

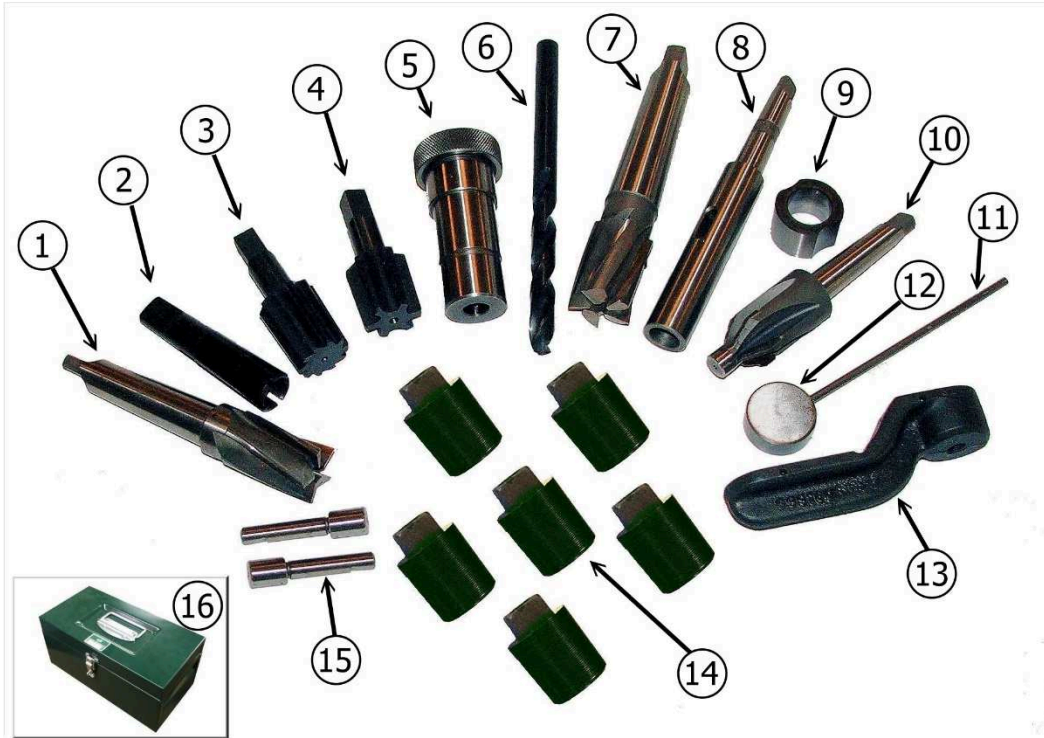


ISX15 / QSX15 DOHC SERIES CASTING CUTTER KIT INSTRUCTIONS

PN: 450-6110-60

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ISX15 / QSX15 DOHC SERIES CASTING REPAIR TOOLING INSTRUCTIONS



450-6110-60 - The Complete ISX15 / QSX15 DOHC Casting Repair Tooling

Above Kit includes the following:

IMAGE #	DESCRIPTION	PART #
1	Enlarging Counter Bore Cutter	434-6513-20
2	7/8 Split Sleeve Tap Driver #3MT	449-6933-30
3	J-Tapered Reamer	407-5213-10
4	J-Tapered Tap	407-5313-10
5	Drill Bushing	416-6156-19
6	M14.5 Taper Length Drill	416-6156-26
7	End Facing Counter Bore Cutter	416-6156-61
8	Driving Arbor	416-6156-32
9	Guide Bushing	414-6114-10
10	ISX / QSX Casting Seat Cutter	416-6156-28
12	Casting Seat Cutter Gauge	416-6156-29
11	Gauge Handle	414-6111-30
13	Gauge Finger	433-6991-00
14	J-Solid Diesel Iron Plug (6)	452-2613-13
16	Tool Box with Tray	467-1950-50
15	Counter Bore Pilot (2)	416-6156-62



CONSUMABLES

Ceramic Seal (pint)	468-9120-16
Tap-O (8 oz)	468-9920-08



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Rebuilding the casting injector seat

- 1) Remove the old injector sleeves
 - a) Using the Cummins sleeve remover, remove the old injector sleeve from the injector holes in the casting.

