

Transportation Safety Technologies, Incorporated

Ford CVPI Trunk Pack Evaluation Factual Finding Report – 7/28/03

This will serve as the second reporting of three crash tests that were conducted on July 10 and 11, 2003 at KARCO Engineering on retrofitted 1998+ Ford Crown Victoria Police Interceptor (CVPI) for the purpose of aiding in the evaluation of the Ford “trunk pack.” Work is in progress on the posttest documentation, inspection and analysis of the test results. The crash tests include:

- Test 1: 75.99 mph, rear left side 50% offset, impact by Taurus with police cargo and no trunk pack. This test is conducted to confirm the development of a reasonably foreseeable trunk-loading configuration that punctures the non-trunk pack equipped CVPI fuel tank.
- Test 2: 77.64 mph, rear left side 50% offset, impact by Taurus with trunk pack and no police trunk cargo. Trunk is ballasted similar to Ford’s August 19, 2002 testing (four sand bags, totaling 200 lbs, at rear of trunk). This test is conducted to evaluate if the trunk pack alone changes the risk of burn injury compared to the Ford test conducted on August 19, 2002.
- Test 3: 74.22 mph, rear left side 50% offset, impact by Taurus with police cargo loaded identical to test 1 in the Ford trunk pack. This test is conducted to determine if the puncture producing trunk loading configuration is prevented from puncturing the fuel tank by the Ford trunk pack. Further, the test will evaluate performance of the fuel tank, vis-à-vis the trunk pack, as it influences the risk of burn injury.

The CVPI fuel tanks were filled to 95% of usable capacity with stoddard solvent. Ballasting of each test vehicle was similar to Ford’s August 19, 2002 test. For the tests with police trunk equipment a trunk loading protocol was developed and documented to ensure consistent and reproducible loading of the trunk. Because the Ford trunk pack does restrict loading of the CVPI trunk, minor differences between the trunk loading with and without the trunk pack were necessary. Loading of police equipment in the Ford trunk pack was in compliance with the label on the Ford trunk pack. Trunk loading differences with police trunk equipment were allowed that were judged to make no difference in the trunk equipments potential for puncturing the fuel tank or causing damage to the vehicle including the fuel tank. For the test with the trunk pack and trunk ballast only, because the Ford trunk pack restricts loading of the CVPI trunk, ballast is added that duplicates as closely as possible the volume and position of ballast used in the Ford August 19, 2002 test.

Principal aspects of each fuel tanks crash performance include:

Test 1:

- Fuel tank punctured by crowbar #1 (black). Puncture of forward trunk wall and fuel tank (front and back of tank). The hole in the back of the fuel tank is approximately rectangular with average dimensions of one and seven-eighths inches by three-quarters inches (1-7/8 in. x 3/4 in.)
- Fuel tank punctured by crowbar #2 (blue). Puncture of forward trunk wall and fuel tank (front and back of tank). The hole in the back of the fuel tank is approximately rectangular with average dimensions of three inches by one and five-sixteenths inches (3 in. x 1-5/16 in.)
- Fuel tank puncture by small floor jack handle receiver. Puncture of forward trunk wall and back of tank. The hole in the back of the fuel tank is approximately round with average diameter of one and three-quarters inches (1-3/4 in.)
- Fuel tank punctured by small floor jack round jack/vehicle interface. Puncture of forward trunk wall and back of fuel tank. The hole in the back of the fuel tank is triangular shaped with dimensions of three inches by three and one-half inches by three and one-quarter inches (3 in. x 3-1/2 in. x 3-1/4 in.) Small secondary puncture in torn metal in fracture area approximately three-eighths inches (3/8 in.).
- Trunk forward wall puncture by crowbar #2 (blue). Puncture of trunk wall only, but produces galling and possible incipient failure at back of fuel tank. Size of forward trunk wall puncture is three-quarters inches by one-eighth inch (3/4 in. x 1/8 in.)
- Vent control valve broken at vent spud. Major portion of vent housing inside fuel tank broken off and lying inside fuel tank.
- Tapered end of filler pipe inside fuel tank broken off, but no apparent disruption of fillerneck valve function.

Test 2:

- Tear at top of fuel tank. One inch (nominal) by nineteen and one-half inches (1 in. x 19.5 in.) tear in rear half of fuel tank metal next to the top seam weld.
- Small crack top left side of tank – no apparent fuel leakage.
- Vent control valve broken at vent spud. Major portion of vent housing inside fuel tank broken off and lying inside fuel tank.
- Filler pipe valve inside fuel tank broken and disabled.

- Fluid seal at filler pipe grommet disabled due to crush of filler pipe fuel tank insertion hole.
- Appears to be a broad area of forward collapse to back of fuel tank, distributed from top to bottom, including the area of the filler pipe insertion.

Test 3:

- Fuel tank punctured by crowbar #1 (black). Puncture of trunk pack shell, HDPE shield, and Kevlar shield, forward wall of trunk and back of fuel tank. The hole in the back of the fuel tank is triangular with dimensions of three-quarters inches by three-quarters inches by one-quarter inch (3/4 in. x 3/4 in. x 1/4 in.)
- Fuel tank punctured by crowbar #2 (blue). Puncture of trunk pack shell, HDPE shield, and Kevlar shield, forward wall of trunk and back of fuel tank. The hole in the back of the fuel tank is approximately rectangular with average dimensions of two inches by one and five-sixteenths inches (2 in x 1-5/16 in.)
- Trunk forward wall puncture by lid of 50-caliber ammo box. Penetrating box corner may have lightly marked back of fuel tank. Puncture of trunk forward wall near top at location that trunk pack did not cover. Size of forward trunk wall puncture is one and three-quarters inches by approximately one-quarter inch (1-3/4 in. x 1/4 in.)
- Partial trunk pack puncture by small floor jack handle receiver. Puncture of trunk pack shell and HDPE shield.
- Partial trunk pack punctured by small floor jack round jack/vehicle interface. Puncture through trunk pack shell.
- Partial trunk pack puncture by 4-point wrench. Puncture through trunk pack liner.
- Major portion of vent housing inside fuel tank broken off and lying inside fuel tank.
- Filler pipe valve inside fuel tank broken and disabled.