



INSTRUCTION – THREADED ELEMENT

Subject: P/N: TTP2771 Series Threaded Element

Document No: TN02771

Application: Cylinder-head; Continental, Franklin, and Lycoming.

Revision: G

Date: JUN-18-2021

RECORD OF REVISIONS

When revised document changed in its entirety.

REV	DATE	DESCRIPTION	BY	CKD
G	JUN-18-2021	Add Table 7.1 and Figure 7.8 solid type Lyc flange.	DNE	GDO
F	MAY-12-2020	Add ratings, update requirements, and figures sections.	DNE	GDO
E	FEB-14-2017	Rewrite w/engagement requirement and DO NOT USE lock-washer	GDO	DNE

Current revision approval: _____

1. PURPOSE

To provide installation guidance for Subject part listed above and supplement kit specific instruction where applicable.

2. DESCRIPTION

Threaded 50-watt resistance element w/ self-locking sealed connector. Manufactured to a specific watt density for application, replacing cylinder head intake tube, rocker cover or baffle pad fastener. Heat is transferred through the process of thermal conduction effectively heating the cylinder head from the inside, refer to Figure 7.1.

3. RATINGS

115-volt, 50-watt, 264.5-ohm, $\pm 10\%$.

230-volt, 50-watt, 1058.0-ohm, $\pm 10\%$.

Element body: 17-4PH stainless; $\frac{1}{2}$ -inch hex head $1\frac{1}{8} \times \frac{1}{4}$ -20 UNJ threaded shank *.

Lead: 6-inch 24-gauge, 600°C Varglas sleeve.

Connector: TCP2598, sealed self-locking, 13-amp 500-volt, 200°C.

* Threading w/ prescribed root radius; cannot be re-cut w/ standard tooling.

4. REQUIREMENTS / TOOLING

Technicians and users of this instruction are to be familiar w/ Installation Guide TNG1000 and documents associated specific installation when available.

Recommend: SAE Thread Restoring File (20 threads per inch) Nicholson p/n: T33001 and standard $\frac{1}{4}$ -20 UNC tap, or equivalent tooling.

Required:

- Applicable Engine Maintenance Manual.
- Thread Lubricant conforming to MIL-T-83483 (sparkplug lubricant): ATS2612, Tempest T556, Loctite C5-A, or MIL-C-22572 thread oil: Aluminum Tap Magic®, or equivalent.
- $\frac{1}{2}$ -inch Slotted Socket TU02905-05 or equivalent.
- $\frac{1}{4}$ -inch drive torque wrench or equivalent - certified to traceable standards.

PROPRIETARY DATA

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5. INSTALLATION

⚠ Caution: Requires Tension Installation w/ contact full of hex head interface surface and a minimum engagement of half the threaded shank (0.060-inch or 11-threads).

Do Not use split, star, or lock-washer of any type or material. Use of these types of washers limits conductive heat transfer and will result in element failure. Refer to Figure 7.2

- To prevent galling and seizure prior to installation apply lubricant to element threads, refer to Section (§) 4 a).

✓ **FOR SPACING ONLY USE:**

- ✓ ¼-inch Standard flat alloy steel or aluminum washer(s) w/ minimum O.D. 0.50-inch.
- ✓ ¼-inch Aluminum spacer(s) p/n: TU02846, O.D. 0.50, I.D. 0.25 x 0.188 thick.

⊘ **DO NOT:**

- ⊘ Use split, star, or lock-washer of any type or material.
- ⊘ Use stainless washers or spacers.
- ⊘ Use element to secure or anchor wire bracket, clamp, or cushioned clamp (Adel).
- ⊘ Allow element to bottom out in blind hole.
- ⊘ Allow tip of element to expose more than 3 threads through open hole.
- ⊘ Torque over 110-inch pounds (in-lb) / 12.4 Newton meters (Nm).

