

产品规格书

PRODUCT SPECIFICATION

工程变更记录

| 版本号 | 变更日期 | 变更描述 |
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## 产品规格书 PRODUCT SPECIFICATION

## 1. 适用范围 SCOPE

本规范适用于 A0600(XSR) 系列条形连接器, 包含了产品的性能、试验方法和检验要求。

This specification applies to A0600(XSR) bar connector series, contains the product performance, test

methods and inspection requirements.

## 2. 适用的标准 APPLICABLE STANDARDS

- 2.1 GB/T2421 电工电子产品环境试验 第一部分 总则  
Testing method for Environmental of Electrical Connectors  
Class 1:general Principles
- 2.2 GB/T2423 电工电子产品环境试验方法  
Testing method for Environmental of Electrical Connectors
- 2.3 GB/T2424 电工电子产品环境试验导则  
Testing method for Environmental of Electrical Connectors
- 2.4 GB/T5095 电子设备用机电元件基本试验规程及测量方法  
Testing Procedure/method for components of electr eequipment

## 3. 外观及尺寸 APPEARANCE AND DIMENSION

## 3.1 外观 appearance

经目视观察, 外观不可有变形, 电镀脱落等会降低其功能的异常现象, 也不可有严重破裂、刮伤或污损之缺点。-

By looking, there shall not be any abnormality such as deformity, exfoliation of plating,etc., which can reduce performance. No defect such as cracks scratches or blemishes.

## 3.2 尺寸 measure

参照工程图

With reference to engineering drawing

## 3.3 互换性 interchangeability

互换性: 相同规格应能互换

Exchangable:Exchangble with same specification products

## 3.4 建议 PCB LAYOUT 图 Recommended PCB LAYOUT drawing

参照工程图

With reference to engineering drawing

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## 4. 材质 THE MATERIAL

塑胶 plastic Housing: LCP

颜色 Color: 黑色 Rice Black

阻燃等级 (UL94V-0) Flammability Rating(UL94V-0)

端子/镀金/镀锡 Terminal: Copper alloy C5191/Gold-plater

塑胶 plastic Wafer SMT: LCP

颜色 Color: 黑色 Rice Black

阻燃等级 (UL94V-0) Flammability Rating(UL94V-0)

PIN 针 The PIN needle: Copper alloy C5191/Gold-plater/Tin-plater

助焊脚 SolderTAB: Copper alloy C5191/ Tin-plater

## 5. 标准额定值 RATINGS

| 项 目<br>ITEM                         | 规 格<br>SPECIFICATIONS                   |
|-------------------------------------|-----------------------------------------|
| 额 定 电 压<br>Rated Voltage            | 30V                                     |
| 额 定 电 流<br>Rated current            | 0.2A AC /DC                             |
| 温 度 范 围<br>Temperature Range        | -40℃ ~ +105℃                            |
| 湿 度 范 围<br>Humidity range           | 相对湿度 65%以下<br>Relative humidity 65% max |
| 保存温度范围<br>Storage temperature range | -10℃ ~ +50℃                             |
| 保存湿度范围<br>Storage humidity range    | 相对湿度 65%以下<br>Relative humidity 65% max |

## 6. 部件名称&amp;部件编号 Part name &amp; part number

| 部 件 名 称<br>Part name | 部 件 编 号<br>Part number |
|----------------------|------------------------|
| Housing              | A0600HI                |
| Terminal             |                        |
| Wafer (DIP)          |                        |
| Wafer (SMT)          | A0600RS                |

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## 7. 电气特性 ELECTRICAL EFFICIENCY

| No. 编号 | 项目 Item                       | 试验方法 Test Method                                                                                                                                                                    | 性能要求 Requirement                      |
|--------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 7.1    | 接触电阻<br>Contact Resistance    | 测量时将连接器插合，两端施以最大测试电压 20mV 以及最大测试电流 100mA，测量时减去导线电阻值。<br>Mate connectors, load voltage: A maximum voltage of 20mV and a maximum current of 100mA are appliend to the Mate connector. | 30mΩ Max.                             |
| 7.2    | 绝缘电阻<br>Insulation Resistance | 相邻接触体 1 分钟时间内施加 200V DC 电压进行测试，测量期间的绝缘阻抗值。<br>Mate connectors, Appiy 200V DC(rms) for 1minute between adjacent contacts to measure the insulation resistance.                       | 100MΩ Min.                            |
| 7.3    | 耐电压<br>Withstanding Voltage   | 在各相邻接触件间施加 200V AC 之电压持续 1 分钟<br>Mate connectors, apply 200V AC for 1 minute Between adjacent terminal or ground.                                                                   | 无击穿或者产生火花<br>No breakdownor flashover |

