





CASE STUDY **1702A**

INCREASING HORSEPOWER & TORQUE

EVALUATION OF HOT SHOT'S SECRET FR3
IN A SERIES OF DYNAMOMETER TESTS

THIRD PARTY		SOUTH EAST HARLEY-DAVIDSON, BEDFORD HEIGHTS, OHIO
TEST SUBJECT A		2014 HARLEY-DAVIDSON STREET GLIDE FLHX
TEST SUBJECT B		2015 HARLEY-DAVIDSON ROAD GLIDE SPECIAL FLTRXS
PRODUCT TESTED		HSS FR3 FRICTION REDUCER



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CONTENTS

Overview	i
Test Conditions	1
Results, Test #1	
2014 Harley-Davidson Street Glide FLHX	2
Results, Test #2	
2015 Harley-Davidson Road Glide Special FLTRXS	3
Conclusion	4
Analysis	5

OVERVIEW

The effects of Hot Shot's Secret FR3 FRICTION REDUCER were determined in a series of dynamometer tests to find horsepower and torque changes on two Harley-Davidson motorcycles. The following product tests were performed by South East Harley-Davidson in Bedford Heights, Ohio on January 20, 2017.



TEST CONDITIONS

The subject motorcycles included a 2014 Harley-Davidson Street Glide FLHX and a 2015 Harley-Davidson Road Glide Special FLTRXS. The 2014 Harley-Davidson Street Glide was equipped with an air-cooled, High Output Twin Cam 103 engine. The motorcycle had been modified from the original state as follows: 255 high torque cams, aftermarket air breather and aftermarket high flow exhaust. The 2015 Harley-Davidson Road Glide was equipped with the same High Output Twin Cam 103 engine; modifications included an aftermarket air breather and 2 in 1 high flow exhaust.



The tested product, Hot Shot's Secret FR3; is labeled as a 100% synthetic friction reducer. FR3 is a lubricity enhancing oil additive developed to increase the lubrication and wear reduction properties of the host oil. The product label specifies a treatment ratio of 1.5 OZ of product per 1 quart of fluid capacity and recommends use in engines, power steering systems, hydraulic systems and differentials. A disclaimer on the product label determines product is safe for use in synthetic oil.

The dynamometer used in this evaluation was a calibrated, motorcycle specific DynoJet system. All tests were completed on January 20, 2017 in a temperature controlled environment. Two tests: baseline and product trials, were performed on each motorcycle with three passes for each test to prove repeatability. The 2015 Harley-Davidson Road Glide was subject to additional testing after the initial evaluation was completed to determine horsepower and torque effects when FR3 was added to the transmission. Results are shown on pages 2-4.



To ensure accuracy and repeatability, the following tests were conducted with the motorcycles both at a constant operating temperature of 225 degrees Fahrenheit. Test runs were completed to bring equipment up to the operating temperature.

RESULTS, TEST #1

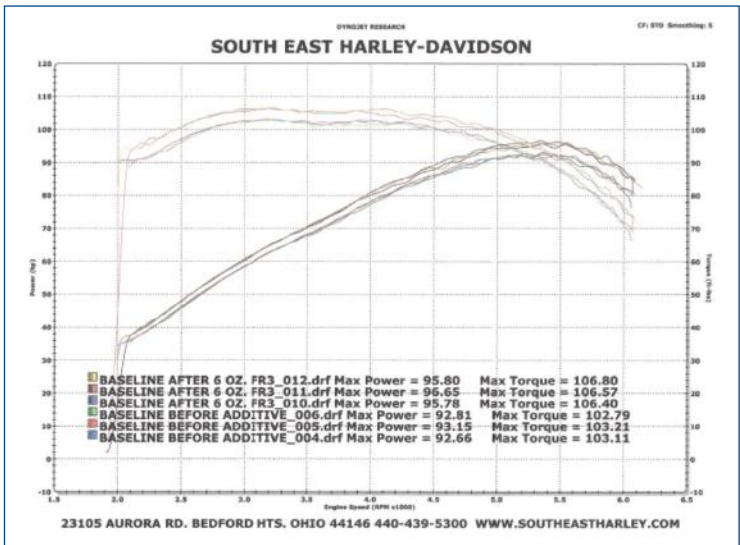
2014 HARLEY-DAVIDSON STREET GLIDE FLHX

The test motorcycle completed three baseline tests. FR3 was added to engine oil at rate described on product label and three product tests were completed. Host engine oil was 20W-50 Harley-Davidson SYN3.

