

**Table 3 — Rating scheme for designating the intensity of changes**

| Rating | Intensity of change                            |
|--------|------------------------------------------------|
| 0      | unchanged, i.e. no perceptible change          |
| 1      | very slight, i.e. just perceptible change      |
| 2      | slight, i.e. clearly perceptible change        |
| 3      | moderate, i.e. very clearly perceptible change |
| 4      | considerable, i.e. pronounced change           |
| 5      | very marked change                             |

比如: 起泡等级 4 (S3) 表示气泡数量为 4 级, 起泡尺寸为 3 级。

\*\*\*\*\*To be continued\*\*\*\*\*



3.根据标准 ISO 4628-2:2016 对起泡评级如下:



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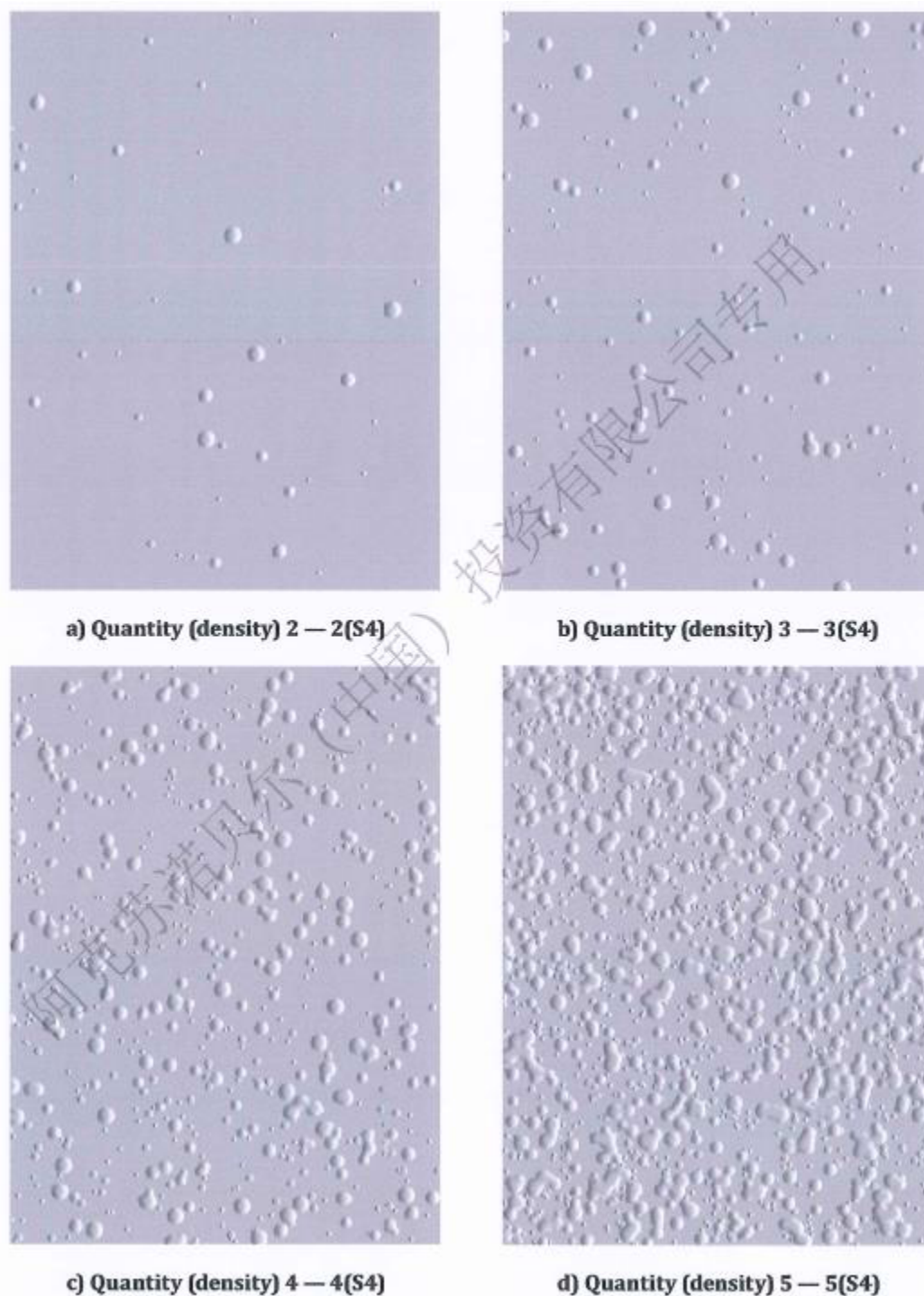


