



# MOONEY INTERNATIONAL CORPORATION SPECIAL LETTER

SPECIAL LETTER 19-10

Date: 10-30-2019

- SUBJECT:** To ADVISE MOONEY OWNERS/OPERATORS of the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)
- MODELS/  
S/N AFFECTED:** Refer to the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)
- TIME OF  
COMPLIANCE:** Refer to the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)
- INTRODUCTION:** Continental Aerospace Technologies (Continental ) valve guides are reamed- in- place after installation. Dimensional specifications for valve guides are provided in Table 1 and Tables 3 through 7. All measurements must be made using properly calibrated and certified precision measuring devices. Reference the current Illustrated Parts Catalog (IPC) for the most current replacement part (see Parts Supersede History at: <http://continental.aero/support/parts-supersedure-history.aspx>).
- INSTRUCTIONS:** Refer to the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)
- WARRANTY:** Refer to the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)
- REFERENCE  
DATA:** Refer to the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)
- PARTS LIST:** Refer to the **Continental Aerospace Technologies Service Bulletin No. SB19-05 Dated Oct. 24, 2019 - Subject: Valve Guide Application, Installation and Reaming Procedures.** (see attached document for more information)

**SERVICE BULLETIN**

Compliance Will Enhance Safety

**SB19-05**TECHNICAL PORTIONS  
FAA APPROVED

- SUBJECT:** Valve Guide Application, Installation, and Reaming Procedures
- PURPOSE:** To provide valve guide application (by cylinder part number), and dimensional fits & limits for valves and valve guides.
- COMPLIANCE:** At engine major overhaul, cylinder overhaul or cylinder repair

**MODELS**

**AFFECTED:** New and rebuilt Continental Aerospace Technologies C-75, C-85, C-90, O-200, O-300, GO-300, IO-240, IOF-240, IO-360, TSIO-360, LTSIO-360 E-SERIES, O-470, IO-470, TSIO-470, IO-520, TSIO-520, LTSIO-520, GTSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 and TSIO-550 aviation gasoline (AvGas) engines.

**I. GENERAL INFORMATION**

Continental Aerospace Technologies™ (Continental®) valve guides are reamed-in-place after installation. Dimensional specifications for valve guides are provided in Table 1 and Tables 3 through 7. All measurements must be made using properly calibrated and certified precision measuring devices.

Reference the current Illustrated Parts Catalog (IPC) for the most current replacement part (see Parts Supersedure History at: <http://continental.aero/support/parts-supersedure-history.aspx>).

**II. IN SERVICE VALVE AND VALVE GUIDE MEASUREMENTS**

1. Reference the applicable engine Maintenance or Overhaul Manual for specific inspection criteria for intake and exhaust valves. Valve stems must conform to specified new parts dimensions.
2. During cylinder repair, measure the valve guide inside diameter in the upper 1/3 and center 1/3 areas of the valve guide length, reference Figure 1 and Table 1. Measurements taken at the bottom (lower 1/3 area) of the intake and exhaust valve guide are not indicative of the overall serviceability of the valve guide.
3. The valve guide inside diameter must not exceed the “Service Limit” dimension for the specific engine and cylinder combination. Valve guides exceeding the “Service Limit” dimensions specified in Tables 1 and Tables 3 through 7, as applicable, will require replacement.

**III. VALVE GUIDE INSTALLATION**

*CAUTION: When installing valve guides in cylinders, verify that the valve guide is correct for the cylinder and engine application (reference Table 1).*

1. Refer to the applicable engine Overhaul Manual for specific installation instructions and specialized equipment and tooling required.
2. Before installing a replacement valve guide, the valve guide bore in the cylinder head must be reamed to the proper oversize dimension. The difference between the valve guide outside diameter and bore inside diameter must be within the dimensional specification provided in Tables 1 and Tables 3 through 7 for the applicable engine and cylinder combination.

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3. Post installation measurements are required on Ream-In-Place valve guides after reaming procedures have been completed. Allow the cylinder to cool and stabilize to room temperature before taking any dimensional measurements. Measure the valve guide inside diameter at three equally spaced locations along the length of the valve guide (reference Figure 2). If the inside diameter is not within specifications, the guide will require refinishing or replacement.

