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## Self-lubricating Bearings & Bushing **Technical Data**

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SF-1 BUSHING:

| Tech.Data             |                         |                           |                                  |                      |                                      |           |
|-----------------------|-------------------------|---------------------------|----------------------------------|----------------------|--------------------------------------|-----------|
| Max.load              | Static                  | 250N/mm <sup>2</sup>      |                                  | Friction coefficient |                                      | 0.03~0.20 |
|                       | Very low speed          | 140N/mm <sup>2</sup>      |                                  | Max.speed            | Dry running                          | 2m/S      |
|                       | Rotating<br>oscillating | 60N/mm <sup>2</sup>       |                                  |                      | Hydrodynamic operation               | >2m/S     |
| Max.PV dry<br>running | Short-term<br>operation | 3.6N/mm <sup>2</sup> *m/S | Thermal conductivity             |                      | 42W(m*K) <sup>-1</sup>               |           |
|                       | Continuous<br>operation | 1.8N/mm <sup>2</sup> *m/S | Coefficient of thermal expansion |                      | 11*10 <sup>-6</sup> *K <sup>-1</sup> |           |
| Temp.limit            |                         | -195°C~+280°C             |                                  |                      |                                      |           |

## SF-2Y: POM BUSHING

| Tech.Data   |                         |                         |  |                                  |                        |                                      |
|---|-------------------------|-------------------------|--|----------------------------------|------------------------|--------------------------------------|
| Max.load  | Static                  | 250N/mm <sup>2</sup>    |  | Friction coefficient             |                        | 0.03~0.20                            |
|   | Very low speed          | 140N/mm <sup>2</sup>    |  | Max.speed                        | Dry running            | 2m/S                                 |
|   | Rotating<br>oscillating | 70N/mm <sup>2</sup>     |  |                                  | Hydrodynamic operation | >2m/S                                |
| Max.PV  |                         | 3N/mm <sup>2</sup> *m/S |  | Thermal conductivity             |                        | 42W(m*K) <sup>-1</sup>               |
| Temp.limit  |                         | -40°C~+110°C            |  | Coefficient of thermal expansion |                        | 11*10 <sup>-6</sup> *K <sup>-1</sup> |
| Initial pre-lubrication at assembly is strongly recommended |                         |                         |  |                                  |                        |                                      |

SF-1B BRONZE BACKED BUSHING:

| Tech.Data             |                         |                           |                                  |                      |                                      |           |
|-----------------------|-------------------------|---------------------------|----------------------------------|----------------------|--------------------------------------|-----------|
| Max.load              | Static                  | 250N/mm <sup>2</sup>      |                                  | Friction coefficient |                                      | 0.03~0.20 |
|                       | Very low speed          | 140N/mm <sup>2</sup>      |                                  | Max.speed            | Dry running                          | 2m/S      |
|                       | Rotating<br>oscillating | 60N/mm <sup>2</sup>       |                                  |                      | Hydrodynamic operation               | >2m/S     |
| Max.PV dry<br>running | Short-term<br>operation | 3.6N/mm <sup>2</sup> *m/S | Thermal conductivity             |                      | 60W(m*K) <sup>-1</sup>               |           |
|                       | Continuous<br>operation | 1.8N/mm <sup>2</sup> *m/S | Coefficient of thermal expansion |                      | 18*10 <sup>-6</sup> *K <sup>-1</sup> |           |
| Temp.limit            |                         | -195°C~+280°C             |                                  |                      |                                      |           |

## SF-1D: BUSHING

| Tech.Data           |                         |                           |                                  |              |                                      |               |
|---------------------|-------------------------|---------------------------|----------------------------------|--------------|--------------------------------------|---------------|
| Max.load            | Static                  | 250N/mm <sup>2</sup>      |                                  | Temp. limit  |                                      | -195°C~+280°C |
|                     | Very low speed          | 140N/mm <sup>2</sup>      |                                  | Max.speed    | Dry running                          | 2m/S          |
|                     | Rotating<br>oscillating | 60N/mm <sup>2</sup>       |                                  |              | Hydrodynamic operation               | >2m/S         |
| Max.PV              | Short-term<br>operation | 3.6N/mm <sup>2</sup> *m/s | Thermal conductivity             |              | 42W(m*K) <sup>-1</sup>               |               |
|                     | Continuous<br>operation | 1.8N/mm <sup>2</sup> *m/s | Coefficient of thermal expansion |              | 11*10 <sup>-6</sup> *K <sup>-1</sup> |               |
| PV max.hydrodynamic |                         | 30N/mm <sup>2</sup> *m/s  | Friction coefficient             | Dry          | 0.08~0.20                            |               |
|                     |                         |                           |                                  | Hydrodynamic | 0.03~0.08                            |               |