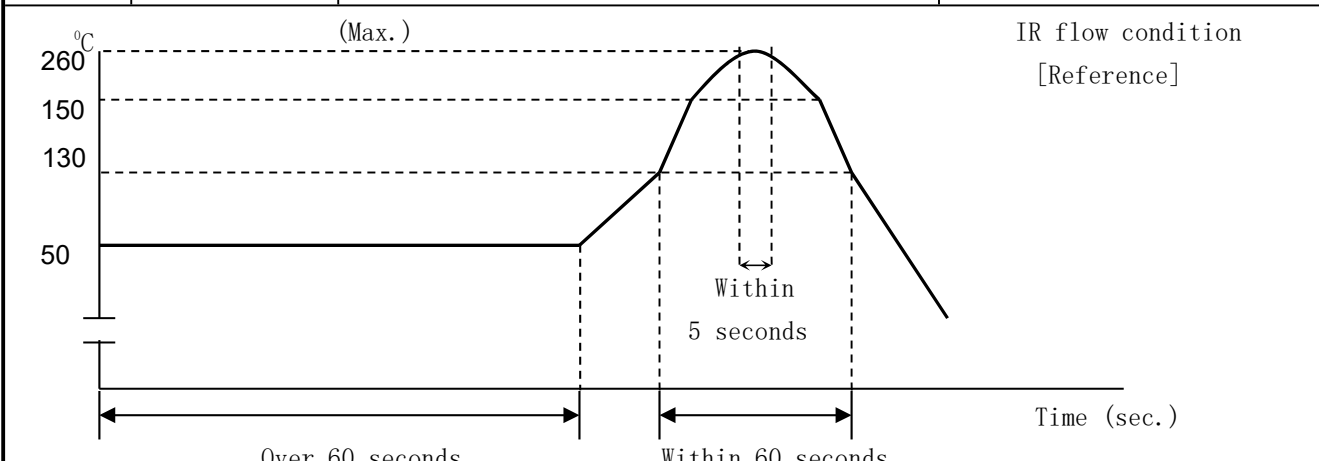
## 8. 环境特性 ENVIRONMENTAL EFFICIENCY

| No. [编号] | 项目 Item                 | 试验方法 Test Method                                                                                                                                                    | 性能要求 Requirement           |                             |
|----------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------|
| 8.1      | 耐热试验<br>Heat Resistance | 将连接器放在温度为+105±2℃的环境中 96 小时，再置于室温下 1~2 小时。<br>Mated connector shallbe placed in an environmental for 96 hours at +105±2℃, Again in 1 ~ 2 hours at room temperature . | 外观<br>Appearance           | 目视外观无任何损坏异状<br>No Breakdown |
|          |                         |                                                                                                                                                                     | 接触阻抗<br>Contact Resistance | 30mΩ Max.                   |
| 8.2      | 耐冷试验<br>Cold Resistance | 将连接器放在温度为-40±3℃的环境中 96 小时，再置于室温下 1~2 小时。<br>Mated connector shall be placed in an environmental for 96 hours at -40±3℃ Again in 1 ~ 2 hours at room temperature.    | 外观<br>Appearance           | 目视外观无任何损坏异状<br>No Breakdown |
|          |                         |                                                                                                                                                                     | 接触阻抗<br>Contact Resistance | 30mΩ Max.                   |