AkzoNobel





AkzoNobel

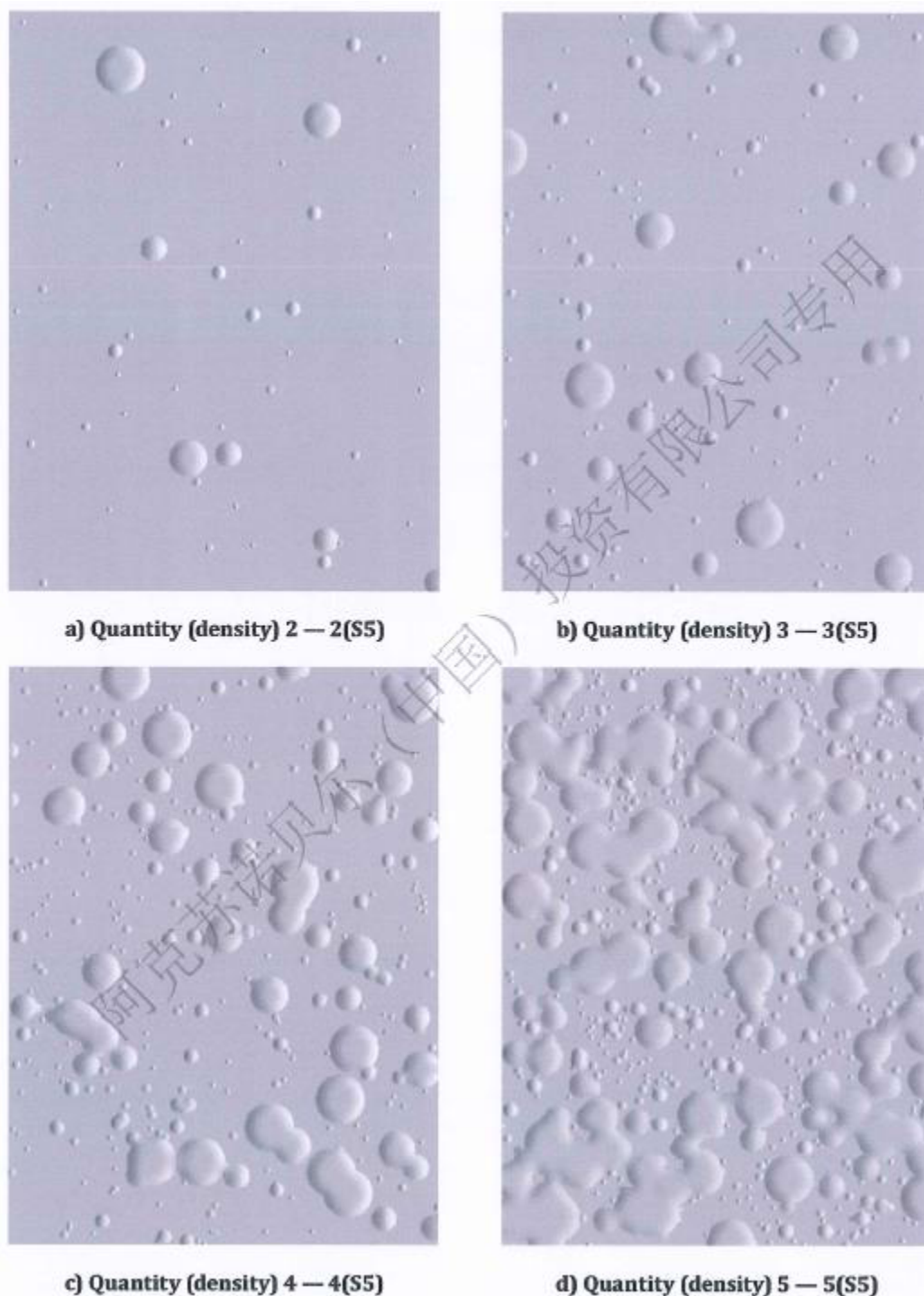


**Figure 3 — Blisters of size 4**

\*\*\*\*\*To be continued\*\*\*\*\*



AkzoNobel



**Figure 4 — Blisters of size 5**

\*\*\*\*\*To be continued\*\*\*\*\*

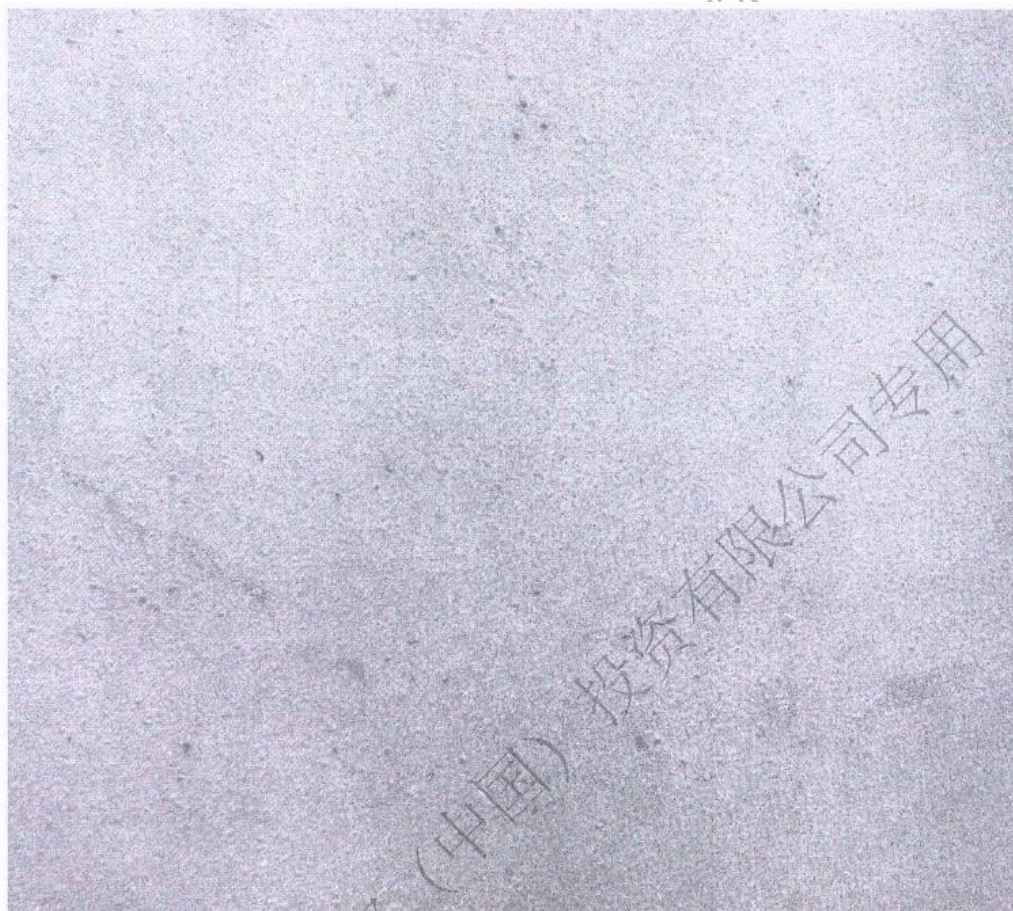


4.根据标准 ISO 4628-3:2016 对生锈评级如下:

**Table 1 — Degree of rusting and rusted area**

| Degree of rusting | Rusted area<br>%      |
|-------------------|-----------------------|
| Ri 0              | 0                     |
| Ri 1              | 0,05                  |
| Ri 2              | 0,5                   |
| Ri 3              | 1                     |
| Ri 4              | 8                     |
| Ri 5              | 40 to 50 <sup>a</sup> |

