



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: PE 14-025
Date Opened: 08/04/2014
Investigator: Robert Young
Approver: Stephen Ridella
Subject: Motorcycle Fires

Date Closed: 05/22/2015
Reviewer: Bruce York-B

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Bombardier Recreational Products Inc.
Products: 2013 Can-Am Spyder RT
Population: 5,165

Problem Description: Motorcycle fire while in operation.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	103	0	103
Crashes/Fires:	2	0	2
Injury Incidents:	0	0	0
Fatality Incidents:	0	0	0
Other*:	1	0	1

***Description of Other:** Numerous postings on Spyderlovers.com

ACTION / SUMMARY INFORMATION

Action: Recall 15V-095. Close this PE

Summary:

This Preliminary Evaluation was opened after NHTSA became aware of two fires involving a MY 2011 and a MY 2013 Can-Am Spyder RT manufactured by Bombardier Recreational Products (BRP). Both occurred within days of each other in July, 2014. The first report (VOQ 10615679) involved a 2011 Spyder RT, converted for police work and operated by the Morgantown, WV police department burned while being operated on July 20, 2014. The second report (VOQ10617819) involved a 2013 Spyder RT that burned while being operated near the 29 Palms Marine base in the Mojave desert.

After a comprehensive review of all information and test data collected during the investigation NHTSA staff met with BRP to discuss its findings. After careful consideration BRP decided to conduct a safety recall (15V095) to address operator burns from elevated vehicle surface temperatures, fuel boiling due to inadequate management of engine compartment heat, and excessive fuel vapor emissions due to the inability of the bikes evaporative emissions system to capture those vapors. We received the company's defect information report on February 13, 2015 and owners began receiving an interim recall notice on February 26th. The interim notice told owners that the recall remedy was in development and would be available in "May, 2015."

In addition, BRP agreed to, and has undertaken, the following actions:

1. Re-notified owners subject to recalls 12V581 and 582 to increase the number who have the recall remedies installed; and
2. Improved its internal system (BossWeb) so that dealers may accurately determine whether a BRP street-legal product has had all relevant recalls completed.

With BRP's recall, and its other actions, this PE is closed.

For additional detailed information on this investigation, see the attached closing report.

The ODI complaints cited above can be reviewed at www-odi.nhtsa.dot.gov/owners/SearchNHTSAID under the following (ODI) numbers: 10422389,10441182,10451964,10454644,10464103,10488563,10495091,10499920,10534185,10538604,10542236,10544661,10544745,10545679,10545719,10547665,10547672,10547761,10549949,10551480,10574592,10576999,10579466,10582917,10587190,10587196,10587659,10593913,10595183,10606604,10607045,10615679,10615793,10616468,10616523,10616893,10617819,10618790,10620886,10620985,10621062,10621082,10621271,10621881,10621966,10622101,10622114,10622350,10622356,10622523,10622664,10625899,10626242,10626248,10626578,10626680,10626861,10627017,10627095,10627236,10627336,10627768,10627778,10628178,10628215,10628314,10629231,10629665,10630345,10630901,10631241,10631265,10631290,10631419,10631703,10631868,10632763,10638824,10649988,10650058,10650065,10650128,10650131,10650531,10650634,10650686,10650717,10650745,10650747,10650802,10650812,10650899,10651070,10651083,10651134,10651139,10651343,10651478,10651558,10651858,10651917,10659906,10664024

1.0 BACKGROUND

This Preliminary Evaluation (PE14025) was opened after NHTSA became aware of two fires involving a MY 2011 and a MY 2013 Can-Am Spyder RT manufactured by BRP. Both occurred within days of each other in July, 2014. The first report (VOQ 10615679) involved a 2011 Spyder RT, converted for police work and operated by the Morgantown, WV police department. It burned while being operated on July 20, 2014.



The second report (VOQ10617819) involved a 2013 Spyder RT that burned while being operated near the 29 Palms Marine base in the Mojave desert.



Since both these vehicles were subject to earlier BRP heat/fire-related recalls (12V582 for the 2011 and 13V386 for the 2013) and still burned, we opened this PE investigation.

2.0 ODI ACTIVITY

Since opening this investigation, we:

- T Reviewed postings on Spyderlovers.com related to owners' concerns about vehicle heat and fuel vapor emissions;
- T Reviewed all Spyder VOQs filed with the agency;
- T Reviewed the three, heat-related safety recalls previously filed by BRP for Can-Am Spyders (12V581, 12V582, and 13V386);
- T Reviewed Early Warning Reporting (EWR) data filed with the agency by BRP;

- T Interviewed operators of the two fire-involved Spyders that prompted opening this PE;
- T Interviewed Spyder RT owners and test-rode their vehicles while gathering evaporative emissions data and measuring vehicle surface temperatures;
- T Visited Spyder dealers and gathered information about BRP's response to heat-related complaints from Spyder RT owners;
- T Inspected disassembled Spyders to understand differences between model years and models;
- T Gathered information about peer motorcycles, including evaporative emissions, possible fuel boiling, and vehicle surface temperatures;
- T Gathered information about the heat dissipation efficacy of BRP's customer satisfaction remedy kit for MY 2008-13 Spyder GS and RS models;
- T Mailed an Information Request to BRP on October 10, 2014.
- T Reviewed BRP's December 2, 2014 partial response to our information request. In lieu of a complete response, BRP agreed to conduct safety recall 15V095.
- T Our Vehicle Research and Test Center (VRTC) conducted comprehensive testing on a MY 2013 Spyder RT leased from an owner who filed a complaint with us (VOQ 10582917);
- T Discussed motorcycle evaporative emission standards with staff at the California Air Resources Board (CARB);
- T Discussed motorcycle evaporative emission standards and vehicle fuel boiling with Transportation Research Center (TRC) emissions lab personnel; and
- T Discussed the VRTC test findings with BRP executives. Reviewed the petitioner attorney's December 31, 2010 and July 26, 2010 letters and exhibits.

3.0 THE VEHICLE

Officially launched by Bombardier Recreational Products (BRP) in February, 2007, its Can-Am brand "Spyder" was unique. While 3-wheeled motorcycles were marketed by other manufacturers, the Spyder was the first mass-produced with a single rear wheel.



Trike - Single Front Wheel

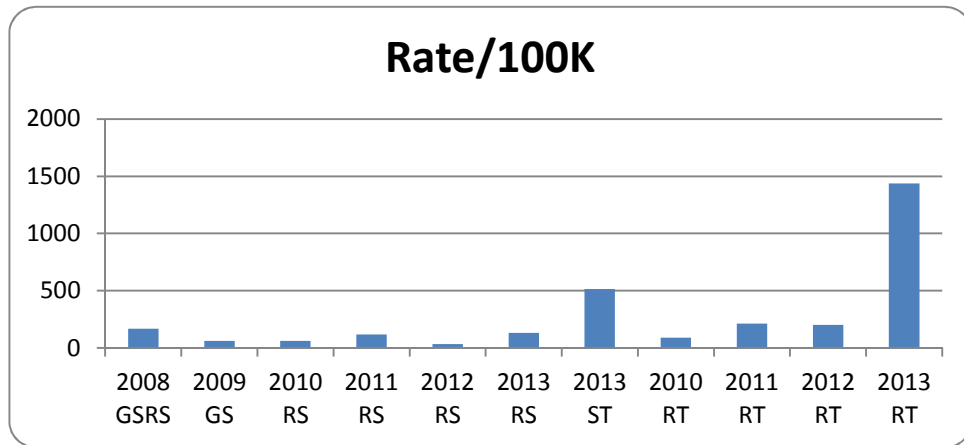
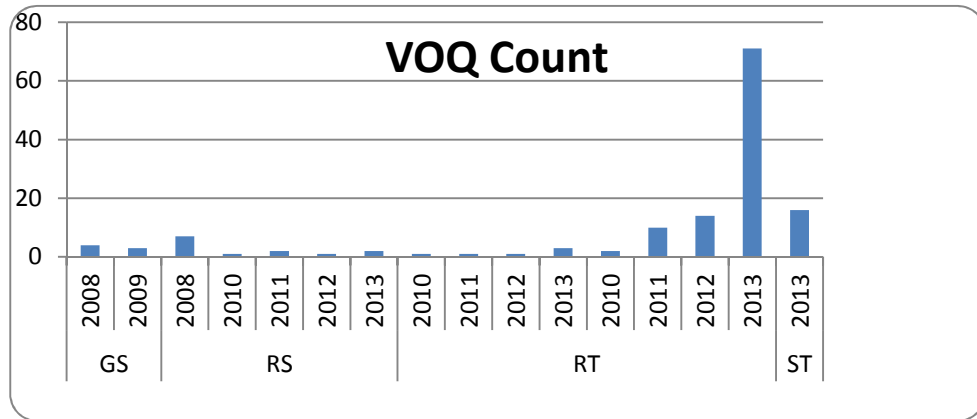


Can-Am Spyder - Single Rear Wheel

3.1 The Subject Vehicle

Prompted by two reports of fires involving 2013 RT models, we gathered heat-related information about all Spyder models. We found that BRP had already conducted three safety-related recalls to address heat related issues with MY 2008-13 Spyders (12V581, 12V582, and 13V386). Despite these recalls, fires continued to be reported for the MY 2013 RTs. As of May 5, 2015, 103 owners of MY 2013 Spyder RTs have filed heat-related complaints with us. The complaint

count and associated complaint rate are shown in the charts below.



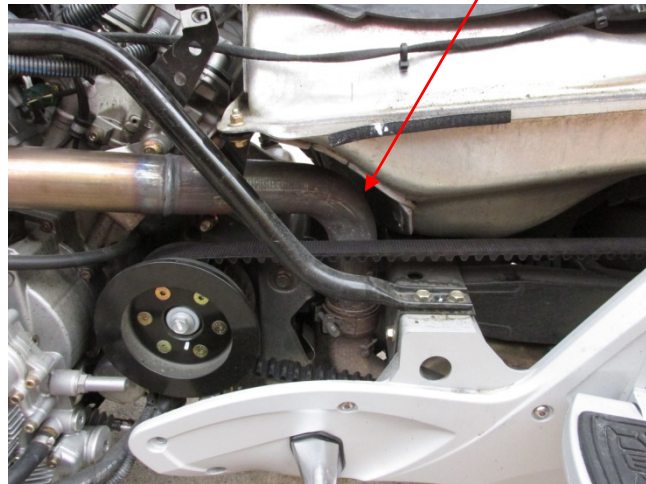
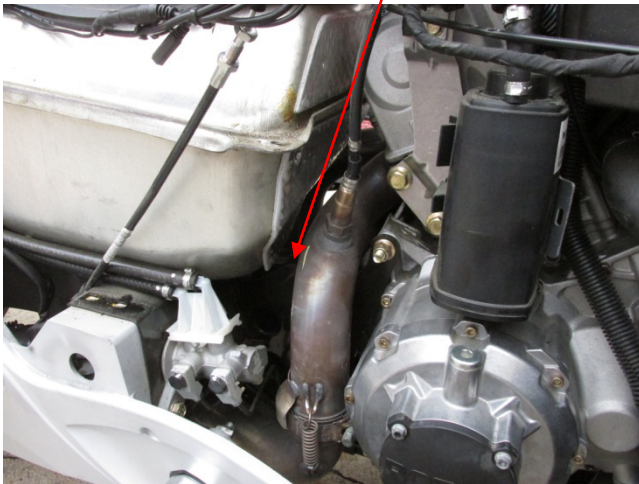
3.2 Subject Vehicle Layout

The MY 2013 Spyder RT is equipped with a fuel-injected 998cc V-twin engine. Because space is at a premium, the engine, exhaust, and fuel system are tightly packaged. Due to very limited airflow through this area, extreme temperatures are observed. The following illustrate how densely packaged the subject vehicles are:



Figures 1-3 -- proximity of exhaust headers to fuel system.

Left side



3.3 2014 Spyder RT

BRP completely redesigned the RT for the 2014 model year. An inline 3 cylinder replaced the V-twin engine. This single change allowed the exhaust system to be routed away from the center of the engine compartment thereby reducing latent heat and its associated problems (boiling fuel, fuel vapor emissions, and elevated vehicle surface temperatures). Retro-fitting earlier production RTs is not practicable.

3.4 Other Spyders

We are aware of heat-related concerns expressed by owners of other model/model year Spyders. However, those were address by either recalls 12V581, 12V582, and/or a customer satisfaction campaign launched in early 2014 whereby owners of GS and RS model Spyders could have MY 2014 body work retro-fitted to their bike. The new bodywork promotes airflow through the engine compartment and, based on our owner interviews and forum posting reviews, has

been very effective at reducing vehicle surface temperatures.

The MY 2014 Spyder "sport models" (i.e., GS, RS, and ST) are equipped with "scooped" body panels that force air into the engine compartment while underway.



The earlier model year "sport models" did not have "scooped" bodywork.



can-am | 

The GS/RS body panels will not fit on the RT models. We note, too, that reports of fuel boiling and/or fuel vapor emissions are very low in these models unlike the MY 2013 RT. Nor were any fires reported on the GS/RS models where all safety-related recalls had been completed.

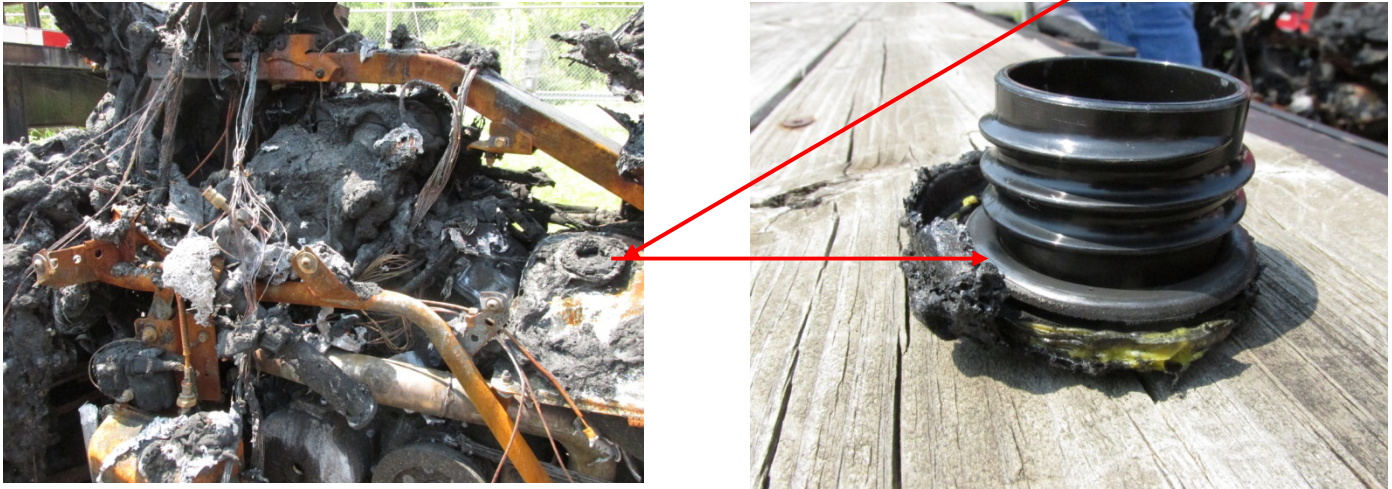


4.0 THE TWO FIRES

We opened this PE after learning of two fires occurring within days of each other.

4.1 Morgantown Police

The first, occurring on 7-20-14, involved a MY 2011 Spyder RT used by the Morgantown, WVA police department. While inspecting the vehicle on August 8th, we found the vehicle had not had its original fuel cap replaced per 12V582. The maintenance department was unaware of this safety recall having never received the notice.



Thereafter, we learned that BRP had no way of verifying whether vehicles subject to the recall had been remedied and thus we asked the company to re-notify all owners of bikes within the recall scope. Additionally, BRP has improved how dealers identify whether motorcycles presented for service have had the recall service done.

4.2 Mohave Desert

We learned of the second fire through the forum at SpyderLovers.com

(<http://www.spyderlovers.com/forums/showthread.php?70542-2013-RT-Fire-26-July-2014>). It occurred on July 26, 2014 and involved a 2013 Spyder RT that had all relevant safety recall servicing done. Its owner had been unhappy with body panel surface temperatures which he attempted to address with insulation. On April 16, 2014 he discussed the heat issue directly with BRP. During that conversation he also mentioned that the bike emitted a strong gasoline odor when parked and fuel would drip from the evaporative emission system vent tube.



He also reported that it sounded as though fuel was boiling in the fuel tank when parked and warm and that the fuel cap was sometimes too hot to touch. According to the owner, BRP offered no solution.

The fire occurred while he was riding on Amboy road at about 60 mph for approximately 10 minutes. At about 6:20PM, the weather was dry, warm (95 degrees) and there was very little traffic (it was in the Mojave desert, after all). He began to smell "burning plastic" and could see smoke trailing behind him. He pulled over and dismounted. The bike was smoking badly so he lifted the seat to inspect and the bike then burst into flames. He ran across the road and watched as it completely burned.



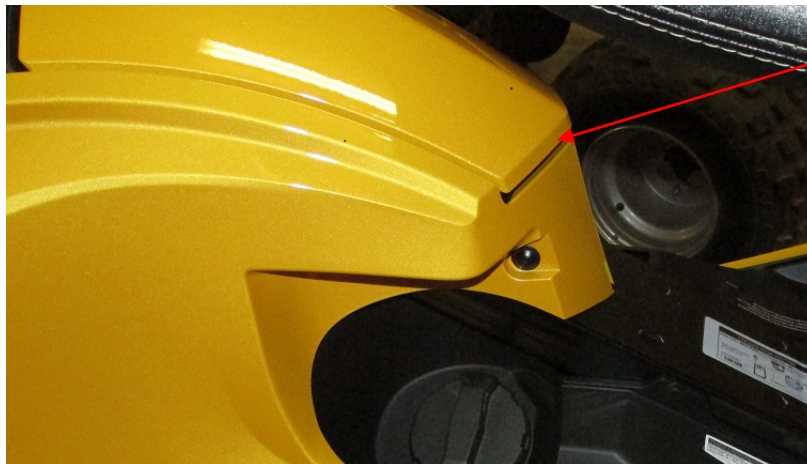
5.0 VRTC & TRC Testing

Owners of subject Spyder RTs consistently reported the presence of fuel odor after parking their bike in a garage. Some also observed apparent fuel boiling in the fuel tank. To quantify the emitted fuel vapor concentration, and to test whether fuel was boiling in the tank, NHTSA's VRTC contracted with the TRC emissions lab to conduct "shed" tests on a "complaint" 2013 Spyder RT leased from an owner who had filed a complaint with us.

First, we ran the vehicle on a dynamometer in a room heated to 95 degrees for 30 minutes.



Vehicle surface temperatures were then recorded and the fuel cap was removed to ascertain whether fuel boiling was apparent. Temperatures as high as 162 degrees were observed where the front of the seat joins the glovebox bodywork.



We also observed active boiling fuel where it exits the fuel injection system return line into the tank.

Immediately after this test, the still hot bike was pushed into the lab's "SHED"¹ to quantify the amount of fuel vapor, if any, was emitted by the vehicle.

¹ Sealed Housing for Evaporative Emission Determination - The SHED, in which the temperature can be controlled, tests the exhaust gas emitted during the operation of vehicles and the amount of hydrocarbon vapors emitted by motor vehicles. It is capable of completing the standard one-hour heat build and hot soak evaporative emissions tests currently required for motorcycle certification.

MY 2013 Complaint RT in the TRC SHED on October 22, 2014:



The highest recorded vapor concentration was 579.42 ppm...one of the highest readings ever recorded by the lab. Indeed, when removing the bike from the SHED, the odor of fuel was readily apparent.

To put this reading in perspective, we used the same testing regimen to evaluate a peer MY 2013 KTM 1190 Adventure. Like the subject Spyder, this motorcycle is powered by a large, water-cooled, v-twin engine.



No fuel boiling or sharply elevated surface temperatures were observed and the SHED test produced a fuel vapor reading of 4.0 ppm...a finding typical of highway vehicles (whether light vehicles or motorcycles) tested by the TRC emissions lab.

5.1 Fuel Boiling

The high evaporative emission reading is a product of fuel boiling in the fuel tank which produces vapors that completely overwhelmed the Spyder's evaporative emissions system. Further investigation revealed that the "boiling fuel" was actually super-heated (i.e., heated under pressure) while in the fuel injection system return line. Once that heated fuel was expelled back into the tank, now at atmospheric pressure, it boils. This is a function of the fuel injection system's exposure to extreme engine compartment heat and return line pressurization.² This explains why vehicle drivability was unaffected by boiling fuel. While in the fuel injection system, the fuel does not boil because it is pressurized but once it is exposed to the lower atmospheric pressure when expelled back into the tank, it does.

5.2 Evaporative Emissions Canister

Prior to the test, a new evaporative emissions charcoal canister, weighing 410 grams was installed. Dealers are instructed to weigh the canister when customers complain about fuel odor and, if the canister weighs more than 484 grams, they are to replace it. Following the test, the "new" canister weighed 515 grams, indicating that the evaporative emissions system had been overwhelmed by fuel vapor during the test.

6.0 CONCLUSION

NHTSA supplied the VRTC test results to BRP which, after careful consideration, decided to conduct a safety recall (15V095) addressing: operator burns from elevated vehicle surface temperatures, fuel boiling due to inadequate management of engine compartment heat, and excessive fuel vapor emissions due to the inability of the bikes evaporative emissions system to capture those vapors. We received the company's defect information report on February 13, 2015 and owners began receiving an interim recall notice on February 26th. The interim notice told owners that the recall remedy was in development and would be available in "May, 2015."

In addition, BRP agreed to, and has undertaken, the following actions:

1. Re-notified owners subject to recalls 12V581 and 582 to increase the number who have the recall remedies installed; and
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With BRP's recall, and its other actions, this PE is closed.

² When pressurized, a fluid's boiling point increases.