⚠ Caution: If Element Begins to Bind: **Stop!**

If a threaded element begins to bind before you are actually tightening it down, stop immediately! Wait a moment to allow any heat to dissipate. Apply Aluminum Tap Magic® or equivalent light weight oil, then back element out. Clean element threads w/ Thread Restoring File. Clean component hole w/ standard UNC tap or restoring tap, clear, lubricate and try again.

Do Not clean or restore external element threads w/ standard die tooling to refer to §§ 3 and 4.

1. Select location that allows for maximum thread engagement. Suggest replacing cylinder head intake tube, baffle pad or rocker cover, fastener. Refer to Figures § 7.
2. Remove existing fastener, clean, inspect and check hole depth. When required, lubricate hole and clean threads w/ standard ¼-20 UNC tap or restoring tap.
3. Configure element for location of installation by lightly lubricating. Only space when required to keep element from bottoming out or exposing more than 3 threads at tip. Optimum installation in open hole does not use spacing, however when spacing is needed space to allow 1 to 3 threads to be exposed at tip.
4. Element is designed to allow for installation w/out washer or spacer in locations where spacing is not needed, refer to Figures 7.5. A and B, and 7.7. A and B.
5. Insert configured element into hole and screw in place.
6. Torque to MFG specification for location of installation. Refer to Table 7.1
7. Secure elements lead midway between element and connector, when possible secure on intake tube, and continue routing w/ ignition leads.

6. SERVICE

There are no authorized repair procedures, only replacement. Test w/ ohmmeter, refer § 3 and/or Installation Guide TNG1000.

7. TABLES & FIGURES

Section contains narratives and examples for locating threaded elements in cylinder heads.

⚠ Before starting installation *thoroughly review* §§ 4 and 5.

Table 7.1. Torque Value Recommendations **Note:** Table contains original manufacture specifications. Aftermarket parts (gaskets/cylinders) may have alternate torque requirements.

Figure	Engine Manufacturer	Fastener Location	Torque Inch Pounds (in-lbs)	Torque Newton Meters (Nm)	Specification Source Reference
7.5, 7.6	Continental	Intake Tube Flange	85 to 110	9.5 to 12.4	MM Publication M-0
7.7, 7.8	Lycoming	Intake Tube Flange	96 to 106	10.8 to 12.0	SSP-1776-5
7.3, 7.4 7.5, 7.6	Continental All	Rocker Cover Cork Gasket	55 to 65	5.6 to 7.3	MM Publication M-0
7.6	Continental (lg bore) crossflow cylinder head	Rocker Cover 100% Silicone Gasket	20 to 25	2.2 to 2.8	SIL21-04A
7.6	Continental (lg bore) crossflow cylinder head	Rocker Cover Fiber-Based Gasket	55 to 60	6.2 to 6.8	SIL21-04A
7.3	Franklin and others (typical)	Rocker Cover Cork Gasket	TBD by user (50 to 60)	TBD by user (5.6 to 6.8)	Refer to MFG Service Manuals
7.7	Lycoming	Rocker Cover Silicone Gasket	35	4.0	L272A SSP-1776-5
7.7	Lycoming	Rocker Cover Cork Gasket	50	5.6	SSP-1776-5

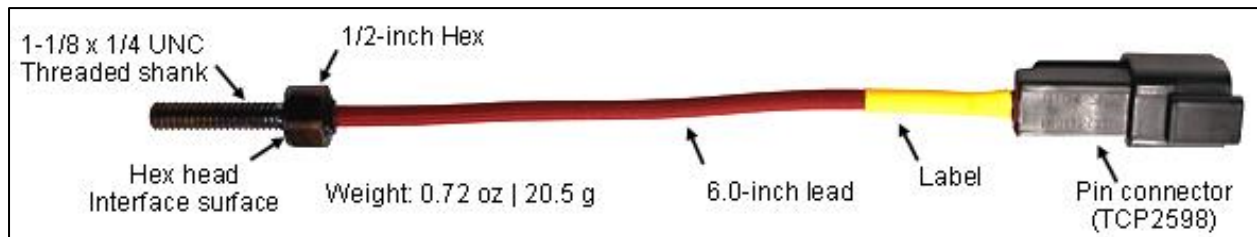


Figure 7.1. 50-watt 1/4-inch Threaded Element: P/N: TTP2771-115/50 and TTP2771-230/50.



