PARTS PRO CLASSIC

CLASSIC EDITION #1

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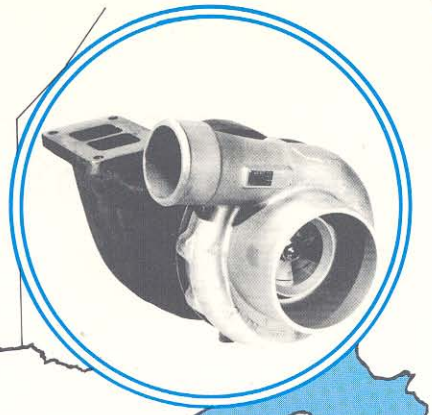
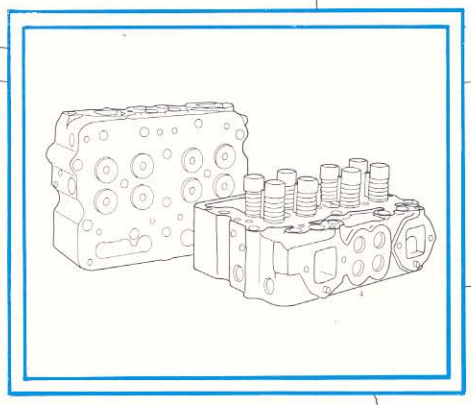
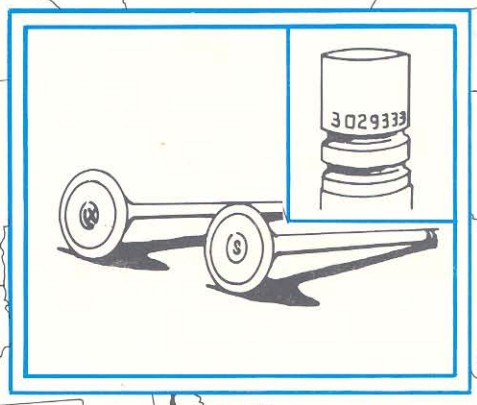
PARTS
PROFESSIONAL



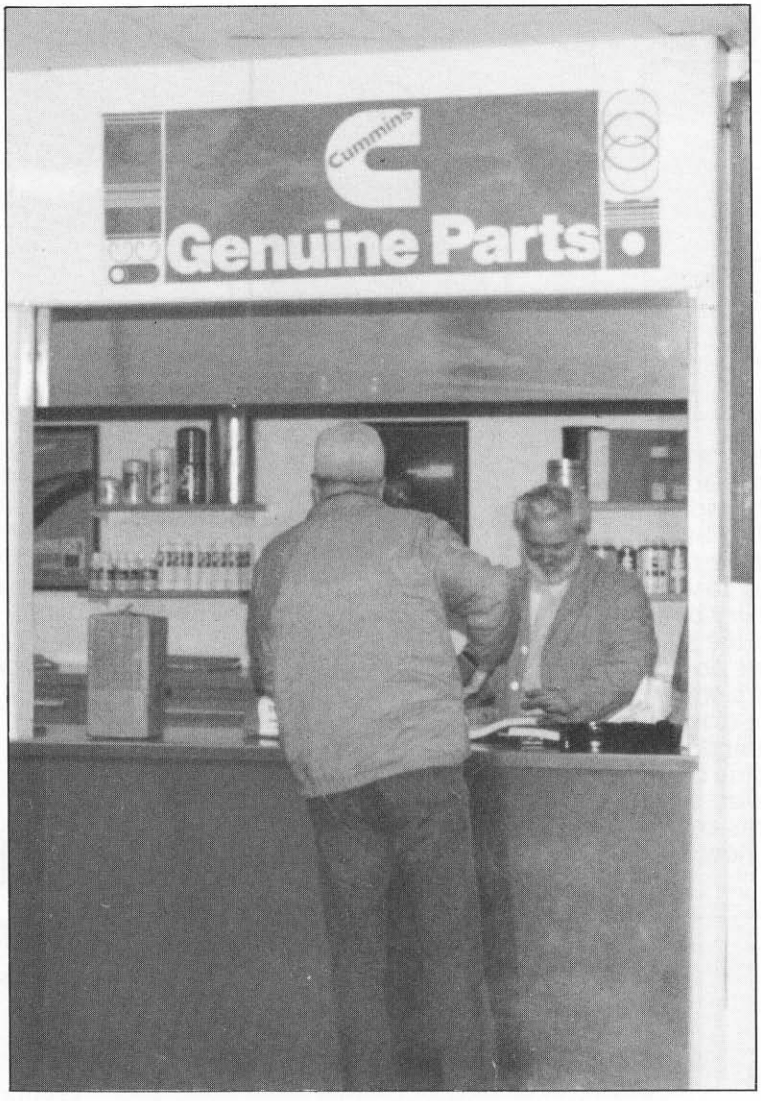




Cummins

PARTS PROFESSIONAL 1

Cummins Parts Professional Tests – Product Familiarity is the Key to Selling Success



The Cummins parts professional series is a great way to increase product knowledge and parts sales. Being sharp and up-to-date on what's happening within the Cummins parts network and how changes and updates affect service help you to be the Parts Professional that customers ask for and technicians rely on. The more you know...the better off you'll be ... both professionally and financially.

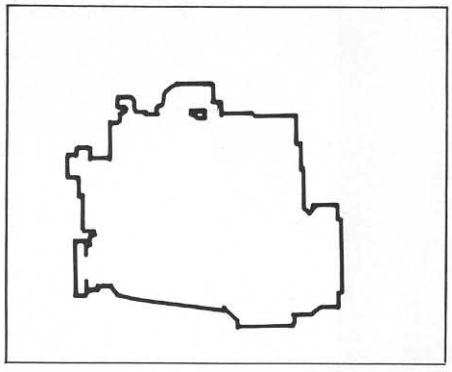
Booklet #1 is the first in the series of programs designed to familiarize and update you with the basics of the Cylinder Head and its' components, New Parts Products, Consolidations, Competitive Information, the latest on Kits and Sets and Parts Marketing Programs. The first three booklets in the series will primarily be centered around the NH engine family. To become an accredited Cummins Parts Professional and continue receiving the training booklets, you must complete and mail the exams in the self-addressed envelope. Scoring an average of 90% or better on the first four exams will earn you an official "Cummins Parts Professional Jacket." Plus, you'll be on your way to keeping up with all the latest Cummins designs and product improvements.

Participating in the Parts Professional program will help you learn more about Cummins Products. You'll gain the competitive edge and that will make a big difference in your earning power.

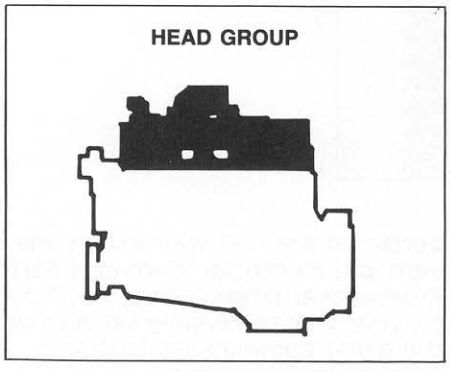
4.00 PM start.
4.45 PM finish

Engine Groups

Engine Groups



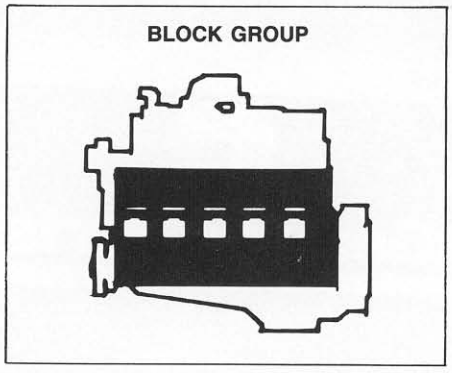
Familiarity with the engine and the ability to visualize the relationship of all the components and systems together is essential to being a Parts Professional. This isn't the easiest thing in the world to do when one considers the complexity of a modern diesel engine, but it's still one of the things you must do; it's essential to your job! Here's something that may help, we've divided the engine into *five basic functional* groups. This breaks the engine down into bite size pieces. Visualize the groups and the components that make them up and think of how they work together.



Using the NH/NT engine family, we'll take a look at the components that make up each of the five groups, starting with the **Head Group**. This Group includes:

- Cylinder head(s)
- Rocker lever assemblies
- Rocker covers
- Injectors
- Manifolds

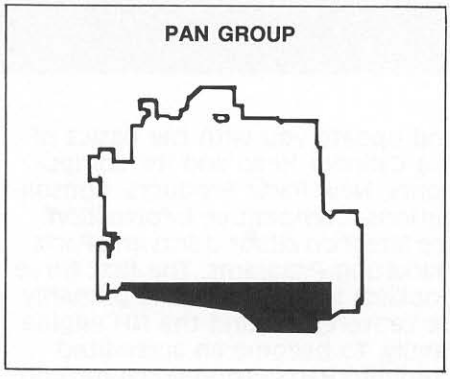
The **Head Group** includes many associated parts which work together for efficient operation.



Booklet #2 will cover the **Block Group**. It's the backbone of the engine as all of the groups are attached to or supported in some way by the cylinder block. It includes the:

- Engine block
- Cylinder liners
- Pistons and Pins
- Piston rings
- Rod bearings
- Main bearings and Caps
- Camshaft
- Cam followers and Bushings
- Push tubes
- Crankshaft

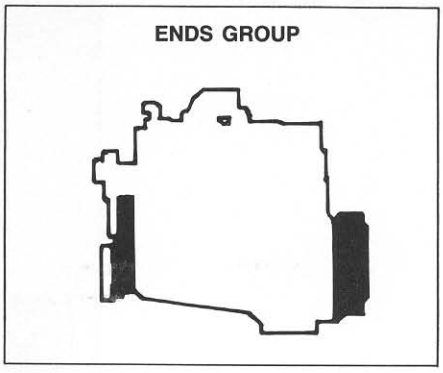
In addition to the above components, there are many other associated parts to include in the customer's order such as seals, gaskets and O-rings, capscrews, etc. These must be included to ensure a complete repair.



The third group is the Pan Group which includes the:

- Oil pan
- Gasket.

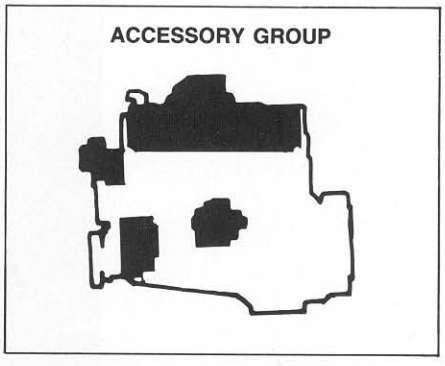
It's identified as a separate group because of the location and the fact that it must be removed for most internal repairs.



The Ends Group includes the:

- Flywheel
- Flywheel housing
- Gear cover
- Oil seals
- Vibration Damper

The Ends Group must be removed in order to service the Crankshaft and its related components, seals and gaskets.



Components in the Accessory Group include the:

- Accessory drive
- Water pump
- Fan hubs
- Lubricating oil pump
- Oil cooler
- Turbocharger
- Aftercooler
- Fuel pump

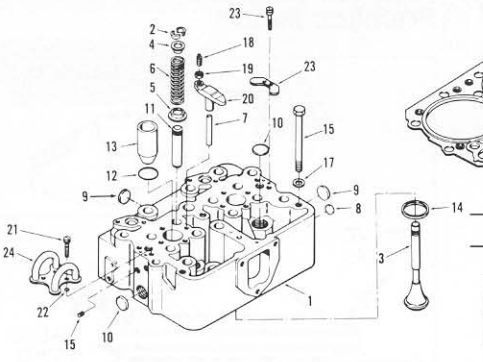
and all of the various other compressors, pumps and "hang-on" items which are attached to the block.

The relationship of one basic component to another is the key to providing your customers with the right parts. Picture in your mind which group is being repaired, this will prepare you to make an associated sale. Remember, when a component is being serviced, at minimum there

are gaskets and seals which must be replaced. Keep yourself one step ahead of the customer or technician by suggesting essential pieces or components that are needed.

The head group is the major focus of booklet #1. Take some time to review the material, then complete the test questions located on the perforated pages. There are 30 questions in all, make sure to double check any answers that you're not sure of. After the test, carefully complete the form and promptly mail the answers in the envelope that's provided.