#### IV. VALVE GUIDE REAMING PROCEDURES

- a. Install a suitable cylinder holding fixture (Borroughs 5221B or equivalent) into a drill press or vertical mill to secure the cylinder. Index the fixture to the proper angle (where shown) and install the cylinder in the cylinder holding fixture.
- b. Zero the tool holder to the guide with a dial indicator in accordance with good machining practices.

#### WARNING

**Do not attempt this procedure with hand held power tools. This procedure requires measurable accuracy and precision. Valve guides reamed with hand held power tools must be replaced.**

*CAUTION: Reamers are made to cut right-hand only. Do Not turn backwards (even a partial turn).*

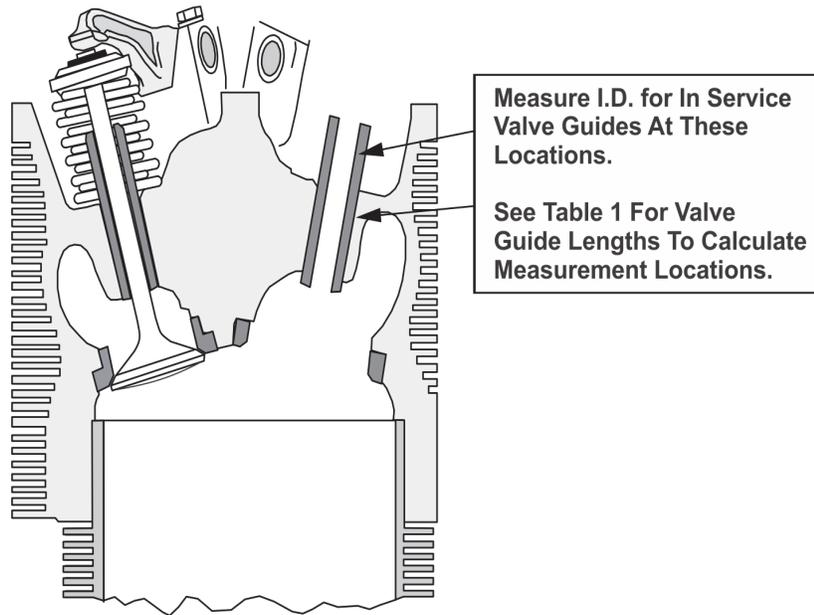
- c. Consult reamer manufacture to select an appropriate high-speed steel or carbide-tip spiral reamer (reference Table 1). Use reamer manufacturer's recommendations for appropriate reaming RPM and feed rate. Use a high quality cutting oil for all valve guide reaming operations.

NOTE: Do not exceed 400 RPM when using high-speed steel reamers or 700 RPM for carbide-tip reamers.

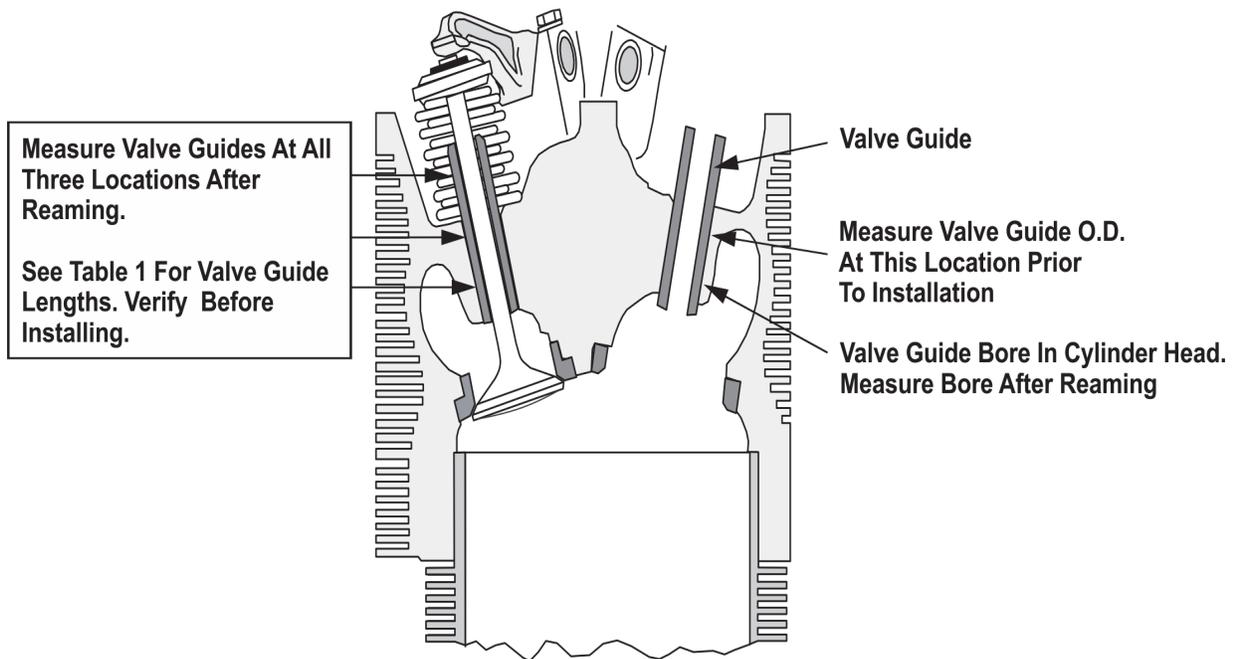
- d. Check the valve guide final dimensions using precision measuring equipment.
- e. Inspect the surface finish of valve guide inner bore after final reaming. The surface finish of the intake valve guide must not exceed 63 Ra, the surface finish of the exhaust valve guide must not exceed 125 Ra.

