

What is MID™?

Pioneered in 1978

Darton pioneered modular sleeve designs and specialty ductile iron material beginning with our manufacture of top fuel sleeves for Keith Black Racing Engines and Milodon Engineering in 1978.



This experience, our racing heritage, and our highly experienced staff of machinists and racing engine builders offered a unique set of blended talent to solve inherent block weakness design in the currently available engines where bore sizes were intended to be increased. Many production cast iron and aluminum blocks suffer from a design weakness of cylinder stability by nature of poor support at the upper deck area. The manufacturing process of “cast in sleeves” provides for economy of scale in low horsepower engines, but does not accommodate high horsepower, high boost, or larger bore sizes. Darton has engineered a superior patented (patent #6,799,541) solution by using a unique designed cylinder sleeve which when siamesed and nested, creates a solid deck of sleeve flanges held in tension, reinforcing the upper deck area and provides for individual replacement with what we call Modular Integrated Deck (MID).

In addition, Darton designs' manage and enhance water flow from block to head to promote stability of cooling and all sleeves are of the "Wet" design. The enhanced water flow in and around the flange area is possible because of ported water flow control engineering we call "Swirl Coolant Technology™". This process begins with specific engineering models of respective cylinder head and combustion chamber designs and then we promote increased flow of water in those areas of the upper sleeve area subjected to the most heat. Heat is also dissipated through the use of "Register Fins"™. There is a different engineering model for each engine and cylinder design. While heat is generally considered to translate into energy, high resident heat in the combustion chamber can lead to detonation, the single highest cause of engine failure in the high horsepower regimes.

High RPM normally translates into efficient scavenging of airflow but during misfires or incomplete flame propagation, high cylinder pressures and temperatures are created. Our MID™ design compensates for this high resident heat soak condition. In the normal dry sleeve installation the cooling medium, water, must transfer heat absorption through block material and sleeves, which may be dissimilar metals. When dry sleeves are pressed in with interference fit, the materials interface is not perfect which further exacerbates heat transfer. This thermal conductivity is inefficient and as more heat is generated, the combustion process is compromised.

Even in wet sleeve designs of the past, water is never efficiently processed or flowed between the block and head to provide for maximum heat dissipation in the combustion chamber. Inherent in open or closed deck engine blocks of cast iron or aluminum is a certain amount of water stagnation. This is like pouring water through a funnel, there is really no flow or velocity until the water exits the spigot. In the case of blocks and heads, the casting ports are designed for ease of casting not efficient flow. Now with Darton's "MID", Swirl Coolant Technology the cooling medium is ported and directed to significantly improve heat transfer where it is needed most, in the upper cylinder wall/flange area.

Now that Darton has solved the design issue of cylinder weakness another issue with wet sleeves is the sleeves exterior surface. In a standard wet sleeve design sleeves are punished by turbulent coolant often causing corrosion or rust. Darton now supplies the MID sleeves with a phosphate coating. Phosphate coating is the treatment with a solution whereby the surface of the metal is covered with an integral, protective layer of insoluble crystalline. This microcrystalline structure on the MID sleeve makes it optimal for corrosion and rust resistance.

Additionally this adds another protective barrier for the o-rings in the lower register of the sleeve extending their lifespan even longer. This coating resists abrasion from the hot turbulent water flow that is created in the water jacket area of the block. This aids the elimination of hot spots in the compression area allowing you to make more power. This coating makes the MID™ sleeves impervious to problems most commonly found in all wet sleeved blocks. Adding the phosphate coating to the MID sleeve is just another way Darton is constantly evolving sleeve design and the way the industry perceives the way you can sleeve a block.

The Darton MID™ Sleeve Kit is available for many series of 4, 6, and 8 cylinder import and domestic engines and provides for maximum bore sizes and boost potential. The benefits of our MID™ series kits are:

- Cast iron performance in an aluminum block
- Improved block integral strength
- Improved cooling
- Kits can be installed by your local machine shop
- “Wet sleeve” replaceability
- Full installation manual available on website
- Increased horsepower output potential
- High boost and horsepower potential
- Superior oil and compression control
- Superior cylinder sealing and ring wear
- Street or strip application
- Bulletproof Darton ductile iron
- 130,000-psi tensile strength