Head Group Components



REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		CYLINDER HEAD Fleet 300, Formula 300, NTC-300, NTC-350, Formula 350	
1	3041993	Head, cylinder (3041991)	3
2	127554	Collet, valve	48
3	135957	Valve, intake	12
3	145701	Valve, exhaust	12
4	170296	Guide, valve spring	24
5	172034	Guide, valve spring	24
6	211999	Spring, valve	24
7	123558	Guide, valve crosshead	12
8	213394	Plug, expansion	3
9	213395	Plug, expansion	18
10	216524	Plug, expansion	6
11	3006456	Guide, valve stem	24
12	3007759	Seal, O-ring	6
13	3011934	Sleeve, injector	6
14	3017759	Insert, valve (exh.)	12
14	200354	Insert, valve (int.)	12
15	3013623	Capscrew	36
16	3036126	Gasket, cylinder head	3
17	69699	Washer, plain	36

REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		CYLINDER HEAD Formula 400, NTC-400	
▶1	3037989	Head, cylinder (3041991)	3
2	127554	Collet, valve	48
▶3	135957	Valve, intake	12
▶3	3029333	Valve, exhaust	12
▶4	3032711	Guide, valve spring	24
▶5	3035996	Spring, valve	24
▶6	3036966	Retainer, valve spring	24
7	123558	Guide, valve crosshead	12
8	213394	Plug, expansion	3
9	213395	Plug, expansion	18
10	216524	Plug, expansion	6
11	3006456	Guide, valve stem	24
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15	3013623	Capscrew	36
16	3036126	Gasket, cylinder head	3
17	69699	Washer, plain	36
		CROSSHEAD All Models	
	3030038	Assembly, crosshead	12
18	147389	Screw, crosshead adjusting	12
19	203131	Nut	12
20	3028293	Crosshead, valve	12
		FUEL CROSSOVER All Models	
21	70772	Capscrew, springtite	12
22	131026	Seal, O-ring	12
23	135308	Plate, cover	2
24	147100	Crossover, fuel	2

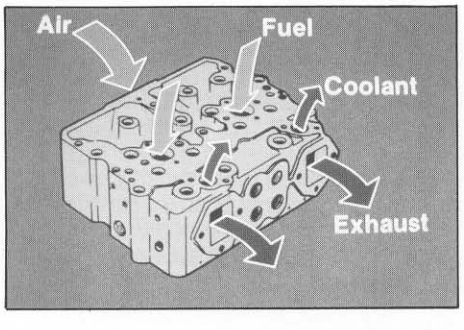
Cylinder Head

The **Cylinder Head** is the foundation of the head group. It's precisely ground and finished to Cummins exacting specifications. As you can see from this exploded view, there are many intricate components which must meet specific tolerances to withstand the rigors of combustion.

Cummins offers two standardized cylinder heads for servicing NH/NT Big Cam models. All Big Cam models except the Big Cam IV 400 use the same head for service. The Big Cam IV 400 model uses a heavier valve spring and has a larger inside push tube diameter.

The new head numbers and their uncommon part numbers are highlighted.

The interior of the cylinder head is a maze of passages though which coolant circulates, fresh air and fuel enters and exhaust gases leave. The movement of these fluids and gases through the cylinder head is regulated by different components which attach to the cylinder head.



Specifically, the cylinder head performs the following functions:

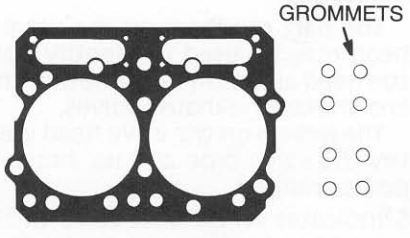
- Forms the upper limit of the combustion chamber and seals it during compression and ignition.
- Provides for coolant circulation around valves and injectors.
- Provides passages for intake air and exhaust gases.
- Houses the valves and injectors.

Head Gasket

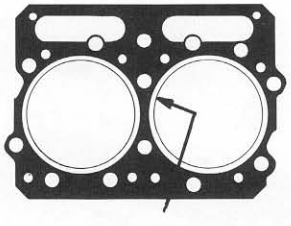
The **Head Gasket** plays an important role in seating the head to the block surface. It must withstand liner flange clamping loads as it seals the head deck from dirt and other abrasives. Head gaskets have experienced a number of changes over the past several years. The **OLD STEEL PLATE GASKET** . . . . . was stamped from carbon steel and required the installation of either asbestos or rubber water grommets and oil seals for the push tubes. This gasket was extremely reliable, however seal installation discrepancies often lead to coolant leakage and block surface wear.

This prompted a change to a **COMPOSITION TYPE GASKET** that would be more conformable to the head deck surface and provide better sealing.

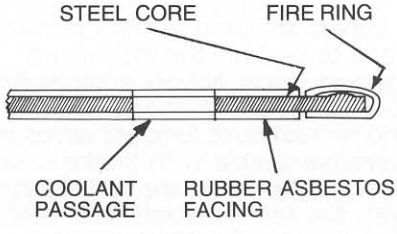
OLD STEEL PLATE GASKET



COMPOSITION GASKET

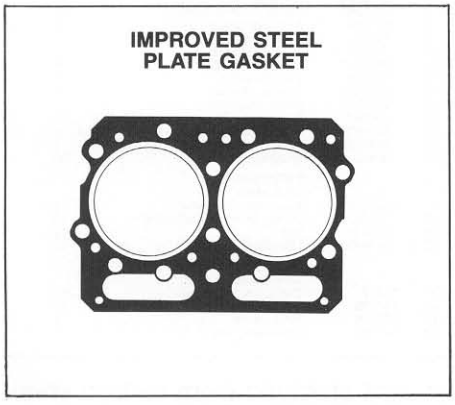


COMPOSITION GASKET CUTAWAY



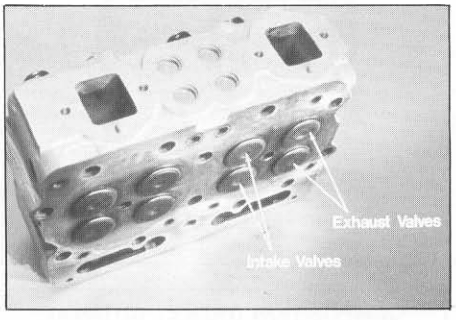
The composition gasket provided better sealing and easier installation characteristics but offered a decreased service life over the "Old Steel Plate" type.

Again, current and future engines demanded cylinder head gasket improvements for greater durability. By combining the reliability of the old steel plate and the sealing technology of the composition gasket, Cummins introduced an IMPROVED STEEL PLATE GASKET.



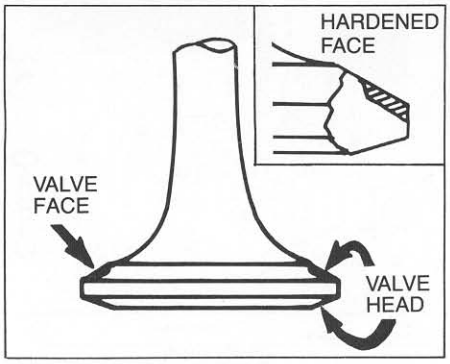
Today's gasket is constructed of steel plate for rigidity; and all the seals are bonded in place for sealing consistency. Use of this gasket has allowed liner flange clamping load to be increased over the earlier designs. Also, the "Improved Steel Plate" gasket has a silicone sealing bead on each end and around the push tube surface to keep dust, leaks and abrasives away from the head deck surface.

Valves

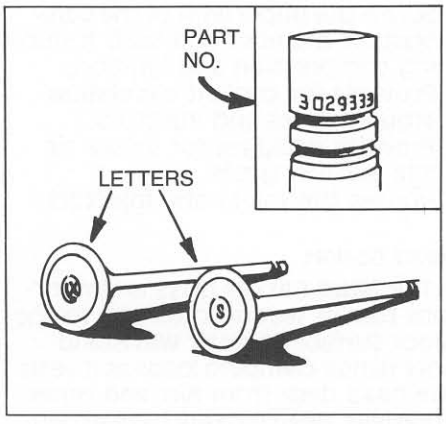


Valves are used in the cylinder head to seal off the intake and exhaust ports. NH/HT engines have four valves per cylinder, two intake and two exhaust. Exhaust valves are interchangeable with intake valves. But, **intake** valves are *not* finished with the same material and cannot be used as exhaust valves.

High Temperature Premium Metals



Valves are subjected to extreme stress, they operate at a very high speed, opening and closing 17 times a second at 2100 RPM. They are subjected to very high temperatures, often in excess of 1,400° F. To withstand the constant pounding of operation and extreme temperatures, valves are precision welded, ground and made with materials specially selected to withstand heat and friction. Before an exhaust valve is ground, Cummins adds a *non-magnetic* material to the valve face to increase its resistance to wear, thermal stress and friction.



Valve identification is accomplished in three ways:

- Part number etched above the collet retainer (keeper) groove.
- Letter cast into the head.
- Non-magnetic test for exhaust valves.

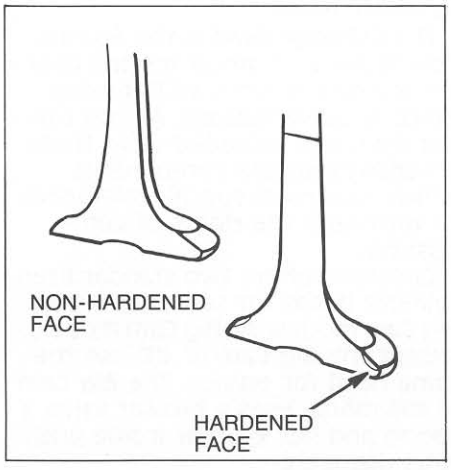
The part numbers on the valve head may be used to identify both the head assembly and whether they are intake or exhaust valves.

The letters on the valve head identify the valve type and its' horsepower range:

S indicates an exhaust valve with a hardened stellite or etonite face.
X indicates a high horsepower intake valve.
O indicates a low horsepower intake valve.

When the valves are in the head you can use the non-magnetic test to differentiate intake from exhaust valves. Simply touch a small magnet to the valve head. All intake valves are magnetic, **exhaust valves** are **nonmagnetic**.

An important point to keep in mind about valves is that Cummins valves are designed by our engineers and backed by quality manufacturing. All welds are 100% ultrasonically tested for reliability. Many aftermarket valves do not meet the stringent quality standards which are set for Genuine Cummins valves. Although these aftermarket valves are often lower priced, their lifetime is shortened by the use of inferior or inadequate materials. To avoid problems, always use Genuine Cummins valves.

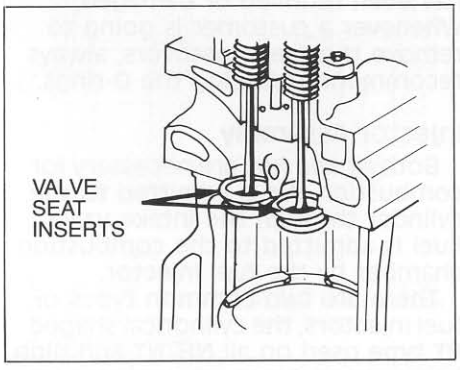


During cylinder head service the valve face is often refinished to provide a better sealing surface against the cylinder head. Valves can only be refinished to a certain point called the wear limit. Refinishing the valve beyond the wear limit will cut off the hardened metal face. Once beyond the wear limit the valve can no longer be used and must be replaced with a **new** Cummins valve.

Valve Seat Insert

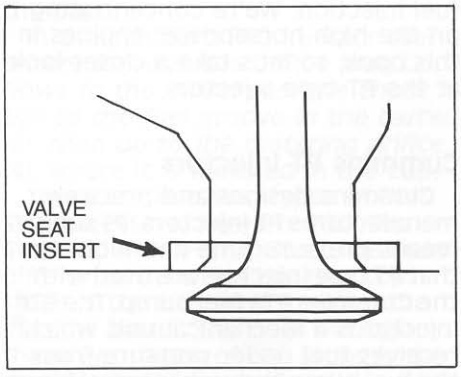
Valve sealing is extremely important because in the seated position the valves must hold in the high pressures generated during the compression stroke and combustion. Valves seat against a **Valve Seat Insert** which is press fit into the cylinder head.