**Table 1. Intake and Exhaust Valve Guides**

| Intake Valve Guides  |                 |                 |                               |                             |                 |
|----------------------|-----------------|-----------------|-------------------------------|-----------------------------|-----------------|
| Guide P/N            | Material        | Length<br>± .01 | Reamer<br>Cutting<br>Diameter | Reamer<br>Pilot<br>Diameter | Finished I.D.   |
| 655166               | Aluminum-Bronze | 2.17            | 0.4354                        | 0.4220                      | 0.4350 - 0.4362 |
| 655523               | Aluminum-Bronze | 2.03            | 0.3750                        | 0.3630                      | 0.3745 - 0.3755 |
| 655525               | Aluminum-Bronze | 1.81            | 0.3750                        | 0.3630                      | 0.3745 - 0.3755 |
| 655527               | Aluminum-Bronze | 2.22            | 0.3440                        | 0.3310                      | 0.3432 - 0.3442 |
| Exhaust Valve Guides |                 |                 |                               |                             |                 |
| Guide P/N            | Material        | Length<br>± .01 | Reamer<br>Cutting<br>Diameter | Reamer<br>Pilot<br>Diameter | Finished I.D.   |
| 636242               | Ni-resist       | 2.36            | 0.4374                        | 0.4220                      | 0.4370 - 0.4380 |
| 639282               | Ni-resist       | 2.22            | 0.3750                        | 0.3630                      | 0.3745 - 0.3755 |
| 655526               | Ni-resist       | 2.12            | 0.3750                        | 0.3630                      | 0.3745 - 0.3755 |
| 656011               | Aluminum-Bronze | 2.36            | 0.4375                        | 0.4220                      | 0.4370 - 0.4380 |
| 655166               | Aluminum-Bronze | 2.17            | 0.4354                        | 0.4220                      | 0.4350 - 0.4362 |