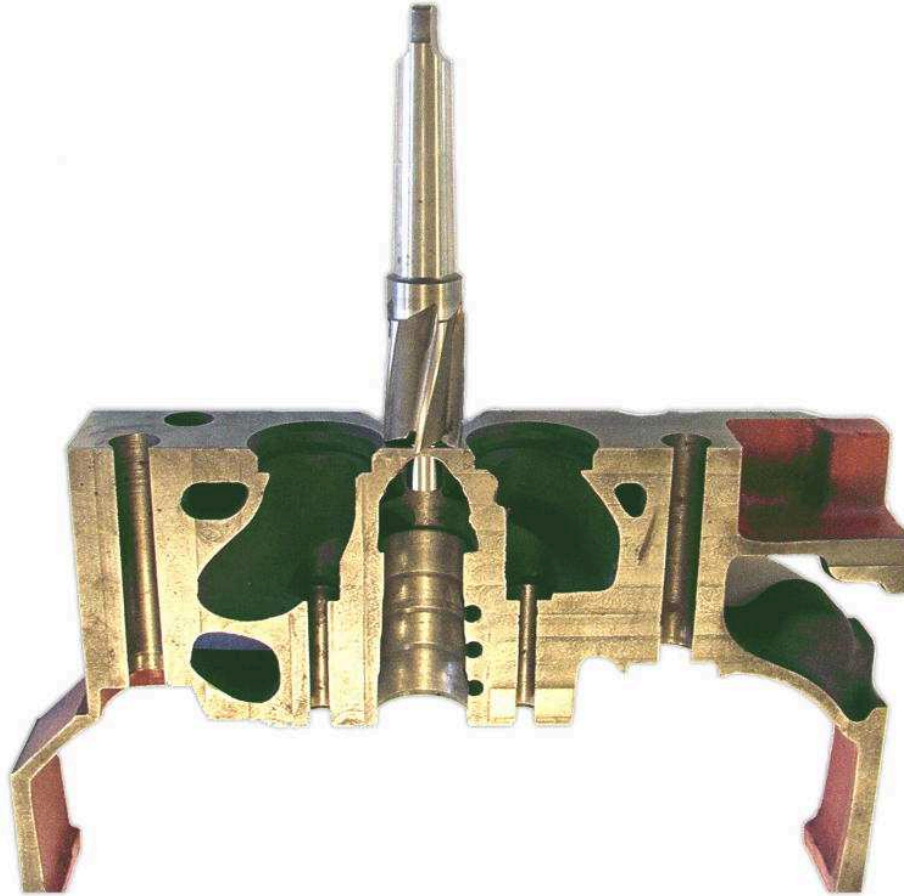
- 2) Clean out the injector seat in the casting
 - a) Using the casting seat cutter (416-6156-28) with the driving arbor (416-6114-10) and the appropriate guide bushing (416-6156-32) clean up the seats at the bottom of the injector holes.
 - b) This will clean out any accumulations and clean up any corrosion in the seat. In addition and more important, it will clean out the serrations at the bottom of the seat.

- 3) Preliminary Check
 - a) Frequently small cracks may appear on the face of the head at the injector hole area. If these cracks extend beyond the area that will be covered by the replacement plug, then these collateral cracks will need to be repaired. Their location on the face of the head should be clearly marked so they can be subsequently repaired using Irontite A-200 or A-235 Plugs.
 - b) It is important that this repair of these collateral cracks be done after the injector hole repair is completed and the replacement plug has been torqued into the injector hole. Otherwise, the torquing in of the replacement plug might have a tendency to open up the collateral crack.
 - c) In some instances it may be desirable to drill a hole at the end of the collateral crack before starting the injector hole repair in order to relieve the casting stress at the collateral crack.

