**General Features**

The RF type cutter has a special light weight Aluminium body, designed for high speed, high efficiency roughing to finish milling of Aluminium and other non-ferrous metals.

**Work Material**

- Aluminium and aluminium alloy
- Other non-ferrous metal

**Characteristics**

- From Roughing to Finishing Processes: Economical carbide insert / High-precision finishing with SUMIDIA
- Strong and Light Cutter Body: Special Aluminium body /40% lighter than steel cutters / Hard-anodized plated body / Improved efficiency in higher rotational speeds, lower spindle loads and shorter tool change time
- Safe Design: Anti-centrifugal force design to prevent inserts from dislodging from cutter (Speeds must be within max. recommended conditions) / Non-wedge design to prevent deformation

**Application Examples**

- Easy Run-out Adjustment: External setting gauge is used for easy tool presetting / High precision cutter construction, units fitted are within 10 μm even before setting

### Work (Work Material) | Cutter Insert (Grade) | Cutting Conditions | Results
---|---|---|---
Case (ADC12) | RF4160R SUMIDIA Blade (DA2200) | \( v_c = 3,000 \) \( v_i = 5,730 \) \( a_p = 0.10 \) | Surface Finish: Ra=0.2μm Output: 30,000 units 30x tool life of carbide tool
Contact Surface of Transmission Case (ADC12) | RF4125R SUMIDIA Insert (DA1000) | \( v_c = 3,000 \) \( v_i = 7,640 \) \( a_p = 1.5 \) | Surface Finish: Ra=0.3μm Output: 20,000 units
Contact Surface of Cylinder Head (AC4C) | RF4250R Carbide Insert (H1) | \( v_c = 2,000 \) \( v_i = 7,535 \) \( a_p = 3.5 \) | Rough Cutting Output: 10,000 units

### Maximum Allowable Spindle Speed

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>( n_{max} ) (min⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF4000R</td>
<td>17,000</td>
</tr>
<tr>
<td>RF4100R</td>
<td>15,900</td>
</tr>
<tr>
<td>RF4125R</td>
<td>13,500</td>
</tr>
<tr>
<td>RF4160R</td>
<td>11,000</td>
</tr>
<tr>
<td>RF4200R</td>
<td>9,000</td>
</tr>
<tr>
<td>RF4250R</td>
<td>7,600</td>
</tr>
<tr>
<td>RF4315R</td>
<td>6,000</td>
</tr>
</tbody>
</table>

### Surface Finish

- Process: Finish Milling
- MIC: Machining Centre
- Arbor: HSK63A
- Work: Si 10 to 12% Al Alloy
- Cutter: RF4100R 6 Teeth (1 Wiper) 
- Grade: SUMIDIA (DA1000)

Rz (Highest Peak): 0.69μm  Ra: 0.092μm

### RF Cutter Structure

- Stopper RFS
- Cap Screw (Main Clamp) BXX620
- Screw (Insert Attachment Screw) BFTX0509N
- Set Screw (Sub-clamp) BT00510
- Cover RFC
- RF Type Aluminium Machining Cutter

- Grade: SUMIDIA (DA1000)
- Work: Si 10 to 12% Al Alloy
- Arbor: HSK63A
- M/C: Machining Centre

---

**Recommended Cutting Conditions**

<table>
<thead>
<tr>
<th>N</th>
<th>Grade</th>
<th>Work Material</th>
<th>Hardness</th>
<th>Cutting Speed ( v_c (m/min) )</th>
<th>Feed Rate ( f_z (mm/t) )</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>DA1000</td>
<td>2000-3500-5000</td>
<td>0.05-0.13-0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>DA2200</td>
<td>0.05-0.13-0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| N | DA1000 | 1000-1750-2500 | 0.05-0.13-0.20 |
| N | DA2200 | 0.05-0.13-0.20 |

**Insert Setup**

- Roughing and finishing in the same process
- When using wiper edge

**CAUTIONS**

As it is possible to mix different types of inserts / blades, it is important to take note of the following.

