# ROTUNDA EVALUATION REPORT

Manufacturer: Doyle Vacuum Cleaner Company, Grand Rapids, Michigan

Date: June 17, 1975

## I. Name of Product

Brake Service Vacuum Cleaner (Dry Recovery)

## II. Product Description

### A. General

The brake service vacuum cleaner is a modification of an existing production unit. It is designed for use in the recovery of asbestos material during the servicing of automobile brake systems. The machine's performance specifications are identical to those of the model 75 currently offered through the Rotunda program. Major differences include a four-part backup filter system to safe guard against external leakage and a self-sealing disposable bag for the safe handling of asbestos material.

### B. Components

#### 1. Package

Each package contains a transport dolly, dirt recovery tank with special intake tube, and caution labeling, power head with supply cord, paper collector bag, fabric filter, cartridge filter, cartridge wrapper and retainer, plastic bag and tie, vacuum hose, connector, duster brush and crevice tool.

#### 2. Overall Dimensions

20" width across wheel axle
24" front to back
35" overall height
16" diameter dirt tank

#### 3. Transport Dolly

. 16 gauge stamped CRS platform with two 8" diameter rear wheels having moulded ABS plastic centers and moulded 1.75 X 3.00 semi-pneumatic tires. The rear wheels ride on a 3/8" diameter CRS plated axle and are retained by metal press-on locking caps. A swivel plate caster with 2½" diameter .75 X 2.5 solid moulded rubber wheel is mounted to the front of the platform. The tank locking clamp is 16 gallon CRS, bolted through the platform and caster swivel plate. The platform is finished in baked enamel. All hardware and other mechanical parts are cadmium plated.

3. Transport Dolly (Continued)

. A 3 piece, 1" O.D. 16 gauge chrome plated steel tube "U" handle for maneuvering the vacuum cleaner is flange locked through the dolly platform and bolted to the tank side at two points.

4. Dirt Recovery Tank

20 gauge 16" diameter CRS seam welded tank with a rolled rim. The tank is epoxy enameled inside and out for corrosion and abrasion resistance approximating stainless steel life under normal operation. A special 1½" tubular intake is mounted to the front of the tank for external connection of the pickup hose and internal connection of the paper collection bag. Two chrome plated clamp locks for the power head are attached to the tank. Special caution and maintenance label is prominently displayed on outside of tank.

5. Filter System

- Paper collector bag: pleated with rubber diaphragm inlet seal, 1 cubic foot recovery capacity for dry asbestos dust. Also included is a plastic bag and tie for use in handling and disposal of the paper bag.
- Fabric filter: 390 square inch spun nylon fabric pouch filter mounted on extruded circular aluminum ring with PVC plastic seal gasket.
- Cartridge filter: pleated paper filter (car type) in rubber rings one end sealed.
- Paper wrap: additional covering over filter surface of cartridge filter.

6. Power Head

Top cover is formed of 16 gauge CRS chrome plated. The perimeter features a downward turned edge with a formed lip for a rigid air seal surface, bumper edge and seat for the tank head clamp locks. Motor/fan assembly is mounted in a formed dome cavity with 16 gauge cadmium plated CRS clamp and air diffuser ring. The formed dome is 22 gauge CRS with a baked epoxy enamel finish. All hardware is plated for corrosion resistance.

7. Motor/Fan Assembly

The motor is a Lamb #115330 dual stage fans rated a 2 HP (max.), 115 volts, 60 Hz, 10 amp. input (used on present Rotunda model 75 vacuum cleaner).

8. Electrical Assembly

Supply cord is 25 feet X 16 AWG, 3 conductors, SJT plastic jacket with 3 prong moulded end plug. The on/off switch is SPST snap toggle, protected against breakage by steel guard plate, fully rated for input loads.

9. Hose

PVC plastic sheath over a PVC coated spiral spring wire core with moulded flexible PVC end cuffs, 10 feet overall length X 1½" I.D. bore.

10. Tools

The unit comes equipped with a moulded high-impact ABS plastic crevice tool and duster brush.

C. Labeling

1. Caution Label

The vacuum cleaner will have a caution and maintenance label permanently affixed to the recovery tank and protected against damage. The caution wording will conform to that prescribed by OSHA and other government agencies. Disposable bag shall also have caution labels as prescribed by OSHA and other government agencies.