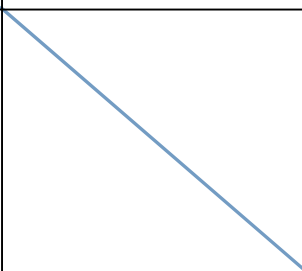
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|     |                             |                                                                                                                                                                                                                                                                                                                                                                                     |                                             |                             |
|-----|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|
| 8.3 | 耐湿性试验<br>Humidity           | 把插合的连接器, 温度 $40 \pm 2^{\circ}\text{C}$ , 相对湿度 60~65% 的环境中, 持续 96 小时。经试验后, 连接器须于温中放置 1~2 小时, 再测定其值。<br>Mate connectors, $40 \pm 2^{\circ}\text{C}$ in temperature and 60 ~ 65%RH in an environmental for 96 hours. After testing connector shall be left alone for 1 to 2 hours in a room ambient.                                                                                   | 外观<br>Appearance                            | 目视外观无任何损坏异状<br>No Breakdown |
|     |                             |                                                                                                                                                                                                                                                                                                                                                                                     | 绝缘电阻<br>Insulation Resistance               | 100M $\Omega$ MIN.          |
|     |                             |                                                                                                                                                                                                                                                                                                                                                                                     | 耐电压<br>Withstanding Voltage                 | 200V AC/minute<br>MIN       |
| 8.4 | 温度循环<br>Temperature Cycling | 低温: $-40 \pm 3^{\circ}\text{C}$ , 30 分钟, 放置转换时 10-15 分钟<br>高温: $+105 \pm 3^{\circ}\text{C}$ , 30 分钟, 放置转换时 10-15 分钟<br>5 次循环后放置在正常环境中恢复 2 小时后进行测试。<br>Low temperature: $-40 \pm 3^{\circ}\text{C}$ , 30min, room temp 10-15min<br>high temperature: $+105 \pm 3^{\circ}\text{C}$ , 30min, room temp 10-15min<br>After 5 cycles at the normal environment for testing after 2 hours. | 外观<br>Appearance                            | 目视外观无任何损坏异状<br>No Breakdown |
|     |                             |                                                                                                                                                                                                                                                                                                                                                                                     | 接触电阻<br>Contact Resistance                  | 30m $\Omega$ Max.           |
| 8.5 | 盐雾试验<br>Salt spray          | 盐水比重: $5 \pm 1\%$ 温度: $35 \pm 2^{\circ}\text{C}$<br>试验时间: $24 \pm 2$ 小时, 试验结束后用清水将残留盐份清洗并将水滴清除后, 才可测量。<br>Salt concentration: $5 \pm 1\%$ Temperature: $35 \pm 2^{\circ}\text{C}$<br>Testing time: $24 \pm 2$ hours, After salt is removed by running water and a drop is removed, it is measured.                                                                                  | 外观<br>Appearance                            | 目视外观无任何损坏异状<br>No Breakdown |
|     |                             |                                                                                                                                                                                                                                                                                                                                                                                     | 接触电阻<br>Contact Resistance                  | 30m $\Omega$ Max.           |
| 8.6 | Solderability<br>[可焊性试验]    | 焊锡时间: $2.5 \pm 0.5$ 秒<br>焊锡温度: $245 \pm 5^{\circ}\text{C}$<br>Soldering time: $2.5 \pm 0.5$ S<br>Solder Temperature: $245 \pm 5^{\circ}\text{C}$                                                                                                                                                                                                                                    | 焊锡面积 $\geq 95\%$<br>95% min. of solder area |                             |

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|                                                                                     |                                        |                                                                                                                                                                                                                                          |                                                                                                                                          |
|-------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 8.7                                                                                 | 耐焊性<br>Resistance to<br>soldering heat | 将连接器置于 PCB 板上, 然后将产品通过 $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 回流焊 $5 \pm 1\text{S}$ 进行测试。<br>Puts the connector on the PCB, and then the product through $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ reflow $5 \pm 1\text{S}$ test. | 塑胶不得有明显的变形或损坏。<br>1. Without deformation of ease or excessive loosen.<br>电气特性必须符合规格<br>2. Electrical characteristics shall be satisfied. |
|  |                                        |                                                                                                                                                                                                                                          |                                                                                                                                          |

## 9. 机械特性 MECHANICAL EFFICIENCY

| No. [编号] | 项目 Item                                 | 试验方法 Test Method                                                                                                                                                                                             | 性能要求 Requirement                                                                      |                          |
|----------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------|
| 9.1      | PIN 针固定力 Pin retention force            | 在针脚前端施加力, 以每分钟 $25 \pm 3\text{mm}$ 的速率, 直到针退出针座的拔出力<br>Exerts a force on the pin end, at a rate per minute $25 \pm 3\text{mm}$ , until the needle exit seat puii-out force                                   | 单一 PIN 针<br>3N Min. Only per PIN                                                      |                          |
| 9.2      | 端子与孔座固定力 Terminal crimping wire stength | 端子与孔座配合, 以每分钟 $25 \pm 3\text{mm}$ 的速率沿导线方向将端子从孔座中拔出的力。<br>The terminal and hoie seat, at a rate per minute to $25 \pm 3\text{mm}$ along the wire direction are puiied ouy from the hole in the seat capacity |  |                          |
| 9.3      | 机械寿命 Mechanical Life                    | 1、连接器必须承受 50 次的插拔循环<br>2、测试速度: $100\text{mm}/\text{分钟}$<br>1、Connectors shall be subjected to 50 cycle of Insertion and Withdrawal.<br>2、Speed: $100\text{mm}/\text{minute}$                                 | 接触电阻<br>Contact Resistance                                                            | $200\text{m}\Omega$ Max. |