Figure 7.2. DO NOT use split, star, or lock-washer of *any* type or material. Use of these types of washers limits conductive heat transfer and will result in element failure.

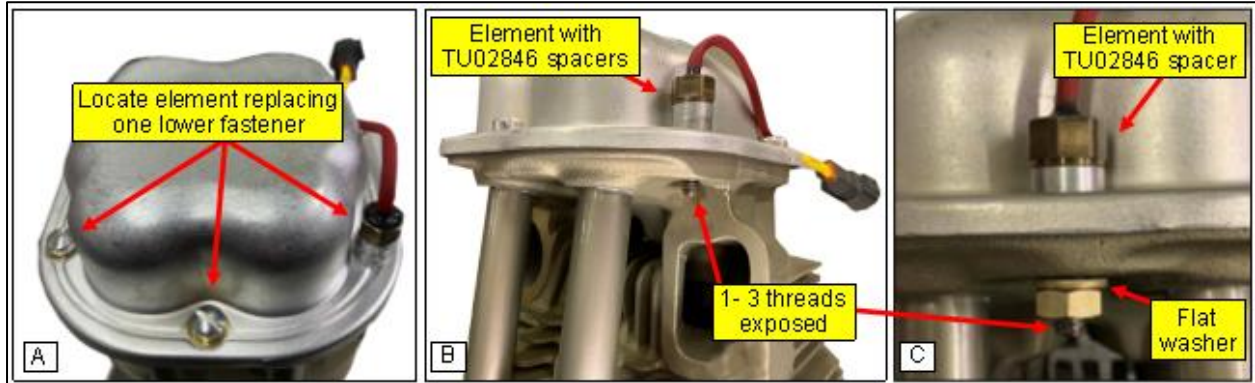


Figure 7.3. Continental and Franklin small bore straight valve cylinder head: A65/O-170, C90/O-200, C-145/O-300, E162/185/225, Franklin O-200 and 6A-215/335/350.

⚠ Before starting installation *thoroughly review* §§ 4 and 5.

Locate one element per cylinder head, space as needed to expose 1 to 3 threads at tip. Secure elements lead midway between element and connector, continue routing w/ ignition leads.

- A. Preferred location is replacing lower rocker cover fastener.
- B. Example element located on intake side, spaced w/ TU02846 spacers.
- C. Example element located in bottom center rocker using all metal stop nut AN363-420, spaced w/ TU02846 spacer and standard flat washer.



⚠ DO NOT use split, star, or lock-washer of *any* type or material, refer to § 4 and Figure 7.2.