**Figure 1. Dimensional Measurements, In Service Valve Guide**



**Figure 2. Critical Measurement Locations, Valve Guide Installation**

**Table 2. Valve Guide Applications**

| Engine   | Cylinder Assembly                   | Intake Valve Guide | Intake Valve | Exhaust Valve Guide | Exhaust Valve |
|--|-------------------------------------|--------------------|--------------|---------------------|---------------|
| C-75, C-85   | 658319A5<br>Swage Push Rod<br>Tubes | 655527             | 655968       | 655166              | 655969        |
| C-75, C-85<br>C-90, O-200-A, B<br>(except as noted)<br>O-300                 | 658188A1<br>Loose Push Rod<br>Tubes | 655525             | 655970       | 655526              | 655971        |
| O-200-A, B<br>O-300  | 658319A1                            | 655527             | 655968       | 655166              | 655969        |
| O-200-D, X   | 657417A1                            | 655525             | 655970       | 655526              | 655971        |
| GO-300   | 658319A7                            | 655527             | 655968       | 655166              | 655969        |
| E-165, E-185<br>E-225  | 658819A1                            | 655166             | 655783       | 656011              | 655771        |
| IO-346   | 658593A1                            | 655166             | 655783       | 636242              | 655771        |
| 360 Series<br>(except as noted)  | 658603A7                            | 655523             | 655867       | 639282              | 655866        |
| IO-240-A, B<br>IOF-240-B<br>IO-360-ES<br>TSIO-360-MB, RB, SB<br>LTSIO-360-RB | 658601A1                            | 655523             | 655867       | 639282              | 655866        |
| O-470-A, E, J  | 658599A2                            | 655166             | 655783       | 636242              | 655771        |
| O-470-G, K, L,<br>R,S [except G(7), (10), and<br>GCI]                        | 658816A1                            | 655166             | 655783       | 636242              | 655771        |
| O-470-U  | 658598A1                            | 655166             | 655783       | 636242              | 655771        |
| O-470-G(7), (10),<br>O-470-GCI,<br>O-470-M,<br>IO-470-C                      | 658816A2                            | 655166             | 655783       | 636242              | 655771        |
| IO-470-J, K  | 658599A1                            | 655166             | 655783       | 636242              | 655771        |
| IO-470-D, E, F, H, L, M, N,<br>S, U, V                                       | 658817A2                            | 655166             | 655783       | 636242              | 655771        |
| IO-520 Series<br>(except as noted)   | 658810A1                            | 655166             | 655783       | 636242              | 655771        |
| IO-550-G<br>TSIO-520-BE  | 658603A1                            | 655166             | 655783       | 636242              | 655771        |
| IO-550-A, B, C<br>IOF-550-B, C   | 658810A1                            | 655166             | 655783       | 636242              | 655771        |
| IO-550-D, E, F, L  | 658592A1                            | 655166             | 655783       | 636242              | 655771        |
| IO-550-N, P, R   | 658815A1                            | 655166             | 655868       | 658736              | 655771        |
| IOF-550-N, P, R  | 658594A1                            | 655166             | 655868       | 636242              | 655771        |
| TSIO-520-UB(17)<br>Special Edition   | 658810A1                            | 655166             | 655868       | 636242              | 655771        |
| TSIO-520-AF, CE, UB<br>(except UB(17))                                       | 658810A1                            | 655166             | 655783       | 636242              | 655771        |

**Table 2. Valve Guide Applications**

| Engine   | Cylinder Assembly | Intake Valve Guide | Intake Valve | Exhaust Valve Guide | Exhaust Valve |
|--|-------------------|--------------------|--------------|---------------------|---------------|
| TSIO-520-B, BB, C, D, DB, E, EB, G, H, J, JB, K, KB, L, LB, M, N, NB, P, R,T,VB,WB | 658810A1          | 655166             | 655783       | 636242              | 655771        |
| TSIO-550-B, C, E   | 658603A1          | 655166             | 655783       | 636242              | 655771        |
| TSIO-550-G, K, N   | 658815A1          | 655166             | 655868       | 658736              | 655771        |
| TSIOF-550-D, J, K  | 658594A1          | 655166             | 655868       | 636242              | 655771        |
| TSIOL-550-A, B, C  | 658596A1          | 655166             | 655783       | 636242              | 655771        |
| GTSIO-520-C, D, H<br>(except as noted)   | 658591A1          | 655166             | 655783       | 636242              | 655771        |
| GTSIO-520-F, K   | 658603A3          | 655166             | 655783       | 636242              | 655771        |
| GTSIO-520-H(7), (8), L, M, N, R  | 658603A2          | 655166             | 655783       | 636242              | 655771        |

NOTE: Visit the Continental website at [www.Continental.aero](http://www.Continental.aero) for the latest production product numbers, applicable illustrated parts catalog, a listing of the latest manual revisions, Service Documents, and Instructions for Continued Airworthiness (ICAs) for Standard Practices.

**Table 3. IO/IOF-240, IO-360, L/TSIO-360-Series**

| Description                                 | Minimum  | Maximum  | Service Limits |
|---|----------|----------|----------------|
| Intake Valve Guide In Cylinder Head         | 0.0010 L | 0.0025 L | 0.006 L        |
| Intake Valve In Guide Ream-In-Place Guides  | 0.0012 L | 0.0030 L | 0.006 L        |
| Intake Valve Stem Diameter                  | 0.3725   | 0.3733   |                |
| Exhaust Valve Guide In Cylinder Head        | 0.0010 T | 0.0025 T |                |
| Exhaust Valve in Guide Ream-In-Place Guides | 0.0025 L | 0.0043 L | 0.008L         |
| Exhaust Valve Stem Diameter                 | 0.3712   | 0.3720   |                |

NOTE: See Table 1 for intake and exhaust valve guide finished dimensions and recommended reamer sizes.

