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noiseletter

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Problem-solvers in vibration isolation,
noise control and seismic restraint.

Ford Advanced Engineering Center Relies on Kinetics Air Spring Isolators

Car buyers have become quality conscious when they are shopping for a new automobile. The absence of squeaks, noises and vibration has become one of the indicators of automobile quality. As a result, American car manufacturers are sensitive to NVH (noise, vibration and harshness) issues in the design and construction of their vehicles.

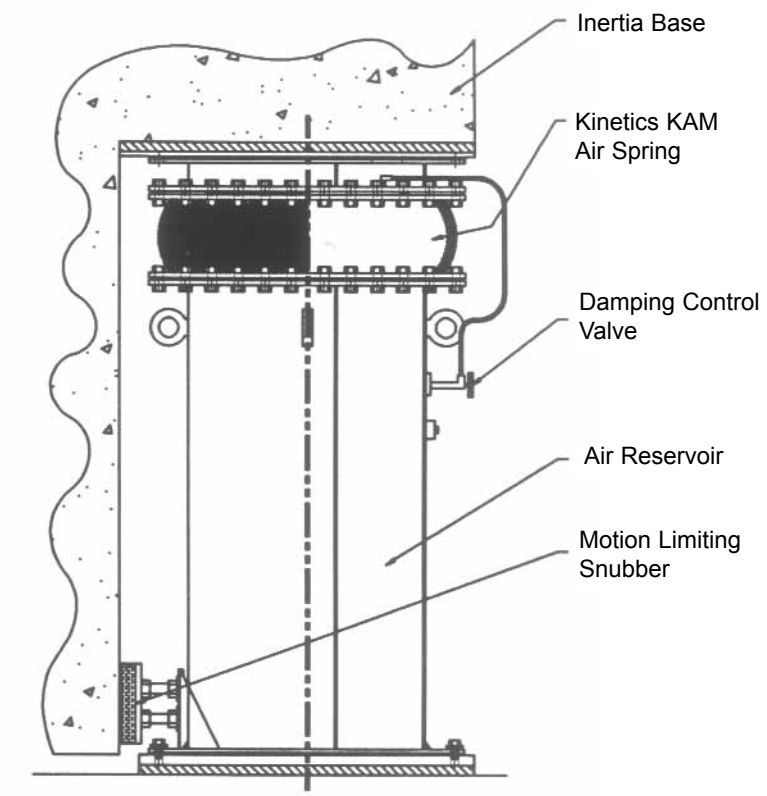
The Ford Advanced Engineering Center (AEC) in Dearborn, Michigan, contains numerous sound and vibration laboratories in which NVH studies are conducted on current as well as advanced design automobiles and components. The centerpiece of the AEC is a series of four chassis laboratories which are housed within anechoic chambers. These labs utilize large dynamometers which permit the AEC engineers to test the automobile design under a wide variety of speed and load conditions.

Each dynamometer system consists of a pair of six foot (183 cm) diameter rollers which are driven by large electric motors. These dynos are capable of generating road speeds of up to 150 miles per hour (240 kph) and can simulate bumps and road surface roughness. Extraneous noise and vibration in the building must be isolated away from the dynos in order that they not interfere with the NVH automotive studies or the work in the adjacent laboratories. The project engineer, Albert Kahn & Associates, specified that each dynamometer system and its base be isolated from the building.

Kinetics Noise Control manufactured 52 air spring isolators and installed them beneath the concrete inertia bases which support the dynos. These inertia bases, designed by Kinetics, vary in weight from 250,000 lbs. to 550,000 lbs. (113,400 kg to 249,500 kg) and are supported by between four and ten air spring isolators.

Each isolator is rated to support a maximum 80,000 lbs. (36,300 kg) and provides a natural frequency of 1.25 Hz. Each inertia base is equipped with three height control sensors which automatically maintain a constant base elevation to an accuracy of within 0.001" (25 microns) as automobiles are driven on and off the dyno rollers.

The use of Kinetics isolators permits the Ford engineers to conduct NVH testing and analysis with the objective being a quieter, higher quality American automobile.



Dynamometer Designation	Inertia Base Size (LxWxH) Ft. (cm)	Total Supported Weight Lbs. (kg)	Number of Kinetics Air Springs	Weight Supported by each Kinetics Air Spring Lbs. (kg)
4 wheel drive chassis dyno	21 x 9 x 10 640 x 274 x 305)	350,000 (159,090)	6	60,000 (27,272)
4 wheel drive chassis dyno	21 x 9 x 10 (640 x 274 x 305)	350,000 (159,090)	6	60,000 (27,272)
4 wheel drive chassis rolls	25 x 17 x 8 (762 x 518 x 244)	550,000 (250,000)	10	55,000 (25,000)
2 wheel drive chassis dyno	15 x 9 x 10 (457 x 274 x 305)	250,000 (113,636)	4	63,000 (28,636)
2 wheel drive chassis rolls	15 x 15 x 9 (457 x 457 x 274)	350,000 (159,090)	6	60,000 (27, 272)
2 wheel drive chassis dyno (holography)	15 x 9 x 10 (457 x 274 x 305)	250,000 (113,636)	4	63,000 (28,636)
2 wheel drive chassis rolls	18 x 13 x 9 (549 x 396 x 274)	350,000 (159,090)	6	60,000 (27,272)
2 wheel drive chassis dyno (environmental)	15 x 9 x 10 (457 x 274 x 305)	250,000 (113,636)	4	63,000 (28,636)
2 wheel drive chassis rolls	18 x 13 x 9 (549 x 396 x 274)	350,000 (159,090)	6	60,000 (28,636)

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