SF-800 BIMETAL:

| Tech.Data             |         |                           |  |                           |                                      |
|-----------------------|---------|---------------------------|--|---------------------------|--------------------------------------|
| Max.load              | Static  | 250N/mm <sup>2</sup>      |  | Alloy hardness            | HB 70~100                            |
|                       | Dynamic | 140N/mm <sup>2</sup>      |  | Temp.                     | -40°C~+250°C                         |
| Max.speed(Lubricated) |         | 2m/s                      |  | Friction coefficient      | 0.05~0.2                             |
| Max.PV                |         | 2.8N/mm <sup>2</sup> *m/s |  | Thermal conductivity      | 60W(m*k) <sup>-1</sup>               |
| Breaking Load         |         | 350N/mm <sup>2</sup>      |  | Coef.of thermal expansion | 14*10 <sup>-6</sup> *k <sup>-1</sup> |

SF-090 WRAPPED BRONZE BUSHING WITH DIAMOND HOLES:

| Tech.Data              |         |                           |  |                            |  |
|------------------------|---------|---------------------------|--|----------------------------|--|
| Max.load               | Static  | 250N/mm <sup>2</sup>      |  | Elongation                 | 40%                                    |
|                        | Dynamic | 40N/mm <sup>2</sup>       |  | Temp.                      | -100°C~+200°C                          |
| Max.speed(Lubrication) |         | 2m/s                      |  | Friction coefficient       | 0.08~0.25                              |
| Max.PV                 |         | 2.8N/mm <sup>2</sup> *m/S |  | Thermal conductivity       | 58W(m*K) <sup>-1</sup>                 |
| Tensile Strength       |         | 450N/mm <sup>2</sup>      |  | Coef. Of thermal expansion | 18.5*10 <sup>-6</sup> *K <sup>-1</sup> |
| Hardness               |         | HB110-150                 |  |                            |  |

## SF-09T: BRONZE BEARINGS

| Tech.Data              |         |                           |                            |  |
|------------------------|---------|---------------------------|----------------------------|--|
| Max.load               | Static  | 120N/mm <sup>2</sup>      | Elongation                 | 40%                                    |
|                        | Dynamic | 40N/mm <sup>2</sup>       |                            | Temp.                                  |
| Max.speed(Lubrication) |         | 2.5m/s                    | Friction coefficient       | 0.08~0.25                              |
| Max.PV                 |         | 2.8N/mm <sup>2</sup> *m/S | Thermal conductivity       | 58W(m*K) <sup>-1</sup>                 |
| Tensile Strength       |         | 450N/mm <sup>2</sup>      | Coef. Of thermal expansion | 18.5*10 <sup>-6</sup> *K <sup>-1</sup> |
| Hardness               |         | HB110-150                 |                            |  |



SF-09G BRONZE BEARINGS WITH GRAPHITE:

| Tech.Data              |         |                           |  |                            |  |
|------------------------|---------|---------------------------|--|----------------------------|--|
| Max.load               | Static  | 120N/mm <sup>2</sup>      |  | Elongation                 | 40%                                    |
|                        | Dynamic | 40N/mm <sup>2</sup>       |  | Temp.                      | -100°C~+200°C                          |
| Max.speed(Lubrication) |         | 2.5m/s                    |  | Friction coefficient       | 0.05~0.25                              |
| Max.PV                 |         | 2.8N/mm <sup>2</sup> *m/S |  | Thermal conductivity       | 58W(m*K) <sup>-1</sup>                 |
| Tensile Strength       |         | 450N/mm <sup>2</sup>      |  | Coef. Of thermal expansion | 18.5*10 <sup>-6</sup> *K <sup>-1</sup> |
| Hardness               |         | HB>110                    |  |                            |  |

