### ARBOR BUSHINGS

**Description**

Milling machine arbor bushing supports receive the most abuse in milling applications, next to the cutters themselves. Quite often, however, milling arbor assemblies are designed and built with little thought given to proper mounting, fit or calibration of the precision bearings, resulting in chatter, vibration and premature failure of the cutters and bushings. Gatco Rotary Milling Arbor Bushings eliminate these problems.

Horizontal milling creates heavy intermittent radial loads on the milling arbor. Gatco Bushings provide the rigid support necessary to evenly distribute these forces, and their unique design allows them to rotate at high speeds virtually friction-free. They are capable of handling heavy loads and interrupted cuts while maintaining cutting accuracy.

Gatco offers a complete line of milling machine bushings for production machines as well as stand-alone horizontal milling machines. These bushings simply slip on the milling arbor at assembly and are secured when the arbor nut is drawn tight. All fitting and calibration is done by Gatco at the factory.

Commonly milling arbors are designed using single row ball bearings, spherical bearings or bronze bearings. Inherent problems are encountered because there is no effective way to pre-load the bearing, no good means of relubricating and usually ineffective seals. These problems will cause chatter, poor tool life and eventually premature failure.

Gatco Anti-Friction Rotary Milling Arbor Bushings are self contained pre-loaded bearing cartridges used to support gang milling arbors. They consist of a stationary outer case; a hardened and ground liner which rotates with the arbor; anti-friction bearings and seals. They are manufactured in several series with each having size and load rating capacities to cover the broadest range of milling applications.

### Special Designs

Although a large number of dimensional combinations are available, Gatco Rotary Bushings may be designed and built to meet the requirements of particular applications. Considering the improvements in milling performance and tool life, Gatco Bushings are a practical and economical addition to any milling machine. Gatco’s Engineering Department can provide a special design to suit your specific requirements.

Not all Milling Machine Bushings are cataloged due to the numerous variations. Contact GATCO for sizes not listed here.

### Application Examples

Three types of milling machine bushings are available:

- **Outboard Support Bushings** are mounted on the end of the milling arbor opposite the spindle. This bushing is critical because it has to be capable of handling the high forces generated by the cut and still have the accuracy to hold finish part tolerances. Most common applications include saw arbors, lock notch arbors, bulkhead arbors and half round arbors.

- **Mid-Support Bushings** are mounted on gang arbors and can be positioned anywhere between the spindle and the outboard support bushing. Mounted directly on the arbor, the bushings may be incorporated either singly or in multiples for adequate support. Overall length is held so that they also act as a spacer. Most common applications include saw arbors, lock notch arbors, bulkhead arbors and half round arbors.

- **Tapered O.D. Bushings** are most commonly used to support milling arbors on stand-alone tool room horizontal milling machines. They replace the tapered O.D. bronze bushings commonly designed into these machines.
Features
- Helps dampen and evenly distribute cutting forces
- Eliminates vibration, chatter, twisted arbors, frozen bushings, tool breakage, bearing collar wear and scoring, with substantial savings in milling machine maintenance
- Eliminates excessive mounting clearances
- Sealed to protect bearings from contamination
- Unique cartridge design simplifies replacement
- Incorporates heavy-duty pre-loaded bearings
- Wide selection of I.D., O.D. and length combinations
- Substantially increases maintainable speeds for advantageous use of carbide tools
  - Provides greater precision through increased rigidity of the arbor
  - Eliminates spacers
  - Increases cutter life

Rebuilding Program
Gatco Rotary Bushings will eventually reach their fatigue life. Therefore, Gatco offers a rebuilding program which will restore the rotary bushing to its original I.D. size, runout specifications and life expectancy. Rebuilding can be done an indefinite number of times as long as the case is reusable as received, and involves replacement of the inner liner, bearings and seals. Upon inspection, if a rotary bushing cannot be rebuilt, it will be returned at a nominal charge for inspection.

Maintenance/Lubrication
Gatco Rotary Bushings require very little maintenance. Only in severe applications or contaminated environments will they require re-greasing. Frequency of re-lubrication must be determined by the end user based on the environment, loads applied and running speed. When re-greasing, it is recommended that the bushing be filled with grease until contaminated grease purges past the seal on both ends. At start up, grease will continue to purge past the seals and will stop when the bearings have purged themselves.

- Recommended grease lubricant is Alvania #2 by Shell Oil (or equivalent).
- Recommended oil lubricant is Mobil DTE (or equivalent).

HOW TO ORDER
- Order by Gatco design number.
- Specify I.D.: Standard I.D. and tolerance will be assigned unless otherwise specified.
- Specify O.D.: O.D. will be provided with approximately .02" grind stock over nominal unless O.D. grind is requested. O.D. will be ground to standard tolerances unless otherwise specified. (Tapered bushings are provided O.D. ground.)
- Special Tolerances: Tolerances other than shown in this catalog are available. Specify your tolerance requirements.
- Special Features: Specify any features required such as flats, etch, keyways, etc.
- Prints: Always provide prints or sketches when available.
- Terms: Net 30 days.
- Prices: Quoted upon request.
- Delivery: Standard lead time is approximately 8 weeks. Consult the factory for current lead times.
- Tool Numbers: Provide end users tool number if available.