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4) Enlarging the Injector Hole

- a) With the pilot (416-6156-62) in the enlarging counterbore (434-6513-20), from the face side of the cylinder head, guide the pilot into the injector hole and cut out the injector area of the casting, it will then be ready for the tapered reamer and in turn the tapered tap.



NOTE: Unless cracks extend to the valve seat area, valve seats do not need to be removed during nose plug machining and installation.

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5) Reaming the Injector Hole

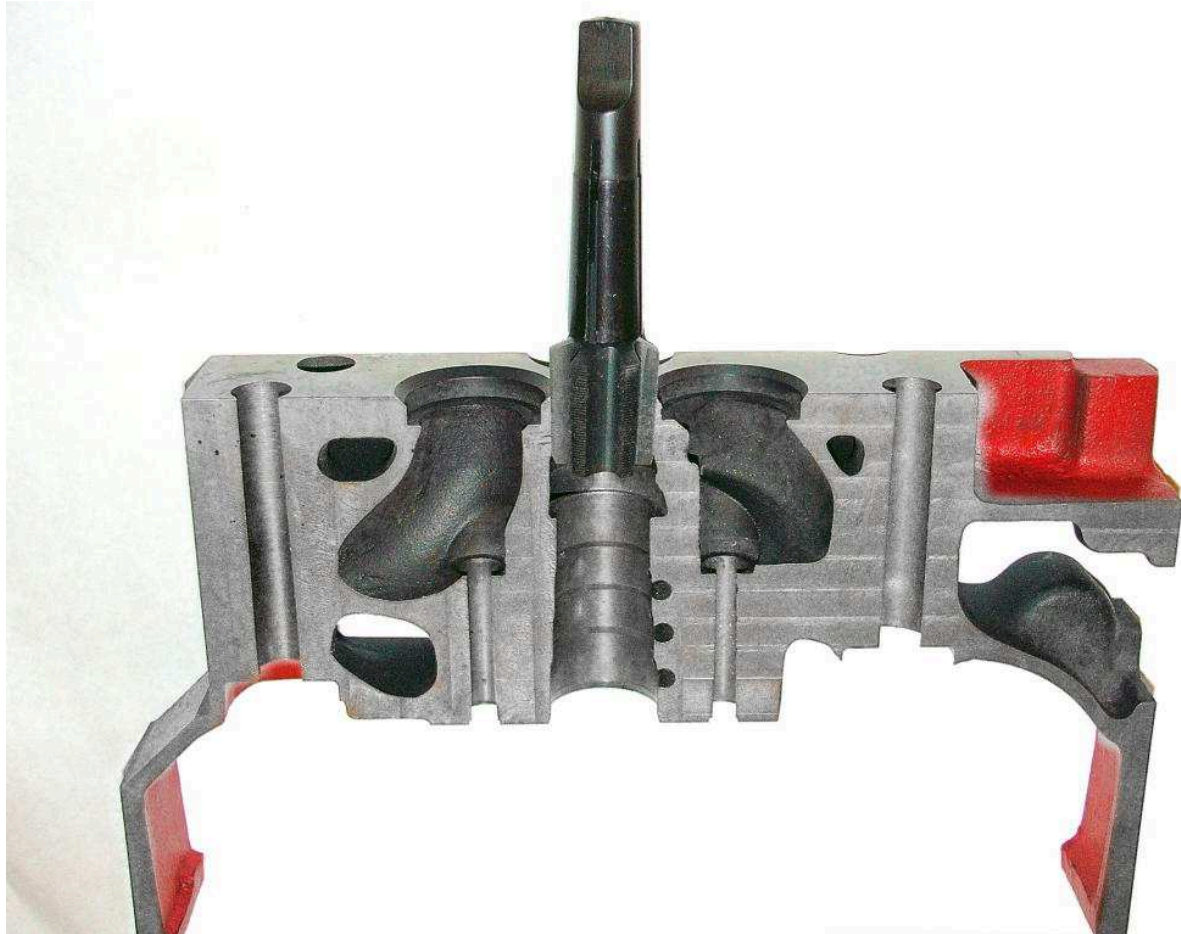
- a) With reamer (407-5213-10) and driver (449-6933-30) and coming from the face of the head, ream out the injector hole, operating the reamer at about 60/80 RPM. Do not ream too deep, just enough to get the tap started with a few threads is sufficient.
- b) Keep reamer well lubricated with Irontite Tap-O (468-9920-08).