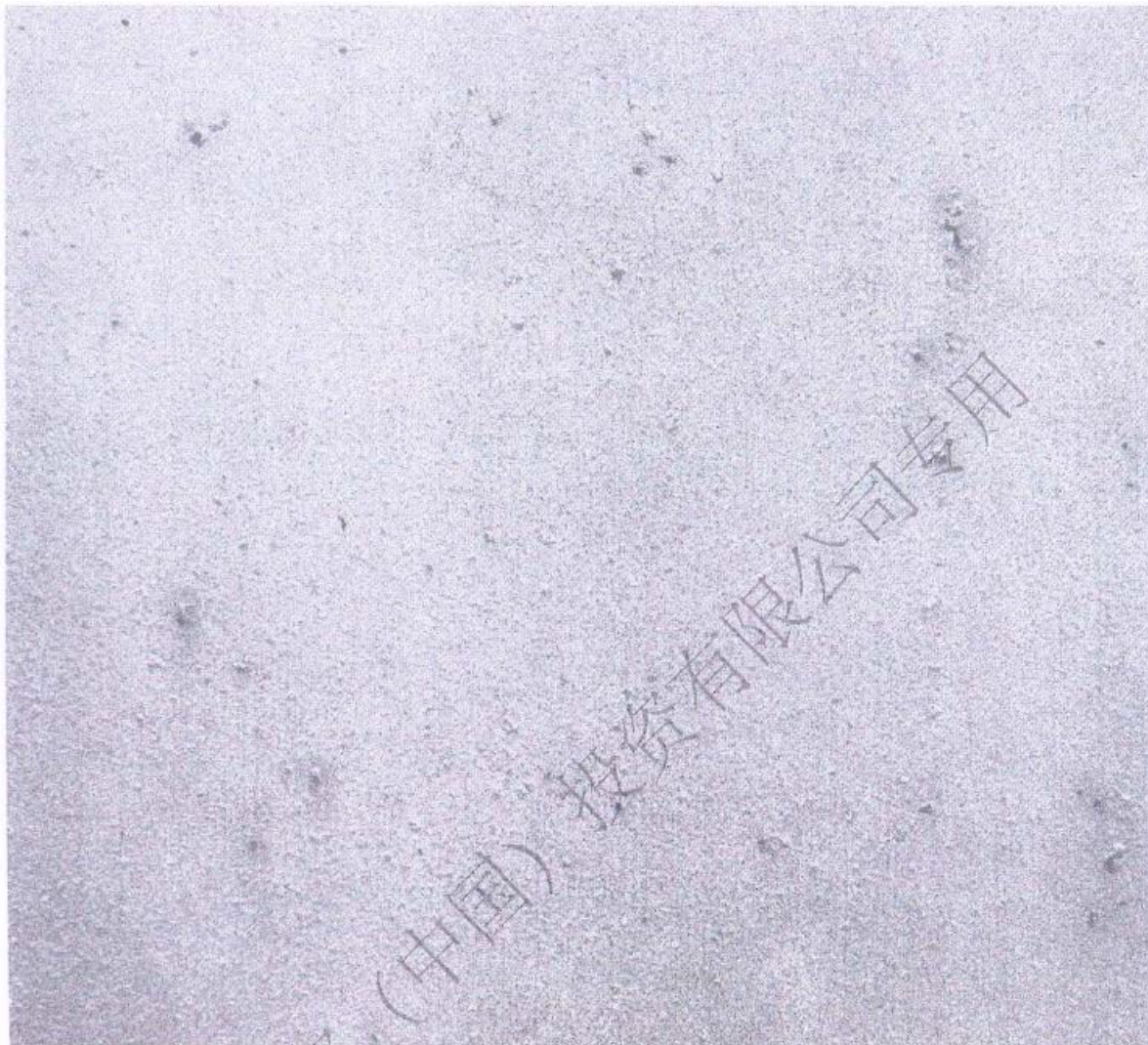
<sup>a</sup> When measuring the rusted area in [Figure A.5](#), it is only about 35 %. If rust is assessed visually using [Figure 5](#), the impression of rusted area is 40 % to 50 %. One reason might be that partly delaminated rust flakes are not distinguished from other rusted areas. But this is negligible because Ri 5 normally is outside any specification.



**Figure 1 — Degree of rusting Ri 1**

\*\*\*\*\*To be continued\*\*\*\*\*





**Figure 2 — Degree of rusting Ri 2**  
\*\*\*\*\*To be continued\*\*\*\*\*



**Figure 3 — Degree of rusting Ri 3**  
\*\*\*\*\*To be continued\*\*\*\*\*





**Figure 4 — Degree of rusting Ri 4**

\*\*\*\*\*To be continued\*\*\*\*\*



**Figure 5 — Degree of rusting Ri 5**

\*\*\*\*\*To be continued\*\*\*\*\*



5.根据标准 ISO 4628-4:2016 对开裂评级如下:

**Table 1 — Rating scheme for designating the quantity of cracks**

| Rating | Quantity of cracks                                        |
|--------|-----------------------------------------------------------|
| 0      | none, i.e. no detectable cracks                           |
| 1      | very few, i.e. small, barely significant number of cracks |
| 2      | few, i.e. small but significant number of cracks          |
| 3      | moderate number of cracks                                 |
| 4      | considerable number of cracks                             |
| 5      | dense pattern of cracks                                   |