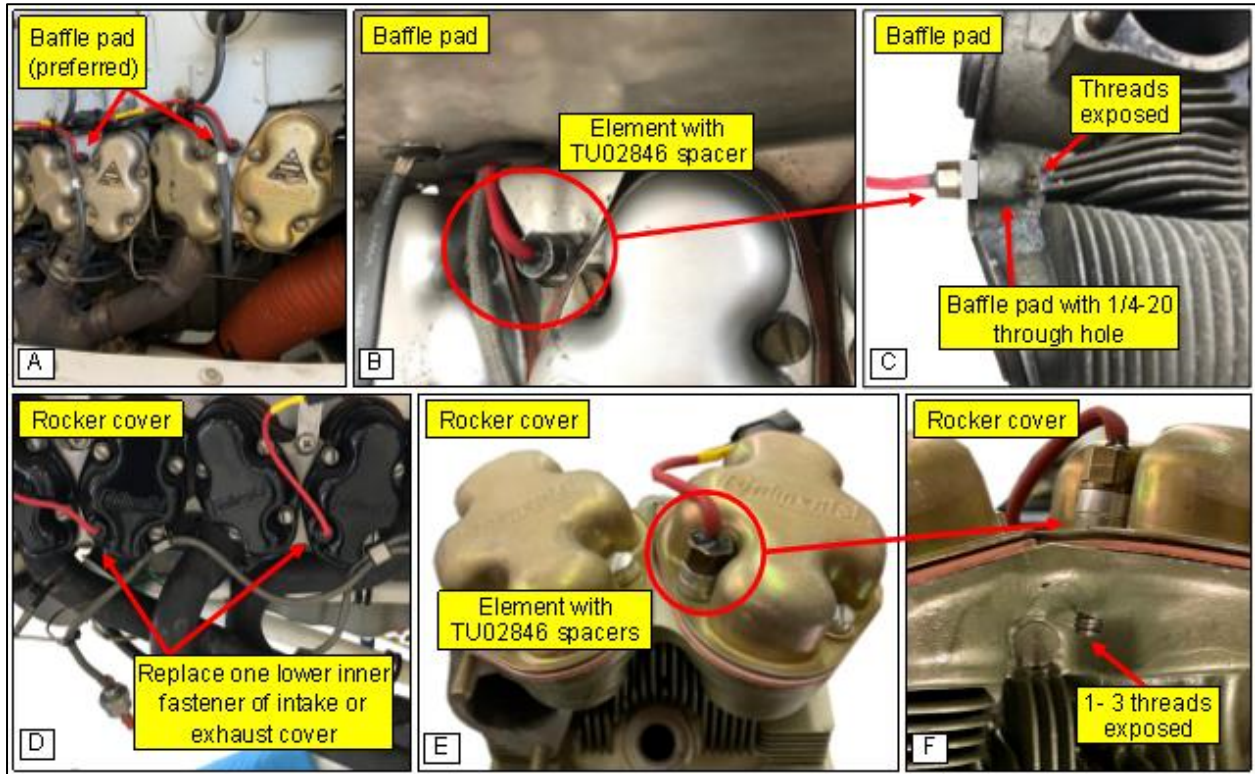


Figure 7.4. Continental smallbore crossflow cylinder head w/ split rocker covers: 240 and 360.

⚠ Before starting installation *thoroughly review* §§ 4 and 5.

Locate one element per cylinder head, space as needed to expose 1 to 3 threads at tip. Secure elements lead midway between element and connector, continue routing w/ ignition leads.

A, B and C. Example of preferred location for element replacing baffle pad fastener, spaced w/ one TU02846 spacer. If element bottoms out drill and tap through for 1/4-20 UNC to accommodate length of element shank w/ spacer installed, approximately 1.0 inch.

C. Looking down from above at backside of baffle pad, when properly spaced w/ one spacer threads may be visible.

D, E and F. Example element replacing lower center intake cover fastener, spaced w/ TU02846 spacers. Space to expose 1 to 3 threads at tip of element. Cylinder w/ cast intake cover locate replacing adjacent fastener of exhaust rocker cover.



⚠ **DO NOT** use split, star, or lock-washer of *any* type or material, refer to § 4 and Figure 7.2.

