



Automotive

*Truff*  
Eaton Corporation  
Air Management Systems Division  
2564 Durham Road  
P.O. Box 241  
Roxboro, North Carolina 27573  
tel: 336 599-1141  
fax: 336 509-6425

RECEIVED

2002 OCT 15 A 9 11

OFFICE OF  
DEFECTS INVESTIGATION

October 10, 2002

Kathleen Demeter, Director  
Office of Defects Investigation  
National Highway Traffic Safety Administration  
400 Seventh Street S.W.  
Washington, D.C. 20590

Re: Engineering Analysis (EA02-018)

Dear Ms. Demeter:

Please find enclosed 2 copies of Eaton Corporation's response to the information that was requested for Engineering Analysis (EA02-018), dated August 30, 2002.

Regards,

Larry Schlesinger  
Product Engineering Manager

1

**Engineering Analysis – EA02-018  
Eaton Corporation – Information for Section 1**

1. Provide the following population/sales information for the subject parts:
  - a. State the total number of tire valves manufactured for sale by year of production from 1999 to the present.
  - b. Provide a summary table of population data for each automotive manufacturer and tire/wheel assembler for which Eaton supplies the subject part as original equipment for all 1999 to 2001 vehicles. For each manufacturer, provide the manufacturer's name, address, and phone number, all vehicle models, and model years of each that were equipped with the subject parts, and the approximate number of subject parts sold per year to each company for each application. Provide the information separately for each manufacturer and arrange it by vehicle model/model year.

**Response**

Total Manufactured	1999	2000	2001
	3,812,000	4,378,450	3,287,000

Manufacturer	Number of Valves/Year			Phone	Address
	1999	2000	2001		
Ford Motor Company	888,500	811,500	153,000	440-282-0332	Ford Motor Auto Assembly Div. AP-07A 5401 Baumhart RD, Lorain , OH 44052
Ford Motor Company	2,158,000	2,248,500	1,701,000	502-428-2310	Ford Motor Auto Assembly Div. AP-10A Kentucky Truck Plant 3001 Chamberlain Lane Louisville KY 40241
Ford Motor Company	17,500	4,000	3,000	904-757-8250	Ford Motor Detroit Pack Plant (RGL) 4333 West Fort Street Detroit, MI 48209
Ford Motor Company	64,000	348,000	8,000	011-525-558997730	Ford Motor Co. Cuautlan AP-23 C/O Ford Laredo Corridor 505 Union Pacific Blvd Laredo TX 78044
Ford Motor Company	0	49,500	157,000	011-52-55-58950121	Servicios Y Montajes Eagle S 11929 SARA Base Dr. Laredo, TX 78045

Eaton Air Controls cannot determine the following information:

"model years of each that were equipped with subject parts, and the approximate number of subject parts sold per year to each company for each application by vehicle model/year". This information is held at the customer level and Eaton does not have access to it.

2

**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 2**

2. State the number and provide copies of all of the following documents received by Eaton that relate, or potentially relate, to the alleged defect in the subject vehicles:
- a. Automotive manufacturer reports and communications;
  - b. Tire/Wheel sub-assembler reports and communications;
  - c. Tire or tire valve distributor reports and communications;
  - d. Owner and fleet reports and communications;
  - e. Field reports or communications; and
  - f. Other similar documents.

**Response**

- A. Number of Automotive manufacturer reports and communications - 1
- B. Number of Tire/Wheel sub-assembler reports and communications - 0
- C. Number of Tire or tire valve distributor reports and communications - 0
- D. Number of Owner and fleet reports and communications - 2
- E. & F. Number of Field reports or communications; and Other similar documents - 0



## Office of Defects Investigation Recall Database

Call the Auto Safety Hotline toll free at (888) 327-4236 to report safety defects or to obtain information on cars, trucks, child seats, highway or traffic safety.

Report Date: June 27, 2001 03:17:33 PM

### NHTSA CAMPAIGN ID Number: 01V046000

Component: TIRES:VALVE STEM  
Manufacturer: FORD MOTOR COMPANY  
Mfg. Campaign #: 01S05  
Year: 2000  
Make: FORD TRUCK  
Model: F550  
Potential Number of Units Affected: 102000  
Manufactured From: SEP 1997 To: OCT 2000  
Year of Recall: '01  
Type of Report: Vehicle  
Summary:

**Vehicle Description:** Trucks equipped with commercial truck tires that have steel cords in the tire sidewall. The valve stems may have been torn or damaged during assembly and could leak causing sidewall damage.

If not maintained, could result in a sidewall zipper failure. A zipper failure during inflation of a damaged tire could result in injury to someone near the tire.

Dealers will inspect the valve stems for leakage, and will replace both the valve stem and the tire if leakage is present. Owner notification began March 28, 2001. Owners who take their vehicles to an authorized dealer on an agreed upon service date and do not receive the free remedy within a reasonable time should contact Ford at 1-800-392-3673. Also contact the National Highway Traffic Safety Administration's Auto Safety Hotline at 1-888-DASH-2-DOT (1-888-327-4236).

This search returned 1 record.

[New Search](#)  
[Return to Safety Problems and Issues](#)



[Send mail to the Web Master](#)



## MANDATORY ACTION BULLETIN

SOCo.MAB 00-10

Ford Tire Valve Replacement

### AFFECTED UNITS:

Year models 1998, 1999, 2000 - Ford F-250, F-350, F-450 & F-550, with single & dual rear wheels, and E-250 & E-350 vans.

### COMPLAINT:

Tires will not maintain set pressures, and tires going flat without any punctures found in the tire, cut stems at the seal area, and stems blowing out of wheel rims while vehicle is in motion.

### CAUSE:

Manufacturer installed valve stem when tires were mounted at Ford KTP, tire valve stems are showing signs of improper seating in the wheel, or perhaps being installed too deep causing the rubber to tear away from the brass center.

### CORRECTION:

Replace the Ford installed Dill brand rubber 1 piece valve stems with metal 2 piece screw in valve stems. These clamp in stems are torqued at 19 in.lb. torque. (Just compress the grommet) All wheels in stock should have the valves replaced. This should include the wheels delivered with these trucks as spare tires. (See Photo #1)

### SPECIAL NOTE:

- ◆ All removed valve stems from each vehicle must be kept separate.
- ◆ The tire stems must be pushed out backwards so as to save the tire valve stem seal area intact.
- ◆ Remove the stems, and put them in a fabric or clear bag with the work order #, unit number and VIN clearly marked on the bag, or on a card inside the bag.

### LABOR:

M4 Code 02-SP-A10 (zero two - S P - Alpha one zero) Visit Reason "W"  
Time required is approximately 1-1/2 hours per truck, for all tires including the spare.

### PARTS:

The valve hole in these wheels measures 0.453 inches in diameter. Replacement valves used can be Schrader 3540K2-5, Dill VS902, Myers 21.583, Tire & Rim WR-418-S or equivalent.

**DO NOT ARBITRARILY SUBSTITUTE FOR THESE PART NUMBERS WITHOUT CONTACTING FLEET SERVICES!**

### WARRANTY:

Warranty recovery from Ford will be considered on an individual unit basis. Units with defective valve stems should be processed through normal channels.

Contact your warranty administrator for further information if required.

- ◆ At this time, warranty will be recovered on the basis of the defective seals we find.
- ◆ Forward the stems to Pam Shoop for inspection & processing.

**COMPLETION DATE:**

This bulletin shall be completed no later than 22-Nov-2000

**GENERAL COMMENTS:**

The G.P.C. fleet has had several incidents where valves have blown out causing very rapid tire deflation. Alabama has experienced several of these failures as well, throughout the fleet. As a result of these failures, APCo. will change out all the DILL 800 HP stems.

We have had meetings with Accuride Wheel of Canada, Eaton Air Controls(Dill) and Ford Motor Company to attempt to determine what is happening to the stem seals and just how wide-spread this may be.

At this time, no OEM or supplier is in a position to say this concern actually exists, or that it is a covered warranty item. But, APCo. & GPCo. has determined that the problem exists to the extent that this bulletin is being performed to ensure the safety and reliability of our fleet.

Please contact me if you have any questions or comments.

# POWER DELIVERY FLEET SERVICE BULLETIN



## VEHICLE BULLETIN

No V 980882  
Effective: 6/28/00  
Revised: 7/21/00  
Page: 1 of 3  
Contact: WALT FULLER /JUSTIN CLARK

### MANDATORY ACTION BULLETIN

WORK ORDER CODE: 02-SP-A26

Ford Authorized Warranty Applies

**Subject: Tire Valve Stem Replacement**

**Models: All Ford F Super Duty 350,450,550, with dual rear wheels also all F Super Duty 250,350 single rear wheel pickup and cab/chassis trucks 1998, 99, 2000 year model**

**I. Condition:**

Tire valve stem blowing out of the wheel rim while the vehicle is in motion. It was first thought that this problem applied to only trucks with Budd type wheels in dual wheel configuration. There have been several incidents on F250/350 pick-ups with single rear wheels since this bulletin was originally published.

**II. Cause:**

Manufacturer installed incorrect type valve stems when tires were installed at the Ford assembly plant

**III.**

**Correction:**

**Dual rear wheel vehicles** Replace the Ford installed Dill brand rubber 1 piece valve stems with 2 piece screw in valve stems using the parts listed below for dual wheels. All wheels on the vehicle should have their stems replaced this should include wheels delivered with the vehicles as spares.  
**Single rear wheel vehicles** inspect the vehicle to determine the type of valve stem originally installed by Ford some vehicles had conventional pull in rubber stems installed and most had the Dill Brand stems. Please view the attached photos to help in determining which your vehicle is equipped with all Dill stems should be replaced with either conventional rubber pull in valve stems or 2 piece screw in stems used in the dual wheel trucks.

**Parts:**

The valve hole in all wheels involved measures .463 in. in diameter. Replacement valves for dual wheel Budd style wheels should be 2 piece metal screw in style stems Shrader 3804-5, Meyers 21.583, Dill VS902 or equivalent. Replacement stems for all single style wheels can either be conventional type rubber pull in stems as shown in the attached photos or the 2 piece screw in types listed above

**Important: This bulletin must be completed by Aug 15, 2000**



**VEHICLE BULLETIN**

No V 980682  
Effective: 6/26/00  
Revised: 7/21/00  
Page: 2 of 3  
Contact: WALT FULLER /JUSTIN CLARK

**Dill Brand Valve Stem (Factory Installed)**



**Rubber Replacement Type**



# POWER DELIVERY FLEET SERVICE BULLETIN



## VEHICLE BULLETIN

No V 980862

Effective: 6/26/00

Revised: 7/21/00

Page: 3 of 3

Contact: WALT FULLER /JUSTIN CLARK

### Metal Type Replacement



3

**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 3**

3. Provide information about Eaton's record keeping methods for tracking consumer complaints for the past 10 years. Include the following information:
- a. Describe how a consumer would file a complaint with Eaton regarding a problem such as the alleged defect.
  - b. Describe Eaton's methods for retaining and accessing the following types of complaints that it receives: telephone complaints, e-mail complaints, written complaints, dealer complaints, etc. (For example, the response should identify where each type of complaint is recorded or stored)
  - c. Do any valve stem distributors collect and record complaint information?
  - d. If the methods have changed over the past 10 years, please describe.
  - e. If a vehicle is now out of warranty or if a vehicle was out of warranty at the time Eaton was contacted, would a record of the complaint be retained in Eaton's files?
  - f. If a complainant contacted Eaton regarding the alleged defect in subject vehicle, would a record be retained and stored? If not, please explain.

**Response**

A, B, D & F: See Eaton work instructions, WI-14-01 Quality Concern Reporting and WI-14-02 Processing Customer Complaints for details on how Eaton tracks customer complaints. These records are maintained per WI-16-01.

C. Valve stem distributors do not collect and record complaint information.

E. The complaint would be handled per WI-14-01 regardless of an OEM's vehicle warranty.

**STORAGE OF QUALITY AND EMS RECORDS****1.0 Scope**

This work instruction establishes a method used for collecting, indexing, accessing, filing, storage, maintenance and disposal of quality and Environmental Management System (EMS) records.

**2.0 Responsibility**

The person or department, identified in the Access/Collection Resp. column of the Records Table will assign the following duties or perform the duties themselves.

**3.0 Procedure****3.1 Physical Records**

3.1.1 Construct a hanging file, drawer or notebook for each type of record listed in Records Table.

3.1.2 Label the hanging file, drawer or notebook with the TITLE (product, person or event), and DATES to which the record applies.

3.1.3 Identify each filing location (cabinet or cabinet drawer) with a label that indicates its contents. These records are considered active & typically located in office areas.

3.1.4 When files become full prior to the disposal date, records will be boxed according to dates, labeled and stored. Label the boxes or containers of stored records with the TITLE (product, person, or event), DATES to which the records apply and the disposal date of the box or container. These records are considered archived and are typically located outside office areas.

3.1.4.1 Construct a master list for the contents for each box of records if the boxed documents are different.

3.1.4.2 Maintain indexing when transferring records to storage boxes.

**3.2 Electronic Records**

3.2.1 When an electronic record is established, the originator will log the record into the record table.

3.2.2 The IT department is responsible for backing up electronic records on a daily basis.

**3.3 Disposal of Records**

**STORAGE OF QUALITY AND EMS RECORDS**

3.3.1 Yearly, the department responsible for their stored records will audit their records. Storage areas will be audited and old records will be disposed. These records shall be disposed within 1 year of the retention date.

3.3.2 Records will be disposed by placing them in the trash compactor or recycle bin.

**4.0 Records:**

The following records are maintained per WI-16-01:

- There are no records for this Work Instruction

Remove and destroy old superseded versions

Date	Rev	Description	Revised By
------	-----	-------------	------------

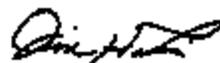
## STORAGE OF QUALITY AND EMS RECORDS

01/26/96	A	Released	
03/13/96	B	Revised sections 2.0 and 3.1.1	L. Byars
04/22/96	C	Added section 3.3.2	L. Byars
06/04/96	D	Revised Records Table	J. Lubis
07/10/96	E	Added page number to attached document	J. Lubis
08/05/96	F	Revised sec. 3.1.2, 3.1.4, and 3.3.2	L. Byars
09/26/96	G	Revised WI per visit with D. Hile, Made various changes to records table.	J. Lubis
10/31/96	H	Added records sec. 4.0	L. Byars
11/21/96	J	Revised sec. 2.0 resp.	J. Williams
11/25/96	K	Added row to records table in sec. 4.11	J. Lubis
5/23/97	L	Revised records table	J. Williams
7/30/97	M	Revised records Table	T. Cavanaugh
4/8/98	N	Revised records Table	B. Lowery
7/6/98	O	Revised records Table	B. Lowery
8/12/98	P	Revised records Table	B. Lowery
10/15/98	Q	Revised records table with release of QS9000 3 <sup>rd</sup> edition	T. Williford
5/25/99	R	Corrected typos and grammar per CR/N 7311	J. Sanders
6/21/99	S	Revised records table per CR/N 7286	J. Sanders
8/31/99	T	Revised per CR/N 7314 and CR/N 7291	J. Sanders
1/24/00	U	Revised Records Table to add EMS references	J. Sanders
2/25/00	V	Revised Records Table to add EMS references	J. Fesperman
3/8/00	W	Added row to records table in Section 4.09	B. Lowery
3/14/00	X	Revised Records Table to add EMS references	J. Fesperman
4/10/00	Y	Revised Records Table to reflect WI-02-09 and per CR/N 8675	B. Lowery
4/17/00	Z	Revised Records Table per CR/N 8497	L. Byars
6/6/00	AA	Revised Records Table per CR/N 8834	B. Phillips
9/21/00	AB	Revised Records Table per CRN 09012	B. Lowery
1/15/01	AC	Revised Records Table per CRN 8789	B. Phillips
3/20/01	AD	Revised Records Table per CRN 8825	K. Nosay
3/20/01	AE	Revised Records Table per CRN 09034	B. Lowery
8/10/01	AF	Revised per CRN 8513	L. Schlesinger
8/21/02	AG	Updated records table per QCR 1708	J. Sanders

Originator: L. Byars

Approved By:

Date: 8/21/02



specified on the QCR. After completion, the auditor will notify the Quality Manager or his designee to update the QCR database

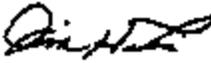
#### 4.0 Records

The following records are maintained per WI 16-01:

- Quality Concern Reports

\*Remove and destroy old superseded versions

Date	Rev	Description	Revised By
01/26/96	A	Released	
03/11/96	B	Revised	L. Byars
03/21/96	C	Revised sections 3.8, 3.11.1 and added 3.11.5	L. Byars
04/08/96	D	Revised section 3.10, added notes to bottom of section 3.12	J. Lubis
07/15/96	E	Added page number to the attached form	J. Lubis
07/29/96	F	Changed 3.11.4 to 3.11.1.4	J. Lubis
07/29/96	G	Added note on page 3 to reflect current practice	K. Tikkanen
04/15/97	H	Revised section 3.12 and 4.0	R. Martin
09/18/97	I	Revised section 3.13 and 4.0	D. Cornett
01/08/99	J	Revised section 3.0	R. Gentry
11/01/99	K	Added references to EMS	L. Byars
03/13/00	L	Revised	L. Byars
01/24/01	M	Revised to reflect web based QCR database	D. Cornett
10/06/01	N	Revised to be for Air Controls only	J. Sanders
12/7/00	O	Updated Organizational Chart	L. Byars
08/23/02	P	Revised per CR/N 10004	J. Sanders

Originator: L. Byars	Approved By: 	Date: 2/25/02
----------------------	---	---------------

EATON CORPORATION  
ROXBORO, NC

**QUALITY CONCERN REPORT**

QA ONLY  
QCR #: \_\_\_\_\_  
  
TEAM LEADER

Product Problems  Customer Complaint  In-House  Internal Audit  
EMS Problems  Agency Complaint  In-House  Internal Audit

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ REPORTED BY: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_ PART NO. CUSTOMER: \_\_\_\_\_  
(or AGENCY) \_\_\_\_\_ PART NO. EATON: \_\_\_\_\_  
Customer Concern #: \_\_\_\_\_ PART NAME: \_\_\_\_\_

REPORT SOURCE:  TELEPHONE  LETTER  IN-HOUSE DISCOVERY  OTHER: \_\_\_\_\_

FROM: \_\_\_\_\_ TELEPHONE NUMBER: \_\_\_\_\_  
TITLE: \_\_\_\_\_ ON (DATE) \_\_\_\_\_

**REPORTED PROBLEM**

WRITTEN DESCRIPTION:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PICTORIAL

QUANTITY INVOLVED \_\_\_\_\_ MFG. DATE/CODES INVOLVED: \_\_\_\_\_

ARE SAMPLES BEING SENT? \_\_\_\_\_ TO WHOM? \_\_\_\_\_

PROBLEM SEVERITY (%OCCURRENCE)  
\_\_\_\_\_

IMMEDIATE ACTION REQ.: (CONTAINMENT, CUST. REQ., ETC.)	RESPONSIBILITY
_____	_____
_____	_____
_____	_____

QCR COMMITTEE:  
RECOMMEND CLOSURE:

BASIS FOR CLOSURE: \_\_\_\_\_

CORRECTIVE ACTIONS AUDITED BY: \_\_\_\_\_

AUDIT RESULTS: \_\_\_\_\_

STATUS:  CLOSED  PERFORM ADDITIONAL ACTIONS: \_\_\_\_\_

DISTRIBUTION FOR AIR CONTROLS PRODUCT PROBLEMS: Operations Manager, Product Line Manager(s),  
Engineering Manager, Quality Manager, Sales Manager, Manufacturing Engineering Manager, Tool Engineer,  
Metrologist, Customer Service Representative

DISTRIBUTION FOR EMS PROBLEMS: General Manager, Factory Manager, Manufacturing Engineering Manager (LA & AC)  
Maintenance Supervisor (LA & AC), Safety Coordinator

**PROCESSING CUSTOMER COMPLAINTS****1.0 Purpose**

The purpose of this work instruction is to define the method for documenting and handling external customer complaints.

**2.0 Responsibility**

The Quality Assurance Manager is responsible for this work instruction.

**3.0 Procedure****3.1 External customer complaints**

External customer complaints may be received by QA, Sales, Product Engineering or others. In order to assure good communication and fast resolution of the complaint, the receiver of the complaint shall complete and distribute a Quality Concern Report (QCR), (Reference WI-14-01, Quality Concern Reporting, Corrective Action and Problem Solving Methods) as soon as the complaint is received.

Customer complaints that are received during the off shift hours will be handled by designated second and third shift QA representatives (typically a QA inspector). These QA representatives are identified on the Off Shift Customer Complaints form (page 4). This form is distributed to the off shift supervisor for use when an off shift customer complaint is received.

A specific customer may ask for the off shift contact person directly, where this information has been provided. Otherwise, the call should be routed to the designated individual (as listed on page 4) by the off shift Supervisor.

The off shift contact person will be knowledgeable and responsible for gathering all of the pertinent customer information, completing the QCR and calling the necessary personnel (as listed on page 4) to assist with containment and corrective actions.

**3.2** Quality Assurance will assure that any immediate short term containment actions are taken and will communicate the problem to other people as appropriate.

**3.3** The 8-D reports and approach will be used to solve problem and take corrective/preventive actions. Where applicable, we will apply the corrective actions taken and controls implemented, to eliminate the cause of a nonconformity to other similar processes and products. Reports to the customer shall be submitted in the 8-D format unless otherwise specified (See section 4.0 below).

**3.4** The QA manager or QA engineer must approve and sign the 8-D report. If

<b>EATON</b>	WI-14-02	Revision: 0	Page 2 of 4
<b>PROCESSING CUSTOMER COMPLAINTS</b>			

requested by the customer, the QA coordinator or engineer will send a copy of the 8-D report to the customer within the time specified by the customer. In all cases, the report will be filed by QA.

#### 4.0 Customer Specific Requirements

##### 4.1 Chrysler

A written corrective action plan following the "Chrysler 7D" format shall be submitted to address all nonconformances. Documentation will include:

- Description of the problem/defect
- Definition/cause
- Interim action and effective date
- Verification
- Control
- Prevention

##### 4.2 Ford

An 8-D report will be submitted to address all nonconformities in the following format:

- Use the team approach
- Describe the problem
- Containment and short term corrective action
- Define and verify root causes
- Implement permanent corrective actions
- Verify corrective actions
- Action to prevent recurrence
- Congratulate the team

##### 4.3 General Motors

Problem solving actions and reports will be submitted in accordance with the latest version of the General Motors document, Problem Reporting and Resolution Work Instruction (GP-5).

##### 4.4 Other Customers

Problem solving reports for other customers will be made according to their requirements. If the customer does not specify the format of the problem solving reports, Eaton will use the 8-D format.

##### 4.5 Reports

## PROCESSING CUSTOMER COMPLAINTS

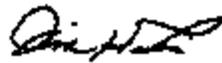
Completed Quality Concern Reports are filed with any supporting documentation including letters to the customer or customer specific problem solving format documents.

The following records are maintained per WI-16-01:

- Records are maintained per the Quality Concern Reporting WI.

\*Remove and destroy old superseded versions

Date	Rev	Description	Revised By
01/26/96	A	Released	
03/13/96	B	Revised	L. Byars
06/07/96	C	Revised section 3.1 to read "off shift supervisor"	K. Tikkanen
07/10/96	D	Paginated attached form.	J. Lubis
07/29/96	E	Revised sec. 3.1 paragraph 3 to reflect off shift supervisor not security guard.	K. Tikkanen
08/01/96	F	Revised sec. 3.1 removing all mention of figure 1 & replacing with page 4.	K. Nosay M. McAllister
09/23/96	G	Revised "off shift customer comp. individual"	J. Lubis
04/23/97	H	Added section 5.0 records	D. Cornett
9/18/97	I	Revised section 6.0 and added section 4.5	D. Cornett
12/1/98	J	Revised section 3.3	T. Williford
9/13/99	K	Updated call list	J. Sanders
11/13/00	L	Updated call list	L. Byars
1/31/01	M	Updated call list	L. Watts
2/19/02	N	Revised call list per CR/N 09928	B. Punnoose
8/25/02	O	Revised call list	J. Sanders

Originator: J. Lubis	Approved By: 	Date: 2/25/02
----------------------	---	---------------

**PROCESSING CUSTOMER COMPLAINTS**

Instructions for person receiving complaint call from customer:

Step 1. Write down the person's name and telephone number in case the call is lost during transfer.

Step 2. Forward the call to the QA Representative listed below.

Instructions for the off shift QA representative - WI-14-02 - Section 3.1

Step 1. Complete information on QCR form.

Step 2. Call Person on list below for corrective action instructions, assistance, etc.

**IN-HOUSE QA REPRESENTATIVES:****PERSON TO CALL AT HOME FOR  
CORRECTIVE ACTION:**

<i>SHIFT:</i>	<i>EATON</i>	<i>HOME</i>
1st Shift	Joe Sanders (336) 503-6581 Leon Watts (336) 503-6506 David Edmundson (336) 503-6599	Joe Leon
2nd Shift	Eaton Security 336-503-6431	Joe Leon
3rd Shift	Eaton Security 336-503-6431	Joe Leon

**QUALITY CONCERN REPORTING****1.0 Purpose**

The purpose of this work instruction is to define the method used for reporting problems, taking corrective actions and implementing and documenting problem solving actions. This work instruction applies to any problem discovered "in-house", reported by the customer or received from the field. Quality Concern Reports (QCR) resulting from QS-9000 Internal Audits and EHS concerns are also covered by this work instruction.

**2.0 Responsibility**

The Quality Manager or designees are responsible for this work instruction

**3.0 Procedure****3.1 General**

3.1.1 Any person can initiate a Quality Concern.

3.1.2 The QCR form is available on the computer network and by clicking on this link: [Blank QCR Form.xls](#)

3.1.3 The QA Manager or Quality Engineers will save the QCRs to the network drive.

**3.2 Entering a Quality Concern and notification of Quality Concerns**

3.2.1 Any person can initiate a Quality Concern. However, QCRs can only be entered into the QCR database by contacting a person listed in 3.1.3 above.

3.2.2 Upon entering a QCR into the database, all persons listed at the bottom of the form receive the QCR information via e-mail.

**3.3 Quality Concern Reporting for External Customers**

3.3.1 For external customers, the customer calls or otherwise notifies an Eaton employee of a problem or possible problem.

3.3.2 The receiver of the notification documents the information on a QCR form.

**QUALITY CONCERN REPORTING**

- 3.3.2.1 Check the box marked "Product Problems", "Customer Complaint."
  - 3.3.2.2 Record the date of the notification, the time of the notification and the person's name that is filling out the QCR
  - 3.3.2.3 Record the Customer Company name and location.
  - 3.3.2.4 Record the Customer part number, Eaton part number and part name.
  - 3.3.2.5 Record how the complaint was received, who notified Eaton of the complaint, their telephone number, fax number and when Eaton was notified.
  - 3.3.2.6 Record a written description of the problem reported, how many were found, a date code (if available) and a picture showing the defect condition (if available).
  - 3.3.2.7 Record if samples are being returned and to whom.
- 3.3.3 Containment
- 3.3.3.1 On the day shift, immediately call the Quality Manager or a Quality Engineer.
  - 3.3.3.2 On any other shift notify the supervisor in charge of the area that the parts were made. The supervisor can then call whoever is needed.
  - 3.3.3.3 ALL similar parts will be contained. Review the areas that may have similar parts stored. This may include:
    - 3.3.3.3.1 Manufacturing cells
    - 3.3.3.3.2 Rework areas
    - 3.3.3.3.3 Inventory areas (floor stock, warehouse, etc.)
    - 3.3.3.3.4 Shipping area
  - 3.3.3.4 ALL parts in-transit must be located and either arrange for sorting at the customer's plant or returned to Eaton.
  - 3.3.3.5 ALL parts at the customer's plant must be either returned to Eaton or sorting arrangements made.
- 3.3.4 The Quality Manager assigns a Quality Engineer the responsibility to process the complaint in the QCR database.
- 3.3.5 The Quality Engineer logs the QCR into the QCR log, completes the QCR as needed, saves the QCR to the network drive and distributes the QCR to the appropriate personnel.
- 3.3.6 The responsible Quality Engineer takes appropriate containment actions, documents these actions to the customer in the designated format and sends the first three steps (at least) to the customer within 48 hours or as required by the customer, and updates the "Initial Response" in the QCR database.
- 3.3.7 If the QCR issue involves returned parts, analysis of the parts is completed by the department responsible for making the parts using the method

**QUALITY CONCERN REPORTING**

designated by the responsible Quality Engineer.

- 3.3.8 If analysis of the return parts warrant, the responsible Quality Engineer forms a team that investigates the problem using the guidelines set forth in the WI 14-02 Processing Customer Complaints work instruction.
- 3.3.9 After investigating and determining the root cause for the problem, the responsible Quality Engineer documents the findings in the customer-designated format.
- 3.3.10 If the root cause is not Eaton's responsibility, the problem solving report can be completed through the last step.
- 3.3.11 If the root cause is Eaton's responsibility, the team activity shall continue until corrective and preventive actions are identified and completed, and the problem solving report is completed.
- 3.3.12 The responsible Quality Engineer updates the following dates in the QCR database:
  - 3.3.12.1 Closed date
  - 3.3.12.2 Future audit date
- 3.3.13 The responsible Quality Engineer updates the QCR files with a copy of the QCR information, the problem solving report and any supporting documentation.
- 3.3.14 The Quality Manager or his designee will review the QCR database monthly for "future audit" dates that are due and assigns audits for closure accordingly.
- 3.3.15 The designated auditor will pull the QCR file and complete the audit specified on the QCR. After completion, the auditor will notify the Quality Manager or his designee to update the QCR database.

**NOTE:** The time to close an 8-D may vary widely depending on the complexity of the problem. After the problem is deemed an Eaton responsibility, closing of the issue or providing status and/or update of the customer or agency concern/complaint will be determined based on the customer's requirements.

### 3.4 QCR for In-House Concerns

- 3.4.1 For in-house problems, any Eaton Roxboro employee contacts either the Quality Manager or a Quality Engineer to enter a Quality Concern into the

**QUALITY CONCERN REPORTING**

database. In-house QCRs may be written to take preventive actions based on reviews of Non-conforming Material Notices (NMN), quality records, or for other reasons.