- Do not mix reground and new inserts or even inserts with different regrounding amount on the same cutter.
- Carbide and SUMIDIA inserts must be arrange in an alternate manner.
- Ensure proper balancing by fixing SUMIDIA inserts of blades on opposite positions of the cutter.
High-efficiency Aluminum Cutter
**RF 4000 Type**

**High Speed Milling Cutter RF4000 Series for Aluminum**

**High-speed Finishing for Non-Ferrous Metal**

---

**Body**

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Stock</th>
<th>Dimensions (mm)</th>
<th>No. of Teeth</th>
<th>Weight (kg)</th>
<th>Fig</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 4080R</td>
<td>●</td>
<td>ø D1: 80, ø D2: 82, ø D3: 60, L: 50</td>
<td>9.5</td>
<td>6, 30</td>
<td>0.7</td>
</tr>
<tr>
<td>4100R</td>
<td>●</td>
<td>ø D1: 100, ø D2: 75, ø D3: 50</td>
<td>12.7</td>
<td>8, 38</td>
<td>1.0</td>
</tr>
<tr>
<td>4125R</td>
<td>●</td>
<td>ø D1: 125, ø D2: 63</td>
<td>15.9</td>
<td>10, 38</td>
<td>1.6</td>
</tr>
<tr>
<td>4160R</td>
<td>●</td>
<td>ø D1: 160, ø D2: 100, ø D3: 63</td>
<td>19.1</td>
<td>11, 38</td>
<td>2.6</td>
</tr>
<tr>
<td>RF 4200R</td>
<td>●</td>
<td>ø D1: 200, ø D2: 130, ø D3: 63</td>
<td>25.4</td>
<td>14, 42</td>
<td>3.6</td>
</tr>
<tr>
<td>4250R</td>
<td>●</td>
<td>ø D1: 250, ø D2: 130, ø D3: 63</td>
<td>25.4</td>
<td>14, 42</td>
<td>6.0</td>
</tr>
<tr>
<td>4315R</td>
<td>●</td>
<td>ø D1: 315, ø D2: 240, ø D3: 80</td>
<td>25.4</td>
<td>14, 42</td>
<td>11.0</td>
</tr>
</tbody>
</table>

---

**Inserts / Cartridges**

- **Grade**
- **Steel**
- **Stainless Steel**
- **Cast Iron**
- **Aluminium**
- **Non-Ferrous Metal**
- **Hardened Steel**

---

**Spare Parts**

- **Cover**
- **Cover Attachment**
- **Stopper**
- **Cap Screw**
- **Set Screw**
- **Screw**
- **Spanners**
- **Adjustment Screw**
- **Insert Attachment**
- **Main Clamp**
- **Sub-clamp**
- **RF-SET**

---

**Internal Coolant Attachments**

Use an internal coolant holder or a standard clamp bolt with coolant hole when using internal coolant. Typical examples are given in the table below. For standards, contact each manufacturer directly.

- **Body Cat. No.**
- **Internal Coolant Holder**
- **Standard Clamped Bolt with Coolant Hole (Ex.)**

---

**External Setting Parts**

Cartridge design allows inserts to be mounted away from the machine with high precision.
Aluminum Machining Cutter

SRF Type

**General Features**
Small diameter milling cutter SRF type is most suited for high-speed aluminium machining on small machines.

**Characteristics**
- **Best Suited For Small Machines**
  Especially reliable on BT30 class small machines.
- **From Roughing To Finishing Processes Utilising SUMIDIA DA1000 Insert with a side edge of 5mm.**
- **Economical NF-type Inserts**
  NF-type SUMIDIA DA1000 inserts lower tooling costs.
- **High Speed Cutting With SUMIDIA**
  Maximum spindle speeds of up to \( n = 20,000 \text{min}^{-1} \)
  (Actual spindle speeds must be set within the rotational limits of your machine and arbor.)
- **Simple design for insert run-out**
  Simple insert mounting design for easy yet precise tool adjustments.

