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Jameco Part Number 803680



# PRODUCT SPECIFICATION

## 1.0 SCOPE

This specification covers the performance requirements for Milli-Grid 2mm Dual Row Shrouded Headers.

## 2.0 PRODUCT DESCRIPTION

2.1 Product covered by this specification are for series number

| Product Name             | Part Number  |
|--------------------------|--------------|
| MGrid Headers (Vertical) | 87831 Series |
| MGrid Headers (SMT)      | 87832 Series |
| MGrid Headers (R/A)      | 87833 Series |

These series mate with Molex :

1. Milli-Grid 2mm Grid Wire to Board Connector, Crimp Receptacle Housing, 51110 series and Crimp Terminal, 50394 series.
2. 2mm Milli-Grid Dual Row IDT, 87568 series.

2.2 For dimensions, materials & plating, refer to the appropriate product drawings.

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

The following documents are part of this specification to the extent specified herewith. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and reference documents, this specification shall take the precedence.

MIL-STD-202 Test Methods for Electrical and Electronic Component Parts.

MIL-STD-1344 Test Methods of Electrical Connector

Reference Product Specifications

PS-51110-001 Milli-Grid 2mm Grid Wire to Board Connector

PS-87568-004 2mm Milli-Grid Dual Row IDT Receptacle

|                     |                                                     |                                                |                          |
|---------------------|-----------------------------------------------------|------------------------------------------------|--------------------------|
| REVISION:           | ECR/ECN INFORMATION:                                | TITLE:                                         | SHEET No.                |
| <b>2</b>            | EC No: <b>S2005-0213</b><br>DATE: <b>2004/09/02</b> | <b>MILLIGRID 2MM DUAL ROW SHROUDED HEADERS</b> | <b>1 of 3</b>            |
| DOCUMENT NUMBER:    | CREATED / REVISED BY:                               | CHECKED BY:                                    | APPROVED BY:             |
| <b>PS-87831-027</b> | <b>AI TING 2004/09/21</b>                           | <b>KC LING 2004/09/21</b>                      | <b>SK TOH 2004/09/21</b> |



# PRODUCT SPECIFICATION

## 4.0 RATINGS

- 4.1 Voltage : 125
- 4.2 Current : 2.00 Amp MAXIMUM
- 4.3 Operating Temperature : -55°C to +105°C

## 5.0 PERFORMANCE

### 5.1 ELECTRICAL REQUIREMENTS

| ITEM | DESCRIPTION           | TEST CONDITION                                              | REQUIREMENT           |
|------|-----------------------|-------------------------------------------------------------|-----------------------|
| 1    | Insulation Resistance | Apply 500 VDC for 1 minute per MIL-STD-1344A, METHOD 3003.1 | 1000 Megaohms minimum |
| 2    | Dielectric Strength   | 1000 Vrms for 1 minute between adjacent terminals.          | No breakdown          |

### 5.2 MECHANICAL REQUIREMENTS

| ITEM | DESCRIPTION                                | TEST CONDITION                                                                                                                    | REQUIREMENT                                                  |
|------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| 3    | Pin/ Terminal Retention Force (in Housing) | Apply an axial load on the terminal in the housing to dislodge the terminals from the connector at a rate of 0.50 inch per minute | Retention Force : 850 g Min per pin. (Before heat soldering) |

|                  |                                       |                                         |                   |
|------------------|---------------------------------------|-----------------------------------------|-------------------|
| REVISION:        | ECR/ECN INFORMATION:                  | TITLE:                                  | SHEET No.         |
| 2                | EC No: S2005-0213<br>DATE: 2004/09/02 | MILLIGRID 2MM DUAL ROW SHROUDED HEADERS | 2 of 3            |
| DOCUMENT NUMBER: | CREATED / REVISED BY:                 | CHECKED BY:                             | APPROVED BY:      |
| PS-87831-027     | AI TING 2004/09/21                    | KC LING 2004/09/21                      | SK TOH 2004/09/21 |