- 3.4.2 The Quality Manager assigns a Quality Engineer responsibility to process the complaint in the QCR database.
- 3.4.3 The responsible Quality Engineer takes appropriate containment actions, documents these actions to the Product Line Manager and complaint originator in 8-D format within 48 hours and updates the "Initial Response" in the QCR database.
- 3.4.4 If the QCR issue involves returned parts, analysis of the parts is completed by the department responsible for making the parts using the method designated by the responsible Quality Engineer.
- 3.4.5 If analysis of the complaint warrants, the responsible Quality Engineer forms a team that investigates the problem using the guidelines set forth in the WI 14-02 Processing Customer Complaints work instruction.
- 3.4.6 After investigating and determining the root cause for the problem, the responsible Quality Engineer documents the findings in the 8-D format. If the root cause is already known and a problem solving report is not needed, the QCR can reflect the actions taken in the "Comments" section.
- 3.4.7 If the issue is not confirmed, the 8-D can be completed through the last step.
- 3.4.8 If the issue is confirmed, team activity shall continue until corrective and preventive actions are identified and completed, and the 8-D report is completed.
- 3.4.9 The responsible Quality Engineer updates the following dates in the QCR database:
  - 3.4.9.1 Closed date
  - 3.4.9.2 Future audit date
- 3.4.10 The responsible Quality Engineer updates the QCR files with a copy of the QCR information, the problem solving report and any supporting documentation.
- 3.4.11 The Quality Manager or his designee will review the QCR database monthly for "future audit" dates that are due and assigns audits for closure accordingly.
- 3.4.12 The designated auditor will pull the QCR file and complete the audit

**RECORDS TABLE  
ECO-NA ROXBORO  
MASTER LIST**

Reference Element	Record Type	Record	Access / Collection Resp.	Ret.	Index	Filing	Disp. Method	Storage Method	Active File Location	Archive File Location
4.14 Corrective and Preventive Action	Investigation to the cause of Nonconformity's	Quality Concern Reports	QA Eng.	3 Years	QCR No.	QCR No.	Recycle	Physical	QA office	Attic
4.14 Corrective and Preventive Action	Investigation to the cause of Nonconformity's	Quality Concern Log	QA Eng.	3 Years	QCR No.	QCR No.	Recycle	Physical	QA Office	Attic
4.14 Corrective and Preventive Action	Preventive Actions	Preventive Action Form	Manufacturing Services Engineer	3 Years	PA No.	PA No.	Recycle	Physical	Mfg. Services Engineer	Mfg. Services Engineer
4.14 Corrective and Preventive Action	Preventive Actions	Preventive Action Log	Manufacturing Services Engineer	3 Years	PA No.	PA No.	Recycle	Physical	Mfg. Services Engineer	Mfg. Services Engineer
4.14 Corrective and Preventive Action	Preventive Actions	Continuous Improvement Program (CIP) team log	Quality Assurance	10 Years	CIP #	Year	N/A	Electronic	DCA (PC)	N/A
4.14 Corrective and Preventive Action	Preventive Actions	Authorization for Returned Goods (ARG's)	Accounting	8 Years	Alphabetically	Date	Recycle	Physical	File Cabinet in Accounting	Controlled Store Room
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage	Floor Stock Withdraw	Warehouse Clerk	3 Years	Day/Mo/Year	Year	Recycle	Physical	Warehouse Production control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage	Inventory Adjustment	Warehouse Clerk	3 Years	Day/Mo/Year	Year	Recycle	Physical	Warehouse Production control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage	Location Transfer	Warehouse Clerk	3 Years	Day/Mo/Year	Year	Recycle	Physical	Warehouse Production control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage	Receivers	Warehouse Clerk	3 Years	Day/Mo/Year	Year	Recycle	Physical	Warehouse Production control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage	Receiving Memos	Warehouse Clerk	3 Years	Day/Mo/Year	Year	Recycle	Physical	Warehouse Production control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage	Move Tickets (Finished Goods)	Warehouse Clerk	3 Years	Day/Mo/Year	Year	Recycle	Physical	Warehouse Production control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage Inventory	Weight-up Sheet	Warehouse Clerk	3 Years	Day	Book	Recycle	Physical	Warehouse Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Storage Inventory	Unplanned Entry	Factory Secretary	3 Years	Unplanned Entry No.	Year	Recycle	Physical	Production Control Office	Warehouse
4.15 Handling, Storage, Packaging, Preservation, and Delivery	Delivery	ASN (electronic)	Order Entry	1 Year	"P" No.	Electronic	Deleted	Electronic	Electronic / Physical	N/A

4

**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 4**

4. State the number of each of the following actions or incidents of which Eaton is aware that are related or potentially related to the alleged defect in the subject vehicles, and provide copies of all documents in Eaton's possession or control that are related thereto:
- a. Crashes
  - b. Injury incidents;
  - c. Fatality incidents;
  - d. Subrogation claims;
  - e. Complaints (from all sources);
  - f. Warranty claims and requests for goodwill or other adjustments;
  - g. Third-party arbitration proceedings (where Eaton is a party to the arbitration); and
  - h. Lawsuits, both pending and closed, in which Eaton is or was a defendant (or codefendant).

Include all crash, injury, and/or fatality incidents regardless of whether any claim, proceeding, or lawsuit is or was involved, or whether or not each has been verified by Eaton. Provide all documents. If you have more than 20 reports, please provide them electronically on a disk or send them via e-mail to [tdronenburg@nhtsa.dot.gov](mailto:tdronenburg@nhtsa.dot.gov).

**Response**

- A. Crashes - 1
- B. Injury incidents - 1
- C. Fatality incidents - 0
- D. Subrogation claims - 0
- E. Complaints (from all sources) - 5
- F. Warranty claims and requests for goodwill or other adjustments - 0
- G. Third-party arbitration proceedings (where Eaton is a party to the arbitration)- 0
- H. Lawsuits, both pending and closed, in which Eaton is or was a defendant (or codefendant) - 0

## NEWS DIGEST

## Companies support relief efforts

Lear Corp. and Yokohama Rubber Co. are the latest rubber product manufacturers to commit financial support to assist support agencies, survivors and families of the victims of the Sept. 11 terrorist attacks in New York and Washington.

Lear will give \$250,000 to aid the disaster relief effort and has implemented a plan to match employee contributions to selected funds on a dollar-for-dollar basis.

Yokohama will donate \$100,000 to the American Red Cross Relief Fund. In addition, its sponsored Team PIG BMW race cars have been re-painted red, white and blue for the Petit LeMans-ALMS in October to honor the victims, their families and those involved in the recovery effort.

## Auto trade shows to go on

Despite CNN broadcast reports to the contrary

## Ford at fault in crash case

By Niles Moore

Rubber & Plastics News Staff

MIAMI—A Florida state court jury has ordered Ford Motor Co. to pay \$16.4 million to the family of a comatose girl in a case involving an allegedly damaged tire valve on a Ford Econoline van.

Ramon and Maria Jimenez were taking their daughter Phoebe to Walt Disney World on May 9, 1999, to celebrate her 10th birthday. As they approached the park, the right rear tire on their new, rented van failed.

The van spun out of control and rolled over, landing on Phoebe. She suffered severe brain damage, leav-

ing her in a vegetative state, according to the suit.

The Jimenez family sued Ford, alleging the van was inherently unstable, and that Ford damaged the tire valve while installing it at the factory.

The tire was a Goodyear Wrangler HT, but Goodyear was never a defendant in the case, said Ervin Gonzalez, one of the attorneys representing the Jimenez family. Plaintiffs' experts determined that Ford alone was responsible for the problems with the tire valve, he added.

The jury in the trial before the 11th Judicial Circuit Court in Miami awarded the family \$30.7 mil-

lion, but reduced that award by half because of contributory negligence. Phoebe had not worn a seat belt at the time of the accident.

"Our heartfelt sympathy goes out to the Jimenez family, but this is a sad reminder that seat belts can help protect passengers only when they are worn," Ford said in a prepared statement, adding that no proof of defect in the tire valve was shown in court.

Ford officials couldn't be reached to confirm whether they would appeal. Gonzalez said he has received no notice of appeal from Ford, "but I guarantee you they will, because they always do."



## Office of Defects Investigation Recall Database

Call the **Auto Safety Hotline** toll free at (888) 327-4236 to report safety defects or to obtain information on cars, trucks, child seats, highway or traffic safety.

Report Date: June 27, 2001 03:17:33 PM

### NHTSA CAMPAIGN ID Number: 01V046000

Component: TIRES:VALVE STEM  
Manufacturer: FORD MOTOR COMPANY  
Mfg. Campaign #: 01S05  
Year: 2000  
Make: FORD TRUCK  
Model: F550  
Potential Number of Units Affected: 102000  
Manufactured From: SEP 1997 To: OCT 2000  
Year of Recall: '01  
Type of Report: Vehicle  
Summary:

**Vehicle Description:** Trucks equipped with commercial truck tires that have steel cords in the tire sidewall. The valve stems may have been torn or damaged during assembly and could leak causing sidewall damage.

If not maintained, could result in a sidewall zipper failure. A zipper failure during inflation of a damaged tire could result in injury to someone near the tire.

Dealers will inspect the valve stems for leakage, and will replace both the valve stem and the tire if leakage is present. Owner notification began March 28, 2001. Owners who take their vehicles to an authorized dealer on an agreed upon service date and do not receive the free remedy within a reasonable time should contact Ford at 1-800-392-3673. Also contact the National Highway Traffic Safety Administration's Auto Safety Hotline at 1-888-DASH-2-DOT (1-888-327-4236).

This search returned 1 record.

[New Search](#)  
[Return to Safety Problems and Issues](#)



[Send mail to the Web Master](#)

Folder: //Network Mailbox/600 HP

To: Larry Schlesinger@PrdEng@ECRoxboroNC  
From: Jack Reaume@Sales@ECRoxboroNC  
Originated by: C=US/A=INTERNET/DDA=ID/TManning(a)IX.NETCOM.com  
Cc: Tom J. Cavanaugh@QA@ECRoxboroNC  
Subject: fwd: Dill High Pressure Snap in Valves TR-600HP  
Attachment: BEYOND.RTF  
Date: 10/23/00 6:52 AM  
Larry/Tom: One of you should make this call. thanks, Jack  
----- Original Text -----

From: C=US/A=INTERNET/DDA=ID/TManning(a)IX.NETCOM.com, on 10/19/00 1:38 PM:  
To: Jack Reaume@Sales@ECRoxboroNC,  
br400@whqig@WHQCleveOH2 [C=US/A=INTERNET/DDA=ID/JackReaume(a)eaton.com]  
Please call me at 818-767-3835  
I have some concerns in regard to multiple failures of this valve.  
Thank you,  
Mike James

Folder: //Network Mailbox/600 HP

To: Larry Schlesinger@PrdEng@ECRoxboroNC  
From: Rabian M. Martin@PrdEng@ECRoxboroNC  
Originated by: C=US/A=INTERNET/DDA=ID/KMILLER(a)southernco.com  
Cc: David V. Armstrong@IndEng@ECRoxboroNC, Jack  
Reaume@Sales@ECRoxboroNC, Tom J. Cavanaugh@QA@ECRoxboroNC,  
Willie Roberacn@Staff@ECRoxboroNC  
Subject: fwd: MAB SOCo.00-10 - Ford Tire Valve Failures & Replacements  
Attachment: MESSAGE1.TXT, MAB SOCo\_1\_.doc, MVC-0408.JPG, ADDRESS.TXT,  
BEYOND.RTF  
Date: 9/27/00 11:44 AM

Gentlemen,  
This is in reference to the trip I made to Alabama Power on September  
7, 2000. Please read carefully.  
Advise any comments/concerns.  
Thanks,

Rabian Martin  
Project Engineer  
Eaton Corporation  
Roxboro, N.C. 27573  
Ph: 336-503-6535  
Fx: 336-503-6425  
e-mail: rabianmartin@eaton.com

----- Original Text -----

From: C=US/A=INTERNET/DDA=ID/KMILLER(a)southernco.com, on 9/27/00  
12:32 PM:  
To: Rabian M. Martin@PrdEng@ECRoxboroNC  
Cc: br400@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/nancy(a)cescor.com],  
br400@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/tpeeler(a)ford.com], br400  
@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/rabianmartin(a)eaton.com], br4  
00@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/mday(a)accuridacorp.com]

**Photographs of Buttons from TR 600 HP  
Returned from Security Paving 10/29/00**



**Valves are reported to have separated during operation in the field. The top portion of the valve was lost.**

# Internal Correspondence

---



**Date** March 29, 2001  
**To** Larry Schlesinger  
**Copy** T. Cavanaugh, W. Roberson, B. Michel, J. Reaume, J. Hebert  
**From** Rabian Martin  
**Subject** EDMONTON AB, CANADA TRIP REPORT

Due to customer concerns reported to the Ford Critical Concerns/Safety committee relating to Eaton's TR 600HP Tubeless Tire Valve, I met with Doug Oswalt, Supervisor Customer Concerns/Safety, Dean McClenaghan, Customer Concerns/Safety, and Phil Beuokelaere, Supervisor, Heavy F-Series Chassis Design in Edmonton Alberta, Canada to visit with the Ford Parts and Distribution Center representatives Bob Woolnough, Fleet Field Service Manager, Western Canada and R. Bob Menard, Fleet Field Service Manager, North American Fleet Services, Western Region to review and discuss these issues.

The above mentioned committee had received complaints of the TR 600HP coming out of the rim during service and also of leaking valves. During our discussions, these "rumored" complaints were being brought to the attention of the Ford Motor Company representatives but had not been officially recorded or documented by Ford Motor Company of Canada, LTD. The team decided to visit the local Ford dealership for their experiences with our valves. During multiple inspections of the TR 600HP on Ford F-350's and above and conversations between the committee and the service manager at the dealership, the Eaton valve was not causing any problems in the field. This prompted the team to visit local tire shops. Again, during vehicle inspections and conversations with the tire changers and shop management, no outstanding facts relating to our valve stem was reported.

It should be noted that the vehicles inspected are of the same type and have similar rigging as those vehicles in Birmingham, Alabama that have proven evidence of valve failure. The environments, however are not similar. The environment under which the Canadian vehicles operate is mostly very thick muddy conditions as opposed to both mud and heavy brush that the vehicles in Alabama must operate.

It should also be noted that during the team's inspection of Eaton's TR 600HP tire valves, some of the valves would bend from the vertical position much easier than others would. Valve insertion depths from mid September to date are less since the "stemmer" has been modified at KTP. This will be to our favor because of the unlikelyhood of over extension during valve insertion into the rim.

Lastly, the Ford Critical Concerns/Safety committee has voiced an interest in visiting our facility to see the TR 600HP manufactured from the bar stock stage to that of a finished product. The committee will notify us of their intentions and visit date.

To: Larry Schlesinger@PrdEng@ECRoxboroNC  
From: Rabian M. Martin@PrdEng@ECRoxboroNC  
Originated by: C=US/A=INTERNET/DDA=ID/KDMILLER(a)southernco.com  
Cc:  
Subject: fwd: FW: Valve Stem Failure on Ford  
Attachment: BEYOND.RTF  
Date: 9/11/00 11:57 AM

FYI

Rabian Martin  
Project Engineer  
Eaton Corporation  
Roxboro, N.C. 27573  
Ph: 336-503-6535  
Fx: 336-503-6425  
e-mail: rabianmmartin@eaton.com

From: C=US/A=INTERNET/DDA=ID/KDMILLER(a)southernco.com, on 9/11/00 11:31 AM:  
To: Rabian M.  
Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/tpeeler(a)ford.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/rabianmmartin(a)eaton.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/mday(a)accurldecorp.com]  
Cc:  
br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/blll.stafford(a)altec.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/JFTHOMPS(a)southernco.com]

We had another one fall Thursday... I asked them to swap out all on that truck to the "clamp in" stems  
They are sending them to me for forwarding.

I also had a call from Doyle Crocker at Global Rental Co.(Altec Leasing). They had one fall on the rear of a cable TV unit Thursday night, then had a front one go down on Friday as they were going to get the rear one repaired. The driver verified the front stem was cut. He was going to try to salvage both pieces. Doyle is going to get those valves for me too, along with the VIN.

ken

> -----Original Message-----  
> From: Laird, Gene  
> Sent: Friday, September 08, 2000 9:51 AM  
> To: Miller, Kenneth D.  
> Cc: Bailey, J. Douglas  
> Subject: RE: Valve Stem Failure on Ford  
>  
> Ken.....  
>  
> The valve stem failure occurred in 34567, a 2000 F250, VIN  
> 1FTNF21L4YED32921.  
>  
> -----Original Message-----  
> From: Miller, Kenneth D.  
> Sent: Thursday, September 07, 2000 1:18 PM  
> To: Laird, Gene  
> Cc: Bailey, J. Douglas  
> Subject: Valve Stem Failure on Ford  
>  
> Gene...

> I can't get into M-4 today... I am on the road and can't reach the  
> server.

> Could you send me the VIN for the unit you had fail the tire stem  
> today? Also, F-250 or what???

> I need to send this to KTP along wth the others we sent yesterday.

> Thanks!

> Ken Miller  
> Sr. Fleet Specialist  
> office: 205)664-6343  
> link: 334)350-9679  
> radio:19679

To: Larry Schlesinger@PrdEng@ECRoxboroNC  
From: Rabian M. Martin@PrdEng@ECRoxboroNC  
Originated by: C=US/A=INTERNET/DDA=ID/froth(a)ford.com  
Cc:  
Subject: fwd: FW: F550 tire failures  
Attachment: BEYOND.RTF  
Date: 8/28/00 12:55 PM

Larry,

I have not copied anyone else on this, but maybe you and I should discuss. Frank Roth is requesting testing data for the past six (6) months.

Rabian Martin  
Project Engineer  
Eaton Corporation  
Roxboro, N.C. 27573  
Ph: 336-503-6535  
Fx: 336-503-6425  
e-mail: rabianmmartin@eaton.com

From: C=US/A=INTERNET/DDA=ID/froth(a)ford.com, on 8/28/00 12:47 PM:

To: Rabian M.  
Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/rabianmmartin(a)  
eaton.com]

Info

Frank E. Roth, KTPPVT Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

-----Original Message-----

From: Green, Dale (D.R.)  
Sent: Monday, August 28, 2000 7:54 AM  
To: Roth, Frank (F.E.)  
Subject: RE: F550 tire failures

The valve stem manufacturer is EATON AIR CONTROLS-- contact name is Joe Hebert,248-437.9527.

Frank -- We should get Accuride involved as well.

-----Original Message-----

From: Roth, Frank (F.E.)  
Sent: Friday, August 25, 2000 5:44 PM  
To: Green, Dale (D.R.)  
Cc: Roth, Frank (F.E.)  
Subject: FW: F550 tire failures

Dale - Valve stems continue to fail for 2000 MY. Who is supplier contact? (we) need to talk to them.

Frank E. Roth, KTPPVT Chassis

Something has changed. Let me know what additional information I can provide from the field.

Mark Wilson  
PVT & Field Liaison  
F-Super Duty, Excursion  
502-429-2546 voice, 502-339-5252 fax  
E-mail: MWILSON7@FORD.COM

-----Original Message-----

From: Alcock, Eric (E.W.)  
Sent: Friday, August 25, 2000 12:43 PM  
To: Wilson, Mark (M.B.)  
Cc: Alcock, Eric (E.W.)  
Subject: FW: F550 tire failures

Mark,

See note below regarding the concern with the valve stems.

The fleets are now changing the valve stems to a metal type valve stem as so as they receive the trucks.

Can you pass along to the correct person at the PVT?

Regards,  
Eric Alcock, FCSD-North American Fleet Service  
Parts/Technical Liaison  
FCDTWB, Suite 950-C, Rm-345  
PH 313-33-76741, FAX 313-39-01880  
ealcock@ford.com

-----Original Message-----

From: GUILLORY, HOWARD G [mailto:HGUILLO@entergy.com]  
Sent: Thursday, August 24, 2000 9:06 AM  
To: 'Eric Alcock'  
Subject: FW: F550 tire failures

FYI

> -----Original Message-----

> From: GORE, THOMAS I  
> Sent: Thursday, August 24, 2000 6:19 AM  
> To: ROBERTS, MICHAEL H; CORNE, DAVID P; RETHERFORD, EDWARD J; GRANT,  
> ARLIS W; PODRAZA, JAMES  
> Cc: GUILLORY, HOWARD G; SLAVEN, JESSE O  
> Subject: RE: F550 tire failures

>  
> Yes we have---We have presented to SAB in Mississippi and Jesse Slaven is  
> sending out system wide alert. We are installing metal valve stems in the  
> trucks we have received and are installing in the new ones before we send  
> out to field. We are also experiencing tire problems on front tires and  
> are replacing within 10K miles. The wear characteristics of this tire are  
> terrible and don't hold up on the front.

> Ivy

>

> -----Original Message-----

> From: ROBERTS, MICHAEL H

> Sent: Wednesday, August 23, 2000 6:01 PM

> To: GORE, THOMAS I; CORNE, DAVID P; RETHERFORD, EDWARD J; GRANT, ARLIS

> W; PODRAZA, JAMES

> Cc: GUILLORY, HOWARD G

> Subject: F550 tire failures

>

> I had a report today regarding two 19.5" tire failures on one of our new  
> L37M material handlers on an F550. In each of these two instances, the  
> valve stem failed and caused the tire to go flat. One failure involved a  
> front tire and one a rear tire. Both failures were on the same truck, but  
> occurred at different times. The truck in question has been in service  
> only a few months.

>

> Have any of you experienced or heard of similar tire failures on the F550  
> or F450 trucks with 19.5" tires?

>

> Thanks

> Mike



## MANDATORY ACTION BULLETIN

SOCo.MAB 00-10

Ford Tire Valve Replacement

### AFFECTED UNITS:

Year models 1998, 1999, 2000 - Ford F-250, F-350, F-450 & F-550, with single & dual rear wheels, and E-250 & E-350 vans.

### COMPLAINT:

Tires will not maintain set pressures, and tires going flat without any punctures found in the tire, cut stems at the seal area, and stems blowing out of wheel rims while vehicle is in motion.

### CAUSE:

Manufacturer installed valve stem when tires were mounted at Ford KTP, the valve stems are showing signs of improper seating in the wheel, or perhaps being installed too deep causing the rubber to tear away from the brass center.

### CORRECTION:

Replace the Ford installed Dill brand rubber 1 piece valve stems with metal 2 piece screw in valve stems. These clamp in stems are torqued at 19 in.lb. torque. (Just compress the grommet) All wheels in stock should have the valves replaced. This should include the wheels delivered with these trucks as spare tires. (See Photo #1)

### SPECIAL NOTE:

- ◆ All removed valve stems from each vehicle must be kept separate.
- ◆ The tire stems must be pushed out backwards so as to save the tire valve stem seal area intact.
- ◆ Remove the stems, and put them in a fabric or clear bag with the *work order #, unit number and VIN* clearly marked on the bag, or on a card inside the bag.

### LABOR:

M4- Code 02-SP-A10 (zero two - S P - Alpha one zero) Visit Reason "W"  
Time required is approximately 1-1/2 hours per truck, for all tires including the spare.

### PARTS:

The valve hole in these wheels measures 0.453 inches in diameter. Replacement valves used can be *Schroeder 3640K2-5, Dill VS902, Myers 21.583, Tire & Rim WR-416-S* or equivalent.

**DO NOT ARBITRARILY SUBSTITUTE FOR THESE PART NUMBERS WITHOUT CONTACTING FLEET SERVICES!**

### WARRANTY:

Warranty recovery from Ford will be considered on an individual unit basis. Units with defective valve stems should be processed through normal channels.

Contact your warranty administrator for further information if required.

- ◆ At this time, warranty will be recovered on the basis of the defective seals we find.
- ◆ Forward the stems to Pam Shoop for inspection & processing.

**COMPLETION DATE:**

This bulletin shall be completed no later than 22-Nov-2000

**GENERAL COMMENTS:**

The G.P.C. fleet has had several incidents where valves have blown out causing very rapid tire deflation. Alabama has experienced several of these failures as well, throughout the fleet. As a result of these failures, APCo. will change out all the DILL 600 HP stems.

We have had meetings with Accuride Wheel of Canada, Eaton Air Controls(Dill) and Ford Motor Company to attempt to determine what is happening to the stem seals and just how wide-spread this may be.

At this time, no OEM or supplier is in a position to say this concern actually exists, or that it is a covered warranty item. But, APCo. & GPCo. has determined that the problem exists to the extent that this bulletin is being performed to ensure the safety and reliability of our fleet.

Please contact me if you have any questions or comments.

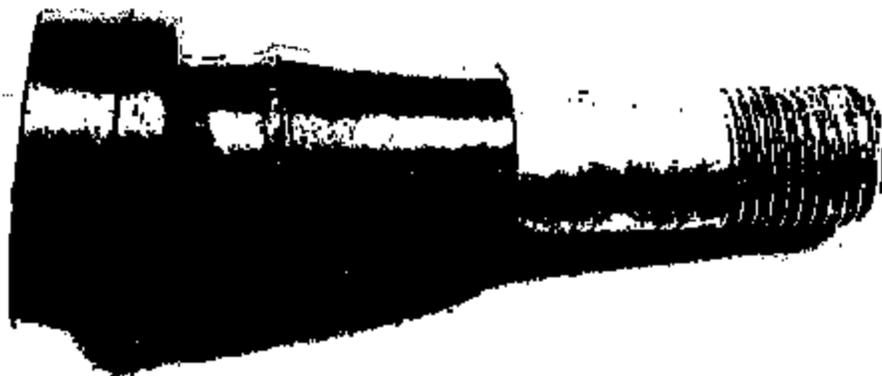
*Ken Miller*

Valve Stem Warranty Reports

#	DOR	DOB	VIN	Model	Location	Mileage	Description - Valve Stem
	5/05/00	6/12/00	YEE06566	W36	MS	201	blown out
	6/14/00	5/10/00	YED51599	W37	WY	2	leaking
	4/26/00	5/22/00	YED48700	W33	MI	12,565	leaking
	4/29/00	12/17/99	YEB88528	X31	OK	1,914	leaking
	7/31/00	12/7/99	YEB87826	F56	FL	17,158	leaking tire blown
	7/17/00	12/16/99	YEB78421	W32	AL	23,866	untucked
	12/6/99	10/9/99	YEA87087	W31	VA	4,192	leaking
	10/20/99	8/31/99	YEA58981	X21	PA	1,243	leaking
	8/30/99	7/28/99	YEA01418	U42	TN	10	leaking
	1/22/00	7/21/99	YEA01601	U42	LA	4,032	leaking



TR 600 HP from Alabama Power 10/11/00.  
Cavity 189  
Hardness 61



600-HP Received from Alabama Power 10/11/00 during visit with Ford. Valve is reported to have come apart in service.

Cavity Number 20  
Hardness: 61

To: Larry Schlesinger@PrdEng@ECRoxboroNC  
From: Rabian M. Martin@PrdEng@ECRoxboroNC  
Originated by: C=US/A=INTERNET/DDA=ID/KMILLER(a)southernco.com  
Cc: David V. Armstrong@IndEng@ECRoxboroNC, Jack  
Reaume@Sales@ECRoxboroNC, Tom J. Cavanaugh@QA@ECRoxboroNC,  
Willie Roberson@Staff@ECRoxboroNC  
Subject: fwd: MAB SOCo.00-10 - Ford Tire Valve Failures & Replacements  
Attachment: MESSAGE1.TXT, MAB SOCo\_1\_.doc, MVC-040S.JPG, ADDRESS.TXT,  
BEYOND.RTF  
Date: 9/27/00 11:44 AM

Gentlemen,  
This is in reference to the trip I made to Alabama Power on September  
7, 2000. Please read carefully.  
Advise any comments/concerns.  
Thanks,

Rabian Martin  
Project Engineer  
Eaton Corporation  
Roxboro, N.C. 27573  
Ph: 336-503-6535  
Fx: 336-503-6425  
e-mail: rabianmartin@eaton.com

----- Original Text -----

From: C=US/A=INTERNET/DDA=ID/KMILLER(a)southernco.com, on 9/27/00  
12:32 PM:

To: Rabian M. Martin@PrdEng@ECRoxboroNC  
Cc: br400@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/nancy(a)caacor.com],  
br400@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/tpeeler(a)ford.com], br400  
@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/rabianmartin(a)eaton.com], br4  
00@admin@whqclevech3 [C=US/A=INTERNET/DDA=ID/mday(a)accuridecorp.com]

Recently, we have had several units across the Southern Company service  
area  
which have had unexplained flats, tire stem failure, and tire stems  
which  
appear to have blown out of the rims. We have met with the  
manufacturers on  
these issues, and they are working to resolve the issues with us.  
However, in the interest of reliability and safety of the fleet, we  
feel it  
is prudent to issue this MAB.

Attached is the Ford Tire Valve MAB and associated photos showing which  
tire  
valve we are looking for in the fleet to replace.  
This MAB is issued specifically for 1998 and later vehicles. For now,  
we can  
not establish that we have had any failures of the valve stems prior to  
1998  
year models.

<<MAB SOCo.00-10.doc>>

The photo below was staged on a new truck in order that you can see the

problem valve.

This valve was bent over sharply and started leaking, requiring replacement.

THIS IS NOT A TEST METHOD!

The valves must be carefully removed from inside the wheel in order to perform a proper inspection of the sealing area.

<<Photo#1.JPG>>

Attachment from Richard Harper regarding new DSO code request for the clamp

in stems for 2001 Ford units.

<<Valve Stem DSO>>

Please contact this office if you have any questions... OR ANSWERS!

Ken Miller

Sr. Fleet Specialist

office: 205)664-6343

link: 334)350-9679

radio: 19679

# POWER DELIVERY FLEET SERVICE BULLETIN



## VEHICLE BULLETIN

No V 980682  
Effective: 6/26/00  
Revised: 7/21/00  
Page: 1 of 3  
Contact: WALT FULLER / JUSTIN CLARK

### MANDATORY ACTION BULLETIN

WORK ORDER CODE: 02-SP-A26

Ford Authorized Warranty Applies

**Subject: Tire Valve Stem Replacement**

**Models: All Ford F Super Duty 350,450,550, with dual rear wheels also all F Super Duty 250,350 single rear wheel pickup and cab/chassis trucks 1998, 99, 2000 year model**

I. Condition:

Tire valve stem blowing out of the wheel rim while the vehicle is in motion. It was first thought that this problem applied to only trucks with Budd type wheels in dual wheel configuration. There have been several incidents on F250/350 pick-ups with single rear wheels since this bulletin was originally published.

II. Cause:

Manufacturer installed incorrect type valve stems when tires were installed at the Ford assembly plant

III.

Correction:

**Dual rear wheel vehicles** Replace the Ford installed Dill brand rubber 1 piece valve stems with 2 piece screw in valve stems using the parts listed below for dual wheels. All wheels on the vehicle should have their stems replaced this should include wheels delivered with the vehicles as spares.  
**Single rear wheel vehicles** Inspect the vehicle to determine the type of valve stem originally installed by Ford some vehicles had conventional pull in rubber stems installed and most had the Dill Brand stems. Please view the attached photos to help in determining which your vehicle is equipped with all Dill stems should be replaced with either conventional rubber pull in valve stems or 2 piece screw in stems used in the dual wheel trucks.