**Application Examples**

<table>
<thead>
<tr>
<th>Work (Work Material)</th>
<th>Cutter Insert (Grade)</th>
<th>Cutting Conditions</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cam Case (ADC12)</td>
<td>SRF50R NF-SNEW09T3ADTR (DA1000)</td>
<td>( n = 6,000 ), ( v_i = 2,400 ), ( a_p = 0.5 )</td>
<td>12,000 pcs produced with no problems.</td>
</tr>
<tr>
<td>Computer Case (ADC12)</td>
<td>SRF50R NF-SNEW09T3ADTR (DA1000)</td>
<td>( n = 15,000 ), ( v_i = 7,500 ), ( a_p = 0.2 )</td>
<td>Improved efficiency of endmill operation by 2.5 times.</td>
</tr>
<tr>
<td>Differential Case (ADC12)</td>
<td>SRF63R NF-SNEW09T3ADTR (DA1000)</td>
<td>( n = 8,000 ), ( v_i = 4,000 ), ( a_p = 0.5 )</td>
<td>No obstructions on tool magazine when mounting ø63mm cutter on small machines.</td>
</tr>
</tbody>
</table>

**Recommended Cutting Conditions**

- Si content of 12.6% or less.

<table>
<thead>
<tr>
<th>ISO Work Material</th>
<th>Hardness</th>
<th>Cutting Speed ( v_i ) (mm/min)</th>
<th>Feed Rate ( f_z ) (mm/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Alloy</td>
<td></td>
<td>Min. - Optimum - Max.</td>
<td>Min. - Optimum - Max.</td>
</tr>
<tr>
<td>N</td>
<td>2,000-3,000 -4,000</td>
<td>0.05 - 0.13 - 0.20</td>
<td>DA1000</td>
</tr>
</tbody>
</table>

- Si content of over 12.6%

<table>
<thead>
<tr>
<th>ISO Work Material</th>
<th>Hardness</th>
<th>Cutting Speed ( v_i ) (mm/min)</th>
<th>Feed Rate ( f_z ) (mm/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Alloy</td>
<td></td>
<td>400 - 600 - 800</td>
<td>0.05 - 0.13 - 0.20</td>
</tr>
</tbody>
</table>

*Note: The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.*
High-speed Finishing for Non-Ferrous Metal

- Standard inserts and wiper inserts can be used on the same cutter body.
- Inserts with nose radius can reduce the clattering.
- These cannot be used with wiper inserts.
- Inserts can be reground 3 times (up to minimum IC diameter 9.225mm).
- Do not mix new and reground inserts, or even inserts with different reground amount on the same cutter.
- When using reground inserts, it is advisable to re-confirm insert height and cutting diameter with a tool pre-setter.
- Arbor for SRF30R, SRF40R

When using SRF30R and SRF40R cutters, there is a requirement to modify the arbor as shown above.

1. Reduce part of the arbor’s adaptor shaft from ø25.4mm to ø15mm.
2. Add 4 tap holes for (M5) cap screws. Please use a hexagonal bolt M5 × 20 mm for securing the body.

Spare Parts

- Recommended Tightening Torque (N m)

Maximum Depth Of Cut Guide (SRF50R, 5 Teeth)

The table below contains guidelines on the maximum depth of cut determined from internal tests. ‘O’ marks indicate the possible application range. Actual cutting conditions should be set based on actual machine and work characteristics.

<table>
<thead>
<tr>
<th>Depth of Cut a(mmm)</th>
<th>Feed Rate ν(mm/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.500</td>
</tr>
<tr>
<td></td>
<td>4.000</td>
</tr>
<tr>
<td></td>
<td>5.000</td>
</tr>
</tbody>
</table>

Cutting Conditions

Cutter: SRF50R
Insert: NF-SNEW 09T3ADTR (DA1000)

n = 10,000min⁻¹
Arbor: BT30 FMA25.4-45
Work: A-5052
Width: 35mm at depth of cut indicated above

Please refer to the table and notes for specific details and guidelines.