U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

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Mr. David A. Miller
Chairman, ASTM F15.22 Subcommittee
Toy Manufacturers of America, Inc.
200 Fifth Avenue
New York, NY 10010

Dear Mr. Miller:

In September of 1997, the staff of the U.S. Consumer Product Safety Commission (CPSC) submitted proposals for battery operated ride-on toys for inclusion within the ASTM Safety Standard F963, Toy Safety. At that time, the proposals were declined.

The staff requested the ASTM F15.22 Subcommittee to re-open the discussion for appropriate requirements for inclusion in F963 in a letter dated May 20, 1999. Attached are the CPSC staff's revised performance requirements for battery operated ride-on toys that are based on those previously proposed by Fisher-Price.

The proposals contained herein represent the views of the staff of the CPSC and do not necessarily represent the official position of the Commission.

Thank you for your consideration in this matter.

Sincerely,

Douglas A. Lee

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cc: John Preston, Chief Engineer, Children's Products,
U.S. Consumer Product Safety Commission
William King, Chief Engineer, Electrical and Fire Safety,

U.S. Consumer Product Safety Commission
Robert Coughlin, Product Integrity Engineer, Fisher-Price
Joan Lawrence, Director of Standards and Regulatory Affairs, Toy Manufacturers of America, Inc.
Aaron Locker, Counsel for Toy Manufacturers of America, Inc.

CPSC REVISED PROPOSED TESTS FOR BATTERY POWERED RIDE-ON TOYS

Following are CPSC staff suggested performance requirements for battery operated ride-on toys that are based on a previous proposal submitted by Fisher-Price. Additions to the Fisher-Price proposal are double underlined and deletions are ~~struck out~~.

1. ~~Class II Circuit Determination. Make an open circuit voltage measurement of the fully charged battery power supply. Load the battery with a variable resistor. Attempt to load the battery to 8 amperes and adjust the resistor as necessary to maintain an 8 ampere load for 1 minute. If the open circuit voltage is less than 30 V dc and a load of 8 amperes cannot be maintained for 1 minute, the power supply is considered to be a Class II power supply. Since a Class II circuit does not present a fire or shock hazard, no further testing is required.~~

1. Scope. These requirements cover ride-on toys using a rechargeable battery as the power source where:

   a. The battery open circuit voltage is less than 30 VDC and the battery can deliver 8 A or more for 1 minute of operation, or

   b. The battery can deliver 15 watts or more for at least 1 minute into an external resistor connected to the battery terminals.

2. Test Conditions. Components tested in accordance with the following requirements are to be installed and operated in the toy as they would be during normal use unless otherwise specified.

3. Normal Operation Test. Physically load the vehicle with a weight that is equivalent to the weight of the highest age child in the age range for which the toy is intended ~~in accordance with~~ (see table 3 of ASTM F963) using a fully charged battery. Operate the vehicle under normal use conditions cycling the motor _____seconds "on" and _____seconds "off" until the battery is exhausted. The maximum temperature measured on the insulation of any conductor may not exceed the temperature rating of the material. If the rating of the material can not be determined, the rise in temperature shall not exceed 35° C. There must be no degradation of electrical insulation.

4. Overload Test. Overload the vehicle by adding weight not exceeding the weight limits described in section 4.17.5 of ASTM F963. Make several trial tests to determine the load which results in maximum heating. Using a power source capable of supplying the equivalent battery peak and run currents, operate the vehicle continuously until ~~the battery is exhausted~~ equilibrium is obtained for X minutes. The maximum temperature measured on the insulation of any conductor may not exceed the temperature rating of

the material. If the rating of the material can not be determined, the rise in temperature shall not exceed 63°F (35° C). There must be no degradation of electrical insulation.

5. ~~Overcurrent Protective Device Operation Test~~.
Stalled Motor Test. ~~Determine the current draw of the toy under stalled motor conditions. Apply an electrical load to the fully charged battery to simulate the stalled motor condition. The protective device must operate within _____seconds.~~ Stall the motor until two fully charged batteries are exhausted. The maximum temperature measured on the insulation of any conductor may not exceed the temperature rating of the material. If the rating of the material can not be determined, the rise in temperature shall not exceed 63°F (35° C). There must be no degradation of electrical insulation. If the overcurrent device is accessible to the consumer then the device shall be bypassed in running the stalled motor test.

