



DID YOU KNOW

HELPFUL HINTS ABOUT INTERNATIONAL BUSES

... one of our competitors in the mid range diesel engine business is telling tall tales? Yes, it's hard to believe, but they're distorting the facts to make their product look better than ours. We thought you and your customers would want to know the real picture.

Cummins Engine Company is circulating printed material that draws comparisons between the new ISB family and the International T444E engine in the areas of durability, maintenance cost, rebuild cost, and fuel economy. Let's look at each of their claims in detail.

Claim: The ISB has longer life than the T444E. This is an apples and oranges comparison. They use two different baselines of measurement in this claim. They say the ISB has an "average" engine life of 350,000 miles and the T444E has only 200,000 miles "by Navistar's own published information". It has become popular in the diesel engine business to describe engine durability in terms of "Bx life". This is usually described as B10 life; the time, in miles or hours of operation, that 10% of the units in service will require major repair. The remaining 90% will go farther. (Navistar's definition of major repair to an engine is when the repair requires removal of the cylinder head and/or the oil pan.) Other Bx numbers can be used, the next most popular being B50 life, where 50% of the engines will have required repair. This can be looked upon as "average" life to overhaul. For a more complete discussion of Bx life see another Did You Know letter DUK#231.

In their comparison Cummins is relating their "average" life, or B50, as 350,000 miles and stating our published life estimate is 200,000 miles. Yes, but that 200,000 number is our B10 life. They're comparing our 10% rebuild time to their 50% rebuild time. The B50 life of the T444E has been found to be 350,000 miles also. Let's use a table to show this more clearly.

	B ¹⁰	B ⁵⁰
T444E	200,000	350,000
ISB	200,000*	350,000

* Estimated, Cummins does not publish this number.

But, wait, there's more. They're basing the durability claim on experience with the previous B family. Their literature proclaims that the ISB has many new designs different from the previous mechanical fueled B family. New crankcase, new cylinder head, new valve arrangement with four valves per cylinder, new valve lever ("overhead") design, new piston design, new fuel system and new electronic controls. Using the previous B family history as a measure of the ISB durability is questionable logic. Our assessment of the T444E is based on four years of successful experience with the current design.

Claim: The ISB costs less to rebuild than the T444E. In this analysis they double counted some parts, included the returned part core value in the price of some exchange units, called for unnecessary replacement of some parts and assigned incorrect labor hours to the T444E. As you read this section, refer to Attachment A. The chart has two sets of columns; one repeats the analysis as Cummins has presented it (Cummins Claims) and the other shows a revised version with corrections that are described below (Corrected).

In double counting, there is an entry for the cost of bearings and another entry for the "Works Kit". The bearings are included with the Works Kit, so a separate entry for them is duplication. In order to better illustrate this comparison we dropped out the Works Kit and showed our prices for the bearing set, the gasket set and the power cylinder kit in the same pattern that they used for the ISB.

The stated costs for the T444E renewed cylinder heads and turbocharger include several hundred dollars for the core value of the removed components. The net amounts are shown in the "Corrected" column of Attachment A.

Cummins included in the rebuild a number of items that International does not consider to be part of normal rebuild practice. They show replacement of the tappets. Apparently, they consider replacement of their flat face sliding friction tappet to be necessary. International does not recommend replacement of the T444E roller follower type tappets (a design concept used in the larger, heavy duty engines from Cummins and other manufacturers) because of their inherently long life. They show replacement of the entire fuel system. We do not recommend replacement of the HEUI injectors or the high pressure supply pump as part of a normal rebuild. If Cummins considers the life of their single plunger rotary pump to be such that renewal at engine rebuild is necessary, we'll accept that judgment.

They include replacement of the water pump. The cost of the T444E water pump is higher, largely because it serves a dual purpose of circulating coolant through the engine and providing the cooling fan mounting. If Cummins considers replacement of the water pump as a necessary part of the rebuild, a major reason for doing so is wear out of the bearing system in the pump. Therefore, they should include the cost of renewal of the bearing in the separate fan mounting bracket used on the B and ISB engines. That amount is added to the Corrected column.

They show 30 hours required to rebuild the T444E. Our literature assigns 24 hours to this level of rebuild. We're unsure where they got the higher number. The attachment reproduces their comparison chart with our modifications to the required parts, prices of our parts and the corrected rebuild labor. You can see that after using correct pricing and International rebuild guidelines the cost of a normal rebuild is less for the T444E than for the ISB. Note that the prices shown are suggested list and the customer's actual cost would likely be discounted from the amount shown.

Actually, this is all just so much rhetoric. The total cost of rebuilding that Cummins has assigned to the T444E exceeds the cost of an International ReNEWed complete engine. Most bus operators, if faced with a major engine repair, would not elect to rebuild the engine themselves, but would purchase a rebuilt engine. Engine rebuild is so uncommon in the school bus arena that few fleets have enough repair volume to justify the tools and training needed to do this work.

Claim: The ISB costs less to maintain. The major influence in this analysis is the oil change interval. Cummins has increased the change interval dramatically from 6,000 miles with the 6BT5.9 engine to 15,000 miles with the ISB. The two main factors in determining proper oil change interval are fuel consumed and oil capacity. Cummins has more than doubled their oil change interval (in miles) from the former B family with-at best-a 3 to 5% reduction in fuel consumed (see fuel economy discussion below) and no increase in oil capacity. Our engineers look at this with skepticism and question the wisdom of such a radical recommendation. If you look at the ratio of change interval miles/hours-to-oil capacity, you find that the ISB has the highest ratio in the industry. Oh, by the way, the change interval on the T444E has been recently increased from the 8000 miles that Cummins discussed to 10000 miles. This revision was based on oil-condition analysis in our four years of experience with this engine.