Parts:

The valve hole in all wheels involved measures .453 in. in diameter. Replacement valves for dual wheel Budd style wheels should be 2 piece metal screw in style stems Shrader 3604-5, Meyers 21.583, Dill VS902 or equivalent. Replacement stems for all single style wheels can either be conventional type rubber pull in stems as shown in the attached photos or the 2 piece screw in types listed above

**Important: This bulletin must be completed by Aug 15, 2000**

# POWER DELIVERY FLEET SERVICE BULLETIN



## VEHICLE BULLETIN

No V 980662

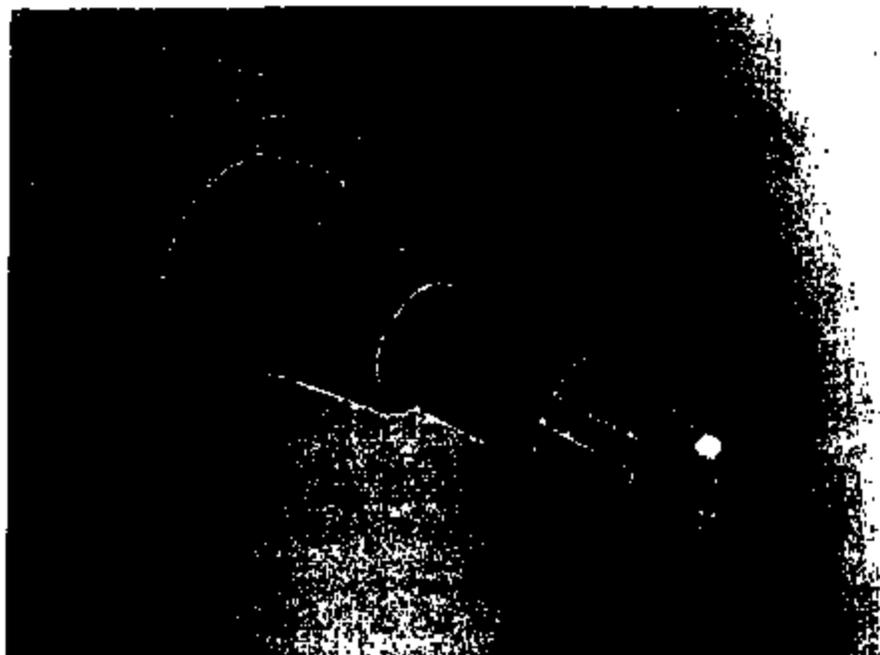
Effective: 6/28/00

Revised: 7/21/00

Page: 2 of 3

Contact: WALT FULLER /JUSTIN CLARK

Dill Brand Valve Stem (Factory Installed)



Rubber Replacement Type



# POWER DELIVERY FLEET SERVICE BULLETIN



## VEHICLE BULLETIN

No V 980662

Effective: 6/26/00

Revised: 7/21/00

Page: 3 of 3

Contact: WALT FULLER /JUSTIN CLARK

### Metal Type Replacement



To: Rabian M. Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveoh3 [C=US /A=INTERNET/DDA=ID/rabianmartin(a)eaton.com]  
From: C=US/A=INTERNET/DDA=ID/froth(a)ford.com  
Cc:  
Subject: FW: F550 tire failures  
Attachment:  
Date: 8/28/00 12:47 PM

Info

Frank E. Roth, KTPPVT Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

-----Original Message-----

From: Green, Dale (D.R.)  
Sent: Monday, August 28, 2000 7:54 AM  
To: Roth, Frank (F.E.)  
Subject: RE: F550 tire failures

The valve stem manufacturer is EATON AIR CONTROLS--- contact name is Joe Hebert,248-437.9527.

Frank -- We should get Accuride Involved as well.

-----Original Message-----

From: Roth, Frank (F.E.)  
Sent: Friday, August 25, 2000 5:44 PM  
To: Green, Dale (D.R.)  
Cc: Roth, Frank (F.E.)  
Subject: FW: F550 tire failures

Dale - Valve stems continue to fail for 2000 MY. Who is supplier contact? I (we) need to talk to them.

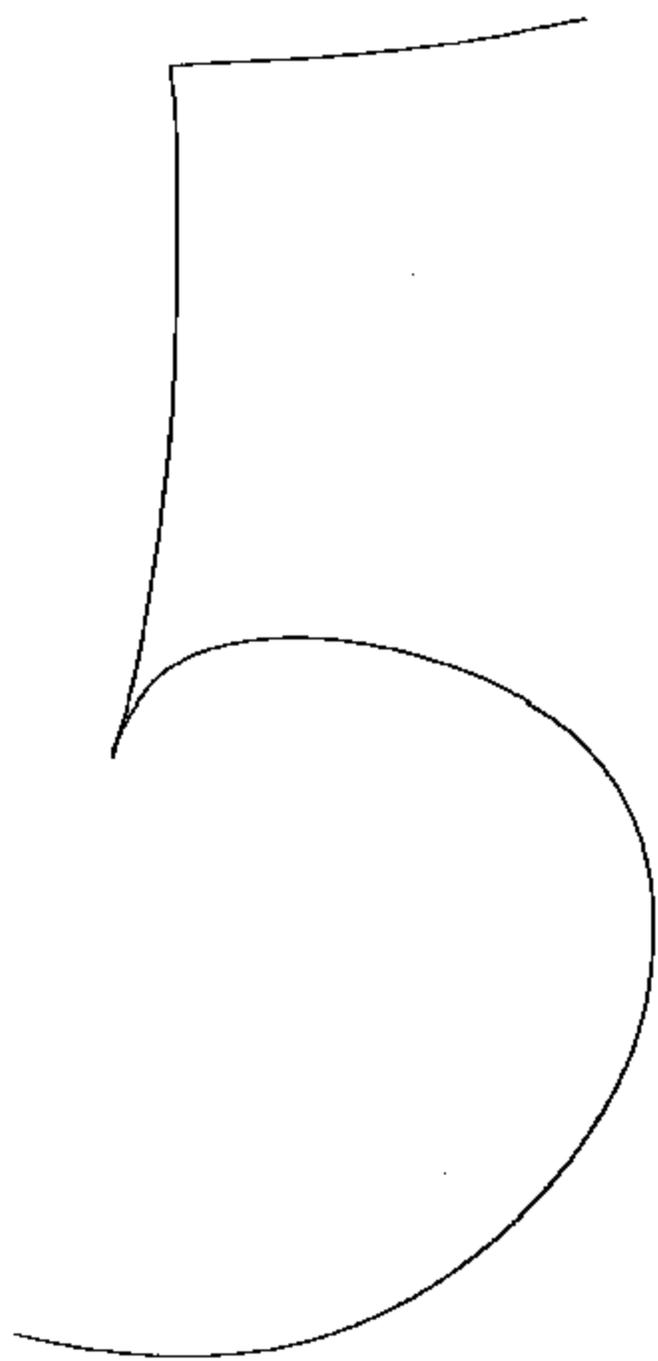
Frank E. Roth, KTPPVT Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

-----Original Message-----

From: Wilson, Mark (M.B.)  
Sent: Friday, August 25, 2000 9:23 AM  
To: Roth, Frank (F.E.)  
Cc: Reed, Bill (B.P.)  
Subject: FW: F550 tire failures

Gentleman,

More reports of valve stem failures. Yesterday I looked through 99 MY CQIS reports and found only 1 report of this happening. Looking at 00 MY we already have 13 reports of which many include multiple vehicles.



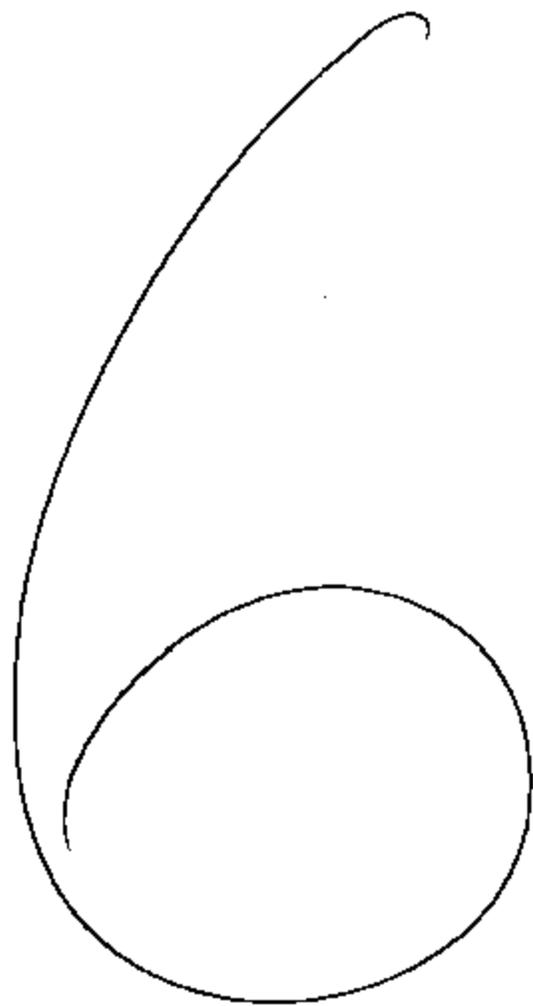
**Engineering Analysis - EA02-018**  
**Eaton Corporation - Information for Section 5**

5. Furnish a summary table of all of the incident information provided in response to questions 3 and 4 above, identifying the Eaton identification number; the tire valve part number; the vehicle owner's name, address, and telephone number; the model, model year, VIN, and build date of the vehicle; the dates and mileages of all incidents (the date of the report if the incident date is unknown); the state in which each incident occurred; a brief description of any injuries associated with the incident; a brief synopsis of the incident. The table should be arranged in ascending order alphabetically according to the vehicle owner's (private or commercial) last name. Where a fleet vehicle is involved, state the name of the fleet, and the name and telephone number of a contact person at that fleet. If Eaton has developed or is developing a similar table, which contains additional information, please include that additional information in Eaton's response. If there are more than 20 incidents, provide an electronic version of this table in Microsoft Excel 2000 format. If this is not available, please call Terri Droneburg at (202) 366-6617 and arrange another acceptable format.

**Response**

Name/Address/Phone No.	Model	Year	VIN	Build Date	Mileage	Date	State	Description of Incident
Ramon & Maria Address and Phone Number are unknown.	Econline	Unknown	Unknown	Unknown	Unknown	Unknown	FL	Vehicle rolled over - tire valve damaged during installation.
Ken Sr. Fleet Specialist  Birmingham, AL 35291-0353	W36		YEE06566	6/12/00	201	8/5/00	MS	Blown out
	W37		YED51599	5/10/00	2	6/14/00	WY	Leaking
	W33		YED48700	5/22/00	12,555	4/26/00	MI	Leaking
	X31		YEB88528	12/17/99	1,914	4/29/00	OK	Leaking
	F56		YEB87826	12/7/99	17,158	7/31/00	FL	Leaking - blown tire
	W32		YEB78421	12/16/99	23,868	7/17/00	AL	Untrucked
	W31		YEA87087	10/9/99	4,192	12/6/99	VA	Leaking
	X21		YEA58961	8/31/99	1,243	10/20/99	PA	Leaking
	U42		YEA01418	7/26/99	10	8/30/99	TN	Leaking
	U42		YEA01801	7/21/99	4,032	1/22/00	LA	Leaking
	F250	2000	YED32921	Unknown	Unknown	9/7/00	?	Valve stem failed.

St. Louis, Mo.	F350	1999	Unknown	Unknown		6/20/01	MO	Stems Broke - 6 valves on 2 different F350's
Mike Sun Valley, CA	F550	Unknown	Unknown	Unknown	Unknown	10/29/00	CA	Two valve seperated during operation.
Michael	F550	Unknown	Unknown	Unknown	Unknown	Unknown	?	Valve stem failed
Address and Phone number unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	?	Loss of service



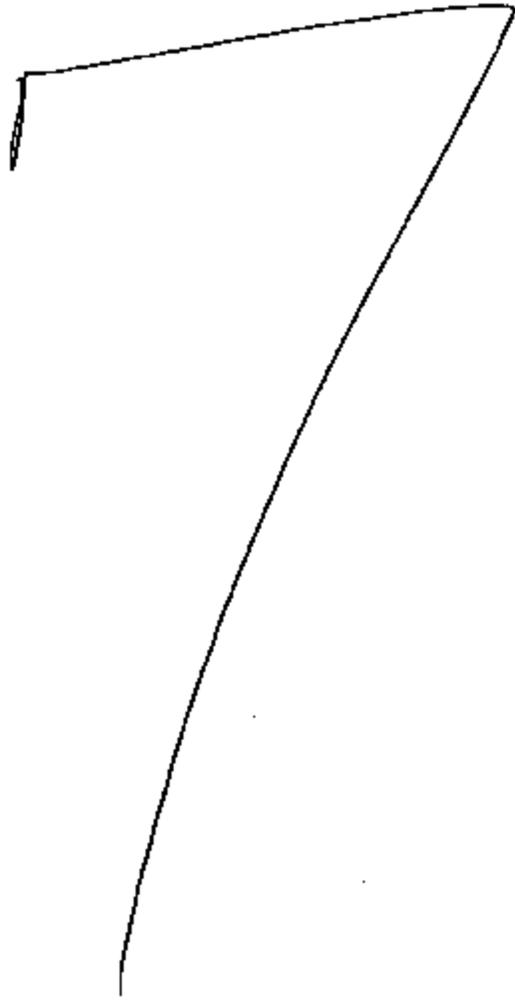
**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 6**

6. Furnish a copy of each service, warranty, or technical document Eaton has prepared, including (but not limited to) bulletins, advisories, informational documents, training documents, or other communications, that were sent or made available to automotive manufacturers, tire/wheel sub-assemblers, tire valve distributors, vehicle or tire dealers, regional or zone offices, field offices, fleet purchasers, or other entities related to the following:
- a. The alleged defect in the subject vehicles;
  - b. The installation, attachment, replacement, or performance of the subject part; or
  - c. The installation, attachment, replacement, or performance of other components which could have an affect on the alleged defect in the subject vehicles.

Identify any of the foregoing communications or documents that Eaton plans to produce, distribute, or make available within the next 120 days.

**Response**

Eaton has not prepared nor do we have plans to issue documents within the next 120 days.



**Engineering Analysis – EA02-018  
Eaton Corporation – Information for Section 7**

7. From 1994 to present, identify and describe each and every modification or change made by, on behalf of, or known to Eaton in the design, material composition, supplier, manufacture, testing, quality control, or installation of the subject parts. Similarly, identify any change or modification that Eaton is aware of that may be designed, or implemented within the next 120 days. The following information must be included for each modification or change:

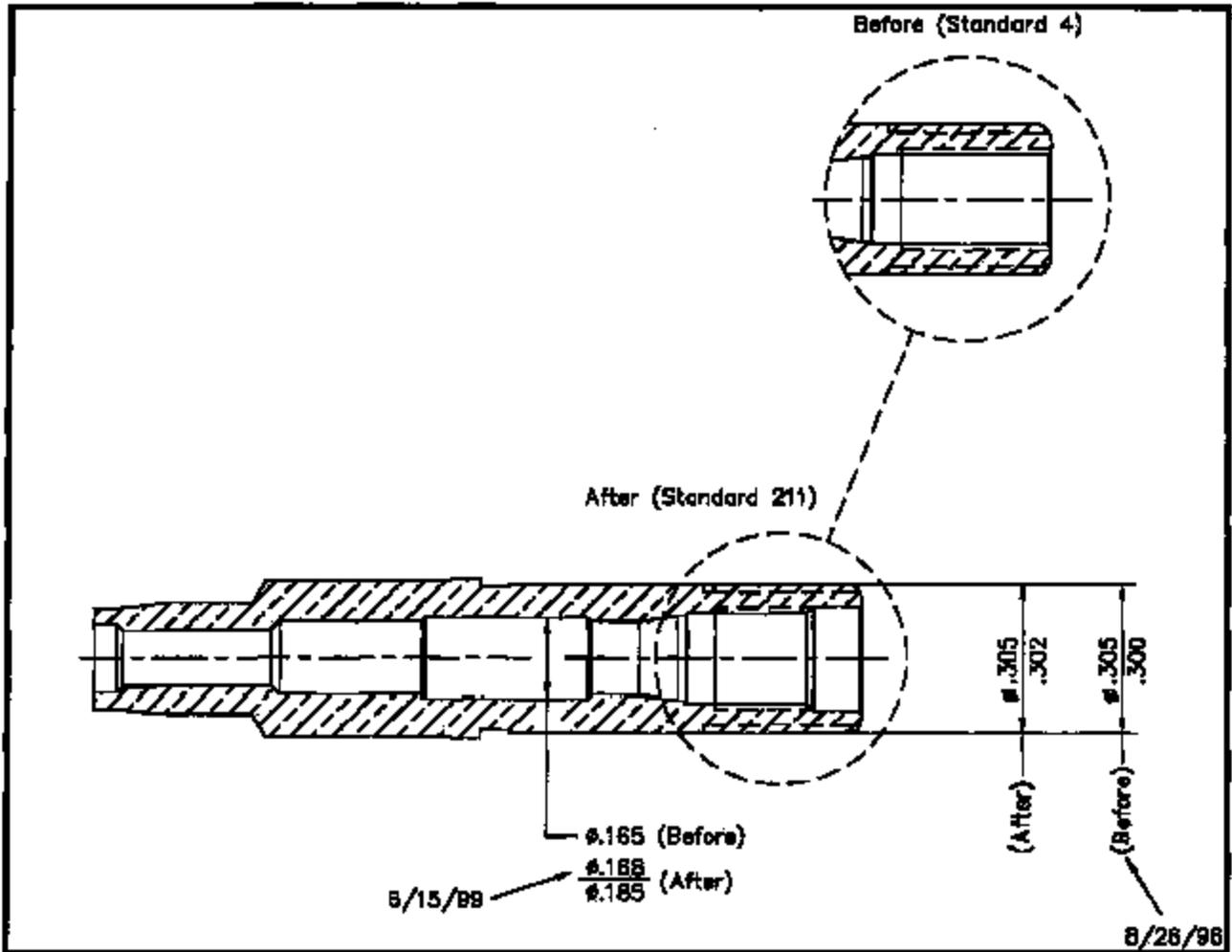
- a. The date on which the modification or change was incorporated into production;
- b. The part numbers of the original, and of the modified or changed components;
- c. A description of the modification or change and an illustration of any design modification or change;
- d. The model, model year, and inclusive dates of manufacture of all vehicles in which the modified or changed part was installed, or could be installed as original equipment;
- e. All the reasons for the modification or change; and
- f. The disposition of the unmodified/unchanged components in Eaton production inventory, Eaton distribution and dealer stock, and the supplier's inventory, furnishing the date(s) if such components were removed or withdrawn from sale or inventory.

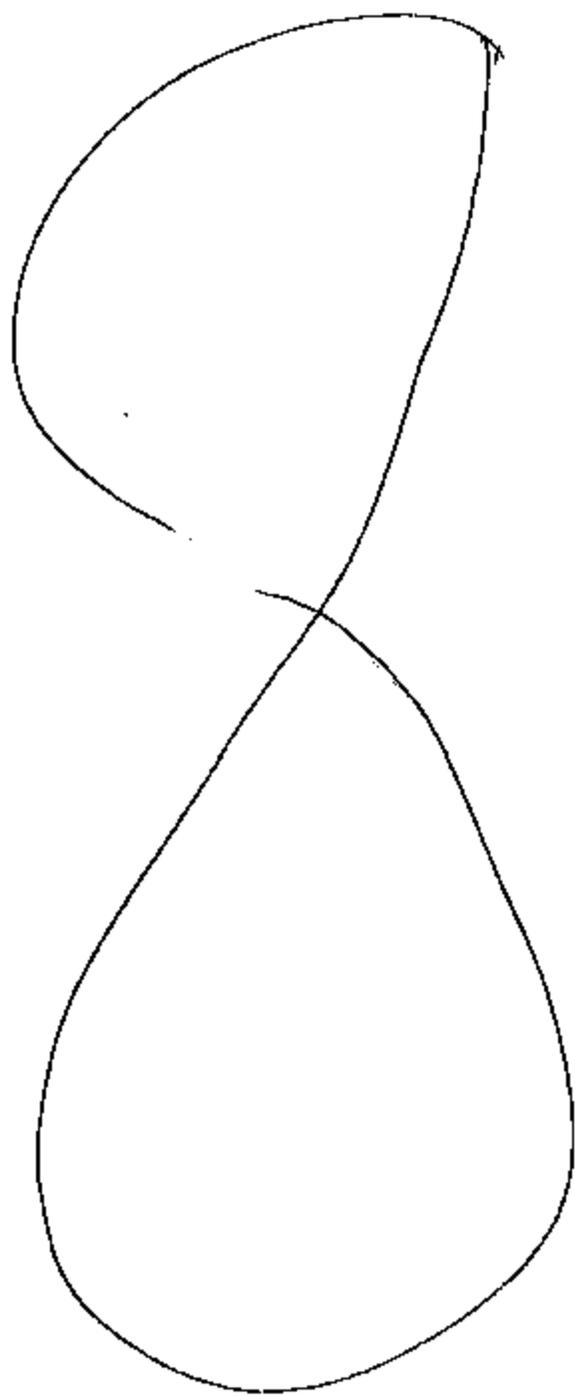
**Response**

A. Date	B. Part No	C. Description of Change	D. Model	E. Reason for Change	F. Disposition of Stock
Jan-01	E-600-1	Bowden CCRB parts washer was replaced with Jen Fab washer.	2001-2002	Reduce the amount of hazardous waste that the washer generated.	Use
6/15/99	E-600-1	Recess diameter changed from 0.165 to .168/.185.	1999-2002	Update recess diameter to conform with TRA No. 1 core chamber.	Use
8/26/96	E-600-1	Changed thread major diameter from .300-.305 to .302-.305 & added SPC to major diameter.	1996-2002	Tighter tolerance for better fitment of plastic valve cap.	Use
11/7/94	E-600-1	Added counterbore to valve mouth.	1994-2002	Aid to automatic assembly of valve core.	Use

Eaton does not have any plans to make a change or modification to the subject part within the next 120 days.

Engineering Analysis - EA02-018  
Section 7C Illustration





**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 8**

8. Separately identify each and every study, simulation, evaluation, analysis, inquiry, test program, survey, investigation, or similar action including the date on which it was performed, the party who performed the action, the methodology employed, and the results. Provide a copy of all documents relating to each such action. For all actions that are incomplete or still in the planning phase, provide (a) a description of the action (including the objective and procedures); (b) the date on which the action was, or will be, initiated; (c) a detailed schedule for the work to be done; and (d) the expected completion date.

**Response**

Analysis	Date	Performed By	Methodology	Results
Force to pull out @ 150F	9/19/00	Eaton	ES-F2UA-1700-AA Pull-Through at elevated temperature	Average force: 117.7 lb.
Force to pull out @ 110F	9/22/00	Eaton	ES-F2UA-1700-AA Pull-Through at elevated temperature	Average force: 128.67 lb.
Rubber hardness evaluation	10/26/00	Eaton	Tested per ES-F2UA-1700-AA.	Hardness values averaged 65 Shore A.
Rubber compound with increased hardness	10/25/00	Eaton	Tested per ES-F2UA-1700-AA.	Hardness values on average exceeded the mean of 65 Shore A.
Polymer Verification on valve returned from Alabama Power	10/10/00	ARDL	ASTM D 3677	Polymer was verified as correct (EPDM).
Ozone Test on valve returned from Alabama Power	11/2/00	Eaton	ES-F2UA-1700-AA, section III	Valve did not crack.
Flex Test	12/1/00	Eaton	Flex valves 30 deg. In each direction	1st valve broke at 24, 050 cycles, 2nd at 27, 300 cycles.
Failure Analysis 2 Head portions from Security Paving (SP)	12/31/00	ARDL	Microscopy	No conclusion could be drawn
Force to pull out @ 65, 100 and 110 deg. F	3/20/01	Eaton	ES-F2UA-1700-AA Pull-Through at elevated temperature	Average @ 65F: 163.8 lb. Average @ 100F: 137.1 lb. Average @ 110F: 134.6 lb.
Loss of Serviceability (Davis)	8/10/01	Smithers	Microscopy	Valve had a circumferential tear.
Valve deflection vs. Speed	8/28/01	STL	Photographs of valve deflection at 45, 60, 90 & 120 mph	5 deg. @ 45 mph, 10 deg. @ 60 mph, 30 deg. @ 80 mph, touches rim at 120 mph
Flex Test in Rim	10/19/01	Eaton	Flex valve against rim.	4,000,000 cycles - no leakage
Design change to increase pull out force.	9/18/02	Eaton	ES-F2UA-1700-AA design verification.	Design change increased pull force by 43 lb.

To: Rabian M. Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/rabianmmartin(a)eaton.com]  
From: C=US/A=INTERNET/DDA=ID/froth(a)ford.com  
Cc: br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/breed1(a)ford.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/froth(a)ford.com]  
Subject: Pull Test at 130 degrees  
Attachment:  
Date: 9/19/00 2:30 PM

Please do valve pull out test on ten valves at 130 degrees F. If you cannot go to 130 do at highest temp you can go. The question was raised on what the effect of temp has on pull out. What temp do you perform pull-out? | read spec as 68 - 75 F.

Need this by COB 9/19/00.  
Frank E. Roth, KTPPV Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

	E-600 Pull in + thru @ 150°F		DD.
	Pull in	Pull thru	Temp.
1.	68	118	60
2.	88	116	61
3.	100	116	61
4.	95	113	60
5.	77	118	60
6.	87	114	60
7.	86	120	60
8.	89	122	62
9.	65	117	61
10.	78	123	60

heads broke off on all except one, which pulled through

Values were aged @ 150°F in oven for 45 min, then transferred to Instron tester as rapidly as possible.

Notes:  
 Frank Roth wanted this  
 → pulled in with Instron  
 P. [Signature]

To: br400@admin@whqcleveoh3 [C=US/A=INTERNET/DDA=ID/froth(a)ford.com]

From: Larry Schlesinger@PrdEng@ECRoxboroNC

Cc: Rabian M. Martin@PrdEng@ECRoxboroNC

Subject: re: Valve Stem Pull Out Tests

Attachment: ENG LAB REPORT 22-507.XLS, BEYOND.RTF

Date: 9/22/00 11:37 AM

Frank:

The results of the test you requested are attached.

Regards,

Larry Schlesinger  
Eaton Corporation  
2564 Durham Road  
Roxboro, NC 27573 USA  
Phone: 336-503-6530  
Fax: 336-503-6425

From: C=US/A=INTERNET/DDA=ID/froth(a)ford.com, on 9/21/00 6:31 PM:

Please do pull out tests of (30) samples in your standard thickness plate of .187 +/- .002" except at our maximum hole diameter of 0.461" and at 110 F. Could this be done by 9/26/00?

This is to understand if we potential have a pull through issue at KTP.

Frank E. Roth, KTPPV1 Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

**E-600 Pull Thru Test**

Test date = 9/22/00

Temperature of Valve Stem = 110 Degrees Fahrenheit

Rim Thickness = .187 +/- .002"

Rim Hole Dia, = .461

Test Sample No.	Pull Thru Value (Lbs.)	
1	125	Lower Limit
2	129	
3	125	Lower Limit
4	131	
5	122	Out of Spec.
6	129	
7	129	
8	125	Lower Limit
9	130	
10	130	
11	125	Lower Limit
12	131	
13	127	
14	126	
15	132	
16	132	
17	131	
18	132	
19	130	
20	121	Out of Spec.
21	131	
22	133	
23	133	
24	129	
25	128	
26	132	
27	131	
28	125	Lower Limit
29	127	
30	129	
<b>Average</b>	<b>128.67</b>	
<b>Standard Deviation</b>	<b>3.21</b>	
<b>High</b>	<b>133</b>	
<b>Low</b>	<b>121</b>	

To: br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/breed1(a)ford.com]

From: Larry Schlesinger@PrdEng@ECRoxboroNC

Cc: br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/bpatell(a)ford.com], br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/breed1(a)ford.com], br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/dgreen13(a)ford.com], br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/pbeuckel(a)ford.com], Joseph A. Hebert@Sales@ECRoxboroNC, Rabian M. Martin@PrdEng@ECRoxboroNC

Subject: re: FW: Valve Stem Pull Out Tests

Attachment: E-600 PULL THRU.JPG, BEYOND.RTF

Date: 9/25/00 9:09 AM

Bill:

The base tears away from the valve. See attached photograph for some actual valves.

Larry Schlesinger  
Eaton Corporation  
2564 Durham Road  
Roxboro, NC 27573 USA  
Phone: 336-503-6530  
Fax: 336-503-6425

From: C=US/A=INTERNET/DDA=ID/breed1(a)ford.com, on 9/24/00 6:36 PM:

Larry, what is the failure mode when the valve stem pulls through? Does the stem pull through undamaged, or is it cut or torn in some way?

Regards,

Bill Reed (breed1@ford.com)

KTP PVT Chassis Engineering Supervisor

Phone (502) 429-2001 Fax (502) 429-2941 Page (502) 336-6294

Text page at: 5023366294@airtouchpaging.com

-----Original Message-----

From: Roth, Frank (F.E.)

Sent: Friday, September 22, 2000 7:53 PM

To: Patel, Bharat (B.C.)

Cc: Reed, Bill (B.P.)

Subject: FW: Valve Stem Pull Out Tests

Frank E. Roth, KTPPVT Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

-----Original Message-----

From: LarrySchlesinger@gsc.eaton.com

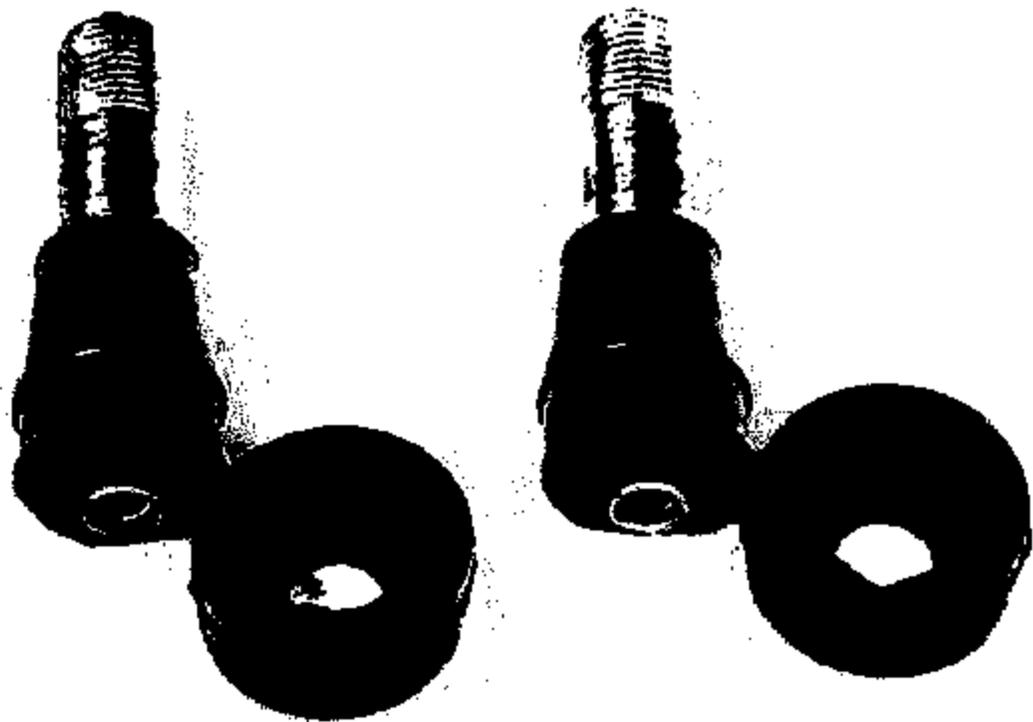
[mailto:LarrySchlesinger@gsc.eaton.com]

Sent: Friday, September 22, 2000 11:38 AM

To: froth@ford.com

Cc: RabianMMartin@gsc.eaton.com

Subject: re: Valve Stem Pull Out Tests



**TR-600 AFTER PULL  
THRU TESTING @110° F**

To: Larry Schlesinger@PrdEng@ECRoxboroNC, Rabian M.  
Martin@PrdEng@ECRoxboroNC, Tom J. Cavanaugh@QA@ECRoxboroNC  
From: Joseph C. Sanders@QA@ECRoxboroNC  
Originated by: C=US/A=INTERNET/DDA=ID/lgarcia3(a)ford.com  
Cc:  
Subject: fwd: Durometer readings  
Attachment: BEYOND.RTF  
Date: 10/6/00 10:48 AM

Any better explanations?

