

Galil Controller Provides Precise Gyrotory and Compaction Motion for Pine Instrument's Asphalt Testing System

It's hard to imagine a world without asphalt. It covers more than 94 percent of the 2.2 million miles of paved roads that weave throughout the country and our neighborhoods. It's on our driveways, parking lots, tennis courts and airport runways.

So why asphalt? Research shows traffic runs much quieter and smoother on asphalt. Contractors like how quickly they can apply it, which cuts construction times. There's even a green angle, since the National Asphalt Pavement Association certifies it as America's most recycled material.

Made from a recipe of precisely engineered stone, sand and gravel that comprises 95% of the mix, asphalt also includes a petroleum-based cement or "glue" that holds or binds the mix together.

While the recipe seems simple, the science behind getting the ingredients mixed correctly is far more complex, especially considering the different climates, temperatures, soil, topography, traffic patterns and traffic loads that need to be taken into account.

At the forefront of this process is the Pine Instrument Company of Grove City, PA with its line of SUPERPAVE™ Gyrotory Compactors (SGC). Used by paving contractors, material testing labs, universities and state highway departments, the SGC is used in the design and quality control phases of asphalt production.

For the most part, the SGC includes an integrated cylindrical chamber or mold for placing and compacting the loose, prepared asphalt mix; an extruder; and a computer control system with control panel. With the asphalt in the chamber, the operator enters the desired compaction features, presses START, and the GSC then applies a constant consolidation pressure to the mix while the chamber gyrates at a set speed and at a fixed, precise angle from 0.0 to 1.5 degrees.

To help control the gyrations and applied pressure, the engineers at Pine Instruments specified the DMC-4030 three-axis controller from Galil Motion Control of Rocklin, CA.

"Compared to our prior systems, the fast, precise and programmable performance of the Galil controller enabled



The DMC-4030 provides the flexibility and intelligence required for many applications.

us to design a new SGC with enhanced capabilities that address a wide range of new and ever growing asphalt material applications including rubberized asphalt concrete," said Roger Pyle, Director of Product Technology at Pine Instruments.

"Because of these advancements in asphalt technology, we needed the DMC-4030 to provide the flexibility to operate the SGC at various settings and to accommodate specific inputs and outputs required for the application. Now, asphalt researchers have the means to investigate the different operating parameters of asphalt and get results they can be confident in," Pyle added.

Axis-1 of the DMC-4030 closes the loop with a load cell feedback to control the applied pressure mechanism while the angle of gyration is handled by Axis-2 and -3, both of which operate on position feedback.

These independent actuators swing the mold about a gimbal pivot to create and maintain the gyrating motion to ± 0.02 degrees of the selected angle throughout the compaction cycle in order to impart the proper kneading action into the material sample.

"The easy to program DMC-4030 enabled us to design the SGC to allow the user to precisely control the angle of gyration via the operator interface. This is a significant improvement over our older models which needed to be adjusted mechanically," said Pyle

Once the SGC has completed its cycle, the compacted asphalt mold and the data provided is ready for further analysis of its strength, potential fatigue, susceptibility to moisture and other such parameters. If it passes all tests, then contractors can proceed with their construction project knowing the asphalt will perform to spec no matter what type of rubber tire—or tennis shoe—hits the pavement. ■

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