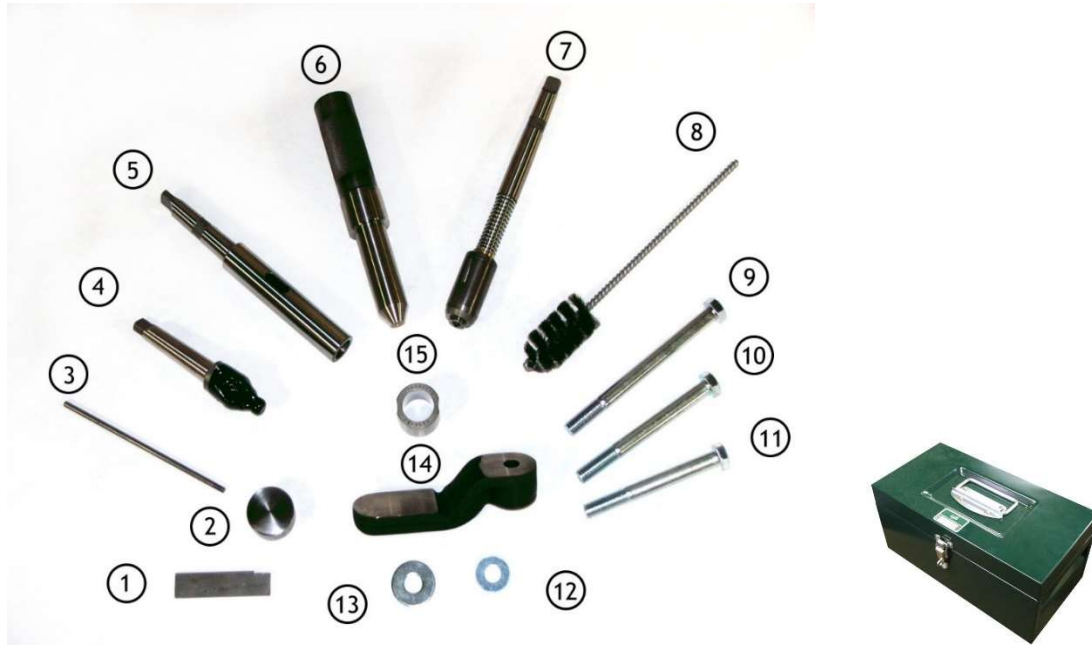




Cummins 250 Series Kit

SLEEVE INSTALLATION TOOLING INSTRUCTIONS

Parts Listing and Instructions for PN: 450-6152-50



450-6152-50 – 250 Series Installation Kit with Toolbox

Kit includes the following:

| Image # | Description | Part # |
|---------------------------|---|-------------|
| 1 | .060 - .070 Flat Tip Protrusion Gauge | 414-6111-12 |
| 2 | .060 - .070 Seat Cutter Gauge | 416-6152-94 |
| 3 | Gauge Handle | 414-6111-30 |
| 4 | Sleeve Seat Cutter (Carbide) | 416-6152-27 |
| 5 | Driving Arbor | 414-6114-10 |
| 6 | Sleeve Drive in Tool | 416-6152-51 |
| 7 | Sleeve Roll-in Tool with Tension Spring | 416-6152-53 |
| 8 | Casting Cleaning Brush (Carbon Steel) | 450-6951-02 |
| 9 | 1/2-13 X 6 (DT) | 467-1686-00 |
| 10 | 1/2-13 X 5 (DT) | 467-1685-00 |
| 11 | 1/2-13 X 4-1/2 (DT) | 467-1684-50 |
| 12 | 1/2" SAE WASHER | 467-1520-51 |
| 13 | 1/2" U S S WASHER | 467-1520-50 |
| 14 | Gauge Finger (includes 9,10,11,12,13 above) | 433-6991-00 |
| 15 | Guide Bushing | 414-6114-32 |
| | Toolbox | 467-1950-50 |
| Items You May Need | | |
| Not part of kit | 250 Series Injector Sleeves | 419-6192-51 |
| Not part of kit | 250 O-Rings | 419-6192-52 |
| Not part of kit | "EA" Lube (8oz) - (highly recommended) | 468-9910-08 |
| Not part of kit | 250 Casting Seat Cutter | 414-6114-26 |

Tooling made in USA

SLEEVE REMOVAL TOOLING – ORDER SEPARATELY

Complete Removal Tools – 250 (Copper Injector Sleeves)

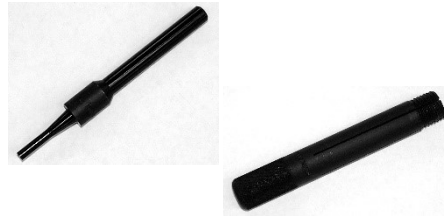
415-6132-50 – for 250 (Copper Injector Sleeves), includes Mandrel & Tool body (shown below)

Mandrel

415-6132-29 – for 250 (Copper Injector Sleeves)