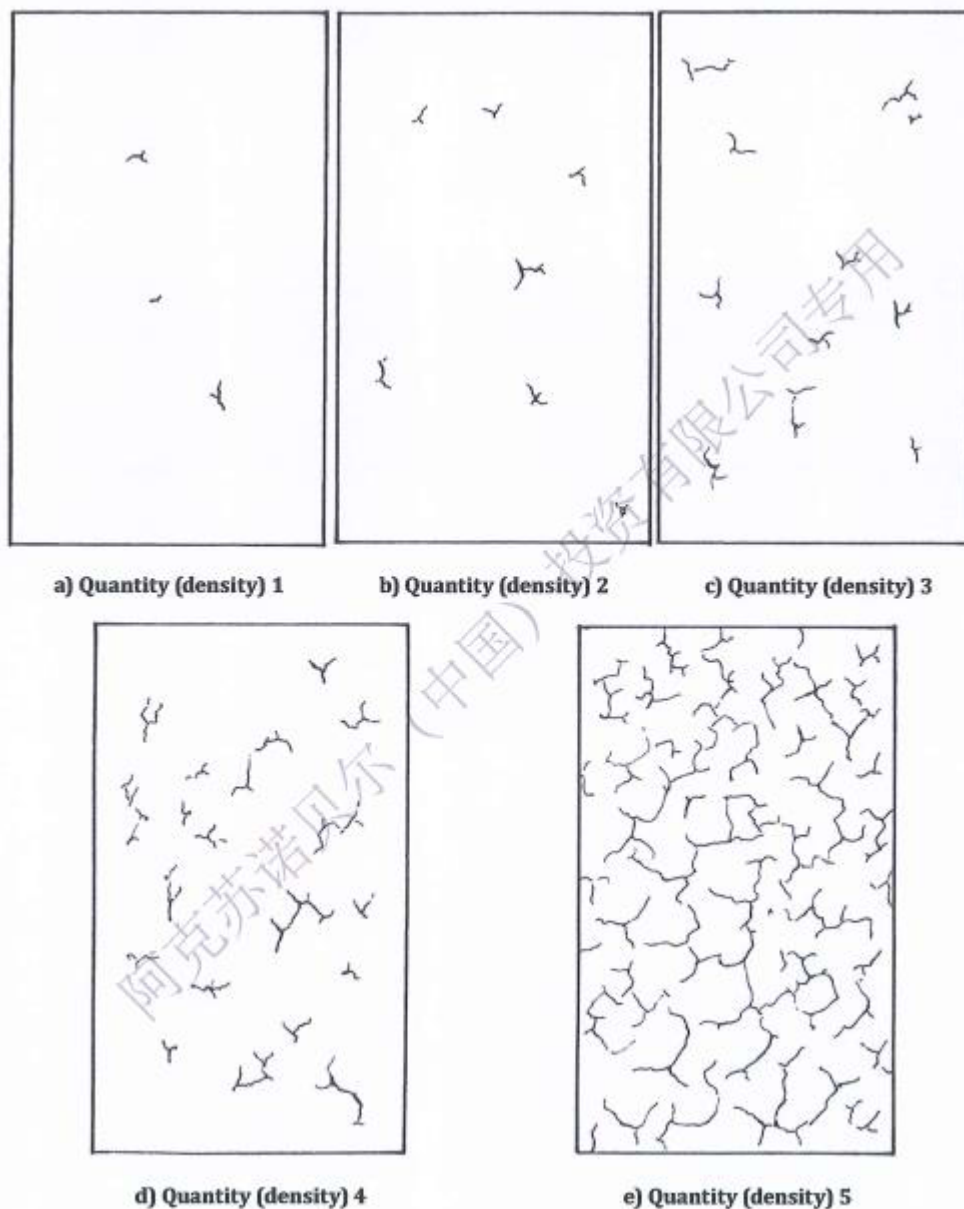
If specified, assess the average size of the cracks in accordance with [Table 2](#).

**Table 2 — Rating scheme for designating the size of cracks**

| Rating | Size of cracks                                                                 |
|--------|--------------------------------------------------------------------------------|
| 0      | not visible under $\times 10$ magnification                                    |
| 1      | only visible under magnification up to $\times 10$                             |
| 2      | just visible with normal corrected vision (up to 0,2 mm) <sup>a</sup>          |
| 3      | clearly visible with normal corrected vision (larger than 0,2 mm up to 0,5 mm) |
| 4      | large cracks, larger than 0,5 mm up to 1 mm wide                               |
| 5      | very large cracks generally more than 1 mm wide                                |