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SF-650 SOLID BRONZE BEARINGS:

| Tech.Data(Main Metal Type)         |                          |
|------------------------------------|--------------------------|
| Grade                              | 650                      |
| Material                           | CuZn25Al5Mn4Fe3          |
| Density                            | 8                        |
| HB hardness                        | >210                     |
| Tensile strength N/mm <sup>2</sup> | >750                     |
| Yeild strength N/mm <sup>2</sup>   | >450                     |
| Elongation%                        | >12                      |
| Coefficient of linear expansion    | 1.9x10 <sup>-5</sup> /°C |
| Max.temp                           | -40~+300°C               |

|   |         |
|---|---------|
| Max.load N/mm <sup>2</sup>                      | 100     |
| Max.speed(Dry)m/min                             | 15      |
| Max.PV<br>N/mm <sup>2</sup> *m/min(Lubrication) | 200     |
| Compression deformation<br>300N/mm <sup>2</sup> | <0.01mm |

### Tech.Data(Solid Lubricants)

| Lubricants          | Features  | Typical application                             |
|---------------------|---|---|
| SL1<br>Graphite+add | Excellent resistance against chemical attacks and low friction.Temp limit 400°C | Suite for general machines and under atmosphere |

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SF-600 CAST BRONZE BUSHING:

| Tech.Data(Main Metal Type)         |                 |
|------------------------------------|-----------------|
| Material                           | 600             |
|                                    | CuZn25Al5Mn4Fe3 |
| Density                            | 8.0             |
| HB hardness                        | >210            |
| Tensile strength N/mm <sup>2</sup> | >750            |
| Yeild strength N/mm <sup>2</sup>   | >450            |
| Elongation%                        | >12             |

SF-250:

| Tech.Data |              |                           |  |                      |                      |
|-----------|--------------|---------------------------|--|----------------------|----------------------|
| Max.load  | Static       | 70N/mm <sup>2</sup>       |  | Temp.                | -40°C~+400°C         |
|           | Dynamic      | 10N/mm <sup>2</sup>       |  | Friction coefficient | 0.08~0.20            |
| Max.speed | Dry          | 0.15m/s                   |  | Tensile strength     | 150N/mm <sup>2</sup> |
|           | Hydrodynamic | 1m/s                      |  | Hardness             | HB>160               |
| Max.PV    |              | 0.8N/mm <sup>2</sup> *m/s |  |                      |                      |

SF-1W DRY WASHER:

| Tolerance for composite thrust washer |  |        |   |        |
|---------------------------------------|--|--------|---|--------|
| Dimension                             | Deviations                               |        |   |        |
|                                       | PTFE composite<br>(designation suffix E) |        | POM composite<br>(designation suffix M) |        |
|                                       | high                                     | low    | high                                    | low    |
| -                                     | Mm                                       |        |   |        |
| Bore diameter d                       | +0,250                                   | 0      | +0,250                                  | 0      |
| Outside diameter D                    | 0  | -0,250 | 0                                       | -0,250 |
| Hole pitch diameter J                 | +0,150                                   | -0,150 | +0,150                                  | -0,150 |
| Hole diameter K                       | +0,150                                   | -0,150 | +0,150                                  | -0,150 |
| Height                                | 0  | -0,050 | 0                                       | -0,100 |

SF-2YW DRY WASHER:

| Tech.Data   |                         |                         |  |                                  |                        |                                      |
|---|-------------------------|-------------------------|--|----------------------------------|------------------------|--------------------------------------|
| Max.load  | Static                  | 250N/mm <sup>2</sup>    |  | Friction coefficient             |                        | 0.03~0.20                            |
|   | Very low speed          | 140N/mm <sup>2</sup>    |  | Max.speed                        | Dry running            | 2m/S                                 |
|   | Rotating<br>oscillating | 70N/mm <sup>2</sup>     |  |                                  | Hydrodynamic operation | >2m/S                                |
| Max.PV  |                         | 3N/mm <sup>2</sup> *m/S |  | Thermal conductivity             |                        | 42W(m*K) <sup>-1</sup>               |
| Temp.limit  |                         | -40°C~+110°C            |  | Coefficient of thermal expansion |                        | 11*10 <sup>-6</sup> *K <sup>-1</sup> |
| Initial pre-lubrication at assembly is strongly recommended |                         |                         |  |                                  |                        |                                      |

SF-FR:

| Tech. Data  |               |                     |  |                      |     |           |
|-------------|---------------|---------------------|--|----------------------|-----|-----------|
| Max<br>load | Static        | 80N/mm <sup>2</sup> |  | Friction coefficient |     | 0.03~0.20 |
|             | Dynamic       | 40N/mm <sup>2</sup> |  | Max.<br>speed        | Dry | 1m/s      |
| Temp.limit  | -195°C~+260°C |                     |  |                      | Oil | >1m/s     |