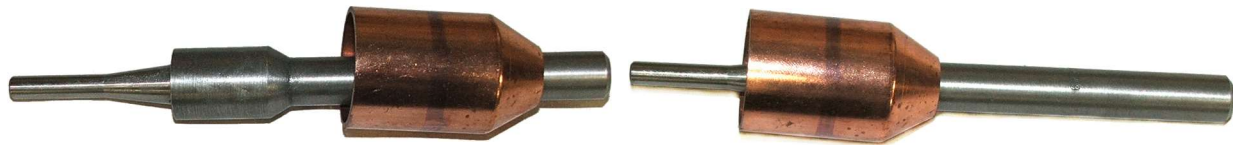
Tool body

415-6132-51 – for 250 (Copper Injector Sleeves)



Sleeve removal tools

The sleeve removal tools consist of one mandrel with a tapered end, and a removal tool body with buttress threads at one end.



The mandrel is positioned into the used sleeve as pictured below.

Mandrel being inserted into installed sleeve in this direction and then fully inserted.

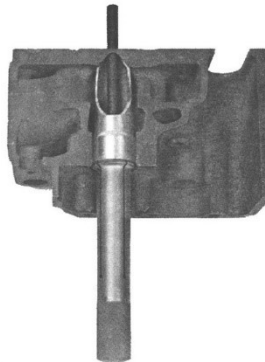


Tool Body slides over the Mandrel that is in the old sleeve.



Press here with
hydraulic press.

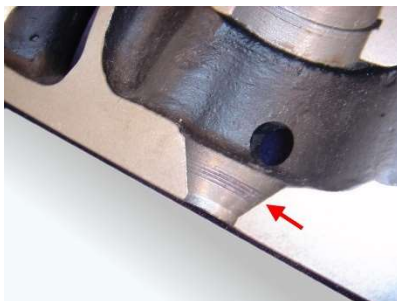
With upward pressure turn the tool body by hand to cut threads into the copper sleeve. Turn by hand until you can't turn it any further. the buttressed threads on the tool body expand and grab a hold on the sleeve, and then use a hydraulic press to press the mandrel, copper sleeve, and tool body out as one unit. **The use of a hydraulic press is required.**



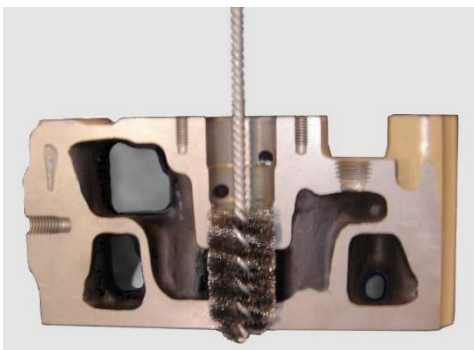
INSTALLATION OF NEW INJECTOR SLEEVES

1) Clean the area before installing new injector sleeves

- a) At the bottom of the injector seat in the casting are a series of small serrations. These serrations must be clean so that when the sleeve is driven in place the tip on the sleeve will be seated right into these serrations. These serrations help the injector sleeve prevent water from leaking in from the water jacket.



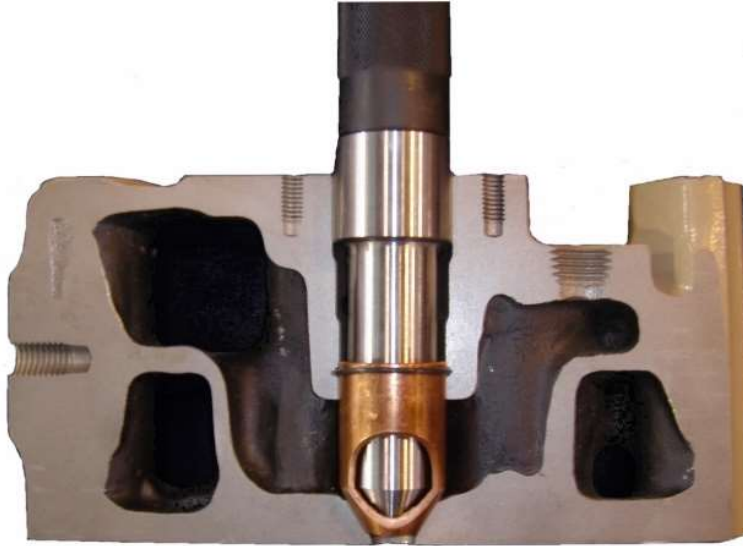
- b) Using the carbon steel brush (450-6951-02) clean the inside of the injector sleeve bore.



- c) If the seat of the casting has just been rebuilt the serrations will be new and clean. If not, besides using carbon steel brush, then consider using the "optional" casting seat cutter (414-6114-26) to clean them out.