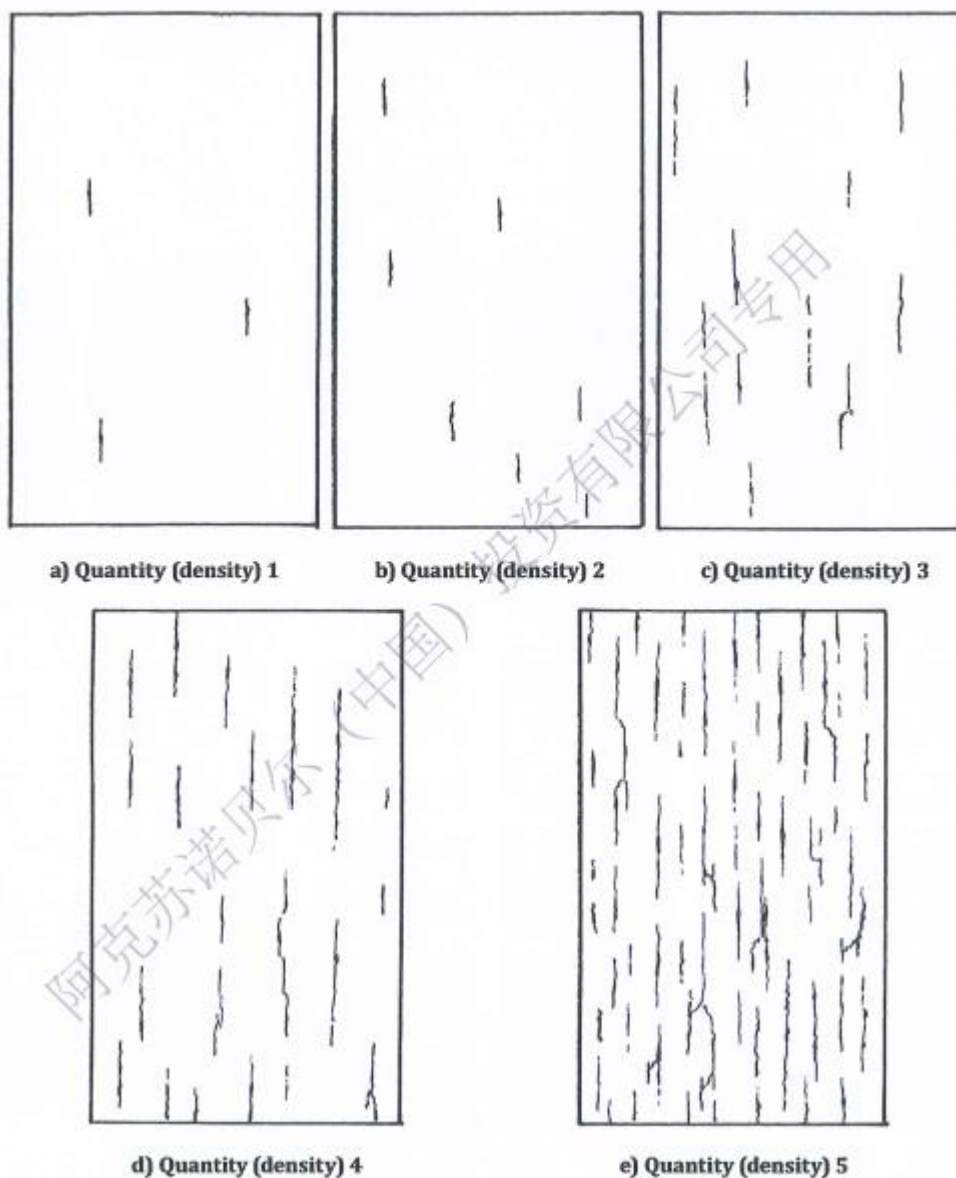
<sup>a</sup> Typically, defects larger than 0,2 mm are visible with normal corrected vision.

\*\*\*\*\*To be continued\*\*\*\*\*



**Figure 1 — Cracking without preferential direction (panels of area 100 cm<sup>2</sup> to 200 cm<sup>2</sup>)**

\*\*\*\*\*To be continued\*\*\*\*\*



**Figure 2 — Cracking in one preferential direction (for example due to brush marks or wood grain) (panels of area 100 cm<sup>2</sup> to 200 cm<sup>2</sup>)**

\*\*\*\*\*To be continued\*\*\*\*\*



6.根据标准 ISO 4628-5:2016 对剥落评级如下:

**Table 1 — Rating scheme for designating the quantity of flaking**

| Rating | Flaked area<br>% |
|--------|------------------|
| 0      | 0                |
| 1      | 0,1              |
| 2      | 0,3              |
| 3      | 1                |
| 4      | 3                |
| 5      | 15               |

Assess the average size of the individual areas exposed by flaking in accordance with [Table 2](#).