Bushings ordered by bushing number only will be furnished with the nominal I.D. and the O.D. with grind stock. Standard manufacturing tolerances will be assigned. No special modifications will be added unless specified. When choosing a bushing always choose the largest bushing which will fit the applications for maximum rigidity.

Standard GATCO Manufacturing Tolerances

Inside Diameter:
- Under 41.27 = +0.007mm. +0.015mm.
- 1.625 and above = +0.013mm. +0.025mm.

Runout
- = 0.013mm. T.I.R.
  (Closer runout avail. on request)

Finish
- = 0.30-0.50µm.

Outside Diameter:
Standard rotary bushings are furnished 0.50mm. oversize for O.D. grinding to fit at assembly by the customer. Finish ground diameter available on request (extra cost). Tapered bushings are provided O.D. ground.

Standard tolerance spread: 0.013mm.
See page 1 for tolerances.

Bushings are available with keyways. Corners of keyways must be within "A" diameter.

 Capacities are based on 300 R.P.M., 1500 hrs. L10 life.

Refer to inside front cover for modifications or special designs.

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### TRLM SERIES

**Light Duty Mid or Outboard Support Bushing**

See page 1 for tolerances.

Bushings are available with keyways. Corners of keyways must be within "A" diameter.

Capacities are based on 300 R.P.M., 1500 hrs. L10 life.

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TRMM SERIES

MEDIUM DUTY MID OR
OUTBOARD SUPPORT BUSHING

See page 1 for tolerances.

Bushings are available with keyways. Corners of keyways must be within "A" diameter.

Capacities are based on 300 R.P.M., 1500 hrs. L10 life.

Refer to inside front cover for modifications or special designs.

Specify I.D. size required when ordering.

Specify "E" (inner liner length) if other than standard shown in tabulation.

Always choose the largest bushing which will fit the application for maximum rigidity.

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See page 1 for tolerances.

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<td>45.0</td>
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<td>69.60</td>
<td>127.000</td>
<td>95.250</td>
<td>45.2</td>
<td>90.4</td>
<td>1100</td>
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<tr>
<td>519</td>
<td>60.000</td>
<td>88.1</td>
<td>69.60</td>
<td>130.000</td>
<td>94.996</td>
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<td>90.2</td>
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<td>520</td>
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<td>88.1</td>
<td>77.52</td>
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<td>94.7</td>
<td>1100</td>
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<tr>
<td>521</td>
<td>76.000</td>
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<td>83.08</td>
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<td>1000</td>
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<tr>
<td>522</td>
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<td>95.00</td>
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<td>524</td>
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<td>120.9</td>
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<td>527</td>
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<td>150.6</td>
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<td>203.000</td>
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<td>132.8</td>
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<td>158.50</td>
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<td>534</td>
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<td>196.60</td>
<td>280.000</td>
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<td>158.2</td>
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<tr>
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<td>196.60</td>
<td>298.000</td>
<td>165.100</td>
<td>79.2</td>
<td>158.2</td>
<td>1300</td>
</tr>
</tbody>
</table>
**TAPERED ARBOR BUSHINGS**

*USED ON STAND-ALONE HORIZONTAL MILLING MACHINES*

![Diagram of Tapered Arbor Bushing]

See page 1 for tolerances

I.D. reducing bushings are available. Contact Gatco for details

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### BUSHING NO. LARGE DIA. ARBOR BODY DIA. EXTD. LGTH. C

**BROWN & SHARPE Milling Machines**

Following arbor bushing adaptable to B&S model #000

<table>
<thead>
<tr>
<th>BUSHING NO.</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>B &amp; S-1-100-</td>
<td>67.46</td>
<td>25.40</td>
<td>68.24</td>
<td>20.62</td>
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</tbody>
</table>

Following arbor bushings adaptable to B&S model #2 @ 3HP, #0, and #20

<table>
<thead>
<tr>
<th>BUSHING NO.</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>B &amp; S-2-100-</td>
<td>68.24</td>
<td>25.40</td>
<td>69.85</td>
<td>31.75</td>
</tr>
<tr>
<td>B &amp; S-2-125-</td>
<td>68.24</td>
<td>31.75</td>
<td>69.85</td>
<td>31.75</td>
</tr>
</tbody>
</table>

Following arbor bushings adaptable to B&S model #2 @ 5HP, #12 @3 and 7.5HP

<table>
<thead>
<tr>
<th>BUSHING NO.</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>B &amp; S-3-100-</td>
<td>69.85</td>
<td>25.40</td>
<td>71.42</td>
<td>22.22</td>
</tr>
<tr>
<td>B &amp; S-3-125-</td>
<td>69.85</td>
<td>31.75</td>
<td>71.42</td>
<td>22.22</td>
</tr>
<tr>
<td>B &amp; S-3-150-</td>
<td>69.85</td>
<td>38.10</td>
<td>71.42</td>
<td>22.22</td>
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**CINCINNATI Milling Machines**