In any event, the numbers in the discussion above have questionable value for the school bus operator. The mileage guidelines are most pertinent to operation of medium duty trucks that have higher average speeds than school buses. The school bus has low average road speed when moving and lots of stopped vehicle engine idle time, so the average miles per operating hour is low, or inversely, the number of operating hours per thousand miles is significantly higher. Because of this, several application specific practices result:

International believes the best indicator for oil change interval for buses is engine operating hours. We provide an engine hour meter as standard equipment on the instrument cluster and a service engine reminder lamp that can be set to prompt oil changes based on hours. The Cummins recommendation for the ISB is 500 hours compared to 350 for the T444E. Their hour based interval is significantly longer, proportionate to the mileage intervals, and the same engineering skepticism about the wisdom of this approach applies.

Most bus operators change oil earlier than the manufacturer's recommended intervals, as a conservative approach, in recognition of the unique low speed operation. Many bus operators schedule maintenance by the calendar, such as 3 month intervals. If this is done, the cost of oil and filters for the two engines is nearly the same. International has some additional cost for cooling system maintenance because of our belief that proper control of the coolant quality will lead to longer life and lower overall cost for the total system, not just the engine.

Ask your bus customer if the ISB oil and filter change interval recommendation has any relationship to his/her operation.

Claim: Cummins has built 1.7 million 6B engines. Numbers game alert! What they're counting here is all B family history including four cylinder engines and non-highway applications such as farm and industrial equipment. When the total volume of six cylinder B family engines used in automotive applications, including the pickup truck market, is considered their volume number is more like 800,000. And that's for the previous B family. The ISB is, by their own description, a significantly new product. As for the T444E; counting engines sold in the on-highway automotive use category, the production volume exceeds 740,000 for the existing continuing product.

Innuendo: Cummins refers to the T444E as having a gasoline engine heritage. Huh?! Where does this come from? There is no part, process, displacement, or machining operation in the T444E that is common to any gasoline engine International ever built. The only commonality is that the T444E is manufactured under the same roof of the Indianapolis plant where the finest gasoline engines used in the medium truck market were once made.

Assertion: Cummins states that the T444E is limited to 35,000 Lb. GVW while the ISB is rated to 52,000/65,000 Lb. (Some documents from them say 52,000; others say 65,000.) This isn't directly pertinent to bus applications, but is meant to imply that the T444E is less capable and durable than the ISB and that International is trying to limit the loading of the engine. Wrong.

The T444E is offered in two axle trucks. As a single unit straight truck the practical and legal limit for weight carrying capacity is 35,000 Lb. A vehicle with 52,000 to 65,000 Lb. rating would have to be a three axle straight truck or a two axle tractor with semi-trailer. The truck model that the T444E is offered in is also available in a tractor configuration. When the two axle tractor is coupled to a tandem axle trailer the GCW could range up to 65,000 Lb. There are no published restrictions in the International system advising against using the T444E as a tractor, an order can be specified with the engine in a tractor and customers have purchased them. So, the bottom line is the T444E is actually approved, and customer applied, in ratings up to 65,000 Lb.

Claim: The ISB has better fuel economy than the T444E. This is based on combining two other claims; they say the former B5.9 was equal to the T444E in vehicle tests (they don't say what type of vehicle) and the new ISB is 3 to 5% better than the B5.9 in dynamometer tests. First of all, the only true measure of comparison of in-vehicle fuel economy is an industry accepted procedure called the SAE Type II test. Without going into detail, it is a tightly regulated test procedure designed to provide accurate, repeatable comparisons between complete vehicles. There is no statement here that the claimed in-vehicle equality between the B5.9 and the T444E is based on this type test. To the bus customer the vehicle testing should be based on an operating cycle that simulates bus start-stop type service. The percentage improvement of their new engine is apparently based on other published information from Cummins that shows the full load dynamometer fuel consumption of the new engine to be better by that amount. Full load means running the engine at maximum power output throughout the operating speed range. A comparison of two engines at full load performance isn't necessarily a true indicator of their relationship at transient part load operation, and engines in vehicles operate at part load nearly all the time. They acknowledge in a discreet way that in-vehicle tests have not been run. Until they are, this claim has little meaning.

Claim: Cummins extended warranty policies cost less than International. Their literature discusses extended warranties beyond the standard level. The discussion is aimed more at the medium duty truck application where the standard and extended warranty picture is different from school buses. As for school bus operators, the Cummins warranty coverage is less and the cost is more. Here's how that works. The Cummins standard warranty for buses is five years, 150,000 miles; the T444E warranty is five years, unlimited miles. The Cummins discussion speaks of an extended warranty of five years, 250,000 miles. Even with that extended policy, at additional cost, they do not match the T444E school bus warranty.

So there you have it. In today's competitive market Cummins has found it expedient to exaggerate and distort factors to make their new and customer unproven product look attractive. You should discuss this material with your customers who are considering a bus product with the ISB engine and ask them if they are comfortable doing business with a supplier who would resort to such distortions to promote their product.

Oh, yes. What are the advantages of the T444E over the ISB?

- Four years of production and customer experience with the existing continuing design of engine and fuel system. (40,000 T444Es are in service in International school buses.)
- 24% more displacement for better response and low speed performance
- The HEUI fuel system, the most modern advanced electronic control system in the diesel engine field.
- Electronic engine control system with customer features tailored to the school bus operator.
- Hydraulic valve lifters for no valve adjustment required, ever.
- Ability to cold-start down to -20F without external aids.
- Fast Warm Up Device; to keep the kids warmer in the bus in the winter.

International still offers the school bus customer the best in reliability, durability and lowest cost of ownership.

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