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6) Tap the Injector Hole

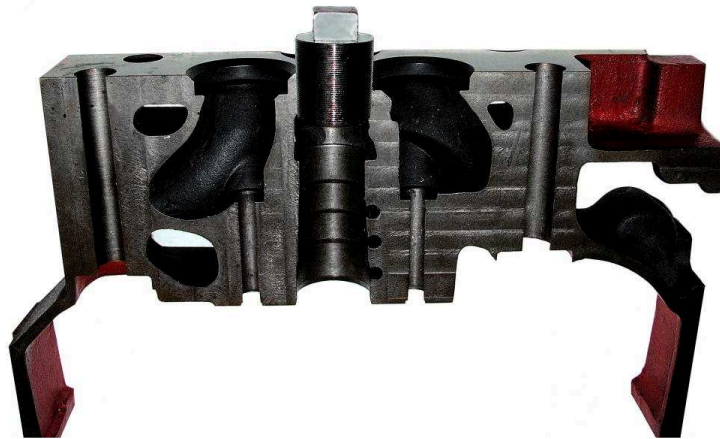
- a) With the Tap (407-5313-10), tap the reamed hole for the installation of the "J" Plug. While tapping, keep the tap well lubricated with Irontite Tap-O (468-9920-08).



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7) Install and Drill the Replacement Plug

- a) Clean the tapped casting area and the “J” tapered plug with a quality cleaner. It is recommended to place Ceramic seal (468-9120-16) on the casting area along with the threads of the plug. Thread the plug into the casting and torque to 200 ft lbs of torque.