Joe Sanders  
Quality Engineer  
Eaton Corporation  
josephcsanders@eaton.com  
336-503-6581 phone  
336-503-6417 fax

From: C=US/A=INTERNET/DDA=ID/lgarcia3(a)ford.com, on 10/6/00 10:46 AM:  
To: Joseph C.  
Sanders@QA@ECRoxboroNC, br400@whqig@WHQCleveOH2[C=US/A=INTERNET/DDA=ID/JosaphCSanders(a)eaton.com], Tom J. Cavanaugh@QA@ECRoxboroNC  
Cc: br400@whqig@WHQCleveOH2[C=US/A=INTERNET/DDA=ID/tomjcavanaugh(a)eaton.com]

Mr. Sanders,

According to your note the durometer hardness readings have been elevated, fine, but this re-aligning of the gauge doesn't have anything to do with the physical hardness of the rubber. The problem as reported by KTP (Ann) is that the rubber is at minimum hardness specification permissible or below

and that is a physical property.

Please explain and enclose the Ford specs.

Thanks,

Louis M. Garcia  
STA Sr. Commodity Engineer (Tires)  
Ph: 313-248-6211 Fx: 313-594-4783  
17101 Rotunda Drive MD-610  
Dearborn, MI 48121

**Process Capability Study  
(30) Piece Sample**

Part No.: 22-800-1  
Description: TTY

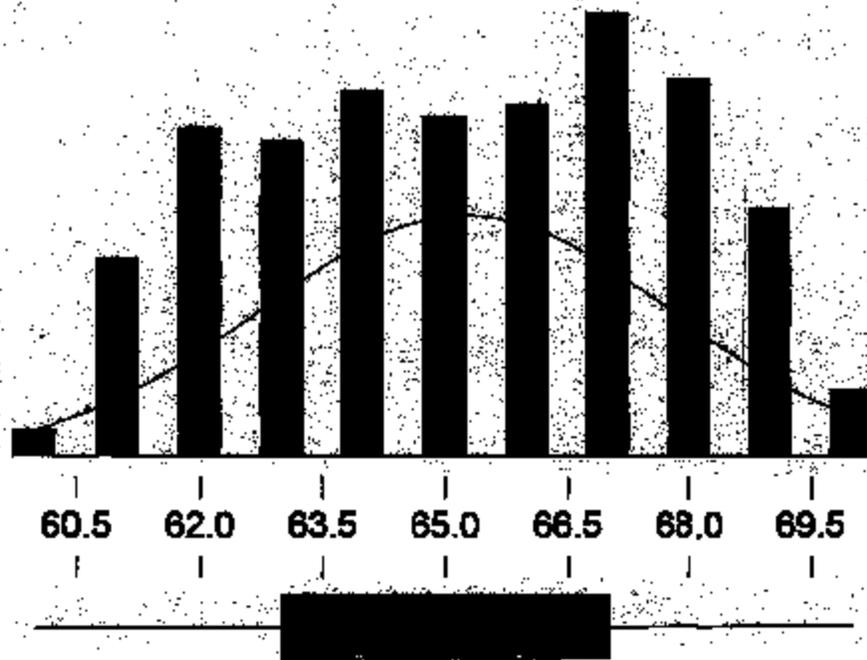
Date: 10/6/00  
Inspector: R.K.E.

Characteristic DURO	
Upper Spec	70.000
Lower Spec	60.000
1	66.0000
2	64.0000
3	65.0000
4	65.0000
5	64.0000
6	67.0000
7	66.0000
8	67.0000
9	66.0000
10	66.0000
11	64.0000
12	65.0000
13	64.0000
14	67.0000
15	66.0000
16	65.0000
17	68.0000
18	67.0000
19	64.0000
20	65.0000
21	68.0000
22	64.0000
23	66.0000
24	65.0000
25	65.0000
26	66.0000
27	64.0000
28	68.0000
29	64.0000
30	64.0000

Max Value	67.000
Min Value	64.000
Range	3.000
Average	65.233
Std. Dev.	1.040
Pp	1.528
Upper Z	1.628
Lower Z	1.677
Ppk	1.528

Note: When calculating capability with "0" (zero) "Lower Spec" calculation for Pp (Line 28) must be deleted

# Descriptive Statistics



95% Confidence Interval for Mu



95% Confidence Interval for Median



## Variable: Durometer Bi-Weekly Test Data

### Anderson-Darling Normality Test

A-Squared: 3.355  
P-Value: 0.000

Mean 65.2650  
StDev 2.5165  
Variance 6.33293  
Skewness -9.8E-02  
Kurtosis -1.04124  
N 234

Minimum 60.0000  
1st Quartile 63.0000  
Median 65.0000  
3rd Quartile 67.0000  
Maximum 70.0000

### 95% Confidence Interval for Mu

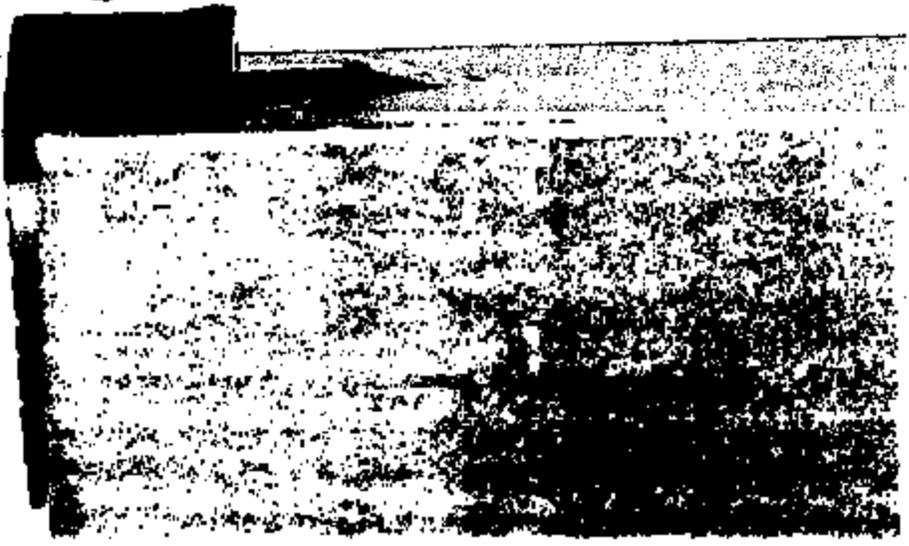
64.9408 65.5891

### 95% Confidence Interval for Sigma

2.3073 2.7678

### 95% Confidence Interval for Median

65.0000 66.0000

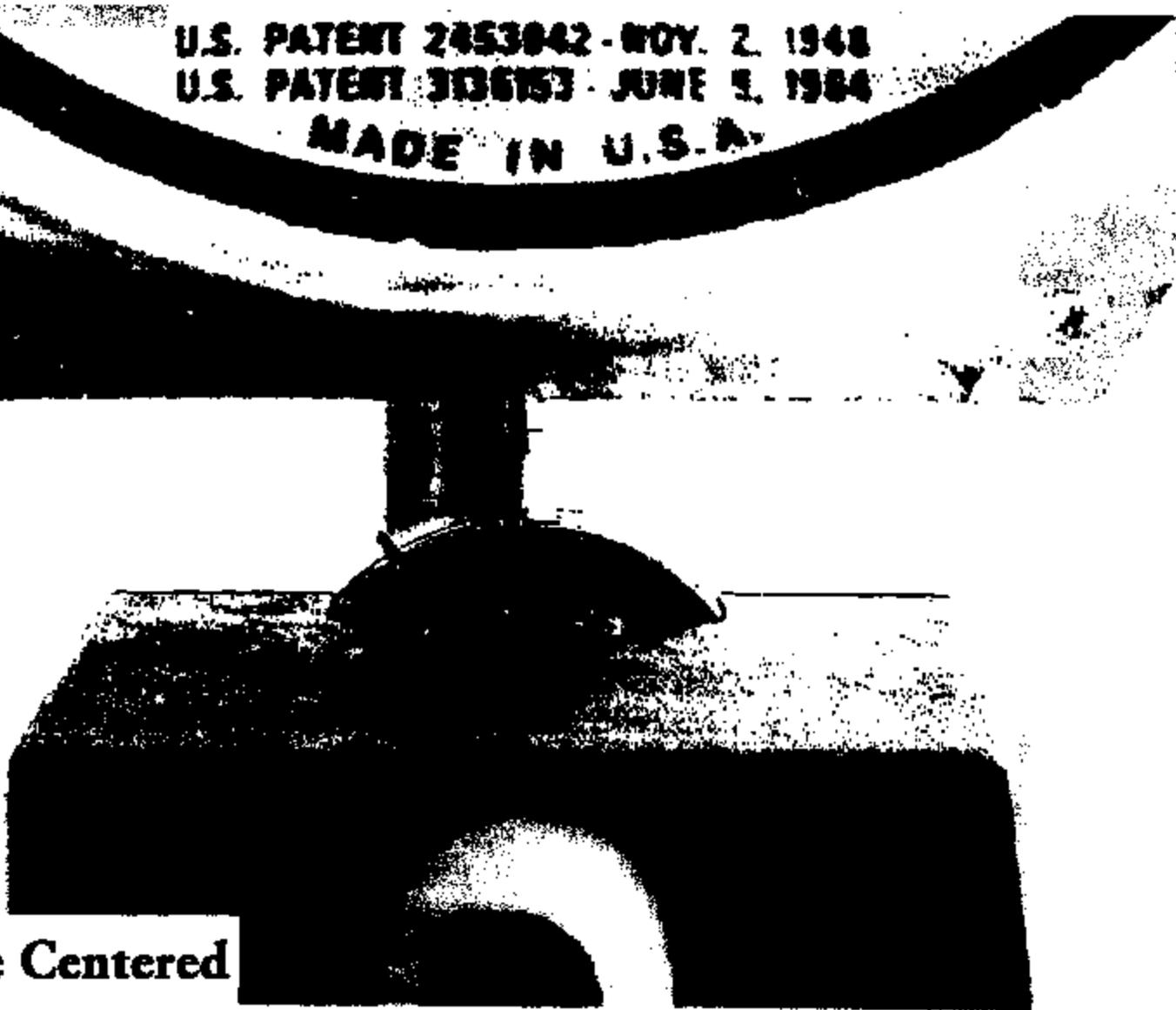


**Gauge Centered**

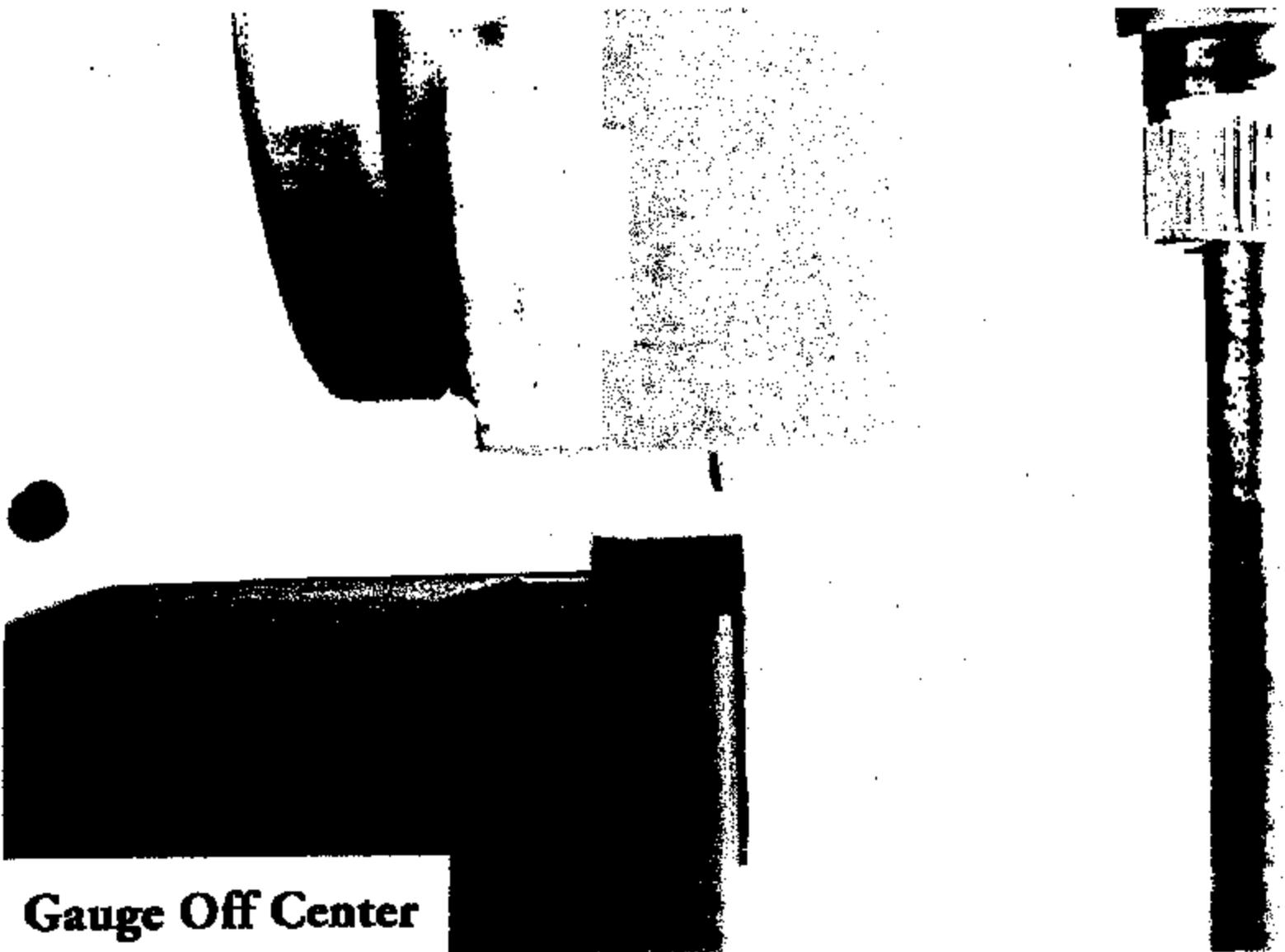
U.S. PATENT 2453042 - NOV. 2, 1948

U.S. PATENT 3136153 - JUNE 5, 1964

MADE IN U.S.A.



Gauge Centered



**Gauge Off Center**



**SHORE DUROMETER  
HARDNESS  
TYPE "A-2"**

**ASTM D2240**

**U.S. PATENT 2,800,000, NOV. 2, 1958**

**U.S. PATENT 2,800,001, NOV. 2, 1958**

**MADE IN U.S.A.**

**Gauge Off Center**

# Fax Correspondence

Eaton Corporation  
Engine Components Operation, North America  
2564 Durham Road • P.O. Box 241 • Roxboro, NC 27573  
336-599-1141 • 336-503-6425

**EATON**

To	Ann Temple	From	Rabian Martin
Company/Division	Ford Motor Co.	Date	October 5, 2000
City	Louisville	Telephone	336-503-6535
State/Country	KY	ADNET #	
Fax #	502-429-2983	Fax #	336-503-6425
ADNET Fax #		ADNET Fax #	
Copy To	Eaton Management, Joe Hebert, Dale Green <i>Louis Garcia 313-594-4783</i>	Subject	Tentative Compound Experiment Schedule

If you do not receive 1 pages (including this cover page) or have any difficulties with this transmission, please call the sender.

**Mrs. Temple,**

Per your request, Eaton will run Product Experiments on the TR 600HP Tubeless Tire Valve with a "revised compound". The compound will have a higher percentage of carbon black in order to increase the durometer of the current product.

The experimental compound should be available to us the week of October 16<sup>th</sup>, 2000. After receipt of the material, lab experiments must be conducted to assure product performance per SAE J1205 (PERFORMANCE REQUIREMENTS FOR SNAP-IN TUBELESS TIRE VALVES) and SAE J1206 (METHODS FOR TESTING SNAP-IN TUBELESS TIRE VALVES). This testing should be completed within five (5) working days after receipt of the compound.

Should this compound pass all of the test requirements and give the desired durometers, Ford Design Validation must also be conducted. This validation must be dictated by Ford Product Engineering.

I hope this schedule meets your satisfaction.

Regards,  
*Rabian Martin*  
Rabian Martin  
Project Engineer

*TEST PER FORD ES-F24A-1700-AA*

# Engineering Lab Work Request



File No.:22- 510\_\_\_\_\_

**Part No. / Description: TR 600HP TUBELESS TIRE VALVE**

**Subject: Aeroquip 50TW Compound  
ES-F2UA-1700-AA testing**

**Customer: VARIOUS**

**Work Requested.**

1. Test Aeroquip 50TW compound on TR 600HP tubeless tire valves per Ford ES-F2UA-1700-AA.

**Reason For Request.**

To evaluate a higher durometer rubber compound provided by Eaton/Aeroquip Global Hose Division

**Requested By: Rabian Martin**

**Approved By:** RA

**Date: October 20, 2000**

**Date Approved:** 10-20-00

**Date Required: ASAP**

20-00

File No 22-510

E-600 71P Aeroquip 50TW

P.J.

Jord ES-F2UA-1700-AA (ES Testing)

Durometer

Age (After 4 hrs @ 212°F)

68	67	65	68	68	69
67	68	68	68	68	69
67	67	67	68	69	69
67	68	67	69	69	70

Burst (PSIG)

1. 954	7. 912
2. 932	8. 924
3. 941	9. 952
4. 940	10. 941
5. 962	11. 940
6. 910	12. 940

Avg = 937 psig.

$\sigma = 15.796$

high = 962 psig.

low = 912 psig.

Pull in

Pull thru

55 lbs.	168 lbs.
52	165
60	171
60	166
59	168
59	167
63	167
77	171
60	168
46	167
48	170
57	167

Pull in Avg = 56 lbs.

"  $\sigma = 5.838$

" high = 63 lbs.

" low = 46 lbs.

Pull thru Avg = 168 lbs.

"  $\sigma = 1.881$

" high = 171 lbs.

" low = 165 lbs.

File No 22-510

10-20-00

E-6007P Aeroquip 50TW

AD

Adhesion

- |         |          |
|---------|----------|
| 1. 100% | 7. 100%  |
| 2. 100% | 8. 100%  |
| 3. 100% | 9. 100%  |
| 4. 100% | 10. 100% |
| 5. 100% | 11. 100% |
| 6. 100% | 12. 100% |

Rim Seal Leak Test

All 12 valves were leak checked @ 100 psig with no leaking found.

Force to Push out (lbs.)

562	567	Avg = 543 lbs.
485	549	$\sigma = 28.802$
562	538	high = 572
572	556	low = 489
553	489	
527	554	

Appearance

All 12 valves appeared to be free of all flaws and good valves.

Cold Temperature Test

All 12 valves checked good after -40°F for 2 hrs @ 100 psig.

Hot Temperature Test

All 12 valves checked good after 212°F for 72 hrs.

# Fax Correspondence

Eaton Corporation  
Engine Components Operation, North America  
2564 Durham Road • P.O. Box 241 • Roxboro, NC 27573  
336-599-1141 • 336-503-6425



To	Frank Roth	From	Rabian Martin
Company/Division	Ford Motor Co. KTP	Date	October 18, 2000
City	Louisville	Telephone	336-503-6535
State/Country	Kentucky	ADNET #	
Fax #	502-429-2111	Fax #	336-503-6425
ADNET Fax #		ADNET Fax #	
Copy To	Ann Temple fx:(502-429-2983)	Subject	Test Report

If you do not receive 5 pages (including this cover page) or have any difficulties with this transmission, please call the sender.

Any review, disclosure or copying of this document or any reliance upon its contents by anyone other than the addressee is strictly prohibited.

---

## Message

Mr. Roth,

Per your earlier request, I am faxing you the polymer identification test report for Eaton's TR 600HP tire valve. The report will identify the material as EPDM.

If you have any questions/comments, please let me know.

Respectfully,

Rabian Martin  
Project Engineer

"More Than Testing, We Care"



October 10, 2000

AKRON RUBBER DEVELOPMENT LABORATORY, INC.  
2857 Glöhriest Road • Akron, Ohio 44305  
1-800-830-AFDL • (330) 794-8800 • FAX (330) 794-8810

## - TEST REPORT -

PN# 41949  
PO# 004854065

Prepared for:

Mr. Keith Cozart  
Eaton Corporation  
2564 Durham Road  
P.O. Box 241  
Roxboro, NC 27573-0241

Prepared by:

  
Kimberly J. Rook

Approved by:

  
Jim Drummond



AN ASLA ACCREDITED LABORATORY  
MEMBER OF ACIL: THE ASSOCIATION OF INDEPENDENT SCIENTIFIC,  
ENGINEERING AND TESTING FIRMS

ISO 9001 Registered



Letters and reports are for the exclusive use of the clients to whom they are addressed and shall not be reproduced except in full, without the written permission of Akron Rubber Development Laboratory, Inc. The information contained herein applies to the specific material, products or processes tested or evaluated. No warranty of any kind is herein contained or implied. The liability of Akron Rubber Development Laboratory, Inc. shall be limited to the amount of consideration paid for services.

"More Than Testing, We Care"



AKRON RUBBER DEVELOPMENT LABORATORY, INC.  
2687 Glickel Road - Akron, Ohio 44308  
1-800-830-ARDL • (330) 794-8600 • FAX (330) 794-8610

Page 1 of 1, PN# 41949

October 10, 2000

Mr. Keith Cozart  
Eaton Corporation  
2684 Durham Road  
P.O. Box 241  
Roxboro, NC 27573-0241

**SUBJECT:** Interdepartmental \*\*\*Polymer Identification on Tire Valve.

**RECEIVED:** One Tire Valve identified as; TR600HP.

**TEST METHODOLOGY:**

**POLYMER IDENTIFICATION: ASTM D 3677-90 (1995)**

Instrument: Perkin Elmer Spectrum BX Spectrometer  
Resolution: 4.0  
Number of Scans: 6  
Method of Preparation: Film Method

**RESULTS:**

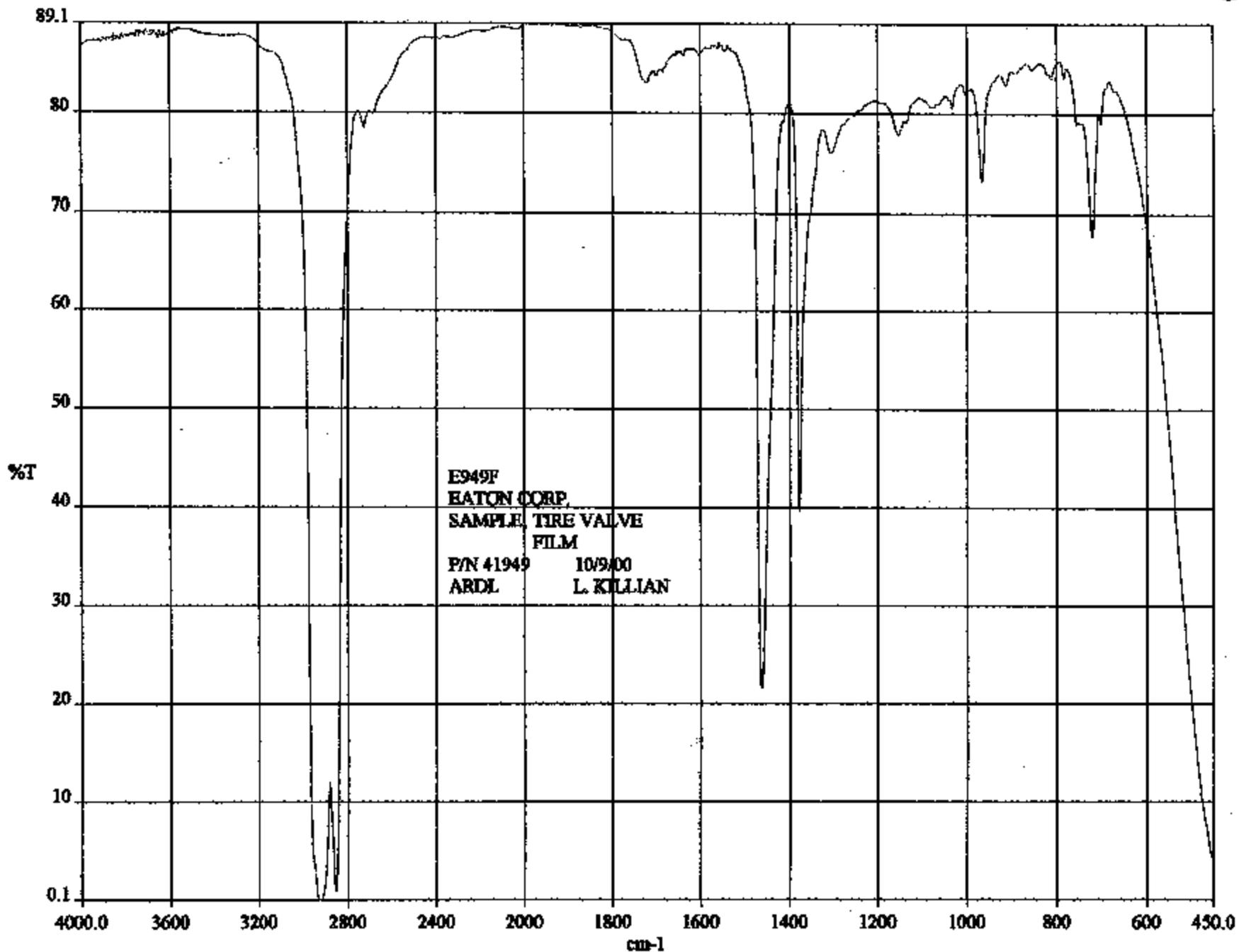
Sample	Polymer
Tire Valve	Ethylene-propylene

\*\* Graphs are included for your review.

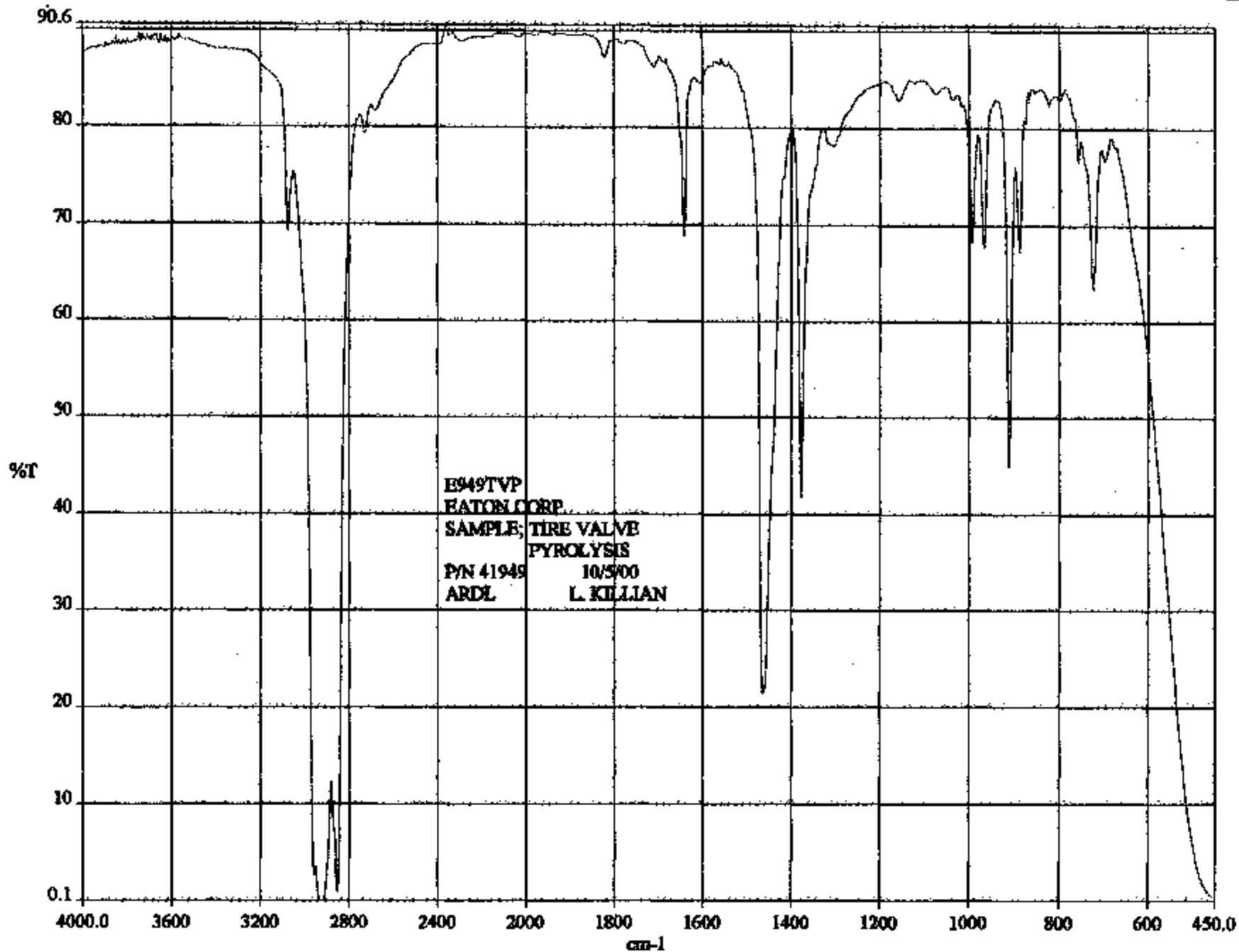
*Kimberly J. Rook*  
Kimberly J. Rook  
Project Technician  
AKRON RUBBER DEVELOPMENT LABORATORY, INC.

Scott W. Yates  
Supervisor  
Plastics Testing Division

KR/SWY/TF  
PN# 41949 INV# 74194901



c:\pel\_data\pco\rate0407.sp



c:\pel\_data\specdata\9494b.gsp



THE AMERICAN ASSOCIATION  
FOR LABORATORY ACCREDITATION  
5301 Buckeystown Pike, Suite 350  
Frederick, MD 21704-8373

## ISO 9001 REGISTERED QUALITY SYSTEM

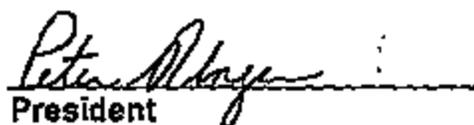
Through the Registration Panel of its Accreditation Council,  
A2LA has registered the Quality System of

**Akron Rubber Development Laboratory**  
of Akron, OH

This quality system meets the requirements of the ANSI/ASQC Q9001 (ISO 9001) standard for material design, development and evaluation, compositional analysis and formulation reconstruction, failure analysis and forensic services, quality assurance, and commercial testing (35-NACE K74.3) of rubber and plastic related materials and products.

Presented this 17<sup>th</sup> day of March, 2000.



  
President  
For the Accreditation Council  
Certificate Number R-019  
Valid to December 31, 2000



THE AMERICAN  
ASSOCIATION  
FOR LABORATORY  
ACCREDITATION

## ACCREDITED LABORATORY

A2LA has accredited

**AKRON RUBBER DEVELOPMENT  
LABORATORY**  
Akron, OH

for technical competence in the field of  
**Mechanical Testing**

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 17<sup>th</sup> day of March, 2000.



