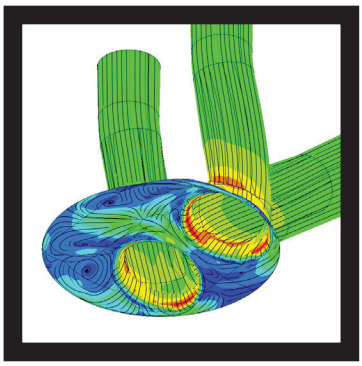
TVI WITH DIESEL

Diesels are high energy efficiency powerplants

In recent years, diesel engines have become increasingly popular. The ability of these engines to run reliably at moderate rpm, with minimal pumping losses, and at very high compression ratios, makes them of great interest for high fuel efficiency. There is one problem however: diesel engines are low-performance engines unless they are turbocharged or supercharged.

… But have inherently lower specific performance

The reason this problem lies within the very nature of the beast. Diesel engines rely on very high compression ratios to create the high cylinder temperatures needed to ignite their air-fuel mixtures instead of a spark plug. As result, the valves that control air flow in (and exhaust gases out) can only be open for a much shorter period of time than their gasoline (spark-ignition) counterparts. Otherwise, the high pressure/temperature needed to ignite the air/fuel mixture will be bled out of the cylinder prematurely.



This “short duration” valve opening sequence is the reason why virtually all passenger car diesels require forced induction: without it, the engine simply runs out of breath at high rpm. Drivers who remember first-generation Diesel-engined cars From the 60’s, 70’s, and 80’s will recall the leisurely pace at which their cars accelerated.

With greater packaging issues

Engineers refer to the output versus engine size and weight as the unit’s “power density”. Because of the higher mechanical loads imposed by their very high compression ratios, diesel engines are bulkier and heavier than conventional gasoline engines are.

On top of that, it becomes necessary to add a bulky, expensive forced induction system. In addition, the lower power-per-displacement of Diesel engines means that a larger engine is required for equivalent output, further lowering its power density.

TVI provides an answer to these problems

TVI porting is a unique porting system with superior breathing characteristics through the elimination of the airflow obstructions inherent with conventional ports. With its excellent short duration, low lift breathing, Dual Swirl provides an excellent opportunity to relieve the problem low diesel performance where the weight and packaging complexity of a turbo is undesirable, because good cylinder filling is achievable even with limited-duration, gentle-profile cam timing.

There are important secondary benefits

There is more post-combustion present in the exhaust with diesels than there is with spark-ignition engines. It would be highly beneficial to be able to recover this unused energy more efficiently than a turbocharger can, which recovers a relatively small portion of exhaust energy. The absence of a turbocharger means that all exhaust energy can be recovered either with a turbo-generator or through a low pressure cylinder.

Either way, the expansion ratio, a major determinant of energy efficiency, is markedly improved. Even turbocharged motors will benefit -at any given level of boost, cylinder-filling will still be superior to conventionally-ported engines. This is again because the major restrictions to good airflow are removed with dual swirl porting.

As a further benefit, the complex, rotational swirl produced by the system assists flame propagation, improving combustion characteristics and lowering pollution.

TVI

TWIN VECTOR INDUCTION

MORE POWER + LESS POLLUTION