



Chicago White Metal Casting

High-Tech Al, Mg, Zn & Zr Die Casting
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Cannondale & CWM Tear Up the MotoSport Dirt Track

New MX400 Dirt Bike Engineering Draws Motosport Pros' Raves

In introducing Cannondale's MX400, its motorcycle engineers have done much more than roll out the first motocrosser produced on American soil in more than 20 years.

Dirt Rider's "Bike of the Year"

Called "Bike of the Year" by Dirt Rider magazine, clean-sheet design innovation from this experienced performance bicycle manufacturer has produced a line of dirt cycles which is pinching the sport's dominant companies. According to Cannondale's Vice-President of R&D Mario Galasso, "we are shaking up the industry with rule-breaking innovations in dirt bike design."

Early design of the new machines is a combination of many software evaluations and exhaustive bench testing. Prior to full

prototype development, relentless fatigue tests with field-simulated riding loads are repeatedly inflicted on bike designs by specially programmed, automated hydraulic fixtures. When the final Cannondale-designed engine passes durability and power-output muster, the resulting unit undergoes rigorous dirt riding performance tests with professional rider feedback. Rider impressions are as important to the company as lab tests and are used to assure that an engine is not only impressive on the dynamometer, but also in real-world competition. Mike Guerra, MX400 Product Manager, and Chris D'Aluisio, Motorcycle Frame

Engineer, hold World and National Championships. Keith Johnson, Cannondale's MX test rider, is an 11-time NESC champ. At an early 2000 NESC Series race in Southwick, MA, Keith won all four motos with an MX400 by an average margin of 20 to 30 seconds. At Hagerstown, MD, Keith won each of six motos he entered.

Outside-the-Box Thinking

All-new efforts that break traditional motocross design rules gave birth to the MX four-stroker, a bike that retains the agile chassis of a two-stroke with the tractable power delivery of a four-stroke.

A reversed cylinder head effectively lowers the center of gravity without sacrificing ground clearance, providing better bike handling while creating a direct air intake tract that improves combustion efficiency for greater power output.

Cycle World's off-road editor Jimmy Lewis test rode the MX400 and commented, in a word, "sweet." His praises included a "solid shifting," good-feeling clutch.

Four Near-Net-Shape Die Castings

Performance and cosmetic appearance are key product benefits in the motosport marketplace and Cannondale has partnered with Chicago White Metal Casting to deliver both.

Two critical components in the MX400's high-performance clutch, its hub and its pressure plate, are CWM high-tech die castings, manufactured to net shape in 380 aluminum—chosen for its excellent yield



Breaking traditional motocross design rules, the new MX400 boasts an innovative reversed-position four-stroke engine. A version of the 432cc four-stroker is also being used to power a new line of FX400 quad ATVs.

strength and ductility, as well as light weight.

The 35 gear teeth on the external involute spline of the clutch hub is produced to zero draft, as cast, with no machining required. The hub's internal spline is machined to final specs, along with turning operations and the tapping of six cored holes. The near-net-shape die cast pressure plate receives selective post-casting machining.

A 16 in. crankshaft cover and 8 in. engine cover are die cast in highly corrosion-resistant AZ91D magnesium. Cast to a cosmetic surface finish, the covers provide high-strength and extremely light weight, important to the award-winning records being logged by the MX.

For more information on CWM high-tech Al, Mg, Zn & Zr die casting, contact your CWM Sales-Engineer Representative, the CWM Sales Dept., or visit the CWM website at: www.cwmf.com ■



CWM FDM prototypes of the MX400's Mg crankshaft cover and engine cover, above.

The CWM near-net-shape Al die cast clutch hub and pressure plate are shown here. The hub has 35 gear teeth cast to zero draft.