*Peter Abaya*  
\_\_\_\_\_  
President  
For the Accreditation Council  
Certificate Number 255.01  
Valid to January 31, 2002

For tests or types of tests to which this accreditation applies, please refer to the  
laboratory's Mechanical Scope of Accreditation



# American Association for Laboratory Accreditation

## SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990

### AKRON RUBBER DEVELOPMENT LABORATORY

2887 Gilchrist Road  
Akron, OH 44305  
Fred Farina Phone: 330 794 6600

### MECHANICAL

Valid To: January 31, 2002

Certificate Number: 0255-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

#### Rubber and Related Products:

ASTM: B117, D257, D380 (except 16.2; 17, 18), D395, D412, D413, D429, D471, D518, D572, D573, D575, D623, D624, D746, D813, D865, D925, D991, D1053, D1056, D1149, D1171, D1229, D1329, D1415, D1646, D1630, D2084, D2137, D2228, D2240, D2632-88, D3137, D3182, D3389, D3395, D4329, F146, F152  
ISO: 34, 37, 812, 815, 1431, 1653, 3384, 6056, 6383  
JIS: K6301, Z2371  
DIN: 53516

#### Plastics and Related Products:

ASTM: D256, D543, D570, D635, D638, D648, D695, D785, D790, D792, D794, D882, D1004, D1203, D1238, D1525, D1693, D1708, D1894, D2583, D2584, D3045, D3364, D3576, D3641, D3763, D3801, D4812, D5420  
ISO: 62, 75-1&2, 178, 179, 180, 188, 293, 306, 527-1, 899, 1133, 1210, 2818 (Sec. 3.2, 6.2, 6.4), 3795  
GM: 9904P

#### Latex:

ASTM: D1055, D3492, D3577, D3578, D5151, D6124, BS 3704  
ARL: 2140

#### Adhesives, Sealers and Adhesive Tapes:

AFG-01 Test Specification (authored by APA-American Plywood Association)

#### Dynamic & Predictive Testing (MTS):

ASTM: D4065, D5992  
UL: 746B  
SAE: J1085a  
ARL: 8105, 8106, 8110, 8111  
ISO: 2856, 4664

#### Flammability:

UL 94  
FMVSS-302  
ISO: 1210

#### Condoms:

ISO: 4074-1  
ARL: 2139  
WHO Specification & Guidelines for Condom Procurement





THE AMERICAN  
ASSOCIATION  
FOR LABORATORY  
ACCREDITATION

## ACCREDITED LABORATORY

A2LA has accredited

**AKRON RUBBER DEVELOPMENT  
LABORATORY**  
Akron, OH

for technical competence in the field of  
**Chemical Testing**

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 17<sup>th</sup> day of March, 2000.



*Peter Abney*  
\_\_\_\_\_  
President  
For the Accreditation Council  
Certificate Number 255.02  
Valid to January 31, 2002

For tests or types of tests to which this accreditation applies, please refer to the  
laboratory's Chemical Scope of Accreditation



# American Association for Laboratory Accreditation

## SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990

AKRON RUBBER DEVELOPMENT LABORATORY  
2887 Gilchrist Road  
Akron, OH 44305  
Fred Farina Phone: 330 794 6600

### CHEMICAL

Valid To: January 31, 2002

Certificate Number: 0255-02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on rubber and plastic materials:

#### Spectroscopy

Atomic absorption  
Infrared (FTIR)

#### Wet Chemistry Measurements

Volumetric  
Gravimetric

#### Microscopy

Light Optical Microscopy (LOM)  
Scanning Electron Microscopy (SEM/EDX)  
Scanning Transmission Electron Microscopy (STEM)  
Elemental Analysis by STEM/EDX  
Polymer Morphology by CUM/TEM  
Failure Analysis

#### Dynamic Mechanical Analysis (DMA)

#### Differential Scanning Calorimetry (DSC)

#### Sulfur Determination (Leco)

#### Resistance of Protective Clothing Materials to Permeation by Liquids or Gases

#### Physical Properties

Density  
Melting Point

#### Melting Point (DSC & Capillary)

#### Thermal Gravimetric Analysis (TGA)

#### Chromatography

Gas chromatography  
High performance liquid chromatography  
Thin layer chromatography  
Gel permeation chromatography  
GC Mass spectrometry

#### Carbon Black Dispersions

#### Primary Aggregate Dimensions

#### Chloroform Coagulation, Latex

#### Toluene Swell Test

#### according to the following standards:

ASTM: D297, D1071, D1076, D1269, D1417, D1434 (Procedure V), D1519, D1817, D2663, D3156, D3417, D3418, D3677-90, D3849, D3895, D4004, D4419, D4591, D5992, E663, E793, E794, E831, E1131, E1356, F739

ISO: 3146



# Engineering Lab Work Request



File No.: 22-513

Part No. / Description: TR 600HP Returns from Alabama Power

Subject: Ozone Test

Customer: KTP

### Work Requested.

- Perform ozone testing per Ford ES-F2UA-1700-AA Section III, sub. A on sample valves provided.

### Reason For Request

Customer Request

*Results on next page:*

*Dean*

Requested By: Rabian Martin *LM*

Approved By: *RS*

Date: October 26, 2000

Date Approved: *10/26/00*

Date Required: Earliest Convenience



In process Tests Phase 2 (IP-2) - IP-2 test program may be implemented only after process capability has been established. Tests must be completed with production parts on a continuing basis. Samples for these tests must be selected on a random basis to represent the entire production population as much as possible. In the event that any portion of these tests are not met, the reaction plan specified in Ford Q-101 section "ES Test Failure" shall be invoked and Light Truck Engineering shall be notified immediately.

### III. TEST PROCEDURES AND REQUIREMENTS

#### A. OZONE RESISTANCE TEST

##### 1) Test Procedure

The unmounted valve shall be aged for 72 hours at 212 degrees F. in a circulating hot air oven. After aging, the valve rated at 80 psig shall be lubricated with lubricant #521-B (30-67-092) or an approved equivalent lubricant and installed in a  $.126 \pm .002$  in. thick metal plate. After aging, the valve rated at 100 psig shall be installed dry in a  $.187 \pm .002$  in. thick metal plate. Hole diameter shall be  $.448 - .450$  in. located 1.50 in. center to center. Edges of hole shall be broken  $.005 - .010$  in. and shall be burr free. The installed valve rated at 80 psig shall be thoroughly washed in cold water to remove all traces of lubricant. The valve is deflected 10 degrees from its axis and retained in that position for the duration of the test. The assembly is placed into a darkened enclosure at room temperature for a minimum of 24 hours. The valve shall be tested in a circulating ozone chamber, maintaining  $100 \pm 5$  parts of ozone to 100 million parts of air for 72 hours at 100 degrees F.

##### 2) Test Requirements/Acceptance Criteria

All samples must exhibit resistance to ozone equivalent to a zero rating per ASTM-D1171.

##### 3) Retest Procedure

No retest permitted. One or more failures invalidates the entire lot.

#### B. Adhesion Test

##### 1) Test Procedure

Method #1 - Subject sample molded valve to 212 degrees F. for 4 hours in a circulating hot air oven and allow to cool at room temperature for 24 hours. Make two parallel cuts down the entire length of the valve about 90 degrees to 120 degrees apart. Manually pull this section of rubber from the housing with gripping pliers. Do not evaluate for adhesion in this section. Manually pull off the balance of the rubber cover circumferentially.

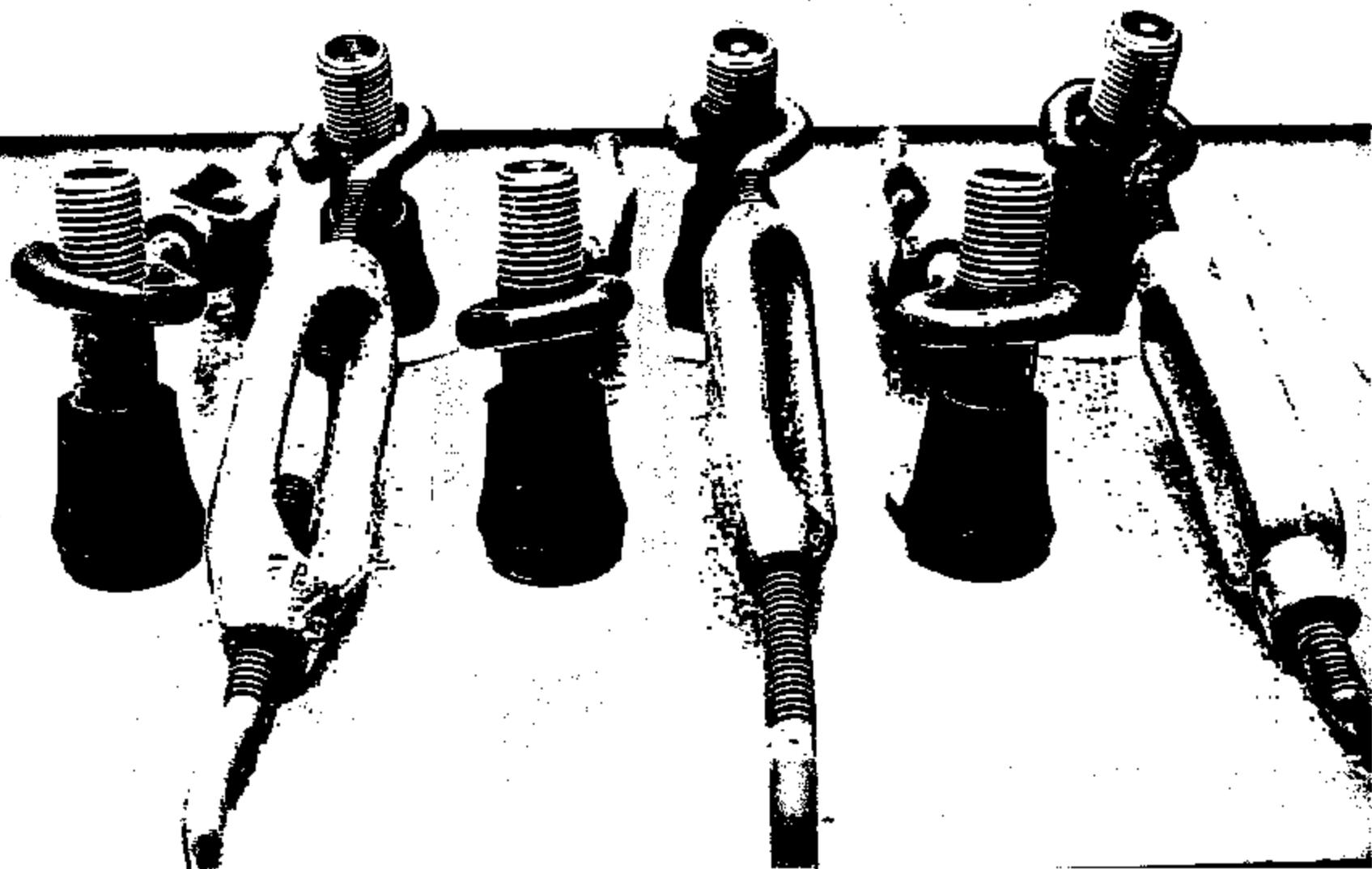
File No 22-513

11-2-00 TR600 HP Returns from Alabama Power Co

### Ozone Test

These returned valves were tested in a circulating ozone chamber maintaining  $100 \pm 5$  parts of ozone to 100 million parts of air for 72 hours @ 100 degrees F. and found no visual defects or cracks in any of the valves tested.

Pictures of valves after test was run accompany this report.



**Returned TR-600-HP From  
Alabama Power after Ozone Test**

<b>E-600 Flex Test</b>				
<b>Production E-600 vs Redesigned E-600</b>				
Valves in slots 1 & 2 are production E-600				
Valve in slots 4 & 5 are Redesigned E-600				
<b>Date</b>	<b>Time</b>	<b>No. Cycles</b>	<b>Slot No.</b>	<b>Gauge Reading (PSI)</b>
11/13/00	2:30 PM	1000	1	80
			2	85
			4	80
			5	80
11/13/00	4:10 PM	1800	1	80
	Stopped @ 4:10 PM		2	85
			4	80
			5	80
11/14/00	8:15 AM	1300	1	80
	Started @ 8:15 am		2	85
			4	80
			5	80
11/14/00	11:15 AM	1600	1	80
			2	84
			4	79
			5	79
11/14/00	2:15 PM	5000	1	79
			2	84
			4	79
			5	79
11/14/00	4:15 PM	7500	1	79
	Stopped @ 4:15 PM		2	82.5
			4	77
			5	78
11/15/00	8:00 AM	7500	1	79
	Started @ 8:00 AM		2	82
			4	78.5
			5	78
11/15/00	11:30 AM	10270	1	79
			2	82
			4	78.5
			5	78
11/15/00	2:30 PM	13000	1	79
			2	82
			4	78
			5	78
11/15/00	3:00 PM	15000	1	79
	Stopped @ 3:00 PM		2	82
			4	78
			5	78

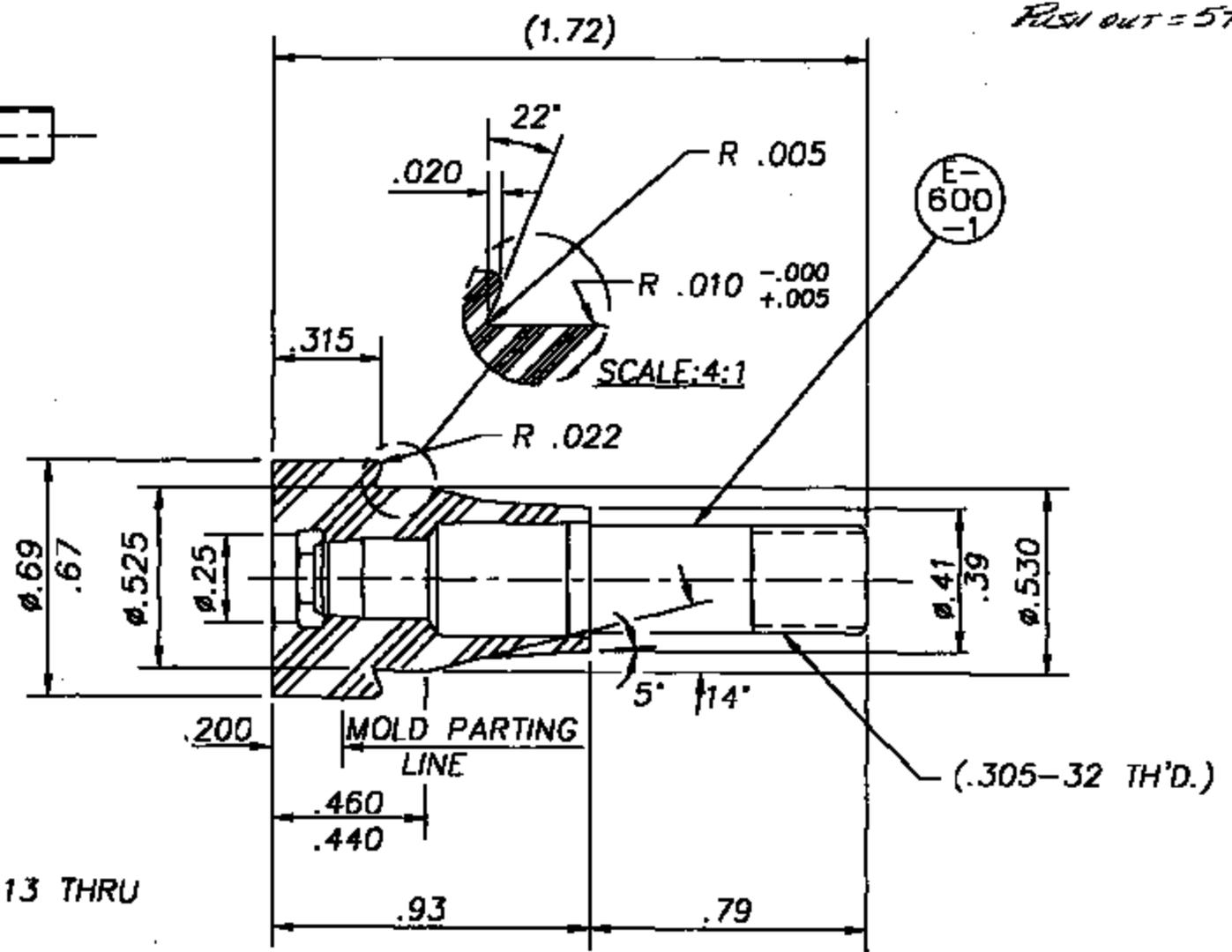
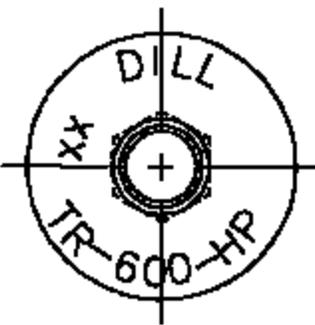
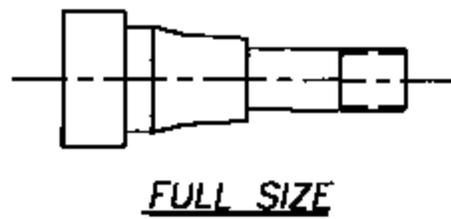
<b>E-600 Flex Test</b>					
<b>Production E-600 vs Redesignated E-600</b>					
Valves in slots 1 & 2 are production E-600					
Valve in slots 4 & 5 are Redesignated E-600					
Date	Time	No. Cycles	Slot No.	Gauge Reading (PSI)	
11/16/00	8:00 AM	13000	1	78	
	Started @ 8:00 am		2	81	
			4	75.5	
			5	77	
11/16/00	8:30 AM	14950	1	78	
			2	81	
			4	75.5	
			5	77	
11/16/00	12:00 PM	17880	1	78	
			2	81	
			4	75.5	
			5	78	
11/16/00	3:45 PM	20640	1	78	
	Stopped @ 3:45 PM		2	81	
			4	75.5	
			5	78	
11/17/00	6:00 AM	20540	1	78	
	Started @ 6:00 am		2	81	
			4	75.5	
			5	78	
11/17/00	10:30 AM	24050	1	78	
			2	Valve Broke	
			4	75.5	
			5	78	
11/17/00	11:30 AM	24830	1	78	
	Stopped @ 11:30 am		2	<del>78</del>	
	Restarted @ 2:00 PM	24830	4	75.5	
			5	78	
11/17/00	3:45 PM	26130	1	78	
	Stopped cycles @ 3:45 PM		2	<del>78</del>	
			4	75	
			5	77	
11/20/00	8:00 AM	26130	1	77	
	Started @ 8:00 am		2	<del>77</del>	
			4	73	
			5	76	
11/20/00	9:30 AM	27300	1	Valve Broke	
			2	<del>76</del>	
			4	72	
			5	76	

<b>E-600 Flex Test</b>				
<b>Production E-600 vs Redesign E-600</b>				
<b>Valves in slots 1 &amp; 2 are production E-600</b>				
<b>Valve in slots 4 &amp; 5 are Redesign E-600</b>				
<b>Date</b>	<b>Time</b>	<b>No. Cycles</b>	<b>Slot No.</b>	<b>Gauge Reading (PSI)</b>
11/20/00	11:30 AM	35455	1	X
			2	X
			4	72
			5	76
11/20/00	1:30 PM	36450	1	X
			2	X
			4	72
			5	76
11/20/00	3:30 PM	31650	1	X
	Stopped @ 3:30 PM		2	X
			4	72
			5	76
11/21/00	5:45 AM	31650	1	X
	Started @ 5:45 AM		2	X
			4	72
			5	76
11/21/00	9:30 AM	34755	1	X
			2	X
			4	72
			5	76
11/21/00	10:30 AM	35555	1	X
	Stopped @ 10:30 AM		2	X
			4	72
			5	76
11/21/00	11:00 AM	35555	1	X
	Restarted @ 11:00 AM		2	X
			4	72
			5	76
11/21/00	1:00 PM	37245	1	X
			2	X
			4	72
			5	76
11/21/00	4:00 PM	39555	1	X
	Stopped @ 4:00 PM		2	X
			4	72
			5	76
11/22/00	6:30 AM	39555	1	X
	Started @ 6:30 AM		2	X
			4	71
			5	75

<b>E-600 Flex Test</b>				
<b>Production E-600 vs Redesigned E-600</b>				
<b>Valves in slots 1 &amp; 2 are production E-600</b>				
<b>Valve in slots 4 &amp; 5 are Redesigned E-600</b>				
Date	Time	No. Cycles	Slot No.	Gauge Reading (PSI)
11/22/00	8:30 AM	41145	1	X
			2	X
			4	71
			5	75
11/22/00	12:30 PM	42865	1	X
			2	X
			4	71
			5	75
11/22/00	3:00 PM	45455	1	X
<b>Stopped @ 3:00 PM</b>			2	X
			4	71
			5	75
11/27/00	6:30 AM	46485	1	X
<b>Started @ 6:30 AM</b>			2	X
			4	69
			5	75
11/27/00	1:30 PM	50595	1	X
			2	X
			4	69
			5	75
11/27/00	3:00 PM	52065	1	X
<b>Stopped @ 3:00 PM</b>			2	X
			4	69
			5	75
11/28/00	6:30 AM	52065	1	X
<b>Started @ 6:30 AM</b>			2	X
			4	68
			5	74
11/28/00	7:50 AM	53105	1	X
			2	X
			4	68
			5	0 Valve Broke
11/28/00	1:00 PM	57135	1	X
			2	X
			4	67
			5	X
11/28/00	3:00 PM	58895	1	X
<b>Stopped @ 3:00 PM</b>			2	X
			4	67
			5	X

<b>E-600 Flex Test</b>				
<b>Production E-600 vs Redesigned E-600</b>				
Valves in slots 1 & 2 are production E-600				
Valve in slots 4 & 5 are Redesigned E-600				
Date	Time	No. Cycles	Slot No.	Gauge Reading (PSI)
11/29/00	8:30 AM	56685	1	X
Started @ 8:30 AM			2	X
			4	67
			5	X
11/29/00	10:30 AM	61815	1	X
			2	X
			4	67
			5	X
11/29/00	1:30 PM	64155	1	X
			2	X
			4	67
			5	X
11/29/00	3:30 PM	66715	1	X
Stopped @ 3:30 PM			2	X
			4	67
			5	X
11/30/00	6:30 AM	65715	1	X
Started @ 6:30 AM			2	X
			4	65
			5	X
11/30/00	12:30 PM	70395	1	X
			2	X
			4	65
			5	X
11/30/00	3:00 PM	72345	1	X
Stopped @ 3:00 PM			2	X
			4	65
			5	X
12/1/00	6:30 AM	72345	1	X
Started @ 6:30 AM			2	X
			4	65
			5	X
12/1/00	11:00 AM	75835	1	X
			2	X
			4	0 Valve Broke
			6	X

FLSH OUT = 57B

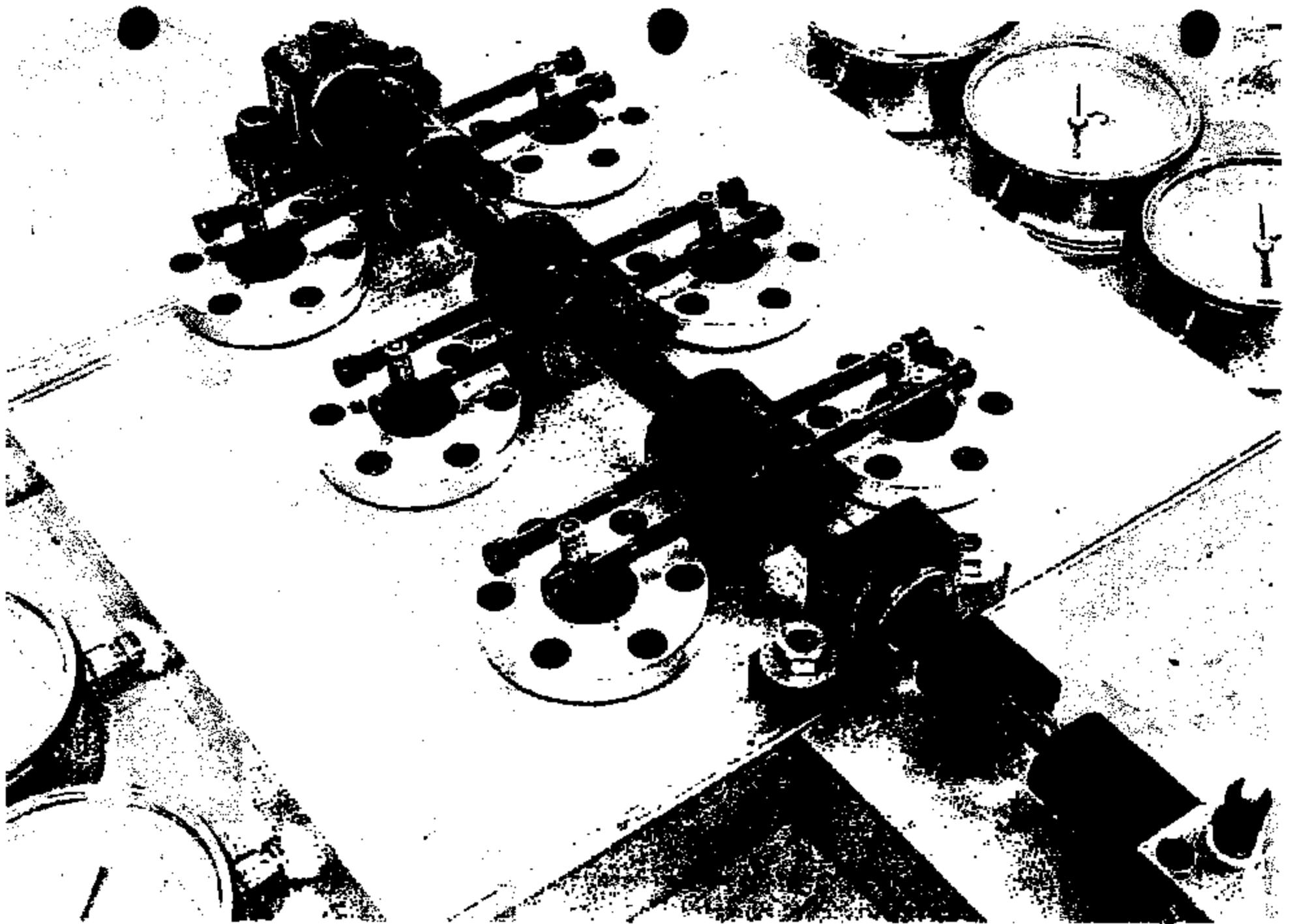


NOTES:

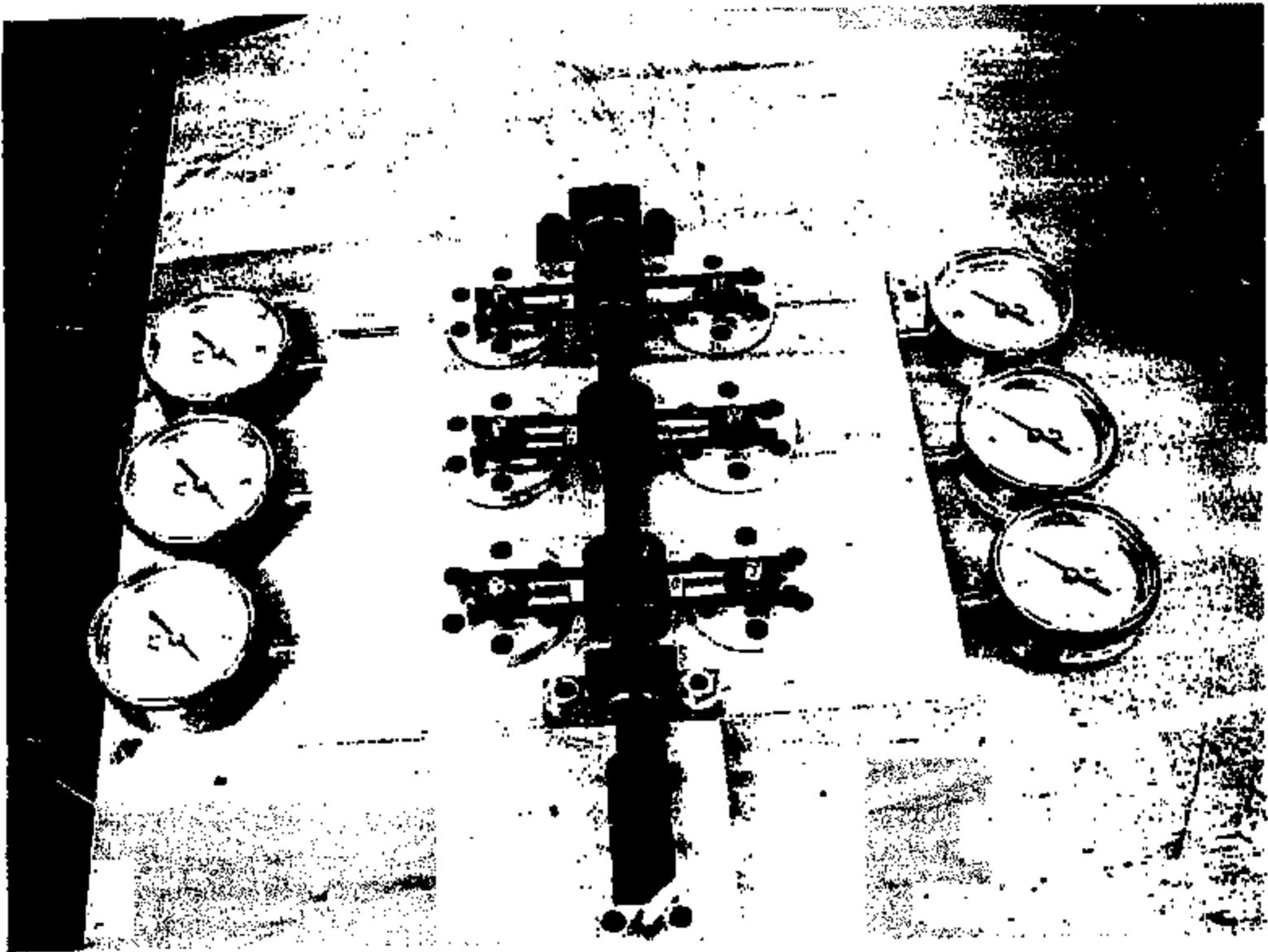
1. MUST MEET PS-22-13 THRU SECTION E.
2. R .0075 MAX. ALL CORNERS UNLESS NOTED

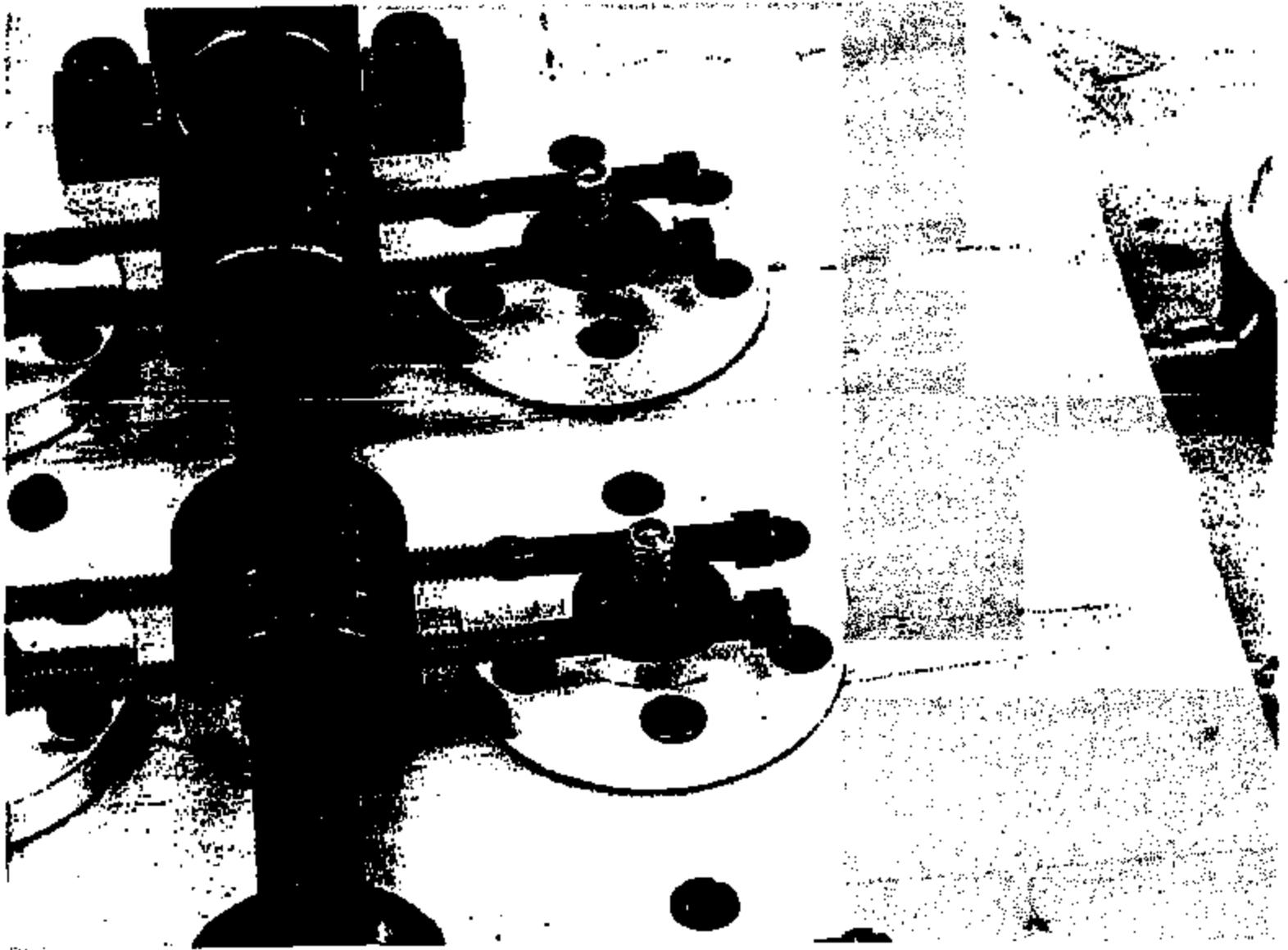
TR-600-HP

		MATERIAL		CODE 22-00600-EM-000-00	
		TOLERANCES UNLESS NOTED		Eaton Corporation Air Control Products Roxboro, N. C. 27573	
		INCHES $\begin{matrix} \pm .02 \\ \pm .005 \end{matrix}$ ANGLES $\pm 2^\circ$ SYMBOL DESIGNATING SPC BREAK SHARP EDGES & CORNERS MACHINE SURFACE ROUGHNESS CONCENTRICITY WITHIN ____ TH		ACAD NO. 32625 DRAWING NO. E-600-EM SH 2 OF 2	
		IN. $\begin{matrix} \pm .02 \\ \pm .005 \\ \pm 2^\circ \end{matrix}$ .015 MAX .125 .010		DRAWN WJB 12/15/00 ENGR. APVD.	
LTR		EON		REVISON	
APVD				TITLE MODIFIED HIGH PRESSURE TUBELESS SNAP-IN VALVE	



**Flex test set-up: Valves being flexed 30°  
in both directions.**





**"More Than Testing, We Care"**



**AKRON RUBBER DEVELOPMENT LABORATORY, INC.**  
2887 Gilchrist Road • Akron, Ohio 44305  
1-800-890-ARDL • (330) 794-8600 • FAX (330) 794-8810

## **CHEMICAL ANALYTICAL SERVICES**

### **- TEST REPORT -**

**Project 42489**

**Prepared for:**

**EATON CORPORATION**

2564 Durham Road  
P.O. Box 241  
Roxboro, NC 27573-0241



**AN AZLA ACCREDITED LABORATORY  
MEMBER OF ACIL: THE ASSOCIATION OF INDEPENDENT SCIENTIFIC,  
ENGINEERING AND TESTING FIRMS**

**ISO 9001 Registered**

Letters and reports are for the exclusive use of the clients to whom they are addressed and shall not be reproduced except in full, without the written permission of Akron Rubber Development Laboratory, Inc. The information contained herein applies to the specific material, products or processes tested or evaluated. No warranty of any kind is herein construed or implied. The liability of Akron Rubber Development Laboratory, Inc. shall be limited to the amount of consideration paid for services.

