



# ***PT. IndyKote***



**Ceramic Coating Specialists**



## **Performance Technical Report**

**Subject:** Increases in Valve Spring Performance from Tech Line S01 Coating

**Scope:**

To determine the reduction in valve spring temperature and pressure losses when coated with Tech Line (IndyGo) S01 solid dry film lubricant.

**Test Description:**

Tech Line Coatings and Air Flow Research (AFR) built a spin fixture to test and evaluate new valve springs in a controlled environment over a measured period of time. The spin machine consisted of a small block Chevrolet engine driven at the camshaft by an electric motor. The pistons were removed and the timing chain was not installed so that only the valvetrain rotated. The oiling system remained fully functional. Pulley sizes were selected for the camshaft and electric motor so that the engine could be spun to 10,000 RPM for extended periods of time.

Eight AFR triple valve springs for roller tappet cams were coated by Tech Line with S01 and eight were left uncoated as a control group. Before installation of the valve springs on the cylinder heads pressure was measured at various compressed heights. The springs were then installed on the cylinder heads with a special spring shim thermocouple was installed at the base of the valve springs to measure spring temperature. After cycling the springs were removed and tested again for their height-load relationship to determine loss of tension as a result of use.

**Results:**

After 90 minutes at 6,500 RPM (300,000 open-and-close cycles) the coated valve springs had lost a maximum of only 3.5% of their original tension. The uncoated valve springs averaged a 15% loss in tension. Temperature of the coated springs was 190° F compared to the uncoated springs 210° F. A reduction of 11%. Oil temperature maintained a steady state of 180° F throughout the test.

These results are due to two benefits of Tech Line S01 coating. First is the reduction in heat producing friction between the inner and outer coils. Second is S01's ability to attract oil like steel to a magnet, keeping a continuous film of oil on the spring to further reduce friction and draw heat away from the spring.

Many professional NHRA and NASCAR race teams report their Tech Line S01 coated valve springs last up to three times longer than uncoated springs.