There are two main types of Valve Seat Inserts, one for the exhaust, the other for the intake. The **exhaust** valve seat inserts are made of high chrome, tungsten and cobalt materials. These materials are extremely



resistant to heat and wear. The **intake** valve seat inserts are made of cast iron for wear resistance and have silicon and molybdenum added for extra strength and heat resistance.

The Valve Seat Insert is press fit into the counterbore and is precisely machined to match the valve face. Valve seat inserts are replaceable for head rebuilding and are available in both standard and oversizes.



Valve Guides

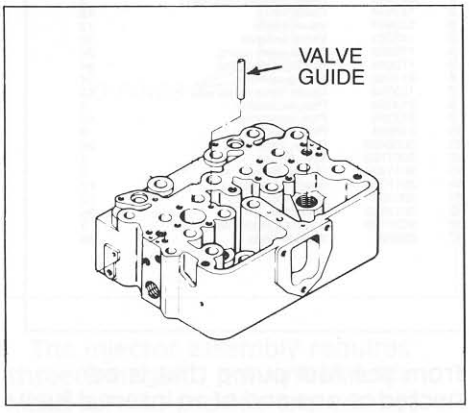
Each cylinder head contains eight **Valve Guides**. The valve guide is made of a ductile iron and is press fit into the cylinder head. The valve guide acts as a centering device to keep the valve aligned with the valve seat during operation. The valve guide holds an oil film to reduce friction and transfers the heat from the valve stem to the cylinder head.

Valve guides are replaceable and are available in both standard and oversizes. Oversize valve guides are used when there is damage or excessive wear to the parent metal of the cylinder head.

NH/NT OVERSIZE SEATS

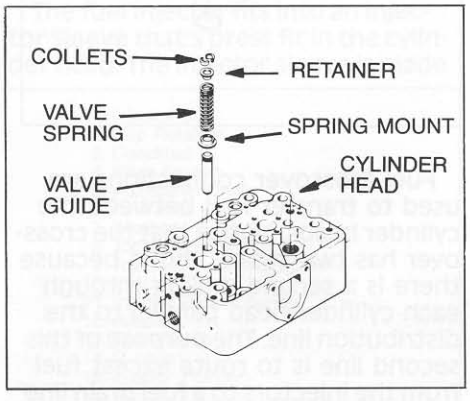
PART NAME	PART NAME	OVERSIZE
3032287	Insert, Valve	0.010 in
3032288	Insert, Valve	0.020 in
3032289	Insert, Valve	0.030 in
3032290	Insert, Valve	0.040 in
3032291	Insert, Valve	0.005 in

NOTE: Oversize valve inserts are designed for use in the intake and exhaust ports.

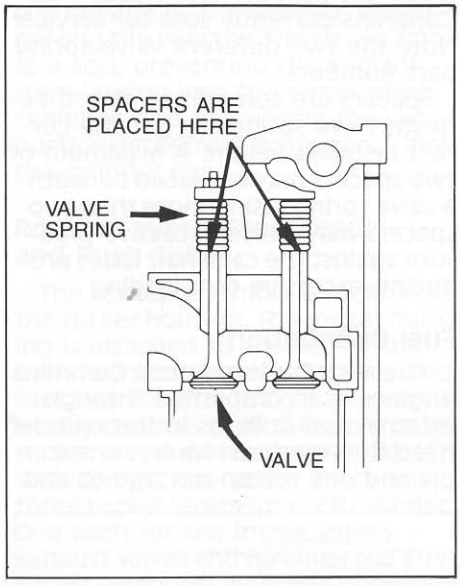


Prior to installing oversize valve guides, the cylinder head must be machined to accept the larger size guide (see appropriate Cummins service literature for details). Maintaining the correct clearance between the guide and valve stem is critical because it affects lateral movement of the valve in the guide and may cause excessive oil consumption.

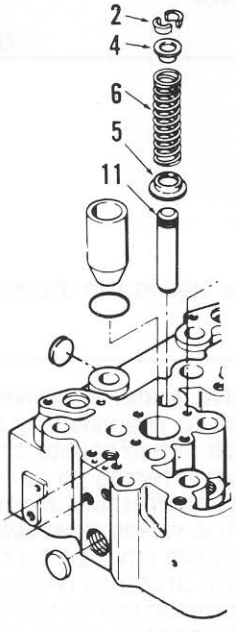
Valve Springs



The **Valve Springs** are located on the top of the cylinder head above each valve guide. The valve spring is attached to the valve by a retainer and a pair of half collets, the collets are often referred to as valve locks or keepers. Pressure from above forces the valves downward, opening the port covered by the valve. When the pressure is released, spring tension forces the valve back up, closing the port. When servicing the valve springs inspect them closely to assure that they are not broken or cracked, and have the proper amount of tension. A damaged or weak valve spring may allow



leakage of combustion pressure and gases causing poor performance. In addition, weak valve springs may cause wear/damage to the valve, its seat, and may change valve timing, possibly allowing the valve to strike the piston.



REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		CYLINDER HEAD Formula 400, NTC-400	
1	3037989	Head, cylinder (3041991)	3
▶ 2	127554	Collet, valve	48
3	135957	Valve, intake	12
3	3029333	Valve, exhaust	12
▶ 4	3032711	Guide, valve spring	24
▶ 5	3035996	Spring, valve	24
▶ 6	3036966	Retainer, valve spring	24
7	123558	Guide, valve crosshead	12
8	213394	Plug, expansion	3
9	213395	Plug, expansion	18
10	216524	Plug, expansion	6
▶ 11	3006456	Guide, valve stem	24
12	3007759	Seal, O-ring	6
13	3011934	Sleeve, injector	6
14	3017759	Insert, valve (exh.)	12
14	200354	Insert, valve (int.)	12
15	3013623	Capscrew	36
16	3036126	Gasket, cylinder head	3
17	69699	Washer, plain	36
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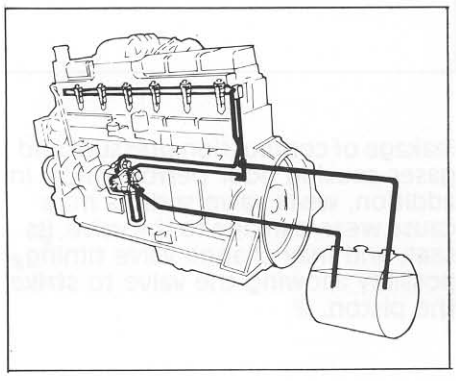
17	69699	Washer, plain	36

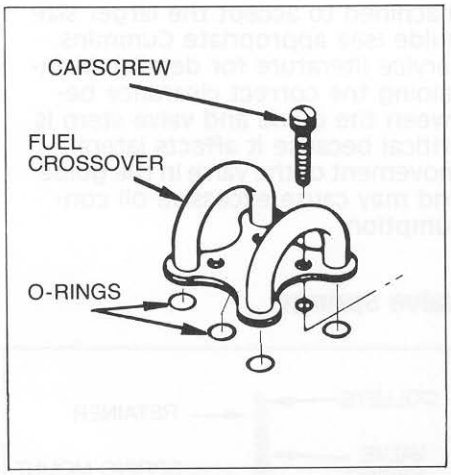
All valve springs are not the same; in fact this spring is the major difference between the BC IV 400 and the other Big Cam cylinder heads that Cummins currently sells for service. Note the two different valve spring part numbers.

Spacers are sometimes placed beneath valve springs to get the correct installed height. A maximum of two spacers may be placed beneath a valve spring. Using more than two spacers may cause excessive pressure against the camshaft lobes producing excessive cam loading.

Fuel Distribution

Fuel distribution in most Cummins engines is accomplished through internal fuel drillings in the cylinder head. This method requires one supply and one return passage to and from the fuel pump that is connected to one end of an internal fuel drilling that runs the entire length of the cylinder head.





Fuel **Crossover** connections are used to transfer fuel between the cylinder heads. Notice that the crossover has two tubes. This is because there is a second drilling through each cylinder head parallel to the distribution line. The purpose of this second line is to route excess fuel from the injectors to a fuel drain line connected to the end cylinder head. The crossover tubes have O-rings beneath them which are very important. Leakage around the O-ring will allow fuel to escape, and air to enter the fuel system thereby producing poor performance. Oversize O-rings are available in the event that a head has been redrilled or damaged. Whenever a customer is going to remove the fuel crossovers, always recommend replacing the O-rings.

Injector Assembly

Both air and fuel are necessary for combustion. Air is admitted to the cylinder through the intake valve. Fuel is admitted to the combustion chamber by the fuel **injector.**

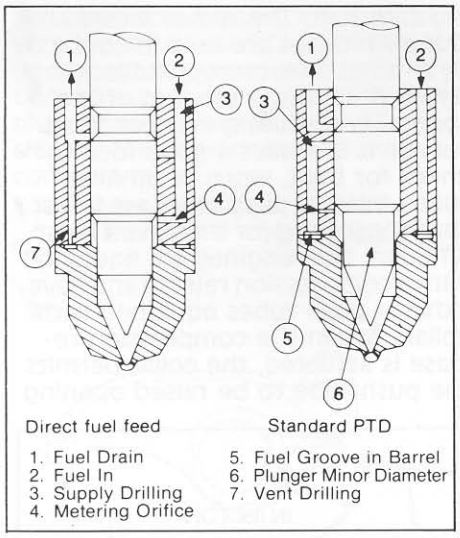
There are two common types of fuel injectors, the cylindrical shaped **PT type** used on all NH/NT and high horsepower Cummins engines and the high pressure **nozzle type** found in the lower hp Cummins B and C series engines. The **PT type injector** is fed fuel through internal fuel passages in the cylinder head and injection pressure is generated within the injector assembly. The high pressure nozzle type is fed fuel by individual lines going to each injector from the injection pump. The injection pump is a distribution type pump that's responsible for generating injection pressure and fuel injection. We're concentrating on the high horsepower engines in this book, so let's take a closer look at the PT type injectors.

Cummins PT Injectors

Cummins designs and precisely manufactures **PT injectors.** PT simply means pressure time and indicates that PT type injectors are used with the Cummins PT© fuel pump. The PT injector is a mechanical unit which receives fuel under pressure from the fuel pump through internal block passages. The injector meters a predetermined amount of fuel into a precision sized cup. Injectors are calibrated to meter and inject a predetermined amount of fuel into the combustion chamber depending upon an engines rating, Injector Cup size, hole size and fuel pump code.

There are four main types of **PT injectors** used on NH/HT engines. They are:

PTD
PTD TOP STOP
PTD DFF (Direct Fuel Feed)
PTD DFF TOP STOP



First, we'll evaluate the differences between a standard PTD and a DFF (direct fuel feed) injector. The best way to determine the difference between these two types is to examine fuel flow through the injector barrels.

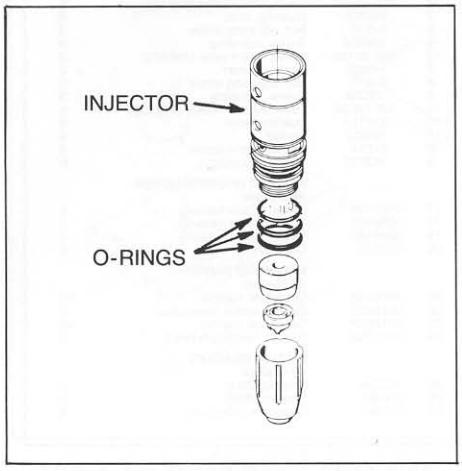
In the (DFF) direct fuel feed barrels, the fuel *goes directly from the check ball to the metering orifice (4) hole.* Excess fuel circulates past the metering orifice, around the injector plunger and exits through the drain while the plunger is seated in the cup.

In the standard PTD injector fuel enters through the orifice plug (2), *flows to the barrel past the check ball to the fuel groove in the barrel (5), then up to the metering orifice (4),* where it is metered in the cup.

There are also two types of TOP STOP injectors. They are PTD Top Stop and PTD DFF Top Stop. The main difference between the two top stops is the fuel flow through the injector barrel. The flow through these two types of top stops is the same as just described.