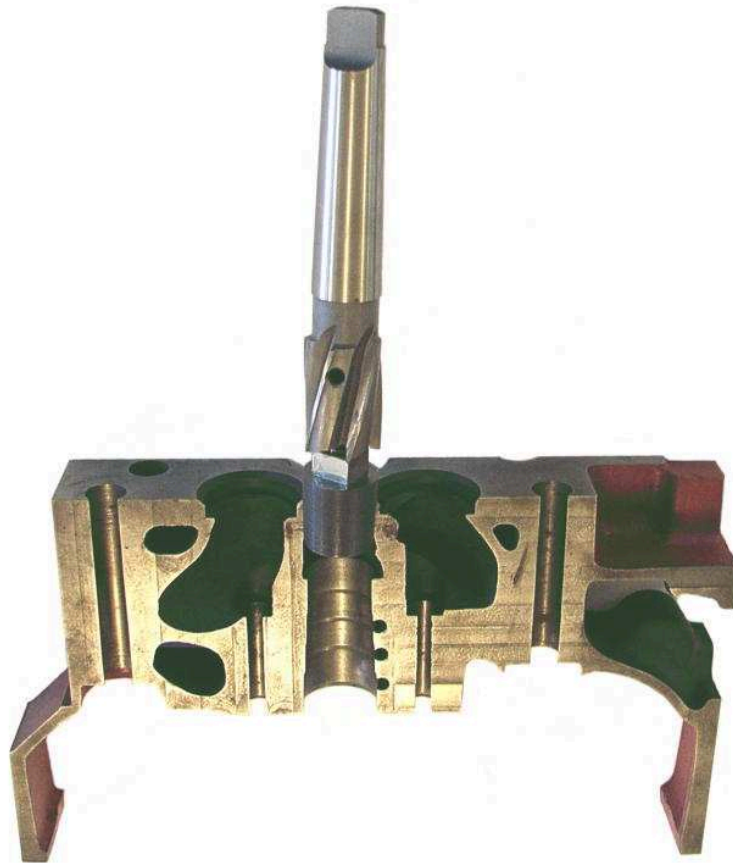


- b) Turn the casting over, and coming in from the spring side of the casting, using the taper length drill (416-6156-26) and drill bushing (416-6156-19) drill the plug all the way through.



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- 8) Face off and peen the outer end of the plug
- a) Turn the casting back over with the face up using the end facing counterbore (416-6156-61) and pilot (416-6156-62) Face off the outer end of the replacement plug. Bring it down to about 1/16" above the face of the casting.

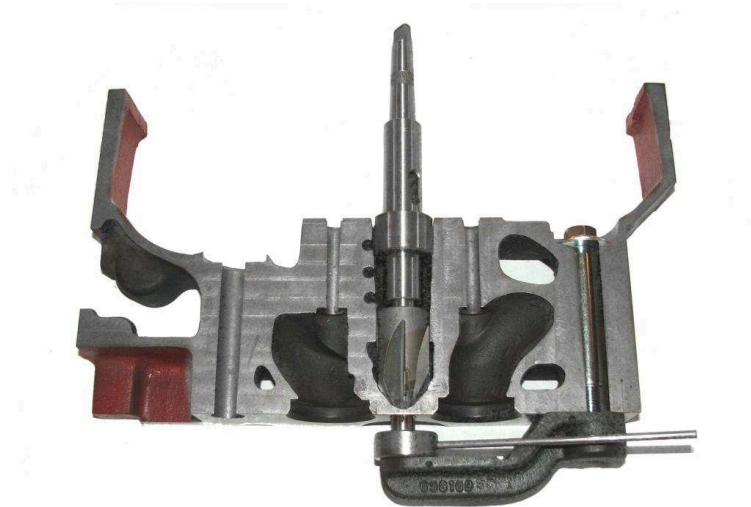


- b) Now peen the outer rim of the plug, always peening away from the center of the plug. After peening the outer rim of the plug, smooth off the end of the plug. If the head is to be resurfaced later, bring the end of the plug down to about 1/32" above the face of the head. If there is not to be any later resurfacing of the head, then finish off the end other plug smooth with the face of the casting.

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9) Check for any collateral cracks

- a) At this stage, after the plug has been installed, check the area around the plug to determine if any small cracks extend beyond the perimeter of the plug. If so, these cracks should be now repaired, using the Irontite crack repair process.
- b) After any such repair is completed, make certain that the surface of the head is smoothed as desired.



10) Cut a new injector seat in the rebuilt area

- a) Cut a new injector seat in the rebuilt injector seat area of the casting using the casting seat cutter (416-6156-28) along with the driving arbor (414-6114-10) and guide bushing (416-6156-32).
- b) One very important feature in cutting the new seat is to cut it to the correct depth. This seat depth is controlled by the use of the gauge finger (433-6991-00) and the casting seat cutter gauge (416-6156-29) in conjunction with the dimensional pilot at the end of the cutter.
- c) Mount the gauge finger on the casting with the flat surface of the gauge finger directly below the injector hole.
- d) Operating the seat cutter at 60/80 RPM while keeping it well lubricated, cut the new injector seat, bringing the cutter slowly down until the dimensional pilot at the end of the cutter bottoms on the casting seat cutter gauge.
- e) An allowance must be made for any head resurfacing that may be contemplated later in the rebuilding process by shimming up the seat cutter gauge on the gauge finger accordingly.

NOTE: When cutting, the seat cutter should be operated at about 60/80 RPM and should be kept well lubricated at all times with our Irontite Tap-O (468-9920-08).



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