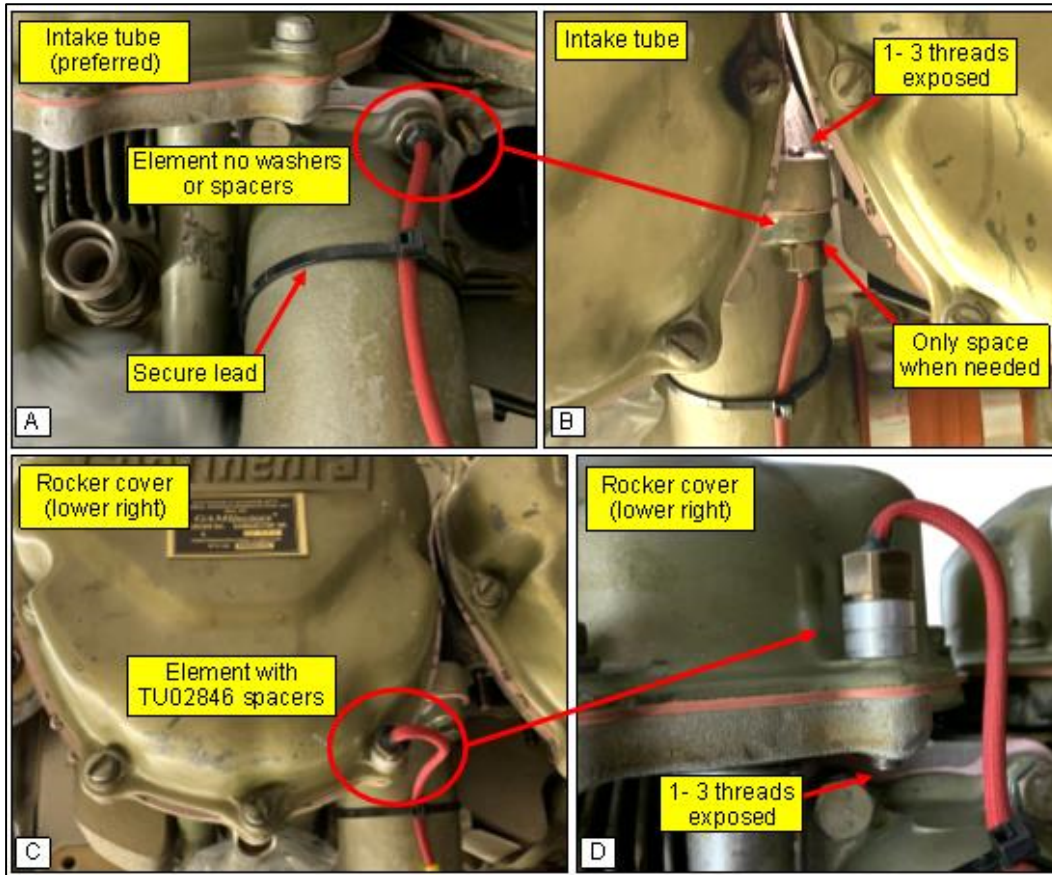


Figure 7.5. Continental large bore angled valve cylinder head w/ D style rocker cover: 470, 520, and 550.

⚠ Before starting installation *thoroughly review* §§ 4 and 5.

Locate one element per cylinder head, space as needed to expose 1 to 3 threads at tip. Secure elements lead on intake tube midway between element and connector, continue routing w/ ignition leads.

A and B. Example of preferred element location replacing intake tube flange fastener, no washers or spacer used. Only use washer or space when more than 3 threads at tip of element are exposed.

C and D. Example element replacing lower right rocker cover fastener, spaced w/ TU02846 spacers. Space to expose 1 to 3 threads at tip of element.



⚠ DO NOT use split, star, or lock-washer of *any* type or material, refer to § 4 and Figure 7.2.