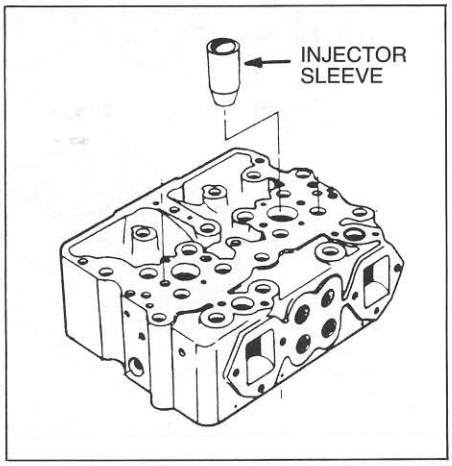
The main difference between a standard PTD and a **PTD Top Stop** injector is the adapter (12) is longer to accommodate the stop. The plunger coupling top is smaller, allowing it to pass through the stop screw (9) and the top stop screw lock nut (8). Parts 7-10 are only required for **top stops.**

Recognizing the unique parts of the top stop provides the answer to differences between the standard PTD and the PTD Top Stop.



The injector assembly requires three O-rings to prevent leakage. Make sure to provide the correct O-ring seals. Currently, Viton O-rings are color coded red for K engines and green for all other engines. Don't use any that are color coded black. Black O-rings were discontinued in 1981 because of a tendency to heat harden after prolonged use, creating a potential leak path. (Refer to Service Parts Topic 84T6-3). O-ring seals are no longer included in the upper engine gasket set because they are included with the injector assembly. If your customer is servicing the injector assembly, be sure to include New Injector O-rings in the order.

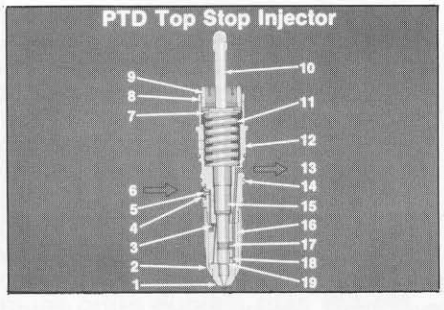
The fuel injector fits into an **Injector Sleeve** that's press fit in the cylinder head. The injector sleeve is made of a soft metal and is precisely machined so that the injector protrudes the correct distance from the bottom of the cylinder head into the combustion chamber. Anytime an injector sleeve is replaced, keep in mind that the sleeve must be machined after installation, otherwise improper fit and leakage will result. Replacement of **Injector Sleeves** requires the use of several special tools plus some special fitting procedures. Customers attempting this job on their own may run into some problems.



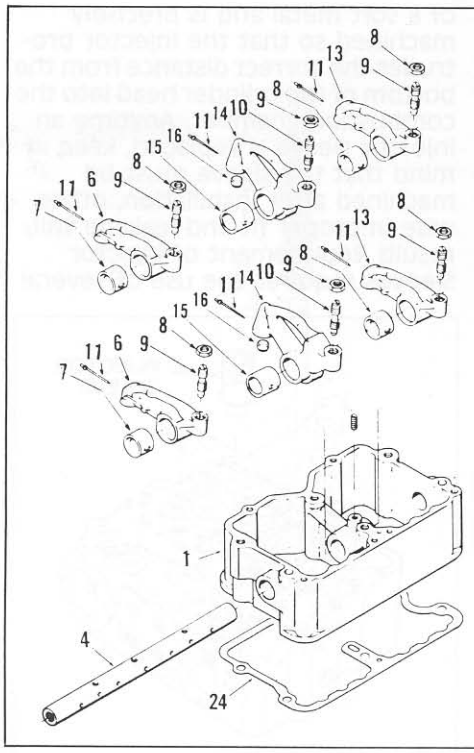
Engine coolant circulates around the outside of the **Injector Sleeve**, cooling the injector. The sleeve acts as a seal, preventing the coolant from leaking into the combustion chamber, and preventing the combustion gases from leaking back into the cylinder head.

Rocker Levers, Crossheads and Push Tubes

The rocker assembly is located in the rocker housing. The rocker housing is attached to the top of the cylinder head above the valves and fuel injector. The rocker assembly is made up of mechanical fingers called rocker levers which control valve and injector operation. There are three rocker levers for each cylinder. One each for the intake valves, exhaust valves and fuel injector. The rocker levers are mounted on a shaft which goes through the rocker housing. The rocker lever shaft in the **old style** housings are sealed at each end by cup plugs. The latest



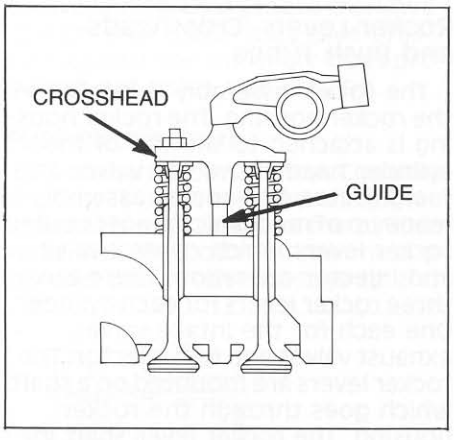
1. Injector Cup
2. Cup Retainer
3. Checkball
4. Filter Screen
5. Adjustable Orifice
6. Fuel Inlet
7. Washer
8. Top Stop Lock Nut
9. Top Stop Adjusting Screw
10. Injector Link
11. Injector Return Spring
12. Adapter
13. Fuel Return
14. O-rings
15. Injector Plunger
16. Barrel
17. Drain Port
18. Metering Orifice
19. Plunger Metering Edge



REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		ROCKER LEVER HOUSING	
		All Models	
	3035961	Housing, rocker lever assembly	3
1	3036285	Housing	3
2	3038903	Plug, expansion	6
3	168319	Screw, rocker lever shaft	3
4	3038904	Shaft, rocker lever	3
5	3000521	O-ring	6
6	BM-95162	Lever, exhaust valve (169705)	
7	140330	Bushing, lever	3
8	S-212	Nut, adjusting screw	3
9	168306	Screw, adjusting	3
10	208084	Rivet, blind	3
11	BM-95161	Lever, exhaust valve (169704)	3
7	140330	Bushing, lever	3
8	S-212	Nut, adjusting screw	3
9	168306	Screw, adjusting	3
10	208084	Rivet, blind	3
12	BM-95159	Lever, intake valve (168805)	3
7	140330	Bushing, lever	3
8	S-212	Nut, adjusting screw	3
9	168306	Screw, adjusting	3
13	BM-95160	Lever, intake valve (168803)	3
7	140330	Bushing, lever	3
8	S-212	Nut, adjusting screw	3
9	168306	Screw, adjusting	3
14	AR-02308	Lever, injector rocker (218152)	6
15	218153	Bushing, lever	6
16	194037	Socket	6
8	S-212	Nut, adjusting screw	6
9	168306	Screw, adjusting	6
		ROCKER HOUSING COVER	
		All Models	
17	3006458	Cover, rocker housing	1
18	3006183	Cover, rocker housing	1
19	3006187	Cover, rocker housing	1
20	101322	Cap, filler	1
		MOUNTING PARTS	
		All Models	
21	3006182	Capscrew, captive	15
22	3016453	Gasket, rocker lever cover	3
23	3010589	Capscrew, captive	18
24	3017750	Gasket, housing to head	3
		LIFTING BRACKET	
		All Models	
25	170226	Bracket, lifting	1
26	204961	Bracket, lifting	1
27	S-176	Capscrew (1/2-13x5)	4

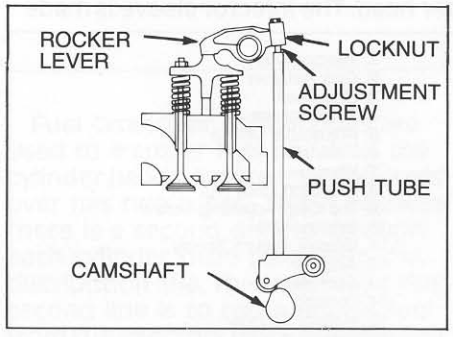
design rocker lever housings do not use cup plugs either in the end of the shaft or in the housing. Cummins now uses a threaded plug that screws into the shaft and has an O-ring seal for the housing.

A special note about rocker levers is that the center fuel injector lever is larger and heavier than the ones used to actuate the intake and exhaust valves. This is due to the fact that it takes more force to inject fuel than to open the valves.

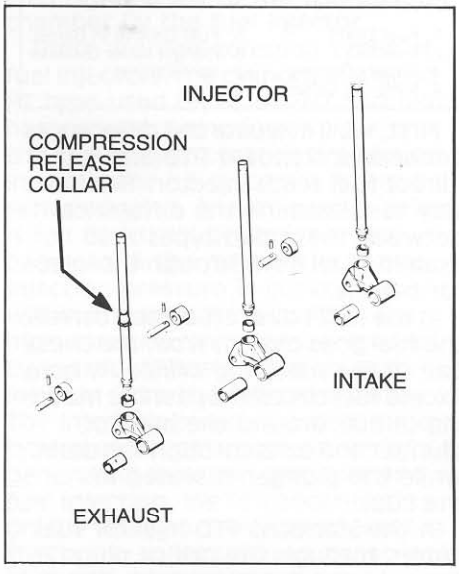


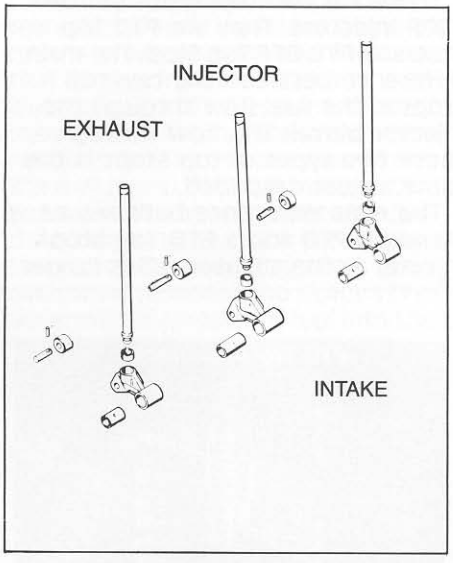
In engines that have four valve heads the rocker levers connect to the dual valve assemblies via a device called a **crosshead**. Each cylinder has two crossheads, one for the intake valves and one for the exhaust valves. The crosshead acts as a bridge between the two valves so that they can be opened by a single rocker lever. Crosshead adjustment is very important since it is responsible for opening and closing both valves simultaneously. Improper adjustment will result in poor engine performance and possible damage to the valve train components.

The crossheads are held in position between the valves by a **Crosshead Guide**. Cummins recommends checking the overhead every 60,000 miles/ 1500 hours. A scheduled check can help eliminate the chance of crosshead misalignment. A misaligned crosshead produces guide wear, a damaged crosshead guide can affect valve operation causing poor performance and decreased fuel economy. Always replace a worn or damaged crosshead or guide with a new Genuine Cummins Part.



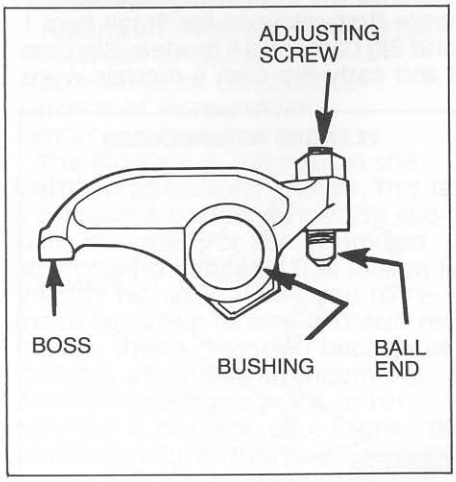
Actuation of the rocker levers is produced by the upward lift of the push tubes controlled by the rotating camshaft. The rocker levers and the push tubes are held in contact by an adjustment screw and locknut which fit through the end of the rocker lever. During cylinder head service it is always a good idea to check for bent, worn or oil filled tubes. Injector push tubes are larger than those used for the valves. Most NT Small Cam engines are equipped with a compression release and have exhaust push tubes equipped with collars. When the compression release is actuated, the collar permits the push tube to be raised opening the exhaust valve. Big Cam engines do not require a compression release, so the intake and exhaust push tubes are identical.