# PRODUCT SPECIFICATION

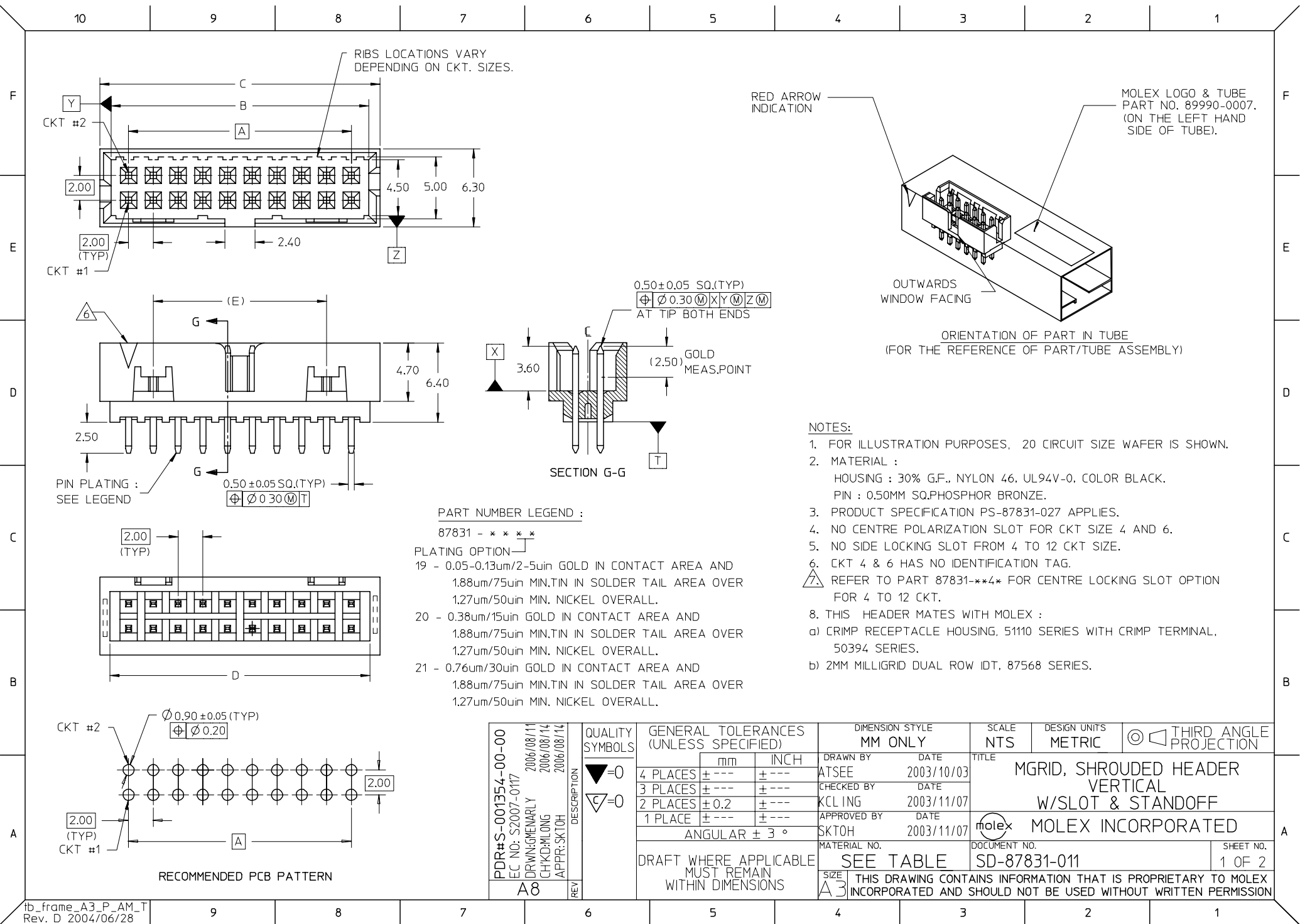
## 5.3 ENVIROMENT REQUIREMENTS

|    |                                                    |                                                                              |                                                         |
|----|----------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------|
| 4. | <b>Solderability</b>                               | Solder Time: 5 +/-0.5 secs .<br>Solder Temperature : 260+/- 5°C              | 95% of the immersed area must show no voids ,pin holes. |
| 5. | <b>Resistance to Soldering Heat (Through Hole)</b> | Solder tail to be dipped in flux as per MIL-STD-202F method 210 condition B. | No damage in appearance of the connector                |
| 6. | <b>Resistance to Infra-Red Heat (SMT)</b>          | Subject connector to the IR Reflow temp. of 260 +/-5 C for 12 +/-2 sec.      | No damage in appearance of the connector                |

## 6.0 Packaging

Product shall be packed in either Tube or Tape & Reel and protected against damage during handling, transportation and storage.

|                     |                                                     |                                                |                          |
|---------------------|-----------------------------------------------------|------------------------------------------------|--------------------------|
| REVISION:           | ECR/ECN INFORMATION:                                | TITLE:                                         | SHEET No.                |
| <b>2</b>            | EC No: <b>S2005-0213</b><br>DATE: <b>2004/09/02</b> | <b>MILLIGRID 2MM DUAL ROW SHROUDED HEADERS</b> | <b>3 of 3</b>            |
| DOCUMENT NUMBER:    | CREATED / REVISED BY:                               | CHECKED BY:                                    | APPROVED BY:             |
| <b>PS-87831-027</b> | <b>AI TING 2004/09/21</b>                           | <b>KC LING 2004/09/21</b>                      | <b>SK TOH 2004/09/21</b> |