**"More Than Testing, We Care"**



**AKRON RUBBER DEVELOPMENT LABORATORY, INC.**  
2887 Gilchrist Road • Akron, Ohio 44305  
1-800-830-ARDL • (330) 794-8600 • FAX (330) 794-8610

December 31, 2000

Mr. Keith Cozart  
Eaton Corporation  
2564 Durham Road  
P.O. Box 241  
Roxboro, NC 27573-0241

**SUBJECT:** Physical analysis of tire valves that had failed in service as requested by the above company.  
Purchase Order Number: 004854087

**RECEIVED:**

1. Two tire valves identified as TR 600 HP (SP) – two different halves.
2. One tire valve identified as TR 600 HP Cavity 600
3. One tire valve identified as TR 600 HP Cavity 189
4. One tire valve identified as DMT "B"
5. One tire valve identified as DMT "C"
6. One new tire valve identified as TR 600 HP

**PHOTOGRAPHS BY LIGHT OPTICAL MICROSCOPE (LOM): ARDL PROCEDURE**

Photomicrographs were taken of the samples with an Olympus Zoom stereo microscope model SZ 60, interfaced with a Polaroid DMC-ES digital camera at various magnifications.

**DISCUSSION**

The package containing the tire valves identified as TR 600 HP (SP) contained two different bottom portions of different valves. No conclusion could be drawn as to the cause of failure.

On the following page are two photographs of the tire valve identified as DMT "C" showing the inside surface of the bottom portion of the valve. The first photograph shows a smooth molded inside surface and just on the opposite side of that surface is the position where the second photograph was taken. There is a line drawn around the pitting and the non-continuous surface smoothness. The pitting seems to end just where the tear initiated.

December 31, 2000

Mr. Keith Cozart  
Eaton Corporation



There actually more of these surface irregularities in various places on the valve's internal surface, but this is the one thought to be the cause of the valve failure.

December 31, 2000

Mr. Keith Cozart  
Eaton Corporation

The sample identified as DMT "B" appears to have the same internal surface defects and one is located just adjacent to the initial failure.



The sample identified as 600 HP from cavity 189 was initially reported as adhesion failure but after a closer look it appears that there was either primer or very thin rubber



December 31, 2000

Mr. Keith Cozart  
Eaton Corporation

extrudate on the surface of the brass shaft. In other words, rubber was not designed to be there. The photograph below shows improper knitting. The torn area at some places on the other side of this base seems to be at the interface of two different rubber surfaces. One may want to examine the scorch safety time to rule out that possibility.

The valve identified as 800 HP Cavity 800 was cut to see if it could be determined what the initial cause of failure was. The picture below shows the smooth interface that



suggests the valve was under high strain when it failed. More significantly is that there is evidence of a knitting problem that would reduce the overall strength of the valve. One can actually follow the air path to the outside of the valve shown by the white line. The prong in the photograph is pulling away showing that tear is also protruding down into the rubber along very predefined, weak interface. As with the other 800 HP valve, one would be advised to examine scorch safety time of the rubber.

*Scott Yates*

Scott Yates  
Manager, Plastics Division  
AKRON RUBBER DEVELOPMENT LABORATORY, INC.

*Thomas M. Knowles*

Thomas M. Knowles  
Vice President, Chemical Services

PN# 42488  
INVOICE# 74248801



# American Association for Laboratory Accreditation

## SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990

AKRON RUBBER DEVELOPMENT LABORATORY  
2887 Gilchrist Road  
Akron, OH 44305  
Fred Farina Phone: 330 794 6600

### CHEMICAL

Valid To: January 31, 2002

Certificate Number: 0255-02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on rubber and plastic materials:

Spectroscopy  
Atomic absorption  
Infrared (FTIR)

Wet Chemistry Measurements  
Volumetric  
Gravimetric

Microscopy  
Light Optical Microscopy (LOM)  
Scanning Electron Microscopy (SEM/EDX)  
Scanning Transmission Electron Microscopy (STEM)  
Elemental Analysis by STEM/EDX  
Polymer Morphology by CUM/TEM  
Failure Analysis

Dynamic Mechanical Analysis (DMA)  
Differential Scanning Calorimetry (DSC)  
Sulfur Determination (Leco)

Resistance of Protective Clothing Materials to Permeation by Liquids or Gases

Physical Properties  
Density  
Melting Point

Melting Point (DSC & Capillary)

Thermal Gravimetric Analysis (TGA)

Chromatography  
Gas chromatography  
High performance liquid chromatography  
Thin layer chromatography  
Gel permeation chromatography  
GC Mass spectrometry

Carbon Black Dispersions

Primary Aggregate Dimensions

Chloroform Coagulation, Latex

Toluene Swell Test

according to the following standards:

ASTM: D297, D1071, D1076, D1269, D1417, D1434 (Procedure V), D1519, D1817, D2663, D3156, D3417, D3418, D3677-90, D3849, D3895, D4004, D4419, D4591, D5992, E663, E793, E794, E831, E1131, E1356, F739  
ISO: 3146





# American Association for Laboratory Accreditation

## SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990

### AKRON RUBBER DEVELOPMENT LABORATORY

2887 Gilchrist Road  
Akron, OH 44305  
Fred Farina Phone: 330 794 6600

### MECHANICAL

Valid To: January 31, 2002

Certificate Number: 0255-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

#### Rubber and Related Products:

ASTM: B117, D257, D380 (except 16.2, 17, 18), D395, D412, D413, D429, D471, D518, D572, D573, D575, D623, D624, D746, D813, D865, D925, D991, D1053, D1056, D1149, D1171, D1229, D1329, D1415, D1646, D1630, D2084, D2137, D2228, D2240, D2632-88, D3137, D3182, D3389, D3395, D4329, F146, F152

ISO: 34, 37, 812, 815, 1431, 1653, 3384, 6056, 6383

JIS: K6301, Z2371

DIN: 53516

#### Plastics and Related Products:

ASTM: D256, D543, D570, D635, D638, D648, D695, D785, D790, D792, D794, D882, D1004, D1203, D1238, D1523, D1693, D1708, D1894, D2583, D2584, D3045, D3364, D3576, D3641, D3763, D3801, D4812, D5420

ISO: 62, 75-1&2, 178, 179, 180, 188, 293, 306, 527-1, 899, 1133, 1210, 2818 (Sec. 3.2, 6.2, 6.4), 3795

GM: 9904P

#### Latex:

ASTM: D1055, D3492, D3577, D3578, D5151, D6124, BS 3704

ARDL: 2140

#### Adhesives, Sealers and Adhesive Tapes:

AFG-01 Test Specification (authored by APA-American Plywood Association)

#### Dynamic & Predictive Testing (MTS):

ASTM: D4065, D5992

UL: 746B

SAE: J1085a

ARDL: 8105, 8106, 8110, 8111

ISO: 2856, 4664

#### Flammability:

UL 94

FMVSS-302

ISO: 1210

#### Condoms:

ISO: 4074-1

ARDL: 2139

WHO Specification & Guidelines for Condom Procurement





THE AMERICAN ASSOCIATION  
FOR LABORATORY ACCREDITATION  
5301 Buckeystown Pike, Suite 350  
Frederick, MD 21704-8373

## ISO 9001 REGISTERED QUALITY SYSTEM

Through the Registration Panel of its Accreditation Council,  
A2LA has registered the Quality System of

**Akron Rubber Development Laboratory**  
of Akron, OH

This quality system meets the requirements of the ANSI/ASQC Q9001 (ISO 9001) standard for material design, development and evaluation, compositional analysis and formulation reconstruction, failure analysis and forensic services, quality assurance, and commercial testing (35-NACE K74.3) of rubber and plastic related materials and products.

Presented this 17<sup>th</sup> day of March, 2000.



A handwritten signature in cursive script, likely belonging to Peter M. ...

President  
For the Accreditation Council  
Certificate Number R-019  
Valid to December 31, 2000

To: Rabian M. Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/rabianmartin(a)eaton.com]  
From: C=US/A=INTERNET/DDA=ID/rcamille(a)ford.com  
Cc: br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/jjaklic(a)dominio ntec.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/froth(a)ford.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/pbeuckel(a)ford.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=ID/dn owick4(a)ford.com],br400@admin@whqcleveoh3[C=US/A=INTERNET/DDA=I D/teifert(a)ford.com]  
Subject: Dominion Valve Stemmer Insertion Rate  
Attachment:  
Date: 3/15/01 2:38 PM

Rablan, earlier we discussed using an valve insertion rate other then the (4-6) inches per minute called out in the Engineering Specification (ES-F2UA-1700-AA). The insertion rate of a Dominion wheel valve stemmer is (5) inches per second. This is what we need to base our analysis of wheel stems on for the Min/Max (65-110) °F and Min/Max hole diameters per TRA. Again, I think we would need to evaluate (30) pieces statistically. Please contact me, if you have any questions.

Regards,  
Robert H. Camilleri  
Super Duty/Excursion OPD  
Tire/Wheel Engineer  
Tel. (313) 24-81150

To: Rabian M. Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveoh3 [C=US/A=INTERNET/DDA=ID/froth(a)ford.com]  
From: C=US/A=INTERNET/DDA=ID/rcamille(a)ford.com  
Cc: br400@admin@whqcleveoh3 [C=US/A=INTERNET/DDA=ID/RabianMMartin(a)eaton.com],br400@admin@whqcleveoh3 [C=US/A=INTERNET/DDA=ID/pbeuckel(a)ford.com]  
Subject: RE: Tire Valve Specification  
Attachment:  
Date: 3/12/01 7:58 AM

Frank, I need to know what the target date is for making this change. I am preparing the necessary paperwork associated with this recall, which requires timing on this. Please let me know when you can provide timing.

-----Original Message-----

From: Roth, Frank (F.E.)  
Sent: Friday, March 09, 2001 1:55 PM  
To: 'RabianMMartin@eaton.com'  
Cc: Roth, Frank (F.E.); Camilleri, Robert (R.H.)  
Subject: RE: Tire Valve Specification

Rabian,

I haven't heard from you in along time. We still interested in changing the spec.

Frank E. Roth, KTPPVT Chassis  
Steering & Handling, 502-429-2448  
froth@ford.com

-----Original Message-----

From: RabianMMartin@eaton.com [mailto:RabianMMartin@eaton.com]  
Sent: Monday, January 22, 2001 2:33 PM  
To: froth@ford.com  
Subject: Tire Valve Specification

Frank,

I am running tests on the TR 600HP in order to establish any correlation between normal pull testing and pull testing at 110 degrees F.

After obtaining the necessary data, I can better relay to you what the minimum pull values should be.

Thanks for your patience.

Regards,

Rabian Martin  
Project Engineer  
Eaton Corporation  
Roxboro, N.C. 27573  
Ph: 336-503-6535  
Fx: 336-503-6425  
e-mail: rabianmmartin@eaton.com

To: Rabian M. Martin@PrdEng@ECRoxboroNC  
From: C=US/A=INTERNET/DDA=ID/rcamille(a)ford.com  
Cc:  
Subject: RE: Schrader Valve Testing  
Attachment:  
Date: 3/16/01 11:34 AM

To many things on my mind! I am talking Eaton/Dill. NOT THOSE OTHER GUYS.  
Sorry about the confusion.

-----Original Message-----

From: RabianMMartin@gsc.eaton.com [mailto:RabianMMartin@gsc.eaton.com]  
Sent: Friday, March 16, 2001 11:19 AM  
To: rcamille@ford.com  
Subject: re: Schrader Valve Testing

Rob,

Are you talking about the "Schrader" valve here or the "Dill" tire valve?  
Eaton is the Dill valve, Schrader is our competitor.

Rabian Martin  
Project Engineer  
Eaton Corporation  
Roxboro, N.C. 27573  
Ph: 336-503-6535  
Fx: 336-503-6425  
e-mail: rabianmmartin@eaton.com  
----- Original Text -----

From: C=US/A=INTERNET/DDA=ID/rcamille(a)ford.com, on 3/16/01 7:57 AM:

Frank, I have been following up with Schrader as to the CR (C11155926) that you issued concerning valve stem pull forces at 110°F. Rabian Martin has indicated that he should have the data from his testing by the end of next week. After further investigating the Engineering Specification (ES), it was decided to have Schrader do further testing using a temperature range (65-110)°F and the valve insertion rate of a Dominion wheel valve stemmer, which is (5) inches per second. ES calls out using an insertion rate of (4-6) inches per minute for conducting tear tests. Once the higher rate data is available and reviewed, we will look into changing the ES to include tear testing at (5) inches/sec. at the temperature range. Please contact me, if you have any questions

Regards,  
Robert H. Camilleri  
Super Duty/Excursion OPD  
Tire/Wheel Engineer  
Tel. (313) 24-81150

\* Will need 30 pc. Sample  
of each at 65° & 110°  
and 100°F

# E-600 Testing For Ford 3/20/01

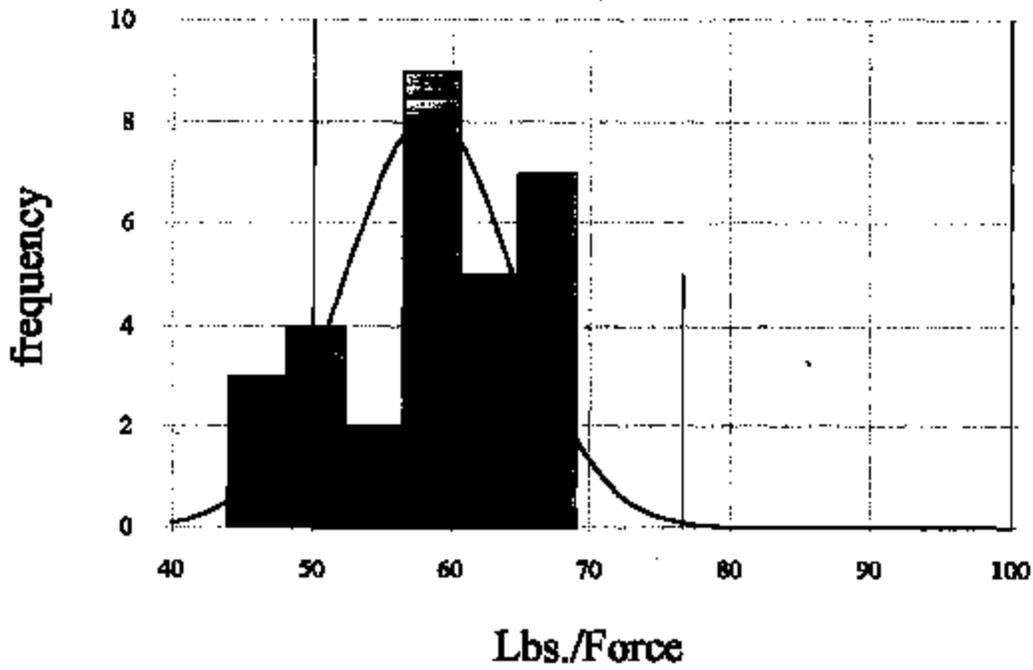
Ref. ES-F2UA-1700-AA

## E-600 Pull In & Pull Thru Values @ 65° F

Sample No.	Pull-In (100lbs.max)	Pull Thru (125lbs.min)	Durometer (60-70)
1	65	168	68
2	58	172	67
3	64	167	68
4	53	173	67
5	67	166	66
6	61	156	66
7	66	164	66
8	68	167	67
9	61	162	68
10	62	157	67
11	51	160	68
12	58	172	68
13	60	152	66
14	59	161	68
15	65	169	66
16	48	157	67
17	49	178	67
18	61	165	66
19	46	166	67
20	65	162	68
21	57	170	66
22	55	170	67
23	52	169	66
24	52	159	65
25	57	161	65
26	48	166	66
27	60	161	66
28	60	166	66
29	60	166	66
30	65	164	66
Averages	58.4	163.8	66.2

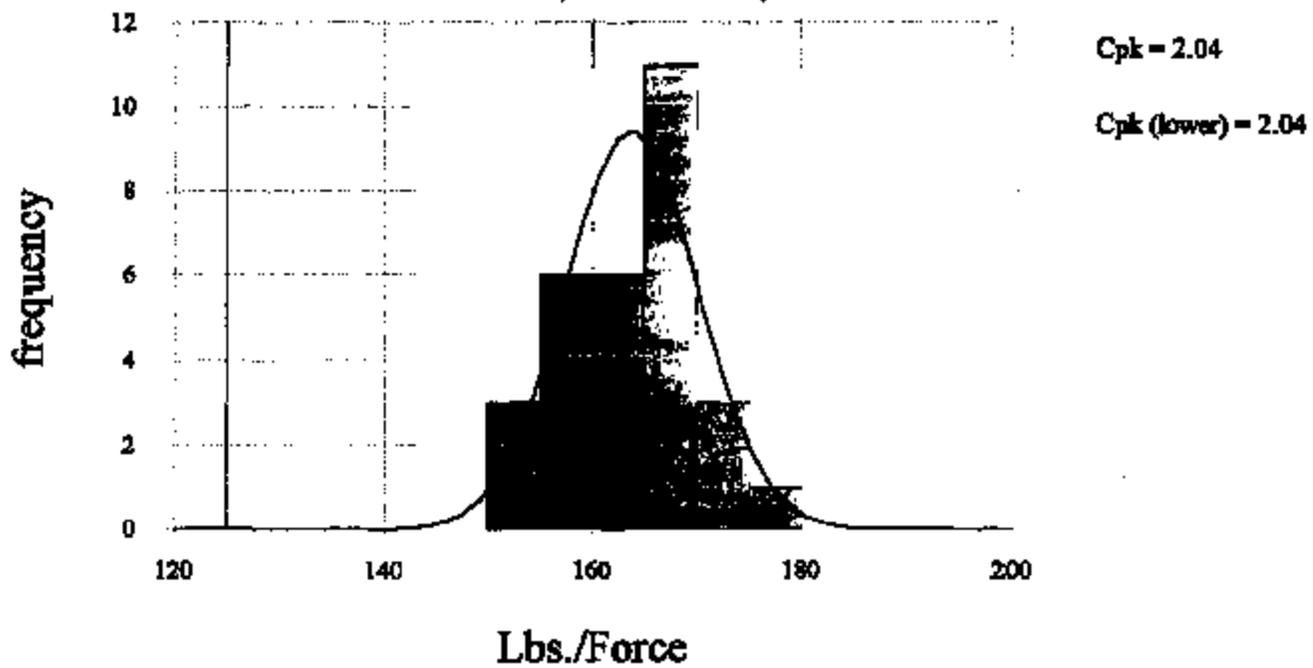
# TR 600HP Pull-In Capability @ 65 deg. Fahrenheit

Nominal = 50.0, USL = 100.0



# TR 600HP Pull Through Capability @ 65deg. Fahrenheit

LSL = 125.0, Nominal = 160.0,



# E-600 Testing For Ford 3/20/01

Ref. ES-F2UA-1700-AA

## E-600 Pull In & Pull Thru Values @ 110° F

Sample No.	Pull In (100lbs.max)	Pull Thru (125lbs.min)	Durometer (60-70)
1	47	135	65
2	47	138	66
3	39	131	67
4	48	133	65
5	49	136	66
6	41	133	66
7	37	134	66
8	48	138	67
9	45	134	65
10	41	131	65
11	38	132	65
12	40	137	67
13	38	133	67
14	43	139	66
15	45	135	67
16	44	134	66
17	42	133	66
18	46	138	66
19	48	132	65
20	49	133	66
21	47	132	65
22	48	129	65
23	48	140	65
24	45	133	66
25	48	136	66
26	52	134	66
27	45	132	66
28	50	134	65
29	38	138	67
30	43	142	65
Averages	44.6	134.6	65.8

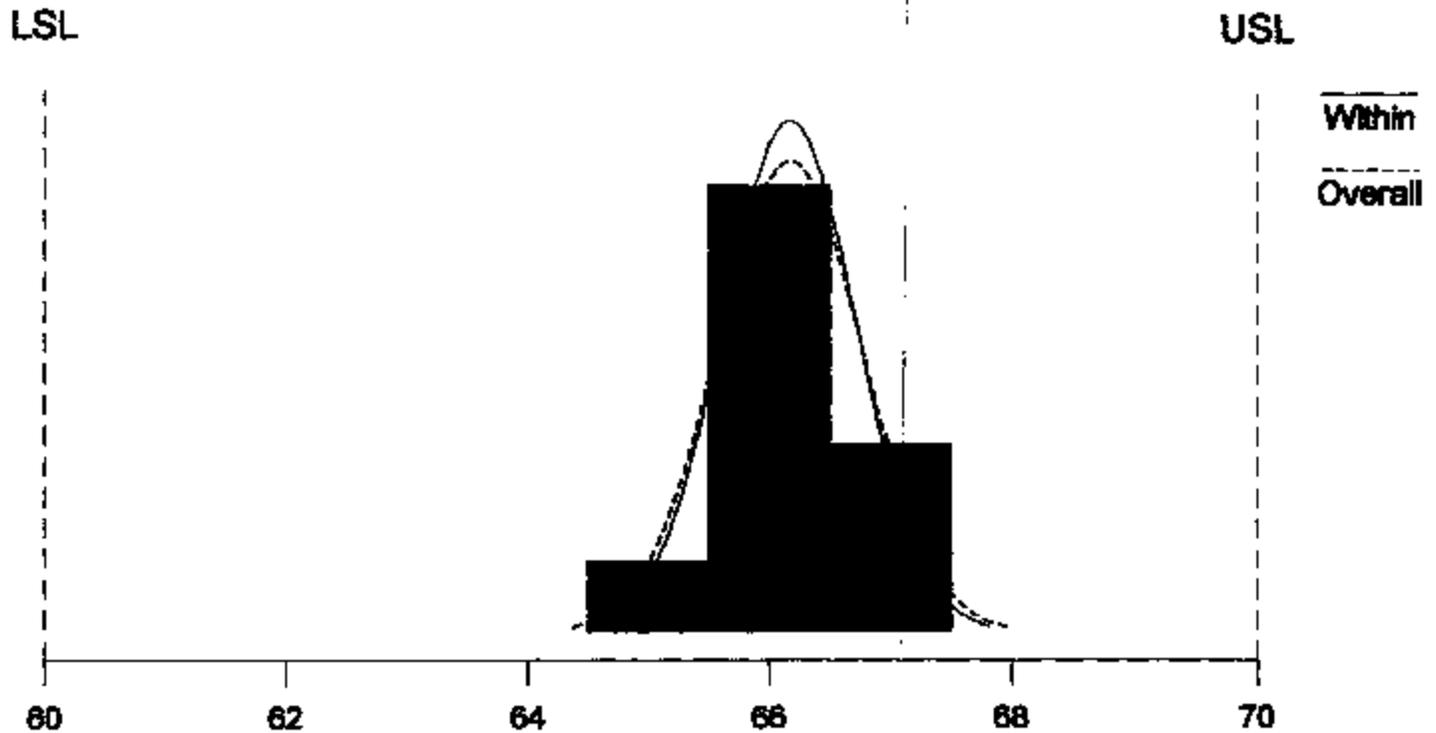
## E-600 Durometer values @ 60°F

**Process Data**

USL	70.0000
Target	.
LSL	60.0000
Mean	66.1667
Sample N	30
StDev (Within)	0.550257
StDev (Overall)	0.597219

**Potential (Within) Capability**

Cp	3.03
CPU	2.32
CPL	3.74
Cpk	2.32
Cpm	.