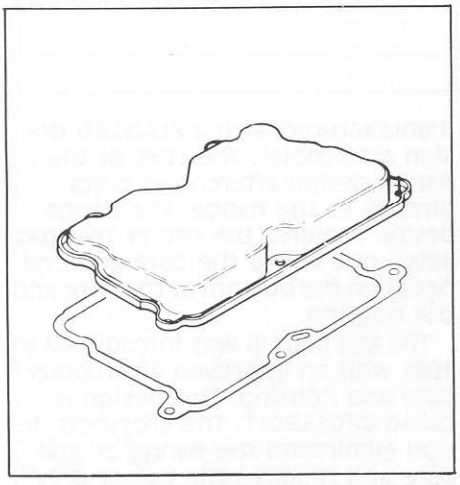


The rocker lever rides on a replaceable steel bushing on the rocker lever shaft. Always check the bushing and shaft for wear along with the

adjusting screw and the rocker levers. If worn beyond specified limits or damaged, replace with new Cummins parts or replace the complete rocker assembly with a specifically remanufactured ReCon component.

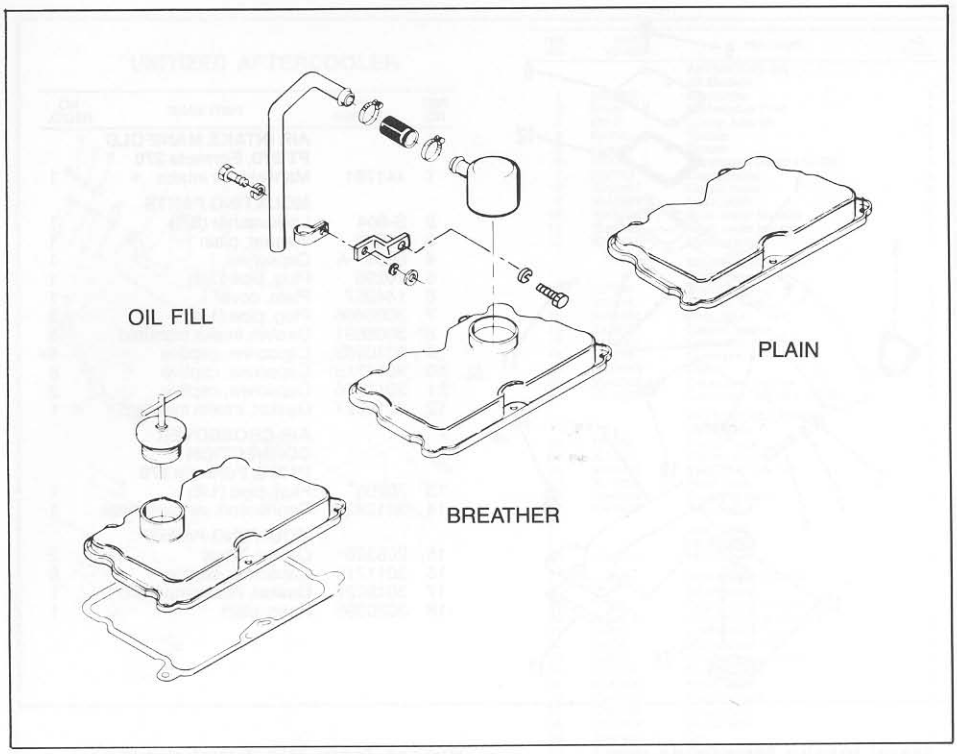


Rocker Housing Cover



Each of the cylinder heads is protected by a **rocker housing cover.** These covers keep oil in and dirt out. The cover rests on a new design flat gasket which eliminated the use of the tabbed gasket. The Rocker Cover Gasket must be replaced with a new Cummins gasket whenever the rocker covers are removed.

New style rocker housing covers are made of **stamped steel** and replace the old style aluminum type. The aluminum type used a baffle plate that was held in by tabs which would sometimes break off allowing the plate to drop down onto the rocker levers causing an oil leak and wear. The baffle on the new steel cover is welded into place and is much more durable than the old style.



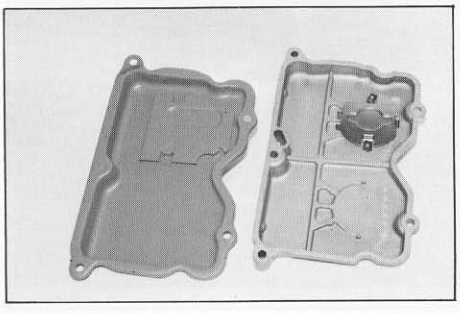
There are three types of rocker housing covers:

- Oil fill equipped
- Breather equipped
- Plain

The purpose of the **breather equipped** cover is to equalize the pressure between the atmosphere and the crankcase. Quite often the breather assembly is equipped with a filter element or it may simply be a breather body with a vent tube. All breathers are designed to allow vapors to escape, NOT OIL. Although it may look like a rather insignificant component, an improperly maintained breather can cause real problems. Without an escape through the breather, pressure has to find another way out of the crankcase and that's usually through SEALS or GASKETS . . . resulting in an oil leak. If you have customers complain about oil leaks and blown seals, ask . . . when was the last time you cleaned or replaced the breather filter?

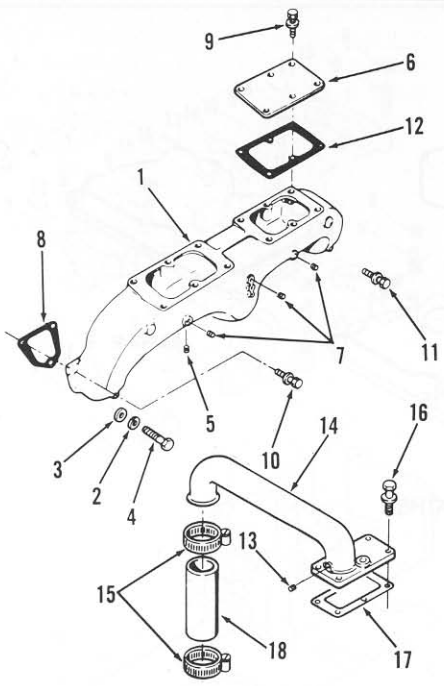
Rocker housing covers containing the **oil filler tube** are equipped with an oil filler cap. Usually, a thermos type cap is used. Rotating the lever on top of the cap expands a rubber grommet to form a dirt-free seal between the filler tube and the filler cap. Recommend to your customers that the filler cap be replaced when the rubber seal becomes hard or worn, or if cracks develop.

NEW STYLE WITH WELDED BAFFLE | OLD STYLE WITH TABBED BAFFLE



Manifolds

Manifolds connect to the outside of the cylinder head and are responsible for the movement of gases and fluids into and out of the cylinder head. The **Intake Manifold** is responsible for bringing air to each of the cylinders. It attaches to the inlet port of each cylinder.



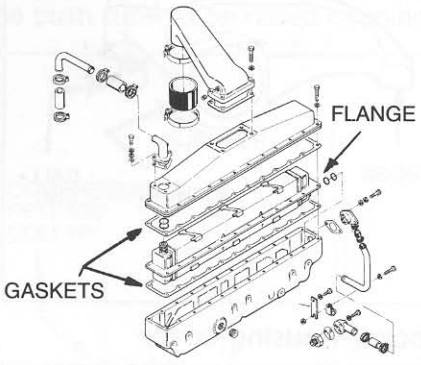
REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		AIR INTAKE MANIFOLD PT 270, Formula 270	
1	141761	Manifold, air intake	1
		MOUNTING PARTS	
2	S-604	Lockwasher (3/8)	1
3	63842	Washer, plain	1
4	69047-A	Capscrew	1
5	70295	Plug, pipe (1/8)	1
6	144257	Plate, cover	1
7	3008466	Plug, pipe (1/4)	3
8	3008591	Gasket, intake manifold	3
9	3010595	Capscrew, captive	6
10	3011715	Capscrew, captive	6
11	3011716	Capscrew, captive	2
12	3019227	Gasket, intake manifold	1
		AIR CROSSOVER CONNECTION PT270, Formula 270	
13	70295	Plug, pipe (1/8)	1
14	3012428	Connection, air crossover	1
		MOUNTING PARTS	
15	208326	Clamp, T-bolt	2
16	3011715	Capscrew, captive	6
17	3019227	Gasket, intake manifold	1
18	3020996	Hose, plain	1

Many Intake Manifolds are equipped with a air to water aftercooler, often referred to as intercoolers. They significantly drop the temperature of the air being drawn into the engine cylinders. Engine coolant circulates through the aftercooler via an intricate arrangement of fins and passages to cool intake air. The **aftercooler** lowers intake air temperature thus providing denser, cooler air to the engine cylinders. Air passes from the turbocharger through the Air Crossover to the aftercooler.

An **aftercooler** may be added to most small Cam I, Big Cam I and II engines for increased fuel economy. The Aftercooler and its plumbing Kits can be added only as part of Full UPRATE to a different CPL number to get more efficient combustion for maximum performance and fuel economy. The required Aftercooler, Air Crossover and Mounting kits contain all the mounting hardware required for a specific chassis manufacturer. Check your Kits and Sets Booklet and UPRATE Manuals and Service Parts Topics for specifics.

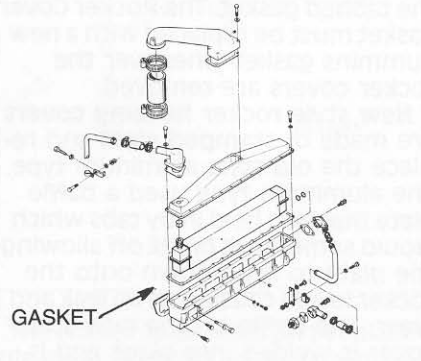
Aftercooler designs have been significantly improved since they were first released for Small Cam I and Big Cam I and II models. Big Cam I and early Big Cam II models were manufactured with a **FLANGED** design aftercooler. The core of the flange design aftercooler bolts directly to the flange. The flange design requires the use of two gaskets—one above the core and one between the bottom of the core and the housing.

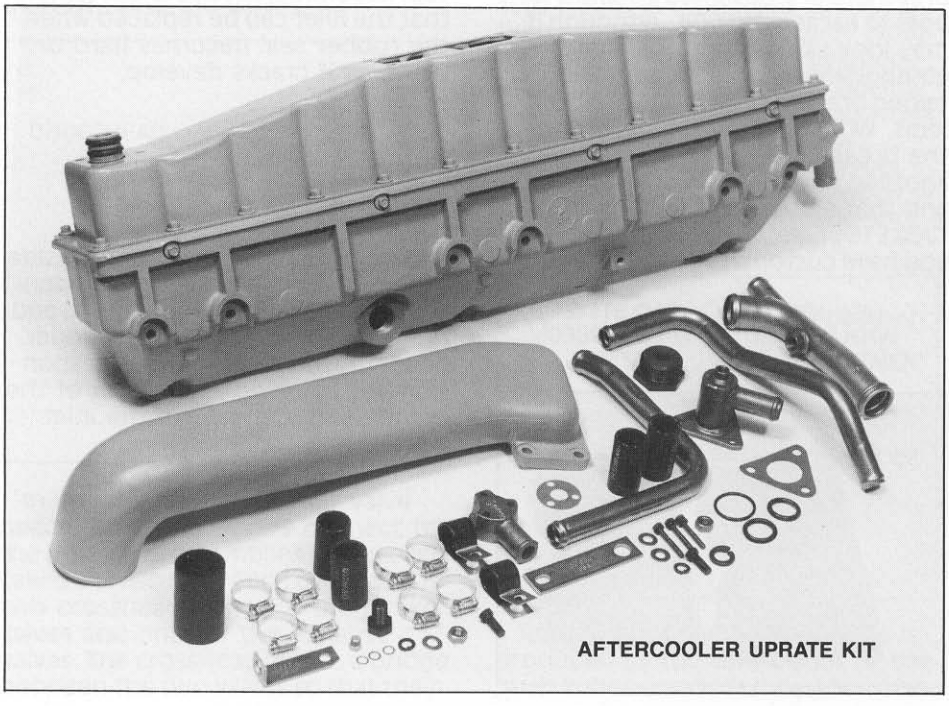
FLANGED AFTERCOOLER



The Big Cam III was introduced in 1981 with an improved aftercooler core and housing. This design is called **CROSSBOLT**. The crossbolt design eliminated the flange on the core and requires the use of only one gasket between the bottom of the housing and the core.