**Table 2 — Rating scheme for designating the size of areas exposed by flaking**

| Rating | Size of flaking                      |
|--------|--------------------------------------|
| 0      | not visible under × 10 magnification |
| 1      | up to 1 mm                           |
| 2      | up to 3 mm                           |
| 3      | up to 10 mm                          |
| 4      | up to 30 mm                          |
| 5      | larger than 30 mm                    |

\*\*\*\*\*To be continued\*\*\*\*\*

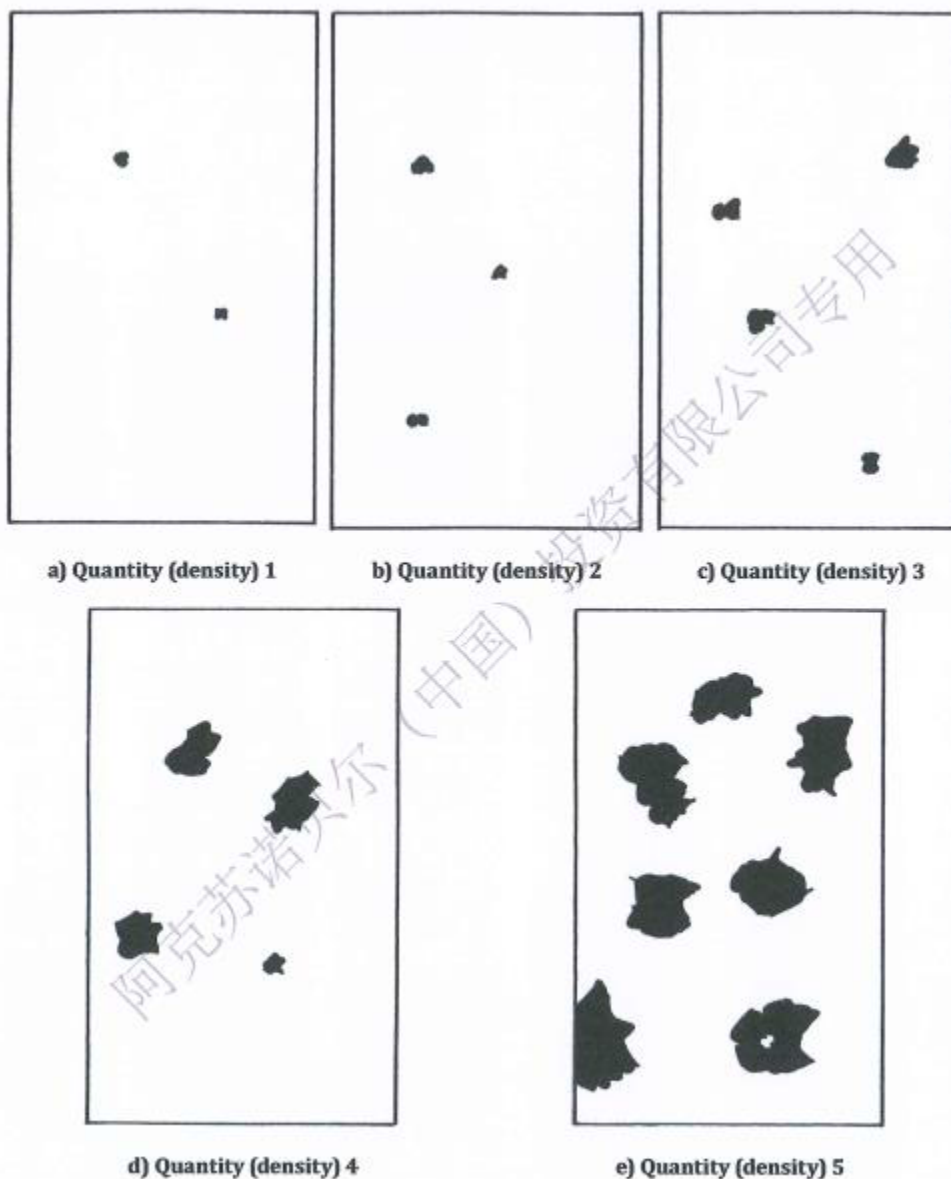


Figure 1 — Flaking without preferential direction  
(panels of 100 cm<sup>2</sup> to 200 cm<sup>2</sup>)