	Horsepower	Torque
Baseline #1	92.81	102.79 ft/lbs
Baseline #2	93.15	103.71 ft/lbs
Baseline #3	92.66	103.11 ft/lbs
Average Baseline	92.87	103.20 ft/lbs

	Horsepower	Torque
Product Trial #1	95.80	106.80 ft/lbs
Product Trial #2	96.65	106.57 ft/lbs
Product Trial #3	95.78	106.40 ft/lbs
Average Product Trial	96.08	106.59 ft/lbs

Net Gain	3.21 hp	3.39 ft/lbs
Percent Gain	3.30%	3.20%



RESULTS, TEST #2

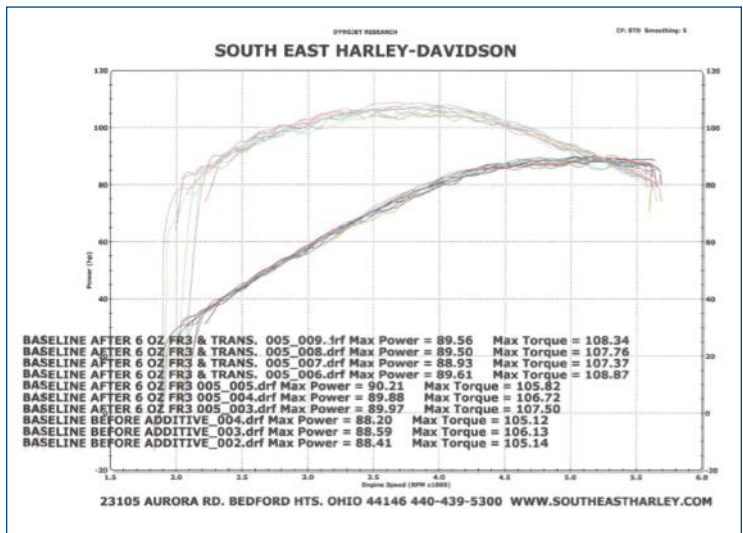
2015 HARLEY-DAVIDSON ROAD GLIDE SPECIAL FLTRXS

The test motorcycle completed three baseline tests. FR3 was then added to engine oil at rate described on product label and three product tests were completed. Host engine oil was 20W-50 Red Line Synthetic.

	Horsepower	Torque
Baseline #1	88.20	105.12 ft/lbs
Baseline #2	88.59	106.13 ft/lbs
Baseline #3	88.41	105.14 ft/lbs
Average Baseline	88.40	105.46 ft/lbs

	Horsepower	Torque
Product Trial #1	90.21	105.82 ft/lbs
Product Trial #2	89.88	106.72 ft/lbs
Product Trial #3	89.97	107.50 ft/lbs
Average Product Trial	90.02	106.68 ft/lbs

Net Gain	1.62 hp	1.22 ft/lbs
Percent Gain	1.80%	1.10%



After baseline and product trials were completed, the 2015 Harley-Davidson Road Glide Special FLTRXS had 1.5 OZ of FR3 added to transmission. Host transmission fluid was 20W-50 Harley-Davidson SYN3.

	Horsepower	Torque
Transmission Test #1	89.56	108.34 ft/lbs
Transmission Test #2	89.50	107.76 ft/lbs
Transmission Test #3	88.93	107.37 ft/lbs
Transmission Test #4	89.61	108.87 ft/lbs
Average Transmission Test	89.40	108.09 ft/lbs

Net Gain	-0.62 hp	1.41 ft/lbs
Percent Gain	-0.69%	1.32%

CONCLUSION

Hot Shot's Secret FR3 had a noticeable effect on the performance of both motorcycles. Test #1 showed an increase of 3.21 in horsepower and an additional 3.39 ft/lbs of torque, an increase of 3.3% and 3.2% respectively. Test #2 proved an increase of 1.62 in horsepower and an additional 1.22 ft/lbs of torque, an increase of 1.8% and 1.1% respectively.

The additional transmission evaluation on the 2015 Harley-Davidson Road Glide Special FLTRXS after baseline and product trials during Test

#2 showed a reduction of .62 horsepower and an increase of 1.41 ft/lbs of torque, -.69% and 1.32% respectively.

FR3, the tested product, improved both the horsepower and torque of each motorcycle in every dynamometer test when

FR3...IMPROVED BOTH THE **HORSEPOWER** AND **TORQUE** OF EACH MOTORCYCLE IN EVERY DYNAMOMETER TEST WHEN ADDED TO THE ENGINE.

added to the engine. When added to the transmission, horsepower increase was negligible over baseline results, but torque was noticeably increased.

ANALYSIS

The results of the Hot Shot's Secret FR3 may be attributed to the friction reducing properties of the product increased efficiency and power of the engine. Further testing of motorcycles using conventional oil as host oil is desired, as well as additional testing on unmodified motorcycles and additional transmission types.

Please Note: FR3 can be used in transmissions that utilize engine oil. Hot Shot's Secret FR3 may also be used in wet clutch applications.

Note: The data and results shown in this evaluation are not meant to be a product effectiveness guarantee. Other users or consumers may find results greater or lesser than the results published in this document. Results may vary from case to case.





Lubrication Specialties, Inc. began in 1997 and since the development of Hot Shot's Secret Stiction Eliminator in 2004 has continued to solve issues for the largest companies across the country. Dedicated to producing the most concentrated and effective solutions on the market, third party testers and our own in-house chemists constantly reevaluate our products. Lubrication Specialties, Inc. is a proud member of the Better Business Bureau.

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