**Table 4. O/IO-470, O-470 (4, 11, & 13), IO/TSIO/LTSIO-520 Series, IO/IOF/TSIO/TSIOF/TSIOL-550, GTSIO-520 Series**

| Ream-In-Place Guides                        |             |          |                |
|---|-------------|----------|----------------|
| Description                                 | New Minimum | Maximum  | Service Limits |
| Intake Valve Guide In Cylinder Head         | 0.0010 T    | 0.0025 T |                |
| Intake Valve In Guide Ream-In-Place Guides  | 0.0010 L    | 0.0032 L | 0.0065 L       |
| Intake Valve Stem Diameter                  | 0.4335      | 0.4340   |                |
| Exhaust Valve Guide In Cylinder Head        | 0.0010 T    | 0.0025 T |                |
| Exhaust Valve in Guide Ream-In-Place Guides | 0.0029 L    | 0.0046 L | 0.0085 L       |
| Exhaust Valve Stem Diameter                 | 0.4334      | 0.4341   |                |

NOTE: See Table 1 for intake and exhaust valve guide finished dimensions and recommended reamer sizes.

**Table 5. C-75, C-85, C-90, O-200, O/GO-300 Series,  
with Loose Push Rod Tubes**

| Ream-In-Place Guides                        |             |             |                |
|---|-------------|-------------|----------------|
| Description                                 | New Minimum | New Maximum | Service Limits |
| Intake Valve Guide In Cylinder Head         | 0.0010 T    | 0.0025 T    |                |
| Intake Valve In Guide Ream-In-Place Guides  | 0.0012 L    | 0.0030 L    | 0.006 L        |
| Intake Valve Stem Diameter                  | 0.3730      | 0.3735      |                |
| Exhaust Valve Guide In Cylinder Head        | 0.0010 T    | 0.0025 T    |                |
| Exhaust Valve in Guide Ream-In-Place Guides | 0.0025 L    | 0.0043 L    | .008L0         |
| Exhaust Valve Stem Diameter                 | 0.3713      | 0.3720      |                |

NOTE: See Table 1 for intake and exhaust valve guide finished dimensions and recommended reamer sizes.

**Table 6. C-75, C-85, C-90, O-200, O/GO300 Series,  
with Swage/Swedged Push Rod Tubes**

| Ream-In-Place Guides                        |             |             |                |
|---|-------------|-------------|----------------|
| Description                                 | New Minimum | New Maximum | Service Limits |
| Intake Valve Guide In Cylinder Head         | 0.0010 T    | 0.0025 T    |                |
| Intake Valve In Guide Ream-In-Place Guides  | 0.0011 L    | 0.0029 L    | 0.006 L        |
| Intake Valve Stem Diameter                  | 0.3413      | 0.3421      |                |
| Exhaust Valve Guide In Cylinder Head        | 0.0010 T    | 0.0025 T    |                |
| Exhaust Valve in Guide Ream-In-Place Guides | 0.0025 L    | 0.0042 L    | 0.008L         |
| Exhaust Valve Stem Diameter                 | 0.4320      | 0.4325      |                |

NOTE: See Table 1 for intake and exhaust valve guide finished dimensions and recommended reamer sizes.

**Table 7. O-470 (4, 11 & 13), E Series**

| Ream-In-Place Guides                        |             |             |                |
|---|-------------|-------------|----------------|
| Description                                 | New Minimum | New Maximum | Service Limits |
| Intake Valve Guide In Cylinder Head         | 0.0010 T    |             |                |
| Intake Valve In Guide Ream-In-Place Guides  | 0.0010 L    |             | 0.0065 L       |
| Intake Valve Stem Diameter                  | 0.4335      | 0.4340      |                |
| Exhaust Valve Guide In Cylinder Head        | 0.0010 T    |             |                |
| Exhaust Valve in Guide Ream-In-Place Guides | 0.0030 L    |             | 0.0076 L       |
| Exhaust Valve Stem Diameter                 | 0.4333      |             |                |

NOTE: See Table 1 for intake and exhaust valve guide finished dimensions and recommended reamer sizes.