2. Usage Identification

The vacuum cleaner will have permanently affixed a usage label in large bold type identifying it as Brake Service Only Dry Recovery.

3. Rotunda Identification

The vacuum will have the Rotunda identification permanently affixed to the power head as detailed in the Rotunda I.D. booklet. A service decal or information identifying the manufacturer and source for service will also be permanently affixed to the unit.

D. Color Scheme

1. Motor Shells
Rotunda red with Rotunda label
Top Cover Plate - Polished chrome plate
Dirt Recovery Tank - Rotunda white
Transport Dolly - Rotunda red with white wheels
Handle - Polished chrome plate
Hose and Nozzle - Medium grey plastic

2. Shipping Weight - 56 lbs.

III. Component Design Life

A. Design Life

Overall design life of the entire structure in normal use is 5 to 7 years. Certain components such as hose, filters, tools and power cord are subject to wear or accidental damage based on amount of usage, location conditions, materials recovered and equipment maintenance.

B. Special Precautions

The disposable filters must be replaced and the asbestos material handled as directed on the product labeling and/or applicable OSHA or other government regulations. This model vacuum cleaner is for dry recovery brake service only. It is not designed for general vacuum cleaning service nor for any wet recovery since such use would damage the filter system components.

IV. Safety

A. Government Compliance

1. The vacuum cleaner shall conform to the allowable 8 hour exposure OSHA Noise Level Standards.

2. The vacuum shall conform to the external leakage TLV (threshold limit value) as required by OSHA.

3. The vacuum shall conform to all applicable standards set by OSHA and other government regulations.

B. Design Overload

Design overload is not a major factor in vacuum cleaner design since the entire load is in the form of air slippage on a centrifugal force connected load. Structural design will accommodate recovered material weight by over 4 times normal recovery weight.

V. Testing

A. Laboratory Tests

A prototype unit was tested by the University of Cincinnati Medical Center for Ford Industrial Hygiene and Ford Rotunda. All tests were conducted in accordance with those in effect and prescribed by OSHA. Air samples in a room size of 880 feet$^3$ were taken using a Type AA. Millipore membrane filters with analysis by 430 X phase microscopy.

The results contained in the attached report, indicate that the unit meets current OSHA TLV and TLV established for implementation July 1, 1976. Based on these test results, if the vacuum evaluated is typical, then it should be acceptable from a fiber emission standpoint when used in the servicing of automotive brake or clutch assemblies.

B. Garage Tests

A prototype unit was tested for several months in Ford owned garage facilities and found to perform satisfactorily. In addition, the supplier conducted usage tests to establish which attachments were most suitable for brake service. Their results indicate that the unit can be successfully used for this purpose.

VI. Field Support/Service Requirement

A. Service Requirement

The service failure rate is minimal in Rotunda vacuum cleaners by virtue of the nature of the function as well as the vendor inspection and quality control. Service replacement is required on the motor brushes after 600-700 hours of operation. Normal use cycle of a Rotunda vacuum cleaner is estimated at 4 to 12 minutes per use. Based upon an 8 minute usage and 7 uses per day, the brush service life factors to 20 hours per month, with a usable brush service interval of 30 months.

Motor brush replacement can be made by dealer personnel using oridinary hand tools in approximately 10 minutes.

Maintenance is detailed on labeling affixed to the unit.

VII. Field Support

A. The vendor utilizes 18 manufacturers agency organizations within the United States with approximately 85 field sales and service men. It is the nature of the product that little or no installation or instruction requirements exist.

B. After-sale service responsibilities rest with the manufacturer. This vendor has had a toll-free telephone service operation for all Rotunda vacuum cleaner sales direct to the factory with field follow-up by their organization. Each product is so labeled with all necessary instructions.

C. The vendor of these products has been the prime supplier of Rotunda vacuum cleaners since 1968 and prior to that time supplied Ford Motor Company dealers as a result of the product recognition extended by Ford and Lincoln-Mercury Used Car Reconditioning and Service Departments over many years.

D. Warranty is for a period of one year.

VIII. Conclusion and Recommendation

Based on the laboratory and garage tests including previous experience with the supplier and his products, it is recommended that the Doyle Brake Service Vacuum Cleaner be added to the Rotunda Product Line.

Prepared By S. F. Svoboda Date 6/20/75

S. F. Svoboda

Approved By A. N. Updegrove Date 6/22/75

A. N. Updegrove

8004 1403 PQ