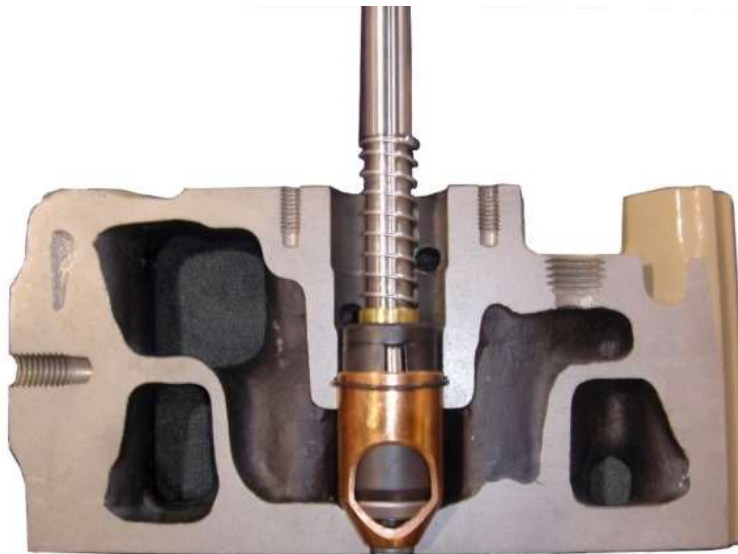


- d) Before installing the new sleeve brush Irontite Ceramic Seal (468-9120-16) onto the nose of the sleeve and onto the seat in the casting. Ceramic Seal will further help seal the nose of the seat and prevent water leakage. Lubricate and install an O-Ring in the casting groove. Drop the sleeve into the hole or put it on the appropriate drive-in tool (416-6152-51) and insert the sleeve into the hole.
- e) With a machinist's hammer drive the sleeve down into the casting seat until the sleeve bottoms in the casting.



Expand the upper end of the injector sleeve

- a. Insert the roll in tool (416-6152-53) into the injector sleeve and operating the tool in a seat and guide machine at about 50RPM roll it slowly down into the sleeve until the tool bottoms. All operating parts of the tool must be kept lubricated with a "Quality Motor Oil" (NOT "EA" Lube) at all times.
- b. As the tool is brought down into the sleeve the rollers on the tool expand and the upper end of the sleeve in turn expands to a diameter within the specified limits.
- c. Now to remove the tool, reverse the direction and draw it back out.



Cut the seat in the new injector sleeve for proper tip protrusion

- a. Using guide bushing (416-6114-32), sleeve seat cutter (416-6152-27) and driving arbor (416-6114-10). Set up in a seat and guide machine, bolt gauge finger (433-6991-00) to face of head, set gauge (416-6152-94) with gauge handle (414-6111-30) onto gauge finger.
- b. Using "EA" Lube (468-9910-08) as lubricant, using the slots at the sides of the guide bushing, run the machine at a slow (60-85) RPM and may have to varied to get a good finish. Cut sleeve until pilot end of cutter touches the gauge.
- c. While any head resurfacing should be done before the installation of the new injector sleeves, if, by chance, any resurfacing is contemplated, the sleeve seat cutter gauge should be shimmed up accordingly.

Checking Tip Protrusion



- a. Tip Protrusion can be checked with the tip protrusion gauge (416-6111-12) obtaining an indicated tip protrusion of .060-.070
- b. With an injector placed into the injector sleeve, placing the tip protrusion gauge down on the face of the head which tells you if the tip protrusion falls with range. This is essential prior to placing the cylinder head back into service.



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INJECTOR CASTING REPAIR - CUMMINS ISX15/QSX15 DOHC

| DESCRIPTION | PART # |
|--|-------------|
| Complete ISX15/QSX15 Casting Repair Kit DOHC with Toolbox Kit Includes the following: | 450-6110-60 |



SLEEVE INSTALLATION - CUMMINS ISX15/QSX15 DOHC

| DESCRIPTION | PART # |
|---|-------------|
| The Complete ISX15/QSX15 DOHC Kit with Toolbox Kit Includes the following: | 450-6156-00 |



SLEEVE INSTALLATION - CUMMINS L-10, M-11

| DESCRIPTION | PART # |
|--|-------------|
| COMPLETE L-10, M-11 (for Copper) KIT Kit includes the following | 450-6152-40 |



SLEEVE INSTALLATION TOOLS - CUMMINS M-11, ISM (for Stainless Steel Injector Sleeves)

| DESCRIPTION | PART # |
|--|-------------|
| The Complete M-11 Series Kit with Toolbox Kit Includes the following: | 450-6152-30 |



SLEEVE INSTALLATION - CUMMINS X15, ISX15/QSX15 SOHC

| DESCRIPTION | PART # |
|--|-------------|
| Complete X15, ISX15/QSX15 SOHC Kit with Toolbox Kit Includes the following: | 450-6157-00 |

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SLEEVE REMOVAL & INSTALLATION

- PACCAR MX-13

DESCRIPTION

PART #

Complete PACCAR MX-13 Kit
with Toolbox
Kit Includes the following:

450-6331-00



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