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| 9.4                   | 插入力&拔出力<br>Insertion force<br>(I.F.)&<br>withdrawal force<br>(W.F.) | (1) 试验方法 Test method: 将孔座和端子配合好, 与针座在同一轴线上进行插拔测试。(测试速度: 20±5 mm/minute)。<br><br>Housing with crimped terminal and wafer shall be mated and unmated on the same axis. For the measurement of single circuit. (Speed:20±5mm/minute)<br>(2) 性能要求 Requirement: (UNITS: N)                                                                                                                                                                                                                                                       |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------------------|------------|--|------------|------------|---|------|------|---|------|------|---|------|------|---|------|------|---|------|------|---|------|------|---|-------|------|---|-------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-----------------------|------------|--|------------|------------|----|-------|------|----|-------|------|----|-------|------|----|-------|------|--|--|--|--|--|--|--|--|--|--|--|--|
|                       |                                                                     | <table><tr><th rowspan="2">Number of<br/>circuits</th><th colspan="2">At initial</th></tr><tr><th>I.F. (max)</th><th>W.F. (min)</th></tr><tr><td>2</td><td>4.00</td><td>1.50</td></tr><tr><td>3</td><td>5.00</td><td>1.50</td></tr><tr><td>4</td><td>6.00</td><td>2.00</td></tr><tr><td>5</td><td>7.00</td><td>3.00</td></tr><tr><td>6</td><td>8.00</td><td>3.00</td></tr><tr><td>7</td><td>9.00</td><td>3.00</td></tr><tr><td>8</td><td>10.00</td><td>3.00</td></tr><tr><td>9</td><td>10.00</td><td>3.00</td></tr></table> |            |            | Number of<br>circuits | At initial |  | I.F. (max) | W.F. (min) | 2 | 4.00 | 1.50 | 3 | 5.00 | 1.50 | 4 | 6.00 | 2.00 | 5 | 7.00 | 3.00 | 6 | 8.00 | 3.00 | 7 | 9.00 | 3.00 | 8 | 10.00 | 3.00 | 9 | 10.00 | 3.00 | <table><tr><th rowspan="2">Number of<br/>circuits</th><th colspan="2">At initial</th></tr><tr><th>I.F. (max)</th><th>W.F. (min)</th></tr><tr><td>10</td><td>12.00</td><td>4.00</td></tr><tr><td>12</td><td>12.00</td><td>4.00</td></tr><tr><td>14</td><td>12.00</td><td>4.00</td></tr><tr><td>16</td><td>12.00</td><td>4.00</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table> |  |  | Number of<br>circuits | At initial |  | I.F. (max) | W.F. (min) | 10 | 12.00 | 4.00 | 12 | 12.00 | 4.00 | 14 | 12.00 | 4.00 | 16 | 12.00 | 4.00 |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | Number of<br>circuits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | At initial |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | I.F. (max) | W.F. (min) |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4.00       | 1.50       |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5.00       | 1.50       |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6.00       | 2.00       |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 7.00       | 3.00       |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 8.00       | 3.00       |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 9.00       | 3.00       |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| 8                     | 10.00                                                               | 3.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| 9                     | 10.00                                                               | 3.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| Number of<br>circuits | At initial                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       | I.F. (max)                                                          | W.F. (min)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| 10                    | 12.00                                                               | 4.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| 12                    | 12.00                                                               | 4.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| 14                    | 12.00                                                               | 4.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
| 16                    | 12.00                                                               | 4.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |            |                       |            |  |            |            |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |      |      |   |       |      |   |       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |                       |            |  |            |            |    |       |      |    |       |      |    |       |      |    |       |      |  |  |  |  |  |  |  |  |  |  |  |  |