CROSSBOLT AFTERCOOLER





AFTERCOOLER UPRATE KIT

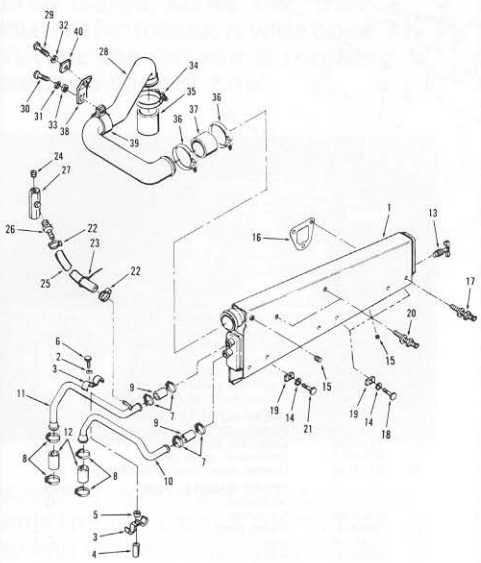
The crossbolt design eliminated the top gasket. The core is significantly improved over the flange design. It uses a greater number of cooling fins and the coolant makes three passes through the core instead of two as was the case in the **flanged** design.

Adding an aftercooler and its conversion kit produces:

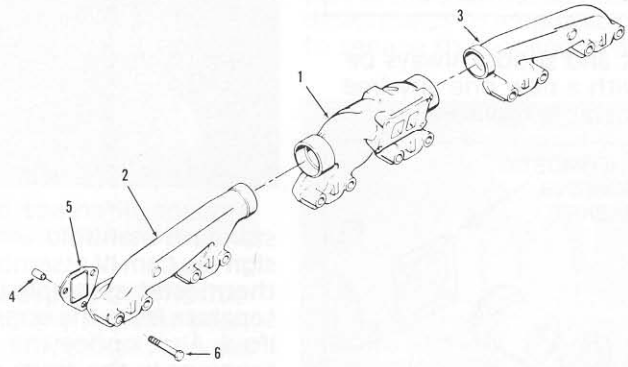
- More efficient combustion
- Increased Horsepower
- Improved Fuel Economy

The Big Cam IV introduces the **UNITIZED** aftercooler design. This is a one-piece core and housing specially designed for the optimized aftercooling concept. This design is unique in that it allows you to remove the valve covers *without* removing the air crossover because of its front mounting arrangement. Another important point to remember is that the core cannot be removed from its housing, however, the core should be cleaned by backflushing. See the current service literature for more information.

UNITIZED AFTERCOOLER



REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		AFTERCOOLER	
		All Models	
1	3038189	Aftercooler	1
2	S-600	Lockwasher (1/4)	1
3	68121	Clamp, lube oil	2
4	68368	Spacer	1
5	114850	Spacer	1
6	137716	Capscrew (1/4-28 x 2-1/2)	1
7	209773	Clamp, hose	4
8	3043487	Clamp, hose	4
9	3044894	Hose, plain	2
10	3044988	Tube, water transfer	1
11	3046307	Tube, water transfer	1
12	3200316	Hose, plain	2
		MOUNTING PARTS	
		All Models	
13	107947	Draincock	1
14	203518	Washer, plain	3
15	3008465	Plug, pipe	2
16	3008591	Gasket, intake	3
17	3043001	Capscrew, captive	6
18	554614	Capscrew	2
19	3043643	Clamp	3
20	3045205	Capscrew, captive	2
21	3044903	Capscrew (3/8-16 x 1-5/8)	1
		AFTERCOOLER VENT	
		All Models	
22	179904	Clamp, hose	2
23	201351	Clamp, wire tie	1
24	3008466	Plug, pipe (1/4-18)	1
25	3044898	Hose, plain	1
26	3044899	Coupling, plain	1
27	3044908	Tee, plain	
		AIR TUBE	
		All Models	
28	3040262	Tube, air	1
		MOUNTING PARTS	
		All Models	
29	S-102	Capscrew (5/16-18 x 1)	1
30	S-118-A	Capscrew (1/4-20 x 5/8)	2
31	S-600	Lockwasher (1/4)	2
32	S-605	Lockwasher (5/16)	1
33	S-631	Washer, plain (9/32)	2
34	208326	Clamp, T-bolt	2
35	3020996	Hose, plain	1
36	3040793	Clamp, T-bolt	2
37	3040794	Hose, plain	1
38	3042454	Brace, tube	1
39	3042455	Clip	1
40	3042456	Washer, plain	1



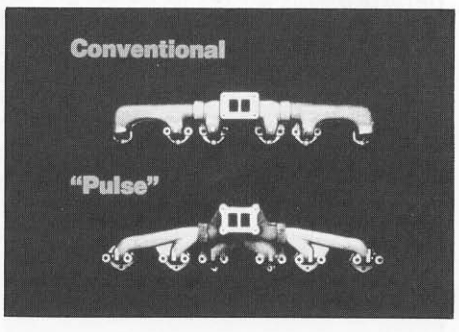
REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		EXHAUST MANIFOLD PT 270, Formula 270, Fleet 270, NTC-300, Formula 300, Fleet 300, NTC-350, Formula 350	
1	3029614	Manifold, exhaust	1
2	3031186	Manifold, exhaust	1
3	3031187	Manifold, exhaust	1

REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		NTC-400, Formula 400	
1	3029614	Manifold, exhaust	1
2	3020717	Manifold, exhaust	1
3	3020718	Manifold, exhaust	1
		MOUNTING PARTS	
		All Models	
4	105199	Dowel	6
5	3020943	Gasket, exhaust manifold	6
6	3031124	Capscrew (7/16-14 x 3-7/16)	12

The **Exhaust Manifold** attaches to the exhaust port of each cylinder. It collects the burned gases from each of the exhaust ports and channels them through the turbocharger into the exhaust pipe. The **Pulse Exhaust Manifold** was introduced on Big Cam II models.

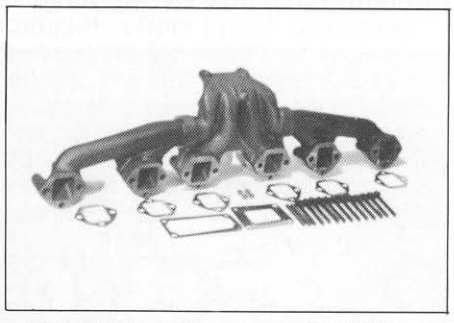
Notice the difference between the conventional **LOG type** manifold and the **Pulse Exhaust Manifold.**

In a conventional manifold, the shape of the passages and numerous right angle bends creates a swirling turbulence which impedes the flow of exhaust gases from the combustion chamber to the turbocharger.



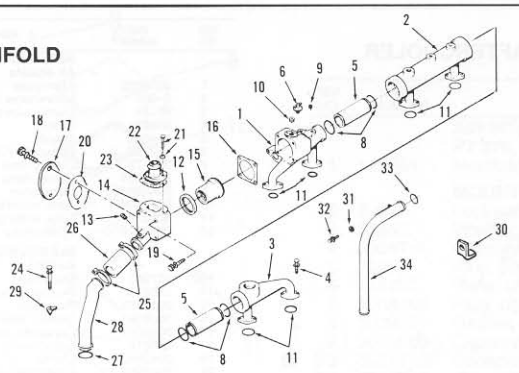
With the Pulse manifold the exhaust gases race through the narrow confines of the small circular passages and around the smooth, aerodynamically contoured bends, unhampered as they speed directly to the turbocharger.

Because of less exhaust gas restrictions, more energy is delivered to the turbo. The result is quicker turbocharger and engine response, which provides improved performance, and increased fuel economy.



The Pulse Exhaust Manifold is an **UPRATE** kit and is a big favorite with drivers and owner/operators. It significantly improves driveability, fuel economy and performance. The **UPRATE** kit contains all the parts necessary for quick and easy installation. See Current **UPRATE** literature (3387319-R) for more information.

WATER MANIFOLD

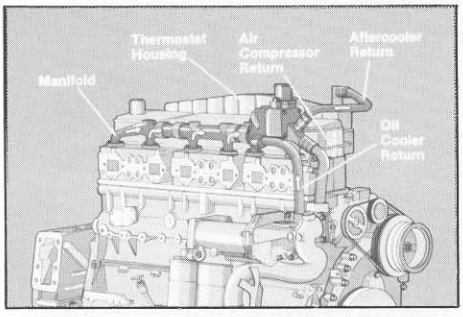


REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		WATER MANIFOLD	
		All Models	
1	3015114	Manifold, water (front)	1
2	139433	Manifold, water (center)	1
3	3013002	Manifold, water (rear)	1
4	3010596	Capscrew (3/8-16 x 1-1/4)	12
5	130394	Coupling, manifold	2
6	S-962-E	Cock, drain	1
8	70624	O-ring, coupling	4
9	3008468	Plug, pipe (1/2)	4
10	3008469	Plug, pipe (3/4)	3
11	3024709	Ring, sealing	6
		THERMOSTAT HOUSING	
		PT 270, Formula 270	
12	186780	Seal, thermostat	1
13	3008469	Plug, pipe (3/4)	1
14	3036211	Housing, thermostat	1
		Fleet 270, NTC-300, Formula 300, Fleet 300, NTC-350, Formula 350 NTC-400, Formula 400	
12	186780	Seal, thermostat	1
13	S-932-B	Nipple, pipe	1
14	3036211	Housing, thermostat	1
		THERMOSTAT	
		All Models	
15	201737	Thermostat	

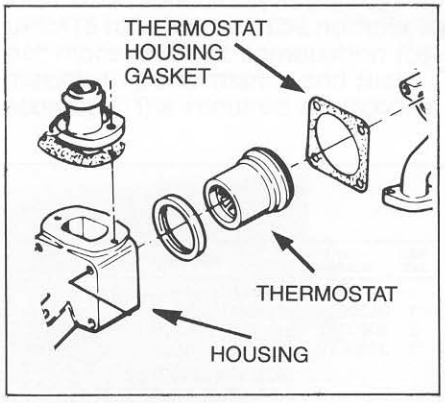
REF. NO.	PART NUMBER	PART NAME	NO. REQ'D.
		MOUNTING PARTS	
		All Models	
16	208128	Gasket, thermostat housing	1
17	210304	Plate, cover	1
18	3010595	Capscrew, captive washer	2
19	3010597	Capscrew, captive washer	2
20	3019158	Gasket, water outlet connection	1
		WATER OUTLET CONNECTION	
		All Models	
21	3010595	Capscrew, captive (3/8-16 x 1")	2
22	3021477	Connection, water outlet	1
23	3019158	Gasket, water outlet connection	1
		FRONT WATER BYPASS	
		All Models	
24	3022589	Capscrew	1
25	43828-B	Clamp, hose	2
26	3034202	Hose	1
27	43463-A	O-ring	1
28	213485	Pipe, water bypass	1
29	214617	Clamp, tube	1
		WATER TRANSFER TUBES	
		All Models	
30	158416	Bracket, water	1
31	S-626	Washer, plain	1
32	3022589	Capscrew, captive	1
33	212161	O-ring	2
34	3024666	Tube, water transfer	1

Coolant flow through the cylinder head is of critical importance because it removes excess heat. Coolant flows through internal block drillings around the cylinder liners to carry heat away from the combustion chamber.

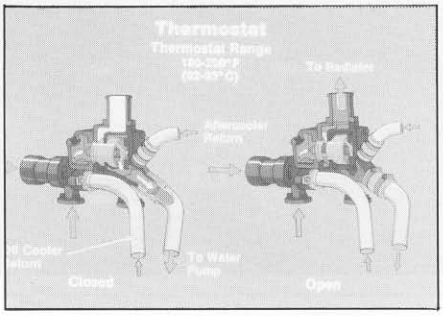
From the aftercooler core the coolant flows through the water manifold to the thermostat housing. This is the standard water manifold used on most Big Cam models. The water manifold transfers heated coolant from the cylinder heads through the thermostat housing.



Note, that when supplying a customer with a replacement thermostat, remember to include the thermostat housing gasket as it is not included with the thermostat assembly. This gasket keeps the coolant from leaking around the thermostat and should always be replaced with a new one anytime the thermostat is replaced.