**Overall Capability**

Pp	2.79
PPU	2.14
PPL	3.44
Ppk	2.14

Observed Performance		Exp. "Within" Performance		Exp. "Overall" Performance	
PPM < LSL	0.00	PPM < LSL	0.00	PPM < LSL	0.00
PPM > USL	0.00	PPM > USL	0.00	PPM > USL	0.00
PPM Total	0.00	PPM Total	0.00	PPM Total	0.00

**E-600 Testing For Ford 3/20/01  
Ref. ES-F2UA-1700-AA**

**E-600 Pull In & Pull Thru Values @ 100° F**

Sample No.	Pull In (100lbs.max)	Pull Thru (125lbs.min)	Durometer (60-70)
1	59	138	67
2	51	141	66
3	65	135	66
4	61	142	65
5	49	142	68
6	42	135	67
7	47	136	66
8	65	137	67
9	54	132	66
10	50	138	67
11	66	138	65
12	60	140	66
13	58	134	65
14	47	137	66
15	66	136	66
16	70	140	66
17	52	135	66
18	56	135	67
19	47	136	66
20	51	137	67
21	46	136	66
22	49	137	66
23	60	135	67
24	57	138	66
25	53	136	67
26	55	135	67
27	45	139	65
28	59	136	65
29	48	139	66
30	59	137	66
<b>Averages</b>	<b>54.9</b>	<b>137.1</b>	<b>66.2</b>

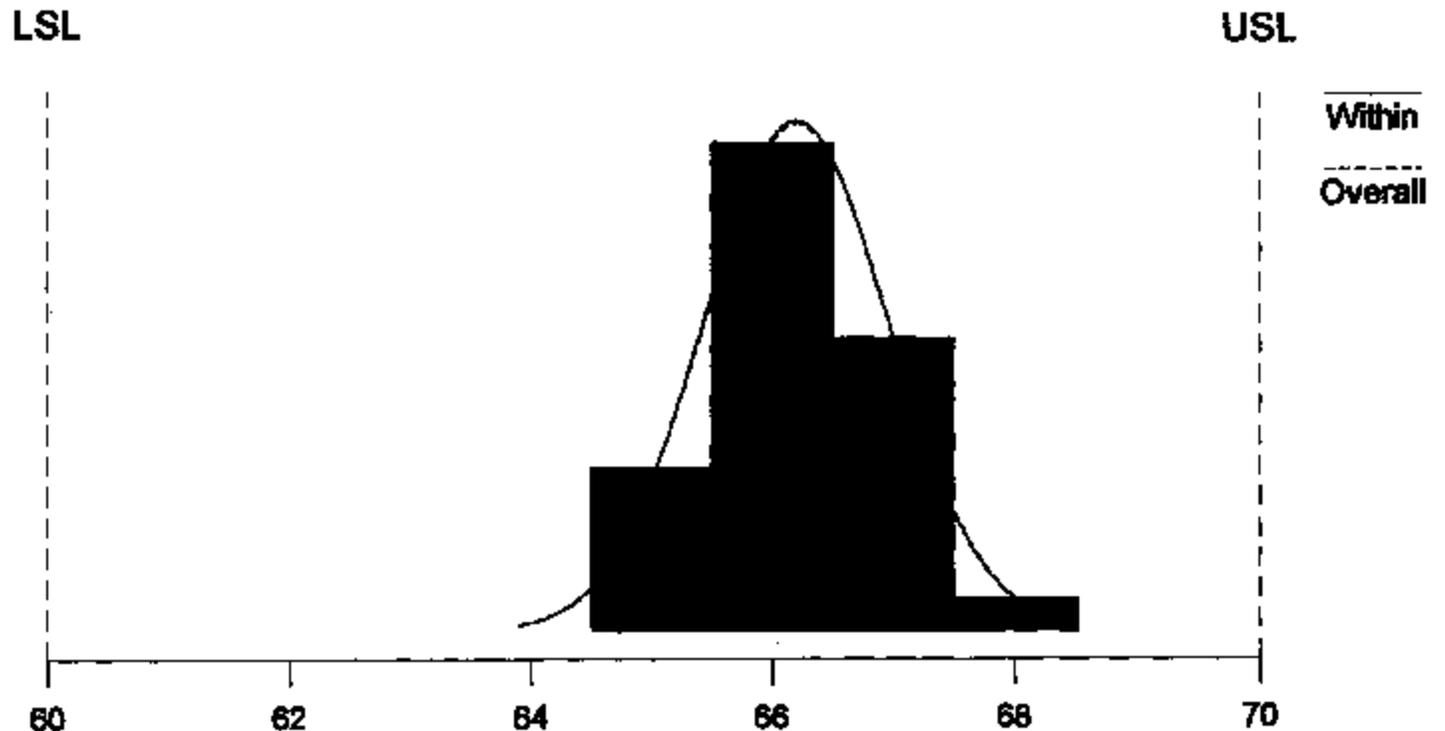
## E-600 Durometer values @ 100°F

**Process Data**

USL	70.0
Target	*
LSL	60.0
Mean	66.2
Sample N	30
StDev (Within)	0.764248
StDev (Overall)	0.767713

**Potential (Within) Capability**

Cp	2.18
CPU	1.68
CPL	2.70
Cpk	1.66
Cpm	*



Overall Capability		Observed Performance		Exp. "Within" Performance		Exp. "Overall" Performance	
Pp	2.17	PPM < LSL	0.00	PPM < LSL	0.00	PPM < LSL	0.00
PPU	1.65	PPM > USL	0.00	PPM > USL	0.33	PPM > USL	0.37
PPL	2.89	PPM Total	0.00	PPM Total	0.33	PPM Total	0.37
Ppk	1.65						

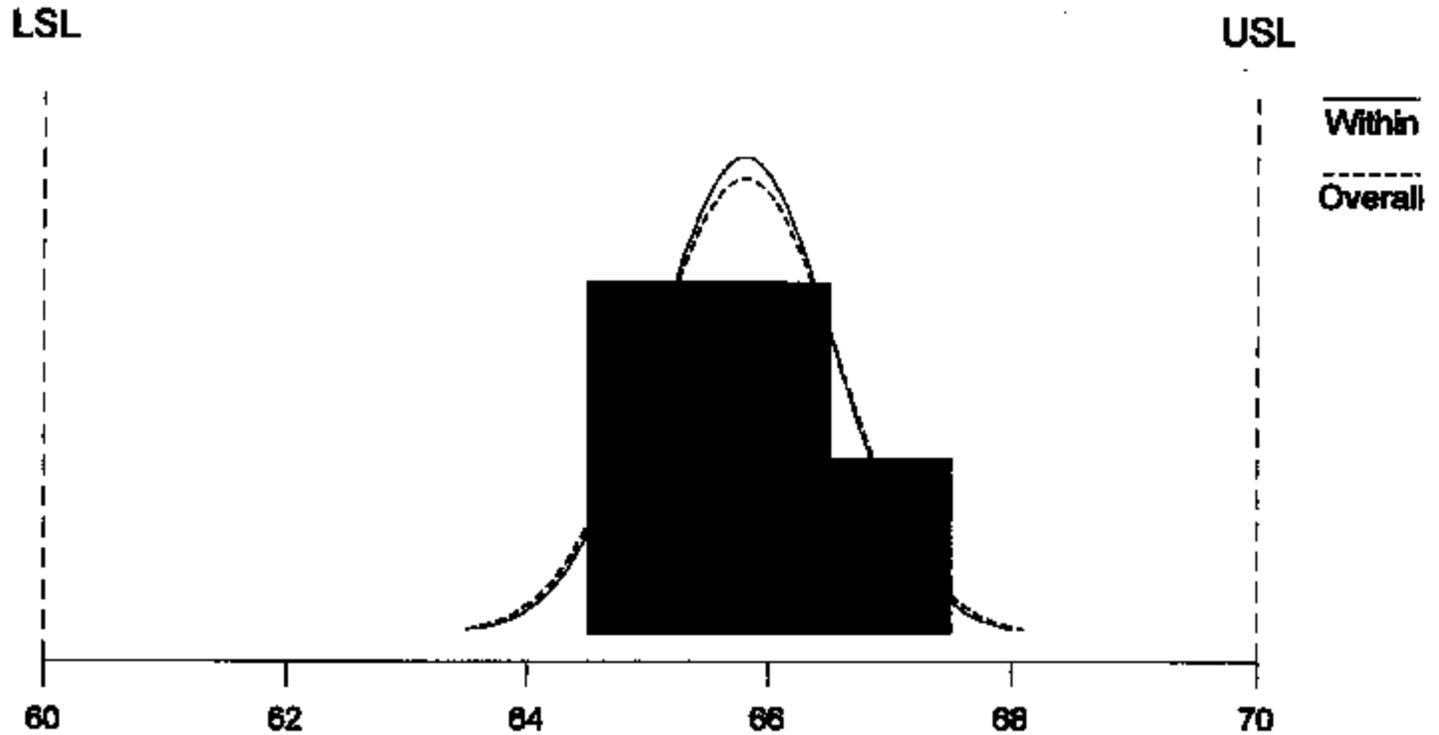
## E-600 Durometer values @ 110°F

**Process Data**

USL	70.0
Target	*
LSL	60.0
Mean	65.8
Sample N	30
StDev (Within)	0.733676
StDev (Overall)	0.767713

**Potential (Within) Capability**

Cp	2.27
CPU	1.91
CPL	2.64
Cpk	1.91
Cpm	*



**Overall Capability**

Pp	2.17
PPU	1.82
PPL	2.52
Ppk	1.82

**Observed Performance**

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00

**Exp. "Within" Performance**

PPM < LSL	0.00
PPM > USL	0.01
PPM Total	0.01

**Exp. "Overall" Performance**

PPM < LSL	0.00
PPM > USL	0.02
PPM Total	0.02

**15 PIECE SAMPLES**  
(As necessary on suspect parts)

100°F

Date: 2-6-01 8:00 AM 127 Mach. No. 27-00 Part No. 22 600-9

*100% All Pass Accepted.*

*572*

Time: *NSJAA*

Dura-meter	Pull-in	Pull-thru
60	83	169
60	96	168
60	89	162
61	97	162
60	72	161
60	88	166
60	85	171
61	89	162
60	85	163
60	86	160
61	91	150
60	79	156
60	72	163
60	82	160

ADMISSION  
 GOOD  BAD  
 SPOTTY

Time:

Dura-meter	Pull-in	Pull-thru
60	70	165
61	93	169
61	96	160
61	82	160
60	84	160
60	97	168
60	92	167
60	94	162
60	96	161
61	82	169
60	98	165
60	90	160
60	89	161
60	90	161

ADMISSION  
 GOOD  BAD  
 SPOTTY

Time:

Dura-meter	Pull-in	Pull-thru
	32	154
	34	157
	34	150
	40	146
	45	145
	49	139
	42	137
	41	146
	37	137
	39	146
	35	138
	34	144
	41	137
	38	142
	37	139

ADMISSION  
 GOOD  BAD  
 SPOTTY

Time:

Dura-meter	Pull-in	Pull-thru
	33	141
	40	139
	35	146
	40	143
	37	139
	44	139
	38	144
	36	144
	38	141
	37	142
	41	144
	34	136
	33	144
	35	137
	40	141

ADMISSION  
 GOOD  BAD  
 SPOTTY

For use on parts from one machine, one part number and one shift only.

12/01/00 15 Piece Sample.xls



Tire Testing & Analysis  
Vehicle Testing & Performance Evaluation  
Materials Testing & Technical Consulting  
Management Consulting & Market Research  
Quality & Environmental Systems Certification

**Smithers Scientific Services, Inc.**

425 WEST MARKET STREET • AKRON, OHIO 44303-2099

**WORLD HEADQUARTERS**

PH: 330/762-7441 FAX: 330/762-7447

August 10, 2001

Mr. Rabian Martin  
**EATON CORPORATION**  
2564 Durham Rd.  
Roxboro, NC 27573

FAX: 336-503-6424

Subject: TR-600-HP TTV (Davis)  
Smithers Scientific Services File No. 4000C/0117

Dear Mr. Martin:

Attached you will find our report covering the work conducted for the subject investigation. If you have any additional question, please do not hesitate to contact us. Also enclosed you will find our invoice for these services.

Thank you for using Smithers Scientific Services for your technical consulting requirements.

Sincerely,

Bruce D. Lambillotte  
Project Manager,  
Technical Consulting

Thomas M. Dodson  
Director,  
Technical Consulting

Enc.

**Subject: TR-600-HP Analysis**  
Smithers Scientific Services File No. 4000C/0117

**Objective**

Analyze one Dill TR-600-HP pneumatic (ID No. 89) valve for cause(s) of loss of serviceability.

**Background**

The following six (6) pneumatic valves were submitted for examination:

NEW PRODUCTION; mm		NEW PRODUCTION - RETRACTED THROUGH WHEEL; mm			RETURNED FROM SERVICE; mm
38	42	33	95	160	89

**Procedures**

1. Nondestructive examinations.
2. Dimensional Analyses using a Mitutoyo Model #500-350 Digimatic digital caliper.
3. Cut section analyses documented with photomicrographs. Microscopy studies were conducted as needed with an Olympus microscope at magnifications ranging from 5 - 50X and fitted with a Sony CCD Color Video Camera and Sony UP-1200A Color Video Printer.

**Results**

1. Nondestructive examination of the #89 valve indicated that a 360-degree circumferential tear had occurred at the base of the groove located adjacent to Diameter C in Figure #1.
2. Nondestructive examination of control valves #33, 95, and 160, which were reported by the client to have been exercised by pulling them through a test wheel aperture from the outside after normal valve mounting, exhibited similar circumferential tearing.
3. Nondestructive examinations of control valves #38 and #42, which were reported by the client to have been new and not exercised, did not exhibit the circumferential fissures exhibited by the aforementioned valves.

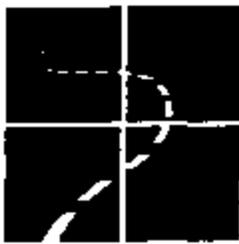
## **Results (cont'd)**

4. Dimensional analyses indicated that the base of the valve, which remains inside the rim and tire cavity, incurred compression set of approximately 6%, which reduced length G, Figure #1. The averages of other dimensional changes are noted in Table #2.
  
5. Cut section analyses of the bases of the valves indicated similar tearing for the control test valves pulled externally from the wheel aperture after mounting (#33, #95 and #160) and the valve removed from service (#89). The tearing in valve #89 had progressed to a greater depth, and this tearing is thought to be the cause of loss of serviceability. The appearances of these cross sections may be found in photomicrographs #1 - #4.

Daw Tire Repair Return







**STL**  
**STANDARDS**  
**TESTING LABS**

*Tough On Testing.™*

September 4, 2001

Rabian Martin  
Eaton Corporation  
PO Box 241  
Roxboro, NC 27573

Rabian:

We tried without luck to fax these.

The marking on the test show 0° standard valve static location.

Other marks are 10° increments except last 5° and valve would be on the wheel rim.

Advise disposition of your test items.

Always At Your Service,  
Standards Testing Labs

Doug Garven  
Vice President Marketing

DG/bjc



**STL**  
STANDARDS  
TESTING LABS

Tough On Testing.™

**EATON CORP.**  
L1-495

SPEC. NO.	CUSTOMER	DATE	8/28/01
TYPE TEST	HIGH SPEED	TEST NO.	EC1-731
TEST DURATION	8 MIN	STATION NO.	11
TIRE NUMBER	TR600HP/685 CURRENT		
TIRE NAME	MYNSTAR PHASER R21		LOAD RANGE S
TIRE SIZE	225/80R16	ID.NO. Y5 KJ5 694	TT/TL TL
MAX.INFLA.SINGLE	38	MAX.LOAD.SINGLE 1655	D.O.T. Y
SPEED INDEX	H	SPEED INDEX 98	T.W.I. Y
CARCASS CORD MAT.	P	BELT CORD MAT. P,S	RIM NO.
NO. PLYS SIDEWALL	2	NO.PLYS TREAD 4	CONSTR. RAD
TEST RIM SIZEMOUNTED			PRETEST INSPECT

## TEST TIRE MEASUREMENTS

AVG

CROSS SECTION	NA						
OUTSIDE DIA.	NA						
TREAD WIDTH	NA						
TREAD RADIUS	NA						
TIRE WEIGHT	NA						

## TEST DATA

VIDEOED		YES	YES	YES	YES	YES	
AIR PRESSURE	38						
AMBIENT TEMP	85	95	95	95	95	95	
TEST LOAD	1,655	1,655	1,655	1,655	1,655	1,655	
ACTUAL LOAD	1,855	1,855	1,855	1,855	1,855	1,855	
TEST SPEED	0	0	45	60	90	120	
TECHNICIAN	ES	ES	ES	ES	ES	ES	
DATE	8/28/01	8/28/01	8/28/01	8/28/01	8/28/01	8/28/01	
CHECK TIME	1041	1043	1045/1047	1047/1049	1049/1053	063/1056	
TEST MILES	0	NA	NA	NA	NA	NA	
TEST CYCLE MIN	0	2	2	2	2	2	
TOTAL HOURS	0	2	4	6	8	10	

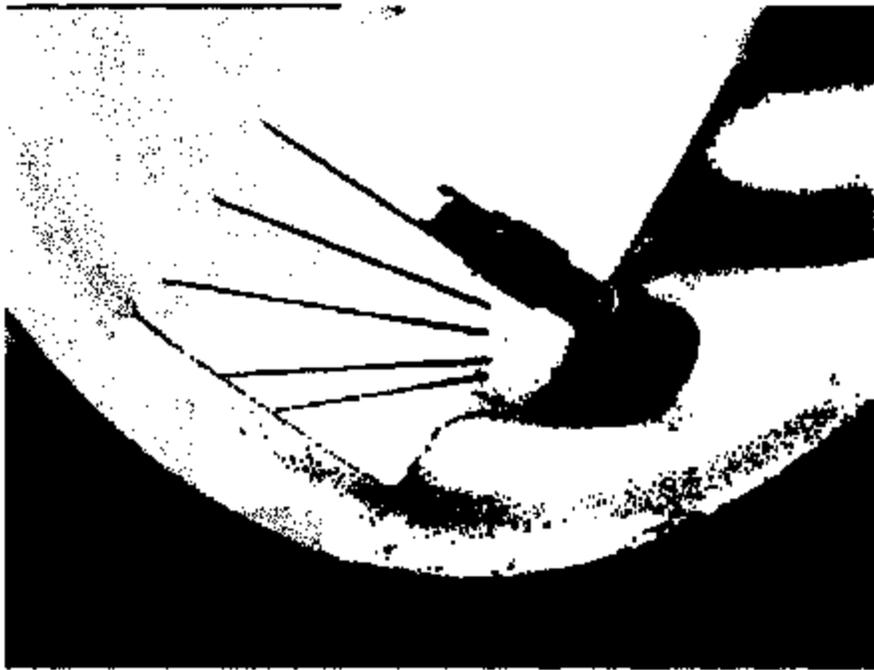
TEST DURATION 15 MIN. DATE COMPLETED 8/28/01 TOTAL MILES N/A

REASON FOR REMOVAL DAMAGE TO VALVE STEM OCCURRED AFTER REMOVAL.

TECHNICIAN E.STEPHENS

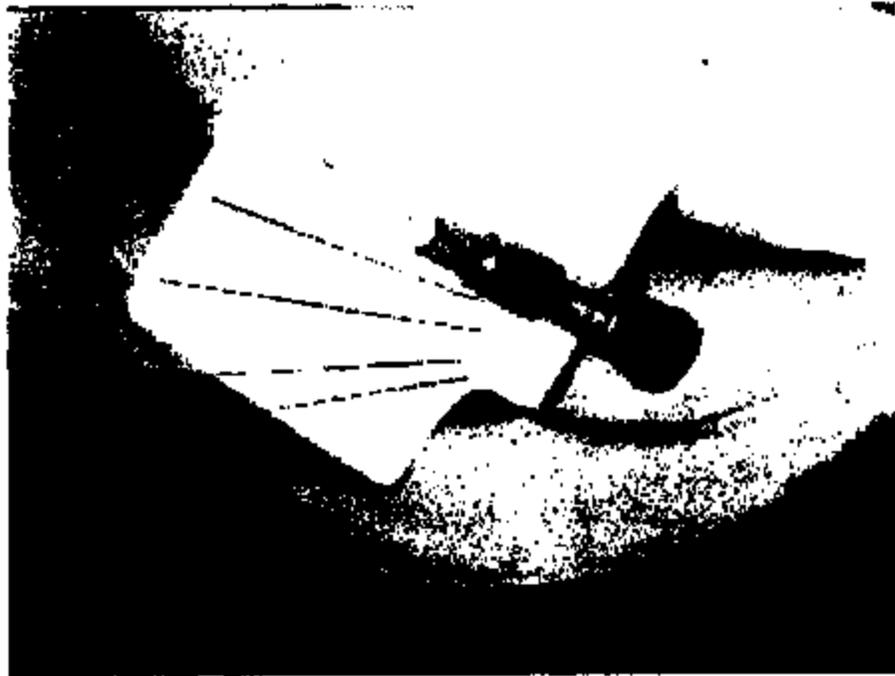
APPROVED BY *C. P. [Signature]*

See above referenced  
test spec. for operational  
tolerances.



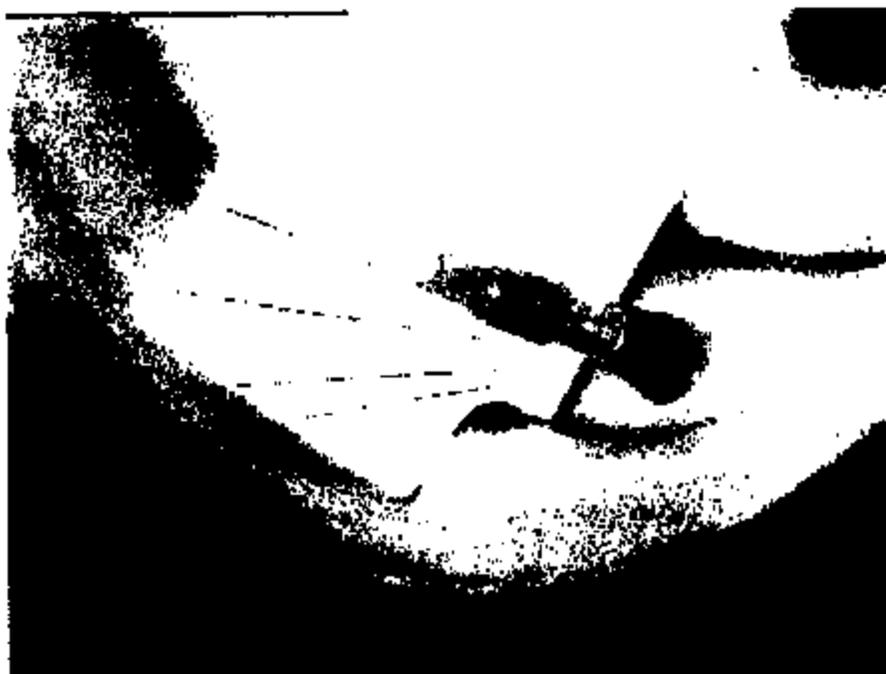
TEST # EC1-731 TIRE # TR600HP/685 CURRENT

0



TEST # EC1-731 TIRE # TR600HP/885 CURRENT

45



TEST # EC1-731 TIRE # TR600HP/685 CURRENT 60



TEST # EC1-731 TIRE # TR600HP/685 CURRENT 90



TEST # EC1-731 TIRE # TR600HP/685 CURRENT 120

# Fax Correspondence

October 5, 2000

Eaton Corporation  
Engine Components Operation, North America  
2564 Durham Road • P.O. Box 241 • Roxboro, NC 27573  
336-599-1141 • 336-503-6425



To	Frank Roth	From	Rabian Martin
Company/Division	Ford Motor Co.	Date	October 5, 2000
City	Louisville	Telephone	336-503-6535
State/Country	Ky.	ADNET #	
Fax #	502-429-2111	Fax #	336-503-6425
ADNET Fax #		ADNET Fax #	
Copy To	Joe Hebert, Ann Temple	Subject	Rim Sample

If you do not receive 1 pages (including this cover page) or have any difficulties with this transmission, please call the sender.

Any review, disclosure or copying of this document or any reliance upon its contents by anyone other than the addressee is strictly prohibited.

**Mr. Roth,**

**In order to perform high speed valve deflection testing, I am asking you to send me the rim(s) of your choosing for this test. The tests will be run by an outside source, thus I must advise you of the timing required for this test after I receive word from those doing the tests.**

**My mailing address is noted above.**

**Thank you for your assistance.**

**Regards,**

**Rabian Martin  
Project Engineer**

To: Rabian M. Martin@PrdEng@ECRoxboroNC,br400@admin@whqcleveh3[C=US/A=INTERNET/DDA-ID/froth(a)ford.com]  
From: C=US/A=INTERNET/DDA-ID/brobert8(a)ford.com  
Cc: br400@admin@whqcleveh3[C=US/A=INTERNET/DDA-ID/breed1(a)ford.com],br400@admin@whqcleveh3[C=US/A=INTERNET/DDA-ID/rabianmartin(a)eaton.com]  
Subject: RE: Rims for Valve Stem Testing  
Attachment:  
Date: 10/16/00 8:50 AM

KTP SHIPPER E17061 ISSUED... REQUESTED A AIR-FRT SHIPMENT

Thank You,  
Bill Roberts  
Parts Control KTP  
(502) 429-2741

> -----Original Message-----  
> From: Roth, Frank (F.E.)  
> Sent: Friday, October 13, 2000 9:01 AM  
> To: Roberts, Bill (W.R.)  
> Cc: Reed, Bill (B.P.); Roth, Frank (F.E.); 'Tire Stem Rabian Martin'  
> Subject: Rims for Valve Stem Testing  
>  
> Bill,  
>  
> Please send ONE EACH of the following rims:  
>  
> FB1A-1015-DA 19.5" STEEL DRW  
> 1C34-1015-BA 16" CHROME CLAD SRW  
> FB1A-1015-AA 16" STEEL SRW  
>  
> to:  
>  
> Eaton Corp. Eng Components Operations  
> 2564 Durham Road  
> Highway 501 South  
> Roxboro, NC 27573  
> Atn: Rabian Martin  
> ph: 336-503-6535  
>  
> Frank E. Roth, KTPPV Chassis  
> Steering & Handling, 502-429-2448  
> froth@ford.com  
>  
>

**Martin, Rabian M**

---

**From:** Martin, Rabian M  
**Sent:** Friday, October 19, 2001 1:46 PM  
**To:** 'rcamille@ford.com'  
**Subject:** TR 600HP

Rob,

The photos attached will show the set-up of how the TR 600HP is flex tested in our engineering lab. The valve was inserted into a 19.5" rim and tire assembly and pressurized to 76psig. The flex testing began on November 21, 2000.

The plastic line you see in the photos is run to a pressure valve that monitors the air line pressure to the air cylinder which is used to flex the valve. If pressure is lost to this valve, the air pressure is cut off and the test is stopped. This permits us to run the test continuously.

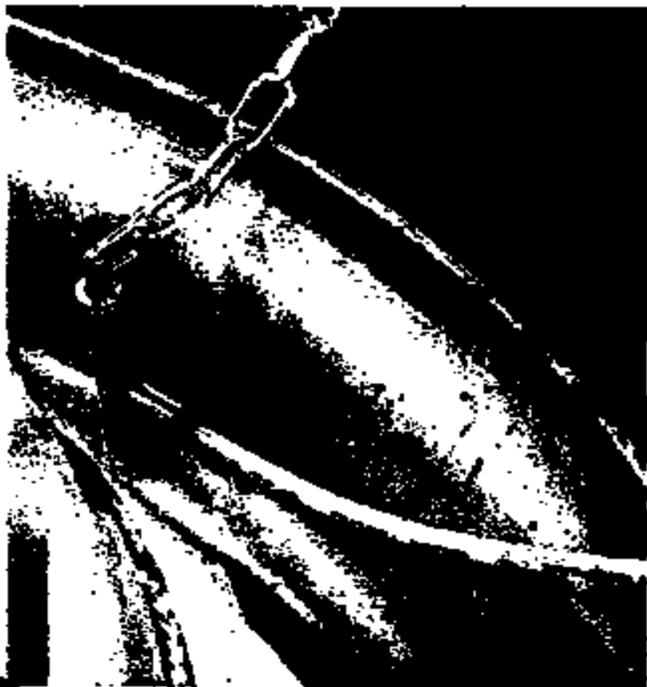
The photos show some abrasion at the rim seal area, but after soaking the valve with a soap solution, no evidence of leakage is detected.

I plan to continue testing until failure.

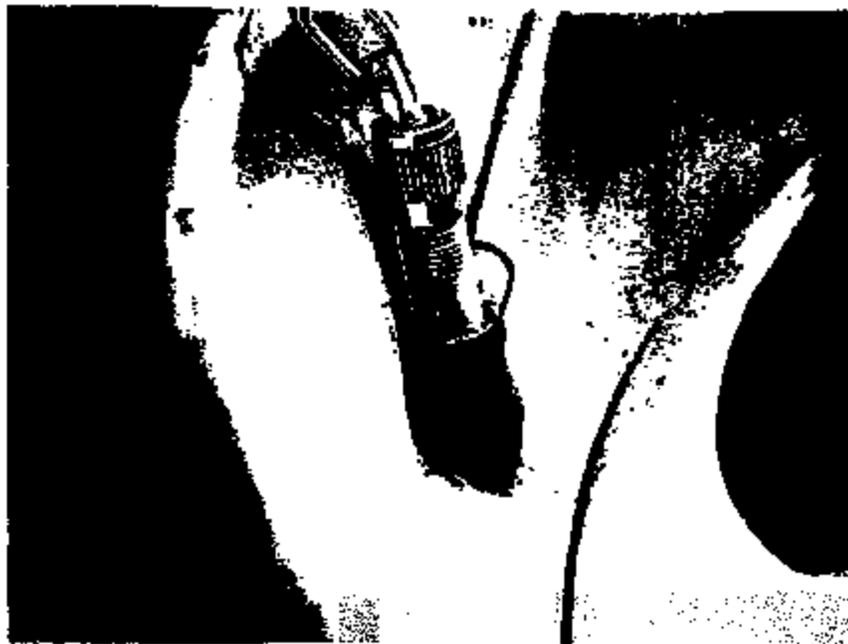
Any questions or comments, please call me.

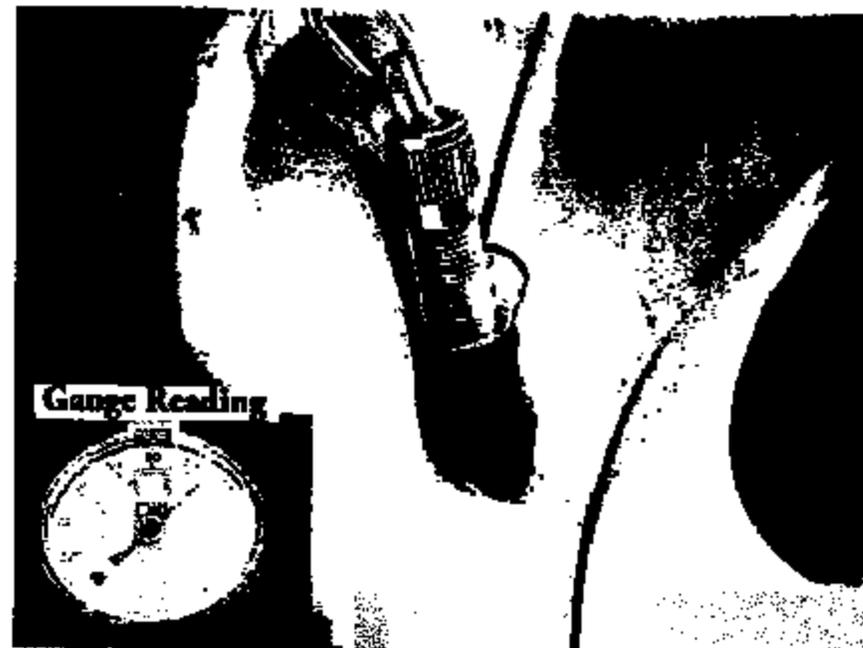
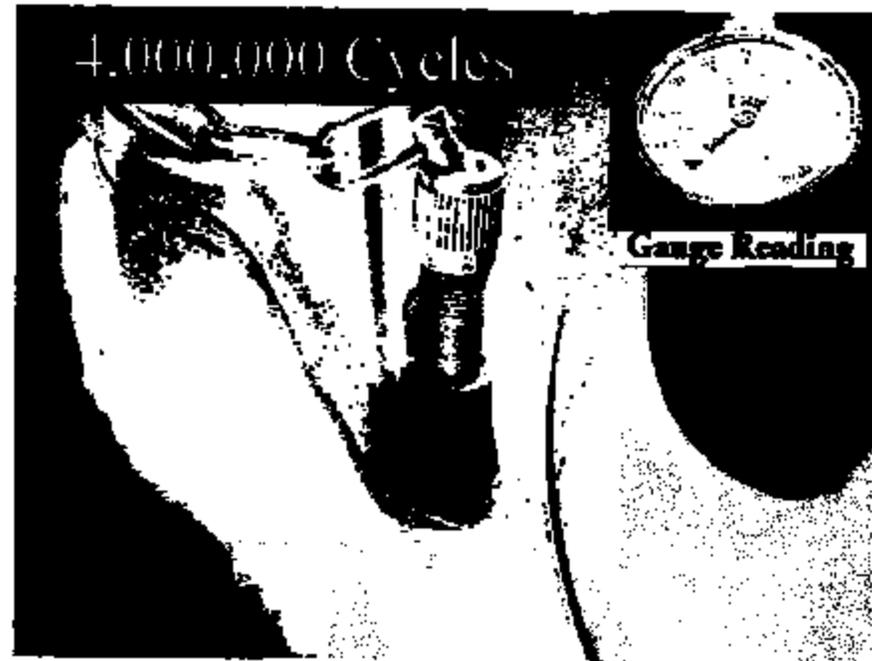
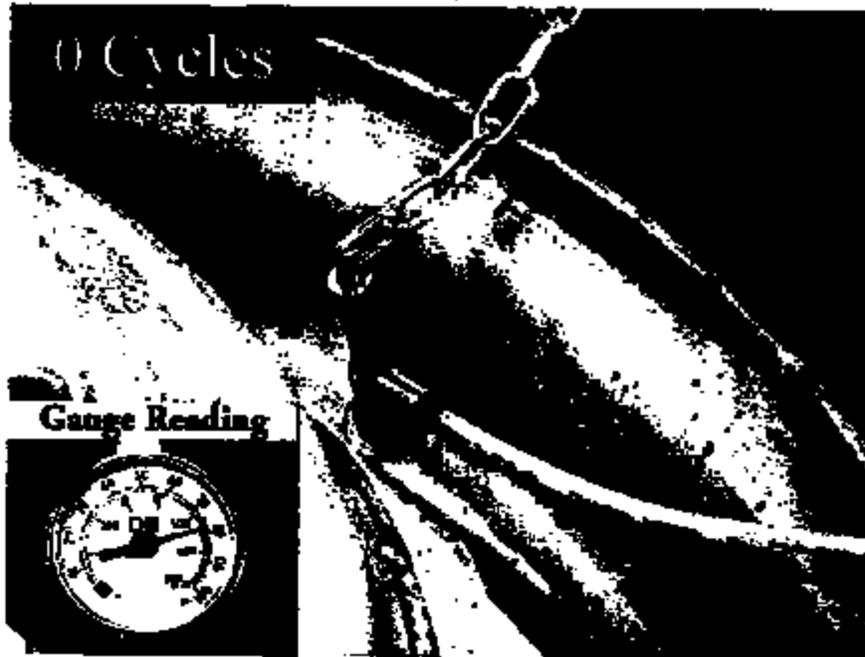
Regards,  
Rabian

0 Cycles



4,000,000 Cycles





**Martin, Rabian M**

---

From: Martin, Rabian M  
Sent: Monday, January 21, 2002 4:11 PM  
To: 'Camilleri, Robert (R.H.)'  
Subject: RE: F250/350 Wheel Valve Stems

High Pressure Snap-In

Redesign...