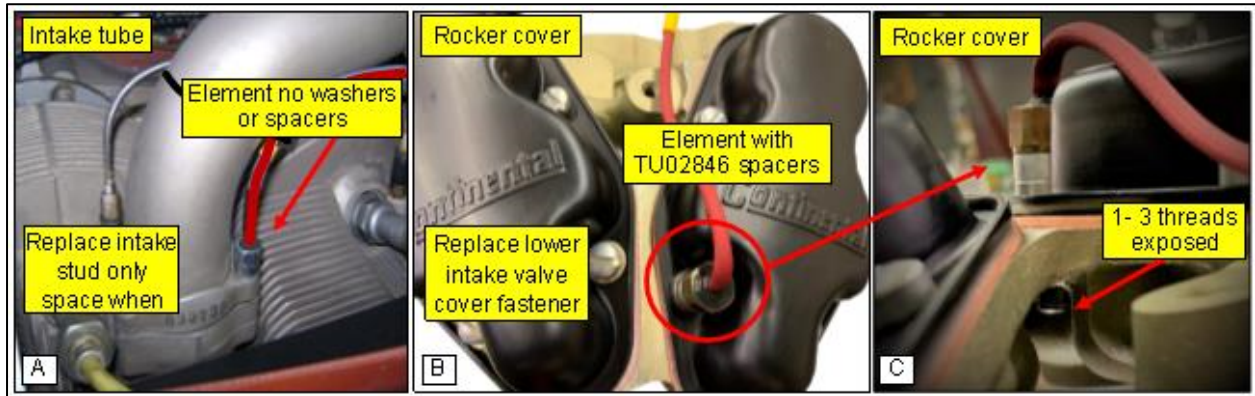


Figure 7.6. Continental large bore crossflow cylinder head w/ split rocker covers: 520 and 550.

Note: Due to variations in gasket compounds, torque specifications for this style of rocker covers is not typical. Refer to Continental Aerospace Technologies™ Service Information Letter SIL21-04 (as amended).

⚠ Before starting installation *thoroughly review* §§ 4 and 5.

Locate one element per cylinder head, space as needed to expose 1 to 3 threads at tip and torque. Secure elements lead midway between element and connector, continue routing w/ ignition leads.

- A. Example of preferred element location replacing intake tube flange fastener/stud. Only use washer or space when more than 3 threads at tip of element are exposed.
- B and C. Example element replacing lower center intake cover fastener, spaced w/ TU02846 spacers. Space to expose 1 to 3 threads at tip of element.



⚠ **DO NOT** use split, star, or lock-washer of *any* type or material, refer to § 4 and Figure 7.2.