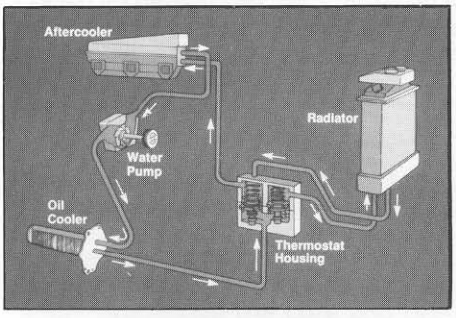
The thermostat is responsible for regulating engine coolant temperature.



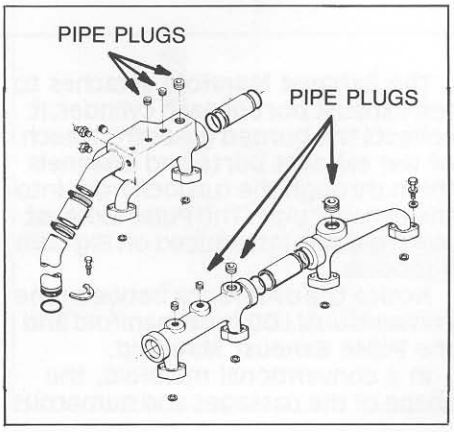
When the engine coolant is below the preset operating temperature the thermostat is in the closed position and the coolant is circulated through the bypass tube to the water pump and the coolant is then recirculated back through the block. When the engine reaches and maintains normal operating temperatures the thermostat opens and directs coolant flow to the radiator.

The **Big Cam IV** optimized aftercooler initiates a new design **water manifold** and **thermostat housing** for greater cooling efficiency.

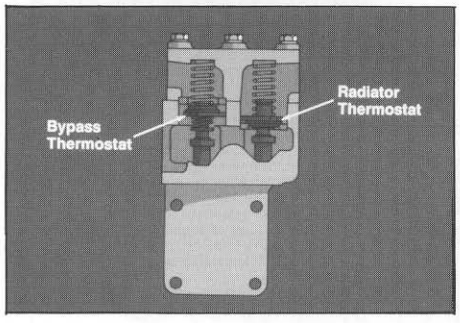
The Big Cam IV cooling loop is quite different from all other Big Cam models. The coolant flows from the aftercooler to the pump through the oil cooler, then to the thermostat housing. Depending on the temperature of the coolant the thermostat either directs the flow back to the aftercooler or into the radiator for cooling.



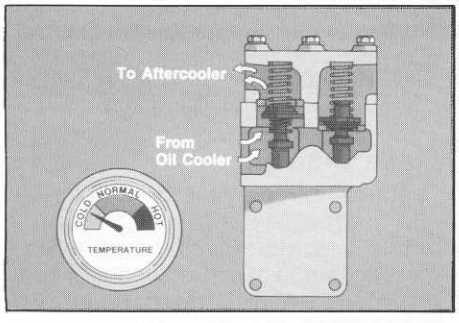
A major difference between the **standard manifold** and the **new design Big Cam IV** assembly is that the thermostat assembly is completely separate from the upper water manifold. Also, notice the additional tappings in the front manifold section. These may be used to plumb accessories and COMPUCHECK©. All vehicle accessory options such as cab heaters, fuel heaters must be connected to the block manifold rather than the upper manifold.



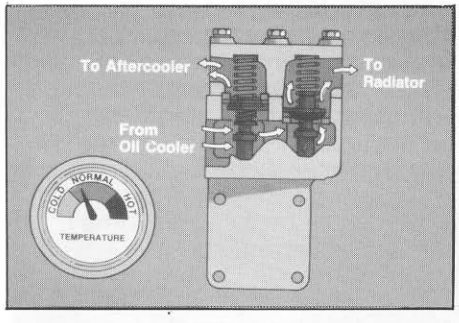
The Big Cam IV thermostats and the housing have been completely redesigned. The housing contains both a **bypass** and a **radiator** thermostat. These two thermostats work together to control coolant flow and temperature.



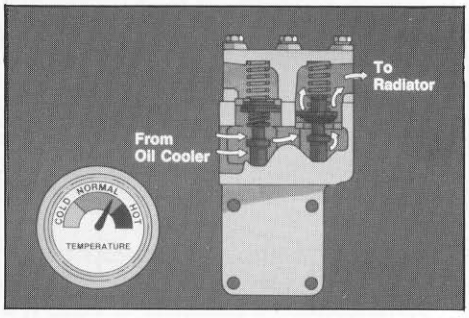
To understand how the two thermostats work together in the Big Cam IV, let's take a closer look at how they operate at different cooling system temperatures.



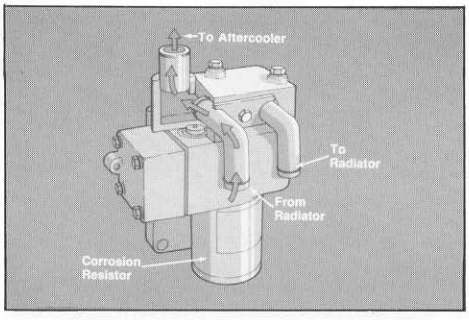
At start-up the bypass thermostat is wide open and the radiator thermostat is completely closed. Coolant flows directly from the cylinder head back to the after cooler inlet (which is the beginning of the engine cooling system).



When the coolant reaches a temperature between 175° and 185° F, the two thermostats work together to control the flow and temperature of the coolant that is entering the aftercooler. At temperatures above 185° F the bypass thermostat is completely closed. Above 195°, the radiator thermostat is wide open. At this time the radiator is receiving maximum coolant flow.



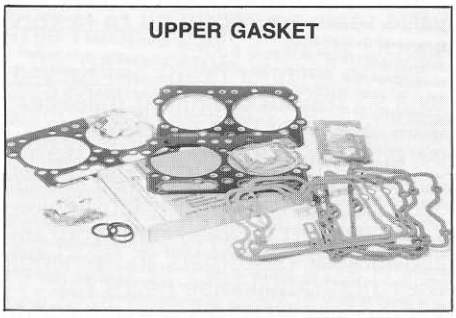
Another important point to note about the Big Cam IV thermostat housing is the positioning of the **corrosion resistor**. It is mounted directly beneath the thermostat housing. In fact, the mounting for the corrosion resistor is an integral part of the thermostat housing. This design helps to emphasize the need to service the cooling system.

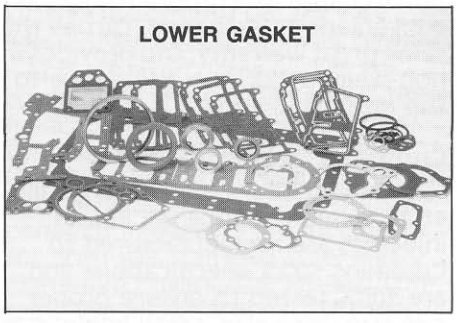


Sealing Elements

Each of the components and assemblies use a variety of different **Gaskets, Seals** and **O-rings** to form leak proof connections. Worn gaskets, seals or O-rings can cause leaks and ingestion of foreign material thereby causing high oil consumption, low power and premature wear leading to a major engine failure. Whenever a gasket is disturbed during service or leakage occurs, the gasket must be replaced with a new gasket of exactly the same type or a specified equivalent. Always replace gaskets, seals or O-rings with genuine Cummins parts. Cummins replacement gaskets, seals and O-rings are designed with the entire system in mind and to exacting specifications, which aren't always true of aftermarket suppliers. Old gaskets should not be reused. Always keep in mind that seals and gaskets are continually being improved.

Changes in gaskets, seals and O-rings are announced in the Service Parts Topics and Parts literature. Make sure you review these announcements, make changes and if needed adjust your parts inventories to reflect the change. Keeping up on the changes will not only help you, but it will be a great service to the customer, technician and also





to Cummins. Keep in mind that Cummins offers Upper and Lower Gasket Sets for complete engine repairs. The Upper Gasket Set includes all gaskets seals and O-rings that do not come along with individual components. Note, your customers may need extra timing gaskets.

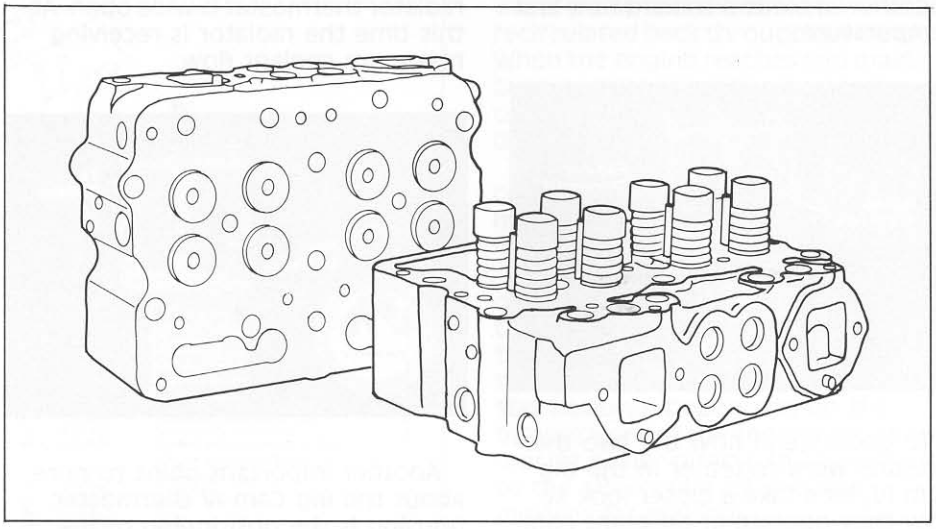
CUMMINS RECON COMPONENTS

Cummins ReCon© Cylinder Heads

Cummins ReCon offers a premium quality, competitively priced exchange cylinder head that helps get your customers on the road faster and keeps them running longer. Every Genuine Cummins ReCon cylinder head is completely remanufactured for maximum reliability and durability. All valve guides, injector sleeves, collets and retainers are replaced with 100% new Genuine Cummins Parts. All valves are replaced with new or remanufactured valves. The combustion surface and valve seats are reground to factory specifications.

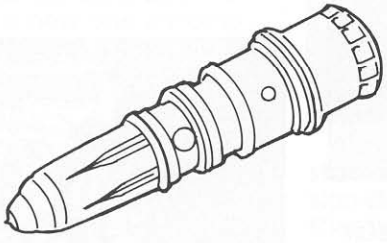
ReCon cylinder heads are backed by a six month unlimited mileage/hour warranty that covers 100% parts, labor, and progressive damage. This warranty is honored at over 3800 Cummins locations worldwide.

The ReCon **Cracked Head Program** allows your customers to exchange their non-rebuildable heads for ReCon cylinder heads at a slight additional charge. The program is just as convenient as exchange, carries the same great warranty, and provides a non-welded risk free alternative to the local weld shop.



Cummins ReCon® Injectors

Built tough and backed with confidence



Cummins ReCon Injectors

ReCon injectors offer high quality at an attractive price. All ReCon injectors are remanufactured to Cummins strict specifications and are 100% tested to ensure proper cup size, hole size, spray angle, cup to plunger alignment and top stop settings.