Rob,

Please see the attached file and advise any comments.

I also received the quote today for the revised mold cavities. I can expect a three to four week delivery.

Regards,

-----Original Message-----

From: Camilleri, Robert (R.H.) [mailto:rcamille@ford.com]  
Sent: Friday, January 18, 2002 5:14 PM  
To: Martin, Rabian M  
Subject: RE: F250/350 Wheel Valve Stems

Rabian, just receiving you email. Thanks for the update and I look forward to seeing the redesign. Once I review it I will try giving you a call to discuss. Thanks

-----Original Message-----

From: Martin, Rabian M [mailto:RabianM@Martin@seaton.com]  
Sent: Friday, January 18, 2002 4:20 PM  
To: 'Camilleri, Robert (R.H.)'  
Subject: RE: F250/350 Wheel Valve Stems

Rob,

will e-mail you a proposed redesign Monday.

Also, I have a sample mold cavity being quoted and expect the cost and delivery date next week. Once I receive the new cavity, samples will be molded, tested, etc.

I left you a phone message earlier, but thought I would send this anyway. Have a great weekend and also a Happy New Year.

Regards,

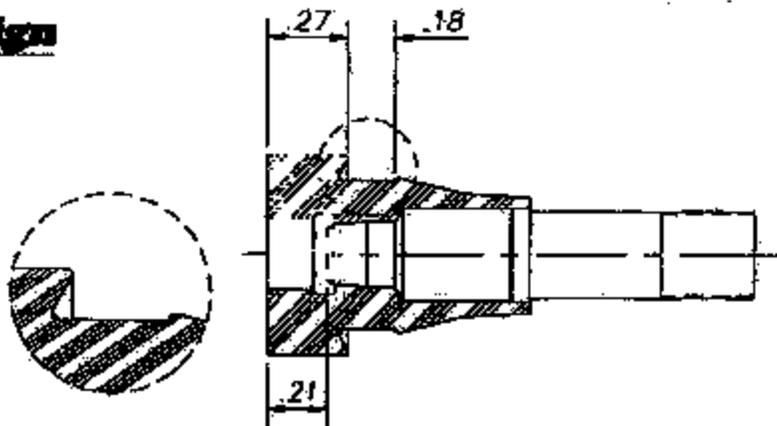
-----Original Message-----

From: Camilleri, Robert (R.H.) [mailto:rcamille@ford.com]  
Sent: Thursday, January 17, 2002 4:13 PM  
To: Martin, Rabian M  
Subject: F250/350 Wheel Valve Stems

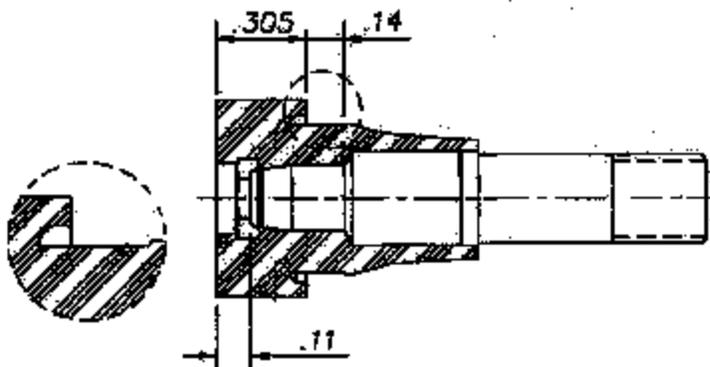
Rabian, Happy New Year. I hope you have survived the Holidays. Our testing on wheels and valve stems is very close to being complete and I suspect we will be holding a review in the next couple of weeks. Last time we talked, you were looking into redesigns of the current stem to make it more difficult to pull out. Can you give me an update as to where you are with this? It has been awhile since we talked, so give me a call if we need a refresher on this. Thanks

> Regards,  
> Robert H. Camilleri  
> Super Duty/Excursion OPD  
> Tire/Wheel Engineer  
> Tel. (313) 24-81150, Pager (313) 796-7531  
>

**Proposed Design**



**Existing Design**



		MATERIAL		CODE	
		TOLERANCES UNLESS NOTED			
		INCHES: .0005		ACAD. NO. 326551 DRAWING NO. X-32655 LAYOUT	
		ANGLES: .01		TITLE: HIGH PRESSURE TUBELESS SNAP-IN VALVE	
		SPECIAL MANUFACTURING INFO: SPEAK SHARP EDGES & CORNERS FINISH: SURFACE POLISHING CONDUCTIVITY: RETURN		SCALE: 2:1 DATE: 1/21/02 ENGR. [ ] APVD. [ ]	
LTR	EDH	REVISION	APVD		

**Martin, Rabian M**

---

**From:** Martin, Rabian M  
**Sent:** Wednesday, March 06, 2002 10:05 AM  
**To:** 'rcamille@ford.com'  
**Cc:** Cash, Melvin; Thomas, Dean D  
**Subject:** TR 600HP Redesign

Rob,

The redesign is not giving me the pull-through values required.

I will request more trial material with a higher durometer for the next test.

The reason for low pull-throughs is that I have shortened the brass insert to allow more flexing of the valve.

The pull-in values are within specification, but with low pull-throughs, I stopped testing.

I am giving this project high priority and will keep you informed of initial results and action plans.

Regards,

Rabian Martin  
Project Engineer  
Eaton Corporation  
Ph: 336-503-6535  
Fx: 336-503-6425

**Martin, Rabian M**

---

**From:** Martin, Rabian M  
**Sent:** Monday, March 25, 2002 5:02 PM  
**To:** 'rcamille@ford.com'  
**Cc:** Cash, Melvin; Thomas, Dean D  
**Subject:** TR 600HP Redesign

Hi Rob,

Progress on the pull-in values with this design project.

I have two design concepts I am reviewing and will decide which one, if not both, I will pursue.

One design permits extensive flexing. The other is more rigid in design. I must finalize my dimensional modifications

and perform extensive flex tests at room temperature and hot and cold testing to verify the design.

I will update you as information is gathered.

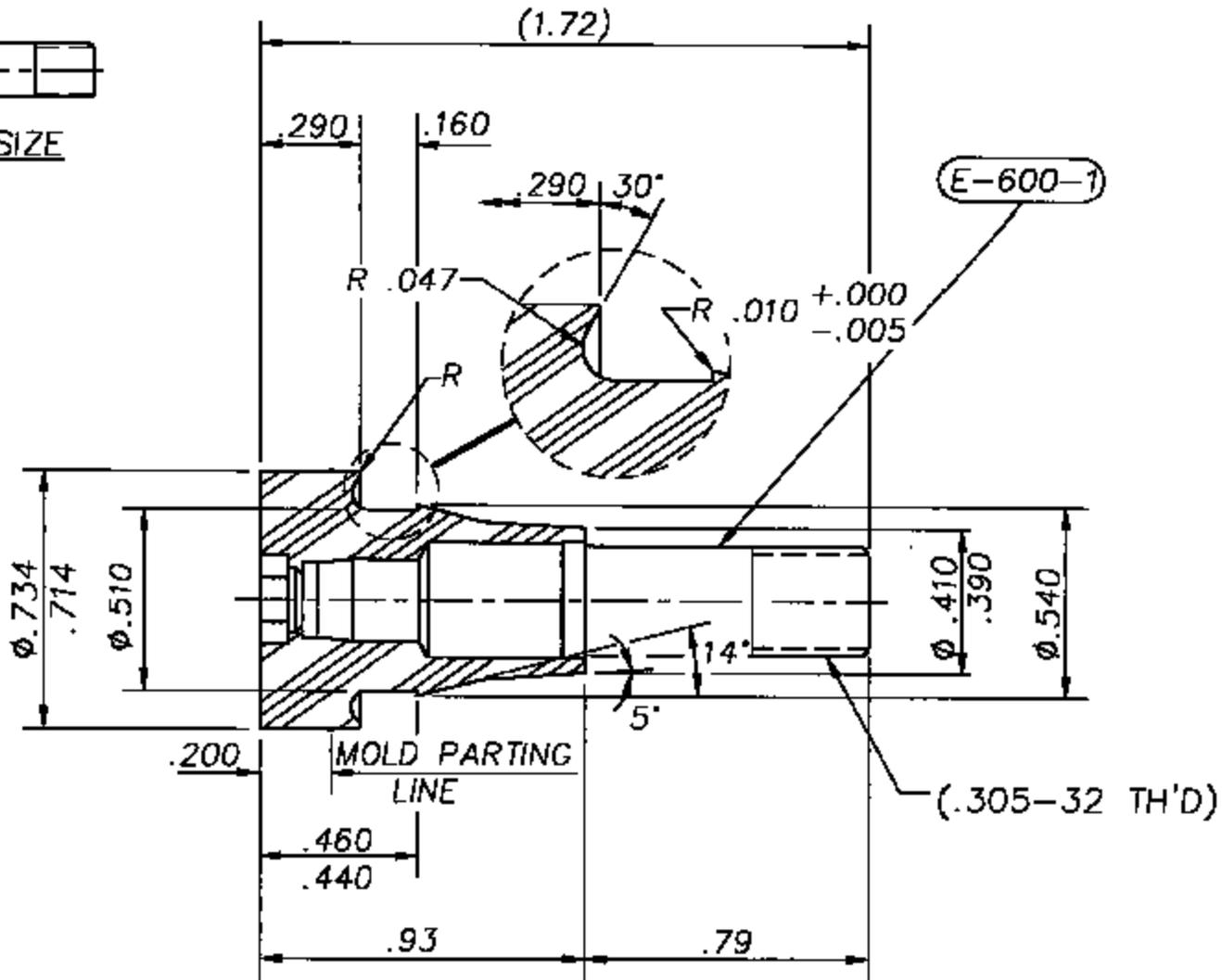
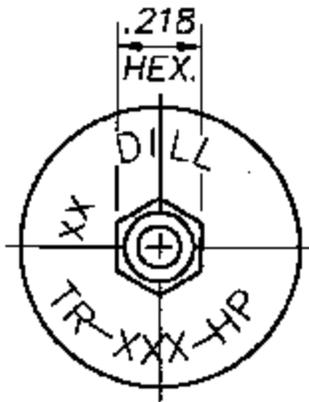
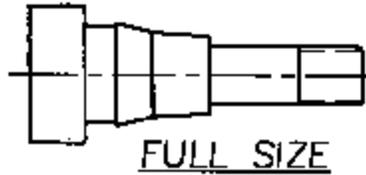
Regards,

Rabian Martin  
Project Engineer  
Baton Corporation  
Ph: 336-503-6535  
Fx: 336-503-6425

System		Assembly			Program				Design Engineer	
Subsystems		Component			Latest Design Level				Reviewed	
TR-900 NPM Snap-In					Original				Rafsan Marati	
Test Name/Item	Acceptance Criteria	Test Results	Design Level Tagging	Sample Size		Statistical Test Accept. Criteria*		Timing		Remarks
				Expected	Failed	Expected	Actual	Expected	Actual	
1. Material Hardness Test /	Paragraph 4.2.1 Unused Valves- Hardness values of 60-70 Shore A durometer are acceptable	63,65,62,61,61,62, 62,61,62,62,61,61 Average hardness = 62	PV	12	0					783V02
	Paragraph 4.2.2 Aged Valves-An increase of 10% maximum over the values obtained in paragraph 4.2.1 of this document, but limited to a maximum hardness value of 75 Shore A durometer is acceptable.	60,66,66,64,64,65, 64,64,65,63,63,64 Average hardness = 64	PV	12	0					783V02
2. Valve Assembly Operations C	Leak test with the valve cap removed at an air pressure of 100+/-6 psig. For one minute. Valves may not leak within one minute	No failures	PV	24	0					783V02
	Valve core must function after repeated depressions / 15 depressions	No failures	PV	24	0					783V02
	Room temperature testing at 60 to 75 deg Leakage at a rate of 0.2 cc/min or less is considered acceptable at the rim seal.	No failures	PV	24	0					783V02
	Low Temperature / -40 degrees F Leakage at a rate of 0.2 cc/min or less is considered acceptable at the rim seal.	No failures	PV	24	0					783V02
3. Rim Seal Leak Test / (.187 X .468 -.480 hole dia. Pth)	High Temperature / +212 degrees F Leakage at a rate of 0.2cc/min or less is considered acceptable at the rim seal.	No failures	PV	24	0					683K2
	Attribute Test - Extreme Environment									683K2
4. Seating or Unseating	Force to Break (.187 X .445-.447 hole dia.) Force to seat shall not exceed 100lb. The valve must withstand a minimum push out force of 100 lbs after being seated.	115, 111, 107, 106, 112, 110, 111, 107, 115, 106, 106, 110 Avg = 110 Push out force >100lbs	PV	12	0					718V02
	Force to Pull Through- A minimum force of 125 to 155 kg is acceptable to break the base or pull the valve out of the hole.	147, 148, 142, 141, 141, 141, 141, 141, 142, 144, 140, 134, 147, 149 Avg = 143	PV	6	0					846K2
	Attribute Test - Destructive									718V02
	Attribute Test - Destructive									718V02
	The valve must withstand a minimum pressure of 300 psig. No failures (.187 X .468 -.480 hole dia. Pth)	805,684,616,623,611,616, 677,688,690,635,633,632 Avg = 694 psig	PV	12	0					783V02
	Attribute Test - Destructive									783V02

\*Use of this column is optional





NOTE:  
 .0075 R MAX. ALL  
 CORNERS UNLESS NOTED

		MATERIAL			CODE	
		TOLERANCES UNLESS NOTED INCHES { .02 .005 ANGLES ±2° SYMBOL DESIGNATING SPC BREAK SHARP EDGES & CORNERS MACHINE SURFACE ROUGHNESS CONCENTRICITY WITHIN TIR			<b>FATON</b> Eaton Corporation Air Control Products Roxboro, N. C. 27573 ACAD NO. 32708	
		IN. ±.02 ±.005 ±2° ② .015 MAX 125√ .010	DRAWN MC 9/24/02 ENGR.	SCALE 2:1 APVD.	TITLE PRELIMINARY-HIGH PRESSURE TUBELESS SNAP-IN VALVE DRAWING NO. X-32708	
LTR	ECN	REVISION	APVD			

System		Assembly		Program				Design Engineer		
Subsystem TR-600 HP Grip-In (1-32706)		Component		Latest Design Level Preliminary				Robert Martin		
Test Name/Source	Acceptance Criteria	Test Results	Design Limit Tested	Sample Size		Statistical Test Accept. Criteria		Timing		Remarks
				Required	Tested	Required	Actual	Sched.	Actual	
1. Material Hardness Test /	Paragraph 4.2.1 Unseal Valves- Hardness values of 80-70 Shore A durometer are acceptable		PV	12	12			TBD		
	Paragraph 4.2.2 Aged Valves-An increase of 10% maximum over the values obtained in paragraph 4.2.1 of this document, but limited to a maximum hardness value of 75 Shore A durometer is acceptable.		PV	12	12			TBD		
2. Valve Assembly Operations C	Leak test with the valve cap removed at an air pressure of 100+/-4 psig. For one minute. Valves may not leak within one minute	No failures	PV	6	6					
	Valve caps must function after repeated depressions / 15 depressions	No failures	PV	6	6					
	Room temperature testing at 85 to 75 deg Leakage at a rate of 0.2 cc/min or less is considered acceptable at the rim seal.	No failures	PV	6	6					
3. Rim Seal Leak Test / (.187 X .465 -.463 hole dia. Pts)	Low Temperature / -40 degrees F Leakage at a rate of 0.2 cc/min or less is considered acceptable at the rim seal.	No failures	PV	6	6					Attribute Test - Extreme Environment
	High Temperature / +212 degrees F Leakage at a rate of 0.2cc/min or less is considered acceptable at the rim seal.	No failures	PV	6	6			6/28/02		Attribute Test - Extreme Environment
4. Bursting or Unsealing	Force to Seal- (.187 X .445 -.447hole dia. Force to seal shall not exceed 100lb. The valve must withstand a minimum push out force of 100 lbs after being sealed.	100, 100, 100, 100, 100, 100, 100, 100 Avg = 100	PV	10	10					Attribute Test - Destructive
	Force to Pull Through- A minimum force of 125 lb (55 kg) is acceptable to break the base or pull the valve out of the hole.	100, 100, 100, 100, 100, 100, 100, 100 Avg = 100	PV	6	6			6/28/02		Attribute Test - Destructive
	Force to Pull Through- A minimum force of 125 lb (55 kg) is acceptable to break the base or pull the valve out of the hole.	100, 100, 100, 100, 100, 100, 100, 100 Avg = 100	PV	10	10					Attribute Test - Destructive
	The valve must withstand a minimum pressure of 300 psig. No failures (.187 X .465 -.463 hole dia. Pts)		PV	6	6			6/28/02		Attribute Test - Destructive

\*Test file names supplied

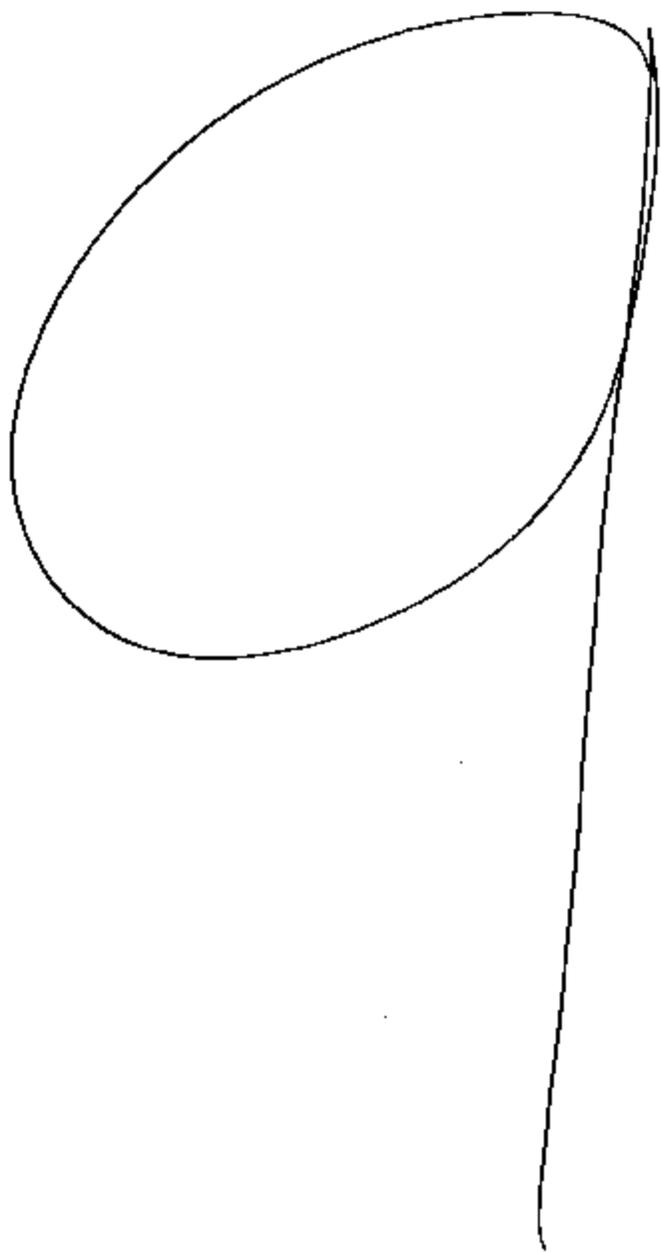
**FATON** Design Verification Plan and

[REDACTED]

Date: 01/02/02

Page 2 of 2

System		Assembly		Program		Design Engineer				
Subsystem		Component		Latest Design Level		Reviewed				
TR-800 HP Step-in (P-32708)				Preliminary		Concluded				
Test Resource	Acceptance Criteria	Test Results - 1	Design Level Tested	Sample Size		Statistical Test Accept. Criteria		Timing		Remarks
				Required	Tested	Required	Actual	Elapsed	Actual	
4. Appearance Check	Parts shall be free of excessive rubber in air passage which restricts air flow to less than the case would allow. No rubber shall be present .13 above shoulder on the insert nor flow marks, blisters, voids, or molding defects. Parts may have mold parting line flash not to extend .080 in. in height and .008 in. in thickness at the outer edge.	No failure. Parts free of excessive rubber. No defects.	PV	100	100			TBD		
5. Cases Resistance Test	The valve rubber cover shall exhibit resistance to abrasion equivalent to a zero rating per ASTM D 1171. (187 X .445-.447 hole dia. Plate)	Rating equal to zero. No cracks.	PV	12	12			TBD		AirBulb Test - Extreme Environment
7. Adhesion Test	No separation between metal and rubber, rubber and cement, or metal and cement in excess of 1/4 in. square or equivalent.	No failures, adhesion at 400psi.	PV	12	12			TBD		AirBulb Test - Destructive
8. Valve Core Test	Valve core shall allow an air flow rate of at least 4.3 SCFM at 80 psig input. Valve core must allow inflation and deflation in accordance with normal procedure P08C20	Valve core flow rate = 6.4 SCFM. Lower test result ok. 6.4 - 3.3718 (0.525) = 3.1	PV	12	12			TBD		One sided statistical tolerance limits
9. Torque Test/Valve Core	Valve core must be able to be removed after 8 in-lb. Test to failure. Torque must be >8 in-lb. No failures	All cores could be removed up to failure. Torque to failure: 37, 38, 39, 40, 41 in-lb.	PV	5				01/02/02		AirBulb Test - Destructive VS-802A
10. Torque Test - Valve cap and/or extension.	Test to failure. Torque must be >6 in-lb. No failures.	No failures. Extension torque to failure > 6 in-lb. Torque to failure: 7.8, 8.7, 9.6, 10.5, 11.4, 12.3, 13.2, 14.1, 15.0, 15.9, 16.8, 17.7, 18.6, 19.5, 20.4, 21.3, 22.2, 23.1, 24.0, 24.9, 25.8, 26.7, 27.6, 28.5, 29.4, 30.3, 31.2, 32.1, 33.0, 33.9, 34.8, 35.7, 36.6, 37.5, 38.4, 39.3, 40.2, 41.1, 42.0, 42.9, 43.8, 44.7, 45.6, 46.5, 47.4, 48.3, 49.2, 50.1, 51.0, 51.9, 52.8, 53.7, 54.6, 55.5, 56.4, 57.3, 58.2, 59.1, 60.0, 60.9, 61.8, 62.7, 63.6, 64.5, 65.4, 66.3, 67.2, 68.1, 69.0, 69.9, 70.8, 71.7, 72.6, 73.5, 74.4, 75.3, 76.2, 77.1, 78.0, 78.9, 79.8, 80.7, 81.6, 82.5, 83.4, 84.3, 85.2, 86.1, 87.0, 87.9, 88.8, 89.7, 90.6, 91.5, 92.4, 93.3, 94.2, 95.1, 96.0, 96.9, 97.8, 98.7, 99.6, 100.5, 101.4, 102.3, 103.2, 104.1, 105.0, 105.9, 106.8, 107.7, 108.6, 109.5, 110.4, 111.3, 112.2, 113.1, 114.0, 114.9, 115.8, 116.7, 117.6, 118.5, 119.4, 120.3, 121.2, 122.1, 123.0, 123.9, 124.8, 125.7, 126.6, 127.5, 128.4, 129.3, 130.2, 131.1, 132.0, 132.9, 133.8, 134.7, 135.6, 136.5, 137.4, 138.3, 139.2, 140.1, 141.0, 141.9, 142.8, 143.7, 144.6, 145.5, 146.4, 147.3, 148.2, 149.1, 150.0, 150.9, 151.8, 152.7, 153.6, 154.5, 155.4, 156.3, 157.2, 158.1, 159.0, 160.0, 160.9, 161.8, 162.7, 163.6, 164.5, 165.4, 166.3, 167.2, 168.1, 169.0, 170.0, 170.9, 171.8, 172.7, 173.6, 174.5, 175.4, 176.3, 177.2, 178.1, 179.0, 180.0, 180.9, 181.8, 182.7, 183.6, 184.5, 185.4, 186.3, 187.2, 188.1, 189.0, 190.0, 190.9, 191.8, 192.7, 193.6, 194.5, 195.4, 196.3, 197.2, 198.1, 199.0, 200.0, 200.9, 201.8, 202.7, 203.6, 204.5, 205.4, 206.3, 207.2, 208.1, 209.0, 210.0, 210.9, 211.8, 212.7, 213.6, 214.5, 215.4, 216.3, 217.2, 218.1, 219.0, 220.0, 220.9, 221.8, 222.7, 223.6, 224.5, 225.4, 226.3, 227.2, 228.1, 229.0, 230.0, 230.9, 231.8, 232.7, 233.6, 234.5, 235.4, 236.3, 237.2, 238.1, 239.0, 240.0, 240.9, 241.8, 242.7, 243.6, 244.5, 245.4, 246.3, 247.2, 248.1, 249.0, 250.0, 250.9, 251.8, 252.7, 253.6, 254.5, 255.4, 256.3, 257.2, 258.1, 259.0, 260.0, 260.9, 261.8, 262.7, 263.6, 264.5, 265.4, 266.3, 267.2, 268.1, 269.0, 270.0, 270.9, 271.8, 272.7, 273.6, 274.5, 275.4, 276.3, 277.2, 278.1, 279.0, 280.0, 280.9, 281.8, 282.7, 283.6, 284.5, 285.4, 286.3, 287.2, 288.1, 289.0, 290.0, 290.9, 291.8, 292.7, 293.6, 294.5, 295.4, 296.3, 297.2, 298.1, 299.0, 300.0, 300.9, 301.8, 302.7, 303.6, 304.5, 305.4, 306.3, 307.2, 308.1, 309.0, 310.0, 310.9, 311.8, 312.7, 313.6, 314.5, 315.4, 316.3, 317.2, 318.1, 319.0, 320.0, 320.9, 321.8, 322.7, 323.6, 324.5, 325.4, 326.3, 327.2, 328.1, 329.0, 330.0, 330.9, 331.8, 332.7, 333.6, 334.5, 335.4, 336.3, 337.2, 338.1, 339.0, 340.0, 340.9, 341.8, 342.7, 343.6, 344.5, 345.4, 346.3, 347.2, 348.1, 349.0, 350.0, 350.9, 351.8, 352.7, 353.6, 354.5, 355.4, 356.3, 357.2, 358.1, 359.0, 360.0, 360.9, 361.8, 362.7, 363.6, 364.5, 365.4, 366.3, 367.2, 368.1, 369.0, 370.0, 370.9, 371.8, 372.7, 373.6, 374.5, 375.4, 376.3, 377.2, 378.1, 379.0, 380.0, 380.9, 381.8, 382.7, 383.6, 384.5, 385.4, 386.3, 387.2, 388.1, 389.0, 390.0, 390.9, 391.8, 392.7, 393.6, 394.5, 395.4, 396.3, 397.2, 398.1, 399.0, 400.0, 400.9, 401.8, 402.7, 403.6, 404.5, 405.4, 406.3, 407.2, 408.1, 409.0, 410.0, 410.9, 411.8, 412.7, 413.6, 414.5, 415.4, 416.3, 417.2, 418.1, 419.0, 420.0, 420.9, 421.8, 422.7, 423.6, 424.5, 425.4, 426.3, 427.2, 428.1, 429.0, 430.0, 430.9, 431.8, 432.7, 433.6, 434.5, 435.4, 436.3, 437.2, 438.1, 439.0, 440.0, 440.9, 441.8, 442.7, 443.6, 444.5, 445.4, 446.3, 447.2, 448.1, 449.0, 450.0, 450.9, 451.8, 452.7, 453.6, 454.5, 455.4, 456.3, 457.2, 458.1, 459.0, 460.0, 460.9, 461.8, 462.7, 463.6, 464.5, 465.4, 466.3, 467.2, 468.1, 469.0, 470.0, 470.9, 471.8, 472.7, 473.6, 474.5, 475.4, 476.3, 477.2, 478.1, 479.0, 480.0, 480.9, 481.8, 482.7, 483.6, 484.5, 485.4, 486.3, 487.2, 488.1, 489.0, 490.0, 490.9, 491.8, 492.7, 493.6, 494.5, 495.4, 496.3, 497.2, 498.1, 499.0, 500.0, 500.9, 501.8, 502.7, 503.6, 504.5, 505.4, 506.3, 507.2, 508.1, 509.0, 510.0, 510.9, 511.8, 512.7, 513.6, 514.5, 515.4, 516.3, 517.2, 518.1, 519.0, 520.0, 520.9, 521.8, 522.7, 523.6, 524.5, 525.4, 526.3, 527.2, 528.1, 529.0, 530.0, 530.9, 531.8, 532.7, 533.6, 534.5, 535.4, 536.3, 537.2, 538.1, 539.0, 540.0, 540.9, 541.8, 542.7, 543.6, 544.5, 545.4, 546.3, 547.2, 548.1, 549.0, 550.0, 550.9, 551.8, 552.7, 553.6, 554.5, 555.4, 556.3, 557.2, 558.1, 559.0, 560.0, 560.9, 561.8, 562.7, 563.6, 564.5, 565.4, 566.3, 567.2, 568.1, 569.0, 570.0, 570.9, 571.8, 572.7, 573.6, 574.5, 575.4, 576.3, 577.2, 578.1, 579.0, 580.0, 580.9, 581.8, 582.7, 583.6, 584.5, 585.4, 586.3, 587.2, 588.1, 589.0, 590.0, 590.9, 591.8, 592.7, 593.6, 594.5, 595.4, 596.3, 597.2, 598.1, 599.0, 600.0, 600.9, 601.8, 602.7, 603.6, 604.5, 605.4, 606.3, 607.2, 608.1, 609.0, 610.0, 610.9, 611.8, 612.7, 613.6, 614.5, 615.4, 616.3, 617.2, 618.1, 619.0, 620.0, 620.9, 621.8, 622.7, 623.6, 624.5, 625.4, 626.3, 627.2, 628.1, 629.0, 630.0, 630.9, 631.8, 632.7, 633.6, 634.5, 635.4, 636.3, 637.2, 638.1, 639.0, 640.0, 640.9, 641.8, 642.7, 643.6, 644.5, 645.4, 646.3, 647.2, 648.1, 649.0, 650.0, 650.9, 651.8, 652.7, 653.6, 654.5, 655.4, 656.3, 657.2, 658.1, 659.0, 660.0, 660.9, 661.8, 662.7, 663.6, 664.5, 665.4, 666.3, 667.2, 668.1, 669.0, 670.0, 670.9, 671.8, 672.7, 673.6, 674.5, 675.4, 676.3, 677.2, 678.1, 679.0, 680.0, 680.9, 681.8, 682.7, 683.6, 684.5, 685.4, 686.3, 687.2, 688.1, 689.0, 690.0, 690.9, 691.8, 692.7, 693.6, 694.5, 695.4, 696.3, 697.2, 698.1, 699.0, 700.0, 700.9, 701.8, 702.7, 703.6, 704.5, 705.4, 706.3, 707.2, 708.1, 709.0, 710.0, 710.9, 711.8, 712.7, 713.6, 714.5, 715.4, 716.3, 717.2, 718.1, 719.0, 720.0, 720.