|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|------------|----------------|-------------|------------------|-----------|-------|-------|-------|-------|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|
|            | 10             |             | 9                |           | 8     |       | 7     |       | 6 |   | 5 |   | 4 |   | 3 |   | 2 |  | 1 |   |   |   |   |   |   |   |   |   |
| F          | P/N IN<br>TUBE | CKT<br>SIZE | VOID<br>POSITION | DIMENSION |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  | A         | B     | C     | D     | E     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-04**     | 4           | -----            | 2.00      | 4.85  | 6.65  | 5.00  | ----- |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-06**     | 6           | -----            | 4.00      | 6.85  | 8.65  | 7.00  | ----- |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-08**     | 8           | -----            | 6.00      | 8.85  | 10.65 | 9.00  | ----- |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-10**     | 10          | -----            | 8.00      | 10.85 | 12.65 | 11.00 | ----- |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-12**     | 12          | -----            | 10.00     | 12.85 | 14.65 | 13.00 | ----- |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-14**     | 14          | -----            | 12.00     | 14.85 | 16.65 | 15.00 | 8.00  |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-16**     | 16          | -----            | 14.00     | 16.85 | 18.65 | 17.00 | 10.00 |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            | 87831-18**     | 18          | -----            | 16.00     | 18.85 | 20.65 | 19.00 | 12.00 |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-20** | 20             | -----       | 18.00            | 20.85     | 22.65 | 21.00 | 14.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-22** | 22             | -----       | 20.00            | 22.85     | 24.65 | 23.00 | 16.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-24** | 24             | -----       | 22.00            | 24.85     | 26.65 | 25.00 | 18.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-26** | 26             | -----       | 24.00            | 26.85     | 28.65 | 27.00 | 20.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-28** | 28             | -----       | 26.00            | 28.85     | 30.65 | 29.00 | 22.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-30** | 30             | -----       | 28.00            | 30.85     | 32.65 | 31.00 | 24.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-32** | 32             | -----       | 30.00            | 32.85     | 34.65 | 33.00 | 26.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-34** | 34             | -----       | 32.00            | 34.85     | 36.65 | 35.00 | 28.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-36** | 36             | -----       | 34.00            | 36.85     | 38.65 | 37.00 | 30.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-38** | 38             | -----       | 36.00            | 38.85     | 40.65 | 39.00 | 32.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-40** | 40             | -----       | 38.00            | 40.85     | 42.65 | 41.00 | 34.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-42** | 42             | -----       | 40.00            | 42.85     | 44.65 | 43.00 | 36.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-44** | 44             | -----       | 42.00            | 44.85     | 46.65 | 45.00 | 38.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-46** | 46             | -----       | 44.00            | 46.85     | 48.65 | 47.00 | 40.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-48** | 48             | -----       | 46.00            | 48.85     | 50.65 | 49.00 | 42.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-50** | 50             | -----       | 48.00            | 50.85     | 52.65 | 51.00 | 44.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-5120 | 12             | 1           | 10.00            | 12.85     | 14.65 | 13.00 | ----- |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-5220 | 44             | 20          | 42.00            | 44.85     | 46.65 | 45.00 | 38.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-5320 | 24             | 13          | 22.00            | 24.85     | 26.65 | 25.00 | 18.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-5420 | 34             | 3           | 32.00            | 34.85     | 36.65 | 35.00 | 28.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-5520 | 20             | 20          | 18.00            | 20.85     | 22.65 | 21.00 | 14.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| 87831-5620 | 28             | 13          | 26.00            | 28.85     | 30.65 | 29.00 | 22.00 |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
| D          |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   | D |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   | E |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   | F |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   | B |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   | A |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   | C |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   | B |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   | A |   |
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|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
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|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   | A |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   | C |   |   |   |   |   |
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|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   | A |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   | C |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   | B |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   | A |
|            |                |             |                  |           |       |       |       | C     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   | B |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   | A |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   | C |   |   |   |   |   |   |
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|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   | A |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | C |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | B |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | A |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | C |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | B     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | A |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | C |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | B |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | A |   |  |   |   |   |   |   |   |   |   |   |   |
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|            |                |             |                  |           |       |       |       |       | B |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | A |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | C |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | B |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
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|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | A |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | C |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | B |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | A |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | C |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | B |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | A |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | C     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | B |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | A |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | C |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | B |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | A |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | C |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | B |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | A |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | C |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | B     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | A |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | C |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | B |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | A |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | C |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | B |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | A |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | C |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | B |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | C |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | B |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | A |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | C |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | B |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | A |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | C |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | B |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | A |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | C     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | B |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | A |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | C |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | B |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | A |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | C |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | B |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | A |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | C |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | B     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | A |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | C |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | B |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | A |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | C |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | B |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | A |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | C |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | B |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | C |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | B |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | A |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | C |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | B |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | A |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | C |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | B |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | A |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | C     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | B |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | A |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | C |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | B |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | A |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | C |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | B |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | A |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | C |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | B     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | A |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | C |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | B |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | A |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | C |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | B |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | A |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | C |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | B |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | C |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | B |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | A |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | C |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | B |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | A |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | C |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | B |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | A |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | C     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | B |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | A |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | C |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | B |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | A |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | C |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | B |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | A |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | C |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | B     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | A |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | C |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | B |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | A |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | C |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | B |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | A |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | C |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | B |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | C |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | B |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | A |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | C |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | B |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | A |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | C |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | B |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | A |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | C     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | B |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | A |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | C |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | B |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | A |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | C |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | B |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | A |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | C |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | B     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | A |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | C |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | B |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | A |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | C |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | B |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | A |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   | C |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   | B |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       | A     |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   | C |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   | B |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   | A |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   | C |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   | B |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       | A |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   | C |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|            |                |             |                  |           |       |       |       |       |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |