

# HYUNDAI AMERICA TECHNICAL CENTER, INC.

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## VIA FEDERAL EXPRESS

Jeffrey Quandt, Chief  
Vehicle Control Division  
Office of Defects Investigation  
National Highway Traffic Safety Administration  
400 Seventh Street, S.W.  
Washington, D.C. 20590

COPY

Re: Preliminary Evaluation (PE04-065)  
2002-Present Kia Spectra; Rear Drum Brake Wheel Cylinder Leakage

Dear Mr. Quandt:

This letter contains Kia's supplemental response to Request No.'s 8, 9, 10, 11 and 12 of your letter dated October 15, 2004 (Reference NVS-213kmb/PE04-065) pursuant to the extension which you granted on November 22, 2004.

### REQUEST NO. 8:

Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, Kia. For each such action, provide the following information:

- a. Action title or identifier;
- b. The actual or planned start date;
- c. The actual or expected end date;
- d. Brief summary of the subject and objective of the action;
- e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and
- f. A brief summary of the findings and/or conclusions resulting from the action.

For each action identified, provide copies of all documents related to the action, regardless of whether the documents are in interim, draft, or final form. Organize the documents chronologically by action.

**RESPONSE TO REQUEST NO. 8:**

Several actions were conducted relating to the alleged defect in the subject vehicles. The table below summarizes the actions conducted by or on behalf of KMC.

Action Title	Start Date	End Date	Subject/Object of Action	Group Responsible	Finding/Conclusion Summary
Spectra Wheel Cylinder Leaked Part Evaluation Result (See Tab 1)	05/28/04	05/28/04	To evaluate rear wheel cylinders obtained from the Korean domestic market based on customer complaints of leaking.	KASCO	Air leak and vacuum density testing indicated a limited impairment of the seals.
Spectra Wheel Cylinder's Warranty Returned Parts Fluid Leakage Verification (See Tab 2)	06/02/04	06/02/04	To determine the resulting amount of leaking fluid when brake force is applied to warranty-returned parts obtained from the Korean domestic market.	KASCO	The same parts identified in the 5/28/04 testing were used. Thousands of brake applications were used to determine a rate of leakage. From 4,000 to 40,000 brake applications were required to cause a 1cc fluid loss. A loss of approximately 134cc of brake fluid is needed to reach the brake warning light "ON" level. Fluid loss was determined to be minimal.

Action Title	Start Date	End Date	Subject/Object of Action	Group Responsible	Finding/Conclusion Summary
<p>Spectra Rear Wheel Cylinder Warranty-Returned Park Brake Performance Evaluation Result Report</p> <p>(See Tab 3)</p>	06/03/04	06/05/04	<p>To determine vehicle braking distance comparing non-leaking and leaking cylinders, including instances when the brake light is "ON".</p>	KMC's Vehicle Testing Team 3	<p>Testing of both non-leaking and leaking wheel cylinders, when compared, does not show any significant changes in the vehicle's braking distance. All braking distances were under both FMVSS standards and Kia's lower target braking distance guidelines. Case 2 of the report identifies that the vehicle's braking distance remains satisfactory even after the brake light is on.</p>
<p>Spectra Rear Wheel Cylinder Leakage Part Brake Performance Evaluation Result Report</p> <p>(See Tab 4)</p>	06/09/04	06/11/04	<p>To evaluate performance at the brake pedal for the Spectra comparing non-leaking and leaking cylinders.</p>	KMC's Vehicle Test Team 3	<p>Brake pedal performance was satisfactory under all conditions. Pedal stroke measured against pedal force increased 3 - 5% with leakage. This was well within normal KMC targets. In order to maintain vehicle deceleration, pedal effort was increased by 11-13%, which was also well within KMC targets. Pedal travel was increased by 4-5%, which is close to or at KMC targets. Braking distance increased 7%, which is</p>

Action Title	Start Date	End Date	Subject/Object of Action	Group Responsible	Finding/Conclusion Summary
					well below FMVSS requirements and at about KMC's target level.
Spectra Brake Warning Lamp Lighting Measurement Report  (See Tab 5)	11/24/04	11/24/04	To evaluate the amount of fluid loss required before the brake warning light turns "ON".	KMC's Quality Assurance Team1	Testing of production vehicles determined that the brake warning light consistently turns "ON" when the brake fluid is approximately 4mm above the MINIMUM LEVEL line on the brake reserve tank, which is itself intended to be a warning; i.e., the minimum level has no significance in terms of brake operation. At this point, approximately 35cc of fluid remains before the primary and secondary reserve tanks are reached; i.e., the reserve tank level is the approximate point where brake pedal travel, force and "feel" begin to change.

Action Title	Start Date	End Date	Subject/Object of Action	Group Responsible	Finding/Conclusion Summary
Spectra Wheel Cylinder N. America Warranty-Returned Part Investigation  (See Tab 6)	12/14/04	12/14/04	To determine the amount of fluid leakage when brakes force is applied to warranty-returned parts from North America.	KASCO	Customer complaints were identified either as leakage or a change in pedal feel (spongy). A thousand brake repetitions were applied to each returned part. Fluid loss was as low as zero and as high as .52cc (i.e., 1/2 cc) per 1,000 repetitions. Leakage determined to be minimal.
Spectra Rear Wheel Cylinder Repair Order Summary  (See Tab 7)	1/3/05	1/4/05	Detailed review of the September and October 2004 Repair Orders regarding rear cylinder brake cylinder replacements, which ROs were obtained manually from dealers	KMA	Twenty-nine (29) of the 68 customers (42%) came in for "other service" and the techs identified cylinder leakage as part of their normal vehicle inspections. This is consistent with Kia's analysis that the 7500 mile brake maintenance requirement should ensure that any maintenance on the vehicle will result in an inspection and repair. Other complaints: physical evidence of leaking (14), brake warning light "ON" (10), difference in brake feel (6), brake noise (6) and other (3). There results are

Action Title	Start Date	End Date	Subject/Object of Action	Group Responsible	Finding/Conclusion Summary
					consistent with Kia's other conclusion that customers are provided with ample other warnings that the brake system has a problem and needs to be serviced. Thus, each problem will be resolved due to normal maintenance, the brake warning light, the physical visibility of the leak, change in brake feel, and brake noise.

**REQUEST NO. 9:**

Describe all modifications or changes made by, or on behalf of, Kia in the design, material composition, manufacture, quality control, supply, or installation of the subject component, from the start of production to date, which relates to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:

- a. The date or approximate date on which the modification or change was incorporated into vehicle production;
- b. A detailed description of the modification or change;
- c. The reason(s) for the modification or change;
- d. The part numbers (service and engineering) of the original component;
- e. The part number (service and engineering) of the modified component;
- f. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
- g. When the modified component was made available as a service component; and

- h. Whether the modified component can be interchanged with earlier production components.

Also, provide the above information for any modification or change that Kia is aware of which may be incorporated into vehicle production within the next 120 days.

**RESPONSE TO REQUEST NO. 9:**

There were no modifications to the Spectra I through the end of production on December 30, 2003.

The Spectra II Mass Production started on December 8, 2003. That model is designed with 4 disk brakes.

**REQUEST NO. 10:**

Produce one of each of the following:

- a. Exemplar samples of each design version of the subject component; and
- b. Field return samples of the subject component exhibiting the subject failure mode.

**RESPONSE TO REQUEST NO. 10:**

These parts will be shipped to NHTSA simultaneously with the submission of this response. The package will include one new exemplar each of parts OK30A 26610 and OK2N1 26610. It also includes 3 samples of returned parts. These parts came from vehicles numbered 15 and 16 in KMA's September - October RO analysis. See Tab 7.

**REQUEST NO. 11:**

State the number of subject components that Kia has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model and model year of the vehicle in which it is used and month/year of sale (*including the cut-off date for sales, if applicable*).

For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number). Also identify by make, model and model year, any other vehicles of which Kia is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

**RESPONSE TO REQUEST NO. 11:**

A chart identifying part sales is attached. See Tab 8.

The supplier of the rear drum brake wheel cylinder (part numbers: 0K30A 26610 (Kia Spectra 4 Door Sedan) and 0K2N1 26610 (Kia Spectra 5 Door Hatchback) is Korea Automotive Systems Co. Ltd., and the point of contact is Dong-Howan Lee (Manager). Mr. Lee can be reached at #72, Sungsan-Dong, Changwon Kyungnam, Korea 641-315 (82)-55-268-3363.

The Kia Rio model years 2001, 2002, 2003, 2004 and 2005 thru production date November 17, 2004 contain the identical component as the Kia Spectra 4 Door Sedan (part no. 0K30A 26610).

**REQUEST NO. 12:**

Furnish Kia's assessment of the alleged defect in the subject vehicle, including:

- a. The causal or contributory factor(s);
- b. The failure mechanism(s);
- c. The failure mode(s);
- d. The risk to motor vehicle safety that it poses;
- e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning; and
- f. The report included with this inquiry.

**RESPONSE TO REQUEST NO. 12:**

- a. **Causal or contributory factors for leaking.** Moisture moves past the internal seals to the core of the brake cylinder.
- b. **The failure mechanism for such leaking:** Corrosion caused by moisture tends to interfere with maintaining a complete seal
- c. **The failure mode for such leaking:** During ongoing use, brake fluid will begin to seep past the seals as pressure is applied.
- d. **Possible risk to motor vehicle safety posed by such leaking:**
  - All testing and analysis conducted by KMC and its supplier, KASCO, show that the loss of fluid is extraordinarily gradual; i.e., it occurs at a measurably insignificant rate.



- Brake fluid loss is not a secret problem; it leaves a trail wherever the vehicle goes.
  - Brakes are to be inspected every 7500 miles under the Kia maintenance schedule, thus ensuring that a customer should experience many maintenance opportunities to have this repair done, especially since techs inspect the brakes without waiting for customer complaints. 42% of all repairs occur due to such normal maintenance; i.e., very early in the fluid loss process.
  - Rear brakes with leakage continue to function as they were designed in terms of stopping distance, which is well within FMVSS standards and consistent with Kia's internal shorter stopping targets for all brakes.
  - When the brake warning light goes into the "ON" position, 35mm of brake fluid is still available in the upper reserve tank, where brake and pedal performance is unchanged.
  - When the brake fluid reaches the marked MINIMUM LEVEL on the tank, approximately 31mm of fluid remains in the main tank.
  - Kia's testing consistently has shown that it takes thousands of brake applications with brake cylinders with this seepage problem to deplete even 1cc of fluid. The worst case scenario tested showed the need for 2,000 brake applications per cc loss.
  - Once the fluid reaches the primary and/or secondary reserve, pedal function is affected in a manner which will alert the customer that the brakes should be inspected, but not so significantly that it will impair the safe operation of the vehicle. These changes in the pedal include increased pedal force and travel, and a spongy feel.
  - At any time in this process, the customer or any dealer tech can readily see evidence of such leakage, both on the ground and on vehicle parts.
  - The risk to motor vehicle safety is thus not increased by what is a minor fluid seepage problem.
- e. **The warnings received by operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning:** These issues have been discussed above. In summary, the chronological sequence of warnings are as follows:

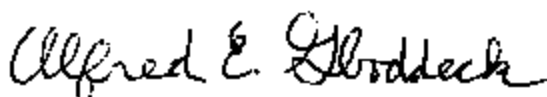
- Brake fluid visible on the ground and on or near the rear brakes.
- Normal brake maintenance as per the service schedule.
- The brake warning light will go "ON" and remain on. When the customer turns to his Owners Manual, they are clearly told to get the brakes serviced.
- An observation of the brake fluid reserve tank will show that it is at the MINIMUM LEVEL.
- Brake pedal force and travel will start to increase.
- The brake pedal will start to feel spongy due to air mixing with the fluid.
- Customers also report that the brakes start making noise.

f. **The reports included with this inquiry:** The Early Warning Report ("EWR") that identified 13 incidents of rear drum brake wheel cylinder leakage is unusual because it was a single DPSM who generated all 13 reports. It is extraordinary for one person to perceive a safety issue when no one else throughout the country is reporting such safety concerns. In fact, an analysis of the vehicles in the report is consistent with KMC, KMA and KASCO's testing and analysis described above. The repair orders for each of the vehicles identified in the EWR show the consumers bringing their vehicles to their dealers with observations of the brake light ON, physical leaking and/or change in brake feel. Below is a summary of these consumer complaints for the VINs identified in the EWR:

#	VIN	Consumer Complaint
1.	KNAFB121225	Brake light on
2.	KNAFB121625	Rear wheel cylinders leaking
3.	KNAFB121525	Squeak at rear brakes, pedal fades
4.	KNAFB121725	Brake light on and brakes noisy
5.	KNAFB121225	Brake warning light on
6.	KNAFB121425	Brake warning light on
7.	KNAFB121225	Brake warning light staying on
8.	KNAFB121325	Brake fluid leaking
9.	KNAFB121325	Brake pedal goes to the floor
10.	KNAFB121225	Car brought in for other service (engine light on and no heat); Upon inspection tech noted rear wheel cylinders leaking
11.	KNAFB121925	Brake warning light on
12.	KNAFB161225	Need brake inspection and low brake pedal
13.	KNAFB121825	Brake concern

Kia has diligently investigated this issue from the time it first received information that a problem might exist. It has been persistent and diligent in testing, analyzing and evaluating the situation with a careful eye on the possibility that a safety issue could possibly exist. All consumer records are consistent with Kia's technical analysis and testing in showing the absence of a safety related problem. Kia believes that its approach to this problem has correctly dealt with the issue from the standpoint of establishing the absence of a safety problem and in diligently honoring its responsibility to repair.

Sincerely yours,



Alfred Gloddeck  
Senior Manager  
Corporate Affairs