There are many features and benefits in choosing high quality Cummins Recon injectors. These include:

- Barrel and plunger clearance is measured in the millionths of an inch. Each barrel and plunger put in a genuine ReCon injector is precision matched and measured to rigid specifications with ultra-sensitive electronic and air-gauging equipment. Adherence to barrel and plunger clearance specifications provides durability and the specific fuel delivery the injector was designed to produce. This close attention minimizes the possibility of fuel dilution due to excessive clearance.
- Cups are tested for proper spray angle. Every ReCon injector is fitted with the proper cup. Each injector cup is spray checked for angle and checked for cup I.D. Matching the right injector cup is important as it will avoid excessive camshaft stress. Proper spray angle avoids excessive smoke or low power and possible catastrophic failures involving pistons and liners.
- Sophisticated remanufacturing equipment. The equipment used to remanufacture ReCon injectors is of the same design and manufacture as the original manufacturing process—not service or other tools applied to a high production environment. For example, the equipment used to set ReCon Top Stop Injectors utilizes a precise digital read-out with accuracies measured in ten thousandths of an inch. These hydraulic-actuated machines cost approximately $50,000 each. This is compared to the service tool to set top stops which costs approximately $200 and is hand actuated.
- Ease of core acceptance. ReCon's style-for-style core acceptance makes visual inspection easy.
  - Assembly is complete
  - Plunger is not broken
  - Core is a part number offered by Cummins ReCon

ReCon injectors are an attractive alternative to recalibrating. They:

- Reduce downtime
- Labor costs
- Guarantee quality
- Offer a genuine Cummins warranty

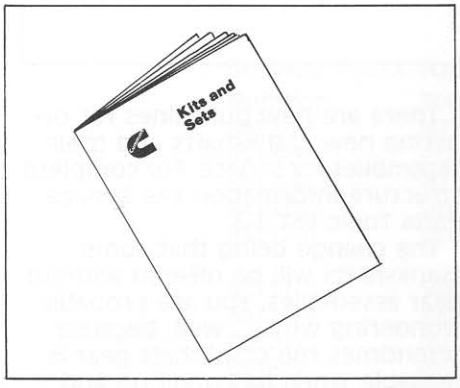
See the latest ReCon Fact Sheets and Core Acceptance handbooks for more information on ReCon exchange programs.

Parts News Update

What's New For Parts Publications?

- A kits and Sets Countermat, Bulletin #3379681-01

The countermat includes major assembly component part numbers for current Cummins models; and repair kit information for the air compressor, water pump and the turbocharger. It also lists **UPRATE** components for certain applications. The flip side features a Big Cam III parts explosion.



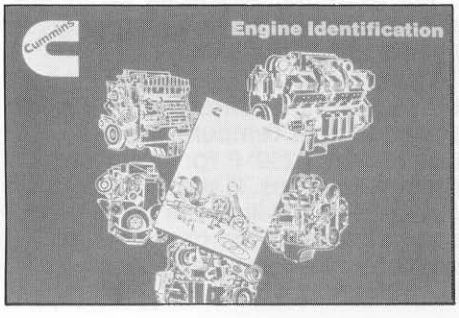
- NT Kits and Sets Pocket-size Booklet, Bulletin #3822013

This booklet will help you identify and locate the most commonly replaced NT parts. For the customer's convenience parts are packaged in either kits or sets. To use the book you'll need the customers CPL#. **UPRATE** information is included as well as a detailed turbocharger and cylinder kit listing.

Two New Slide Tape Programs:

- Engine Identification, Bulletin #3387300-R-S-T

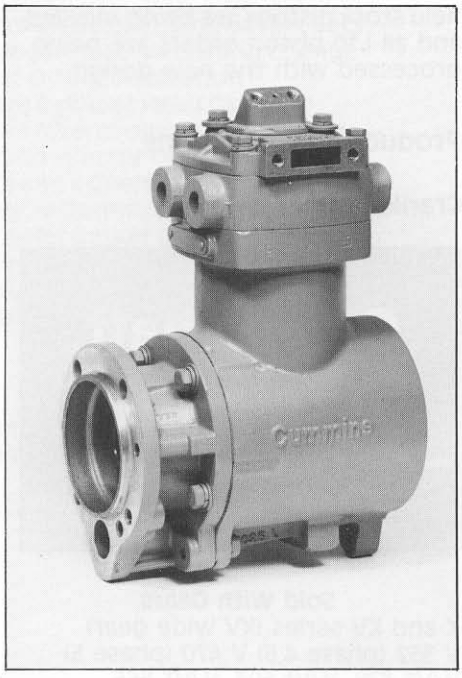
This program describes the importance and use of the CPL (Control Parts List) and provides a basic evolution of the NH engine family. Plus, it describes the entire current Cummins Engine product line.



- Belt Drives and Coolant Hose, Bulletin # 3387308-R-S-T

Focus is scheduled maintenance and choosing the correct belt or hose per application. Think you'll find the program extremely helpful for trouble shooting your belt and hose problems.

New Products

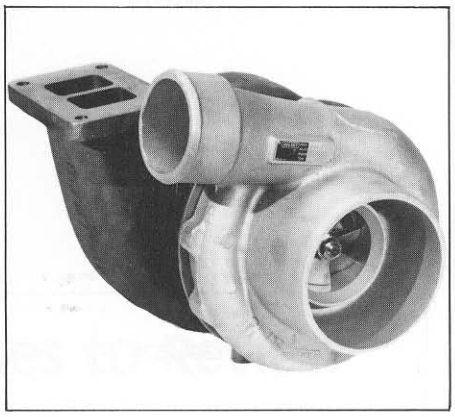


New Improved Cummins Super Single Air Compressor.

A new offering from Cummins. A more reliable and durable 13.2 CFM single cylinder air compressor.

Its many improved features produce such benefits as:

- An improved air delivery system
- Reduced piston carboning
- Easy servicing through specialized repair kits



HT3B Turbocharger

This turbocharger offers improved performance on the low end. Never before have Cummins turbos been more efficient. The HT3B maximizes performance, fuel economy, and efficient high altitude operation. Remember, a turbo performs most efficiently when properly matched to an engines' CPL. The HT3B is also being certified for **UPRATE**. See Service Parts Topic 85T 10-4 for complete kit and retrofitting details.

Aftercooler Gasket Kit, P/N 3801594

This NT aftercooler gasket kit contains all the gaskets and O-rings for a complete overhaul of either the flanged design aftercooler (P/N 214836) or the crossbolt design core (P/N 3028997). Water transfer connection gaskets are included for both the stamped steel and aluminum covers. The kit also contains the intake and exhaust manifold mounting gaskets. See Service Parts Topic 85T-10-1 for complete details.

New L10 Valve Cover Gasket

Use old stock part no. 3032514 to depletion. The new gasket part no. 3034855 will replace the old number. All L10 engines built after November 1984 use the new gasket. The new valve cover gasket part no. 3034855 is included in the upper engine gasket set. This new gasket uses new mounting parts, the old mounting parts are not interchangeable. See Current Service Parts Topics for more information.

Mounting Parts for 3034855

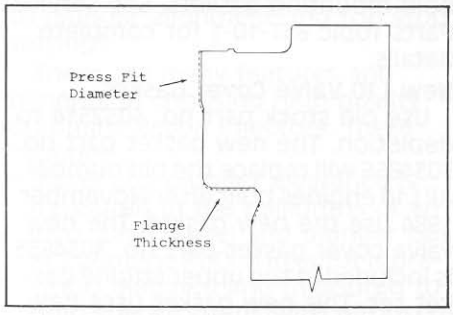
Part No.	Description	Qty
3034855	Gasket	1
3034856	Isolator	14
3335042	Capscrew	14

Oversize Cylinder Kit	Standard Cylinder Kit	Piston	Applicable CPL's
3801575	3801105	3025516	0176, 0178, 0188, 0189, 0217, 0220, 0222, 0270, 0233, 0322, 0323, 0344, 0345, 0506
3801576	3801060	3017348	0250, 0277, 0338, 0353, 0354, 0402, 0407, 0408, 0433, 0456, 0459, 0471, 0491, 0536
3801577	3801061	3017349	0101, 0155, 0160, 0164, 0174, 0181, 0187, 0190, 0196, 0204, 0207, 0227, 0248, 0266, 0278, 0294, 0298, 0306, 0307, 0308, 0309, 0310, 0314, 0315, 0327, 0328, 0239, 0332, 0339, 0369, 0393, 0454, 0455
3801578	3801062	3023102	005, 0267, 0324, 0449

Oversize Cylinder Kits

Cummins has introduced four oversize cylinder kits approved for SC I, BC I and II CPL's. The oversize cylinder kit was released to reduce repair costs for engines that have experienced counterbore wear.

The kit contains an oversize liner P/N 3035812, a premium ring set P/N 3801049 and piston applicable for a specific CPL. The oversize liner actually eliminates the need for a sleeve; instead the counterbore is cut and the liner is installed. The limits to which a counterbore may be safely cut are provided in SPT 84T1-14 and in the engine shop manual, bulletin #3379076-05. You may also want to check Service tool bulletins #3377528 10/81 and 3377524, for complete details on the tools that are required to do the job.



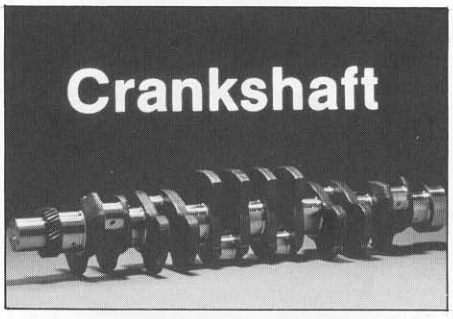
The Oversize Liner is 0.020 inch larger diameter at the press fit and has a 0.010 inch thicker flange than the standard liner. When an oversize liner is applied to an engine the field fix no. 77 should be stamped in the ECS (Emission Control) section on the engine dataplate. See Service Parts Topic 84T 10-1 for complete release information.

Product Improvements

A new piston design has been introduced into production on the L10 and shows a significant improvement over the old design. Tests indicate the "new" piston significantly reduces oil consumption. Old design field stock pistons are being recalled and all L10 piston orders are being processed with the new design.

Product Consolidations

Crankshafts



Sold With Gears

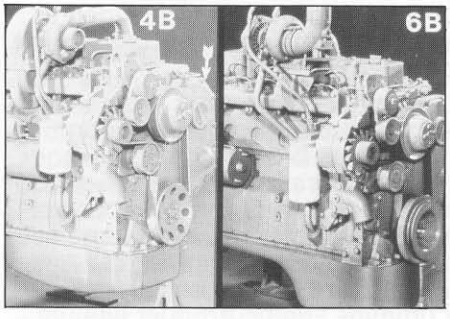
K and KV series (KV wide gear)
V 352 (phase 4,5) V 470 (phase 5)
V/VT 378, V/Vt 504, V/VT 555
4B/4BT Series
6B Series

Sold Without Gears

NH/NT Small and Large Bores
V/VT 903, 785 and V 588
V/28 (V/VT 1710 and V 1486)
L10 Series
L, LR, and LRT Series
C and J Series
VERA/VETA Series

There are new guidelines for ordering new crankshafts and their assemblies for service. For complete structure information see Service Parts Topic 85T 1-3.

The change being that some crankshafts will be offered without gear assemblies. You are probably wondering why . . . well, because oftentimes the crankshaft gear is reusable when its condition and dimensions are within the recommended tolerances. Care should always be used when preparing to reuse a gear. Always follow the recommended procedures or you could damage the gear preparing it for reinstallation.



For example, 4B and 6B Series engine crankshaft gears go through a heat treatment process called *"Austempering"*. It is recommended these gears be heated before installation to a temperature no greater than 250° F for not more than 45 minutes. If these gears are overheated it will cause permanent enlargement of the gear's inside diameter, thereby creating an inadequate press fit.

Recent Cylinder Head Group Changes to Review

Service Parts Topics

Number	Topic	Engine Series
84T2-2A	NT Cylinder Head Change	NT
84T3-3	Rocker Lever Housing Oil Spray Spray Nozzle	NH/NT
84T2-4	NT Cylinder Head	NT
84T17-3	Upper and Lower Engine Gasket Sets	NH/NT
84T17-4	Upper and Lower Engine Gasket Sets	V/VT/VTA-1710 (V28)
84T17-5	Upper and Lower Engine Gasket Sets	Medium-Vee
84T17-6	Upper and Lower Engine Gasket Sets	Small-Vee
84T2-1	NT Cylinder Head Machining Change	NT
84T6-3	Injector O-ring Installation	All
84T2-3	Oversize Cylinder Head Gasket	V/VT/VTA-1710
84T10-8	Unitized Aftercooler and Mounting	NT
84T6-6	Improved Injector Orifice Plug	All
84T1-10	SC, BC I and II Oversize Cylinder Kits	NH
84T0-5	Big Cam IV Optimized Aftercooling	NH/NT
85T10-1	Aftercooler Gasket Set	NH/NT
85T1-3	Service Crankshafts	All
85T10-1	HT3B Turbocharger for earlier NT engines	NT
85T14-1	NT Small Cam and Big Cam	

Parts Publications

3822017	Big Cam IV Parts Catalog	2/85
3379682-01	Big Cam III Parts Catalog	10/84

Cummins Engine Company, Inc.
Box 3005
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