Following arbor bushings adaptable to Cincinnati model #0-8

<table>
<thead>
<tr>
<th>C2-08-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50</td>
<td>25.40</td>
<td>63.50</td>
<td>34.92</td>
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</tr>
<tr>
<td>63.50</td>
<td>31.75</td>
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<td>34.92</td>
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Following arbor bushings adaptable to Cincinnati model #1-18

<table>
<thead>
<tr>
<th>C2-18-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
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</thead>
<tbody>
<tr>
<td>63.50</td>
<td>25.40</td>
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<td>19.05</td>
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</tr>
<tr>
<td>63.50</td>
<td>31.75</td>
<td>63.50</td>
<td>19.05</td>
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Following arbor bushings adaptable to Cincinnati model #3, #4, #5 and #6 series

<table>
<thead>
<tr>
<th>C3-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>82.55</td>
<td>25.40</td>
<td>82.55</td>
<td>19.05</td>
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</tr>
<tr>
<td>82.55</td>
<td>31.75</td>
<td>82.55</td>
<td>19.05</td>
<td></td>
</tr>
<tr>
<td>C3-150-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
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<tr>
<td>82.55</td>
<td>38.10</td>
<td>82.55</td>
<td>19.05</td>
<td></td>
</tr>
<tr>
<td>C4-200-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>100.78</td>
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**KEMPSPMTH Milling Machines**

Following arbor bushings adaptable to model #KMB and #KMC

<table>
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<tr>
<th>K3-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>71.42</td>
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<td>19.05</td>
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<tr>
<td>K3-125-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>71.42</td>
<td>31.75</td>
<td>71.42</td>
<td>19.05</td>
<td></td>
</tr>
<tr>
<td>K3-150-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>71.42</td>
<td>38.10</td>
<td>71.42</td>
<td>19.05</td>
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**MILWAUKEE Milling Machines**

Following arbor bushings adaptable to model #35, #55, #C4 and #C5

<table>
<thead>
<tr>
<th>M3-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
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</thead>
<tbody>
<tr>
<td>63.50</td>
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<td>23.79</td>
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<td>63.50</td>
<td>31.75</td>
<td>65.07</td>
<td>23.79</td>
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</tr>
<tr>
<td>M4-100-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>73.02</td>
<td>25.40</td>
<td>74.59</td>
<td>23.79</td>
<td></td>
</tr>
<tr>
<td>73.02</td>
<td>31.75</td>
<td>74.59</td>
<td>23.79</td>
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</tr>
<tr>
<td>M4-150-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>73.02</td>
<td>38.10</td>
<td>74.59</td>
<td>23.79</td>
<td></td>
</tr>
<tr>
<td>M5-125-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
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<tr>
<td>88.90</td>
<td>31.75</td>
<td>90.47</td>
<td>34.92</td>
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<td>88.90</td>
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<td>34.92</td>
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</tr>
<tr>
<td>M6-200-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
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<td>112.89</td>
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**SUNSTRAND Milling Machines**

Following arbor bushing adaptable to model #0 and #00

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<th>S-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
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<td>55.54</td>
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Following arbor bushings adaptable to model #1 and #1C

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<th>S1-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50</td>
<td>25.40</td>
<td>64.28</td>
<td>17.44</td>
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</tr>
<tr>
<td>S1-125-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>63.50</td>
<td>31.75</td>
<td>64.28</td>
<td>17.44</td>
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Following arbor bushings adaptable to model #12

<table>
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<tr>
<th>S22-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>73.02</td>
<td>25.40</td>
<td>73.81</td>
<td>26.97</td>
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</tr>
<tr>
<td>S22-125-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>73.02</td>
<td>31.75</td>
<td>73.81</td>
<td>26.97</td>
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Following arbor bushings adaptable to model #22

<table>
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<tr>
<th>S33-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
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</thead>
<tbody>
<tr>
<td>85.72</td>
<td>25.40</td>
<td>86.51</td>
<td>26.97</td>
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</tr>
<tr>
<td>S33-125-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>85.72</td>
<td>31.75</td>
<td>86.51</td>
<td>26.97</td>
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Following arbor bushings adaptable to model #C2 and #C3

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<th>SC2-100-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>85.72</td>
<td>25.40</td>
<td>86.51</td>
<td>14.27</td>
<td></td>
</tr>
<tr>
<td>SC2-125-N</td>
<td>LARGE DIA.</td>
<td>ARBOR</td>
<td>BODY DIA.</td>
<td>EXTD. LGTH. C</td>
</tr>
<tr>
<td>85.72</td>
<td>31.75</td>
<td>86.51</td>
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Following arbor bushing adaptable to model #C5 with 7.8cm support arm

<table>
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<th>SC5-300-N</th>
<th>LARGE DIA.</th>
<th>ARBOR</th>
<th>BODY DIA.</th>
<th>EXTD. LGTH. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>123.82</td>
<td>76.20</td>
<td>123.82</td>
<td>47.62</td>
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