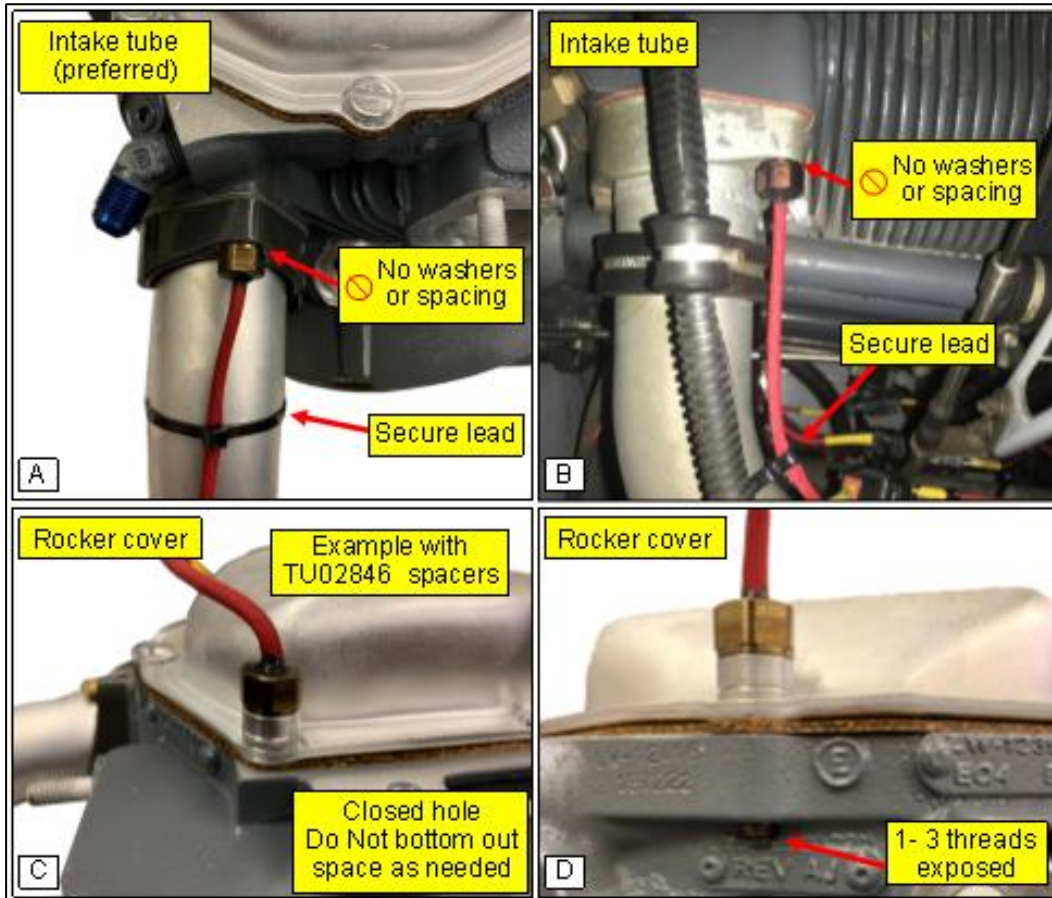


Figure 7.7. Lycoming cylinder head w/ floating type intake flange: 145 through 780. **Note:** For solid type flange refer to Figure 7.8.

⚠ Before starting installation *thoroughly* review §§ 4 and 5.

Locate one element per cylinder head, space as needed and torque. Secure elements lead on intake tube midway between element and connector, continue routing w/ ignition leads.

A and B. Example of preferred element location replacing intake tube flange fastener.

⊘ Do Not space or use washers of any type in this location.

C and D. Example replacing lower rocker cover fastener using TU02846 spacers. Space to keep element from bottoming out or to allow 1 to 3 threads to be exposed at tip.



⚠ **DO NOT** use split, star, or lock-washer of *any* type or material, refer to § 4 and Figure 7.2.

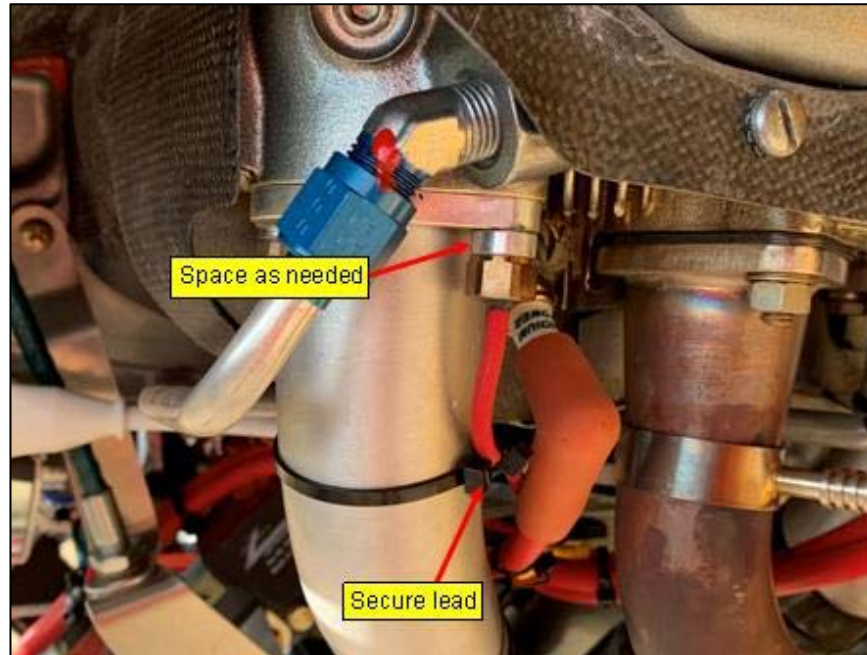


Figure 7.8. Lycoming style/type cylinder head w/ solid flange intake. **Note:** For floating type flange refer to Figure 7.7.

⚠ Before starting installation *thoroughly review* §§ 4 and 5.

Locate one element per-cylinder head, space w/ one p/n: TU02846 1/4-inch aluminum spacer. Depending on flange thickness, one or two standard flat washers may be used in place of 1/4-inch aluminum spacer. **Before torquing** verify element does not bottom out. After torquing secure elements lead on intake tube midway between element and connector, continue routing w/ ignition leads.



⚠ DO NOT use split, star, or lock-washer of *any* type or material, refer to § 4 and Figure 7.2.

***** NOTHING FOLLOWS *****