6. Switch Endurance and Overload Test.
Condition switches as follows before Endurance and Overload Tests.
   a. Salt Spray Conditioning - Condition switches for a period of 48 hours using a 5% by weight salt solution.
   b. Humidity Conditioning - Condition switches at 104°F (40°C), 95% relative humidity for a period of 48 hours.
   c. Thermal Cycling Conditioning - Condition switches for 10 cycles of operation between 14 and 120°F (-10 and 49°C). Evaluate switch at both temperature extremes.

Endurance Test -Cycle a switch for accessories (e.g., lights, horn, radio, cell phone) as described in the Normal Use Test for 6,000 cycles of operation. If a switch is relied upon for safe operation (e.g. foot pedal, high/low, forward/reverse), conduct the endurance test for ~~as many cycles as can be achieved, not to exceed~~ 100,000 cycles. The switch contacts must not weld during the test. *Overload Test* -Stall the motor of the toy. Operate the switch for 50 cycles at a rate not exceeding 6 cycles per minute. The switch contacts must not weld during the test. The switch body shall not degrade to result in short circuit conditions. The temperature rise on the wiring terminals or on the wire leads shall not exceed 54°F (30°C).

7. Electrical Pressure Connection Test. This applies to electrical pressure connectors which involve consumer assembly or replacement. Condition the pressure connection before testing. Condition user replaceable fuses by removing and inserting the fuse for ~~6~~ 50 cycles of operation. Condition connectors required for charging the battery by disconnecting and connecting for ~~150~~ 6000 cycles. Operate the vehicle under normal use conditions cycling the motor for _____seconds "on" and seconds _____"off" until the battery is exhausted. The maximum temperature rise measured on the electrical insulating material in contact with the connection shall not exceed the temperature rating of the material and there must be no degradation of electrical insulation.

8. User Replacement Markings. The toy must be marked with the rating of a user replaceable protective device. The marking must be adjacent to the protective device.

The following are new proposals:

9. High Ambient Testing.

   a. Complete two cycles of the Normal Operation Test at 120°F (49°C) ambient using two fully charged batteries.
   b. Complete 25 cycles of the Stalled Motor Test at 120°F (49°C) ambient.

   The maximum temperature measured on the insulation of any conductor may not exceed the temperature rating of the material. If the rating of the material can not be determined, the rise in temperature shall not exceed 63°F (35° C). There must be no degradation of electrical insulation.

10. Vehicle Body. Polymeric materials used to support or enclose electrical parts shall be 94V rated or pass end product flame tests (UL 746C).

11. Battery Charger. The battery charger shall be certified to the appropriate charger standard (such as UL 1310, CSA___, IEC___). A fault in the charger or charger wires should not cause the battery to feed the fault and become a risk of fire.

12. Accessory Wiring. Wiring for accessories connected to the main/motor battery shall be short circuit protected.

13. Battery Connectors. Battery connectors shall be 94V rated. Battery connectors that are mated and unmated for charging shall be 94V-0 rated.

14. Fuse Short Circuit Test. A fuse shall interrupt a short circuit test with a fully charged battery without presenting a risk of fire.

15. Strain Relief. Strain relief shall be provided so that mechanical stress on a flexible cord will not be transmitted to terminals, splices, or interior wiring.

16. Switches. Switches enclosures or supports of current carrying parts shall be 94V rated. Other switch parts shall be 94HB rated.

Rationale: Over 500 incidents from 1994 to 1999 have occurred from the use of battery operated ride-on toys. These incidents include 25 house fires, 16 injuries, and numerous near fires and injuries. Several of these incidents which resulted in fires have been analyzed and the samples examined. The failure mechanisms appear to be related to components and specifications not addressed in the current edition of ASTM F 963 – 96a, Standard Consumer Safety Specification on Toy Safety. Engineering analysis performed by the CPSC staff, manufacturers staff, and consulting engineers concluded that the majority of incidents were the

result of wires overheating, fuse holder connections failing, switches overheating and distorting, battery chargers failing, and connections overheating.

Regarding the scope in paragraph 1., the CPSC staff believes that the requirements should address all battery ride-on vehicles that have a battery source that can be considered a potential risk of fire. The definition of risk of fire is similar to UL 746C, Polymeric Materials – Use in Electrical Equipment Evaluations, paragraph 3.30.

Regarding the switches in paragraph 6., environmental conditioning is added prior to testing to simulate its normal environment for which it is intended. The requirements are similar to UL 1054, Special-Use Switches. However, motor loads are used instead of the resistive loads required by UL 1054.