\*\*\*\*\*To be continued\*\*\*\*\*

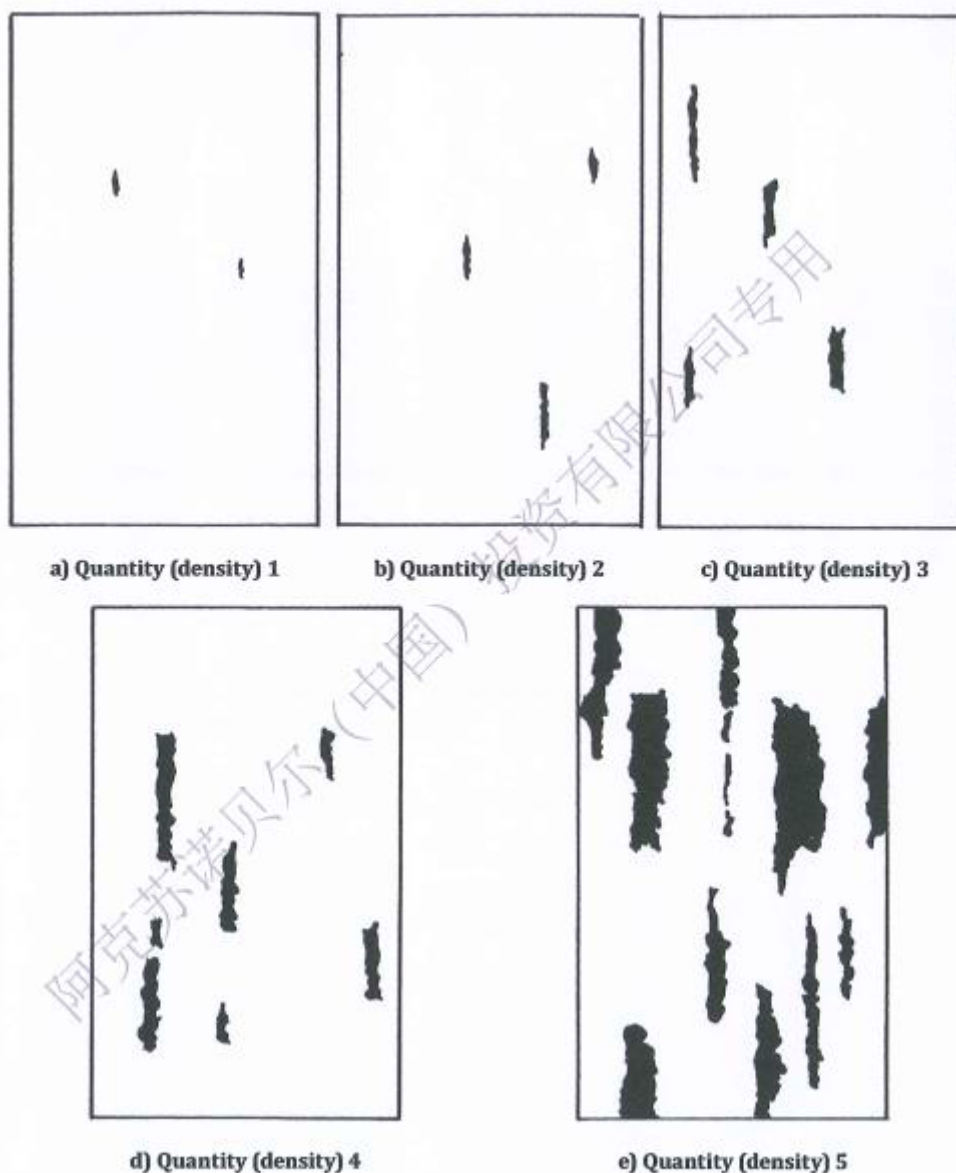


Figure 2 — Flaking in a preferential direction  
(panels of 100 cm<sup>2</sup> to 200 cm<sup>2</sup>)

\*\*\*\*\*To be continued\*\*\*\*\*



张轩凝

主检

许芳芳

审核

张建荣

批准 / 技术负责人



Cost: ¥72800

**注意:**

本实验室只在测试报告签发后 30 天内保留您的测试样品。如有特殊要求, 请在报告日后 30 天内联系本实验室相关人员。

本检测结果仅对被检测物品有效, 未经本技术中心同意, 部分采用本报告无效

\*\*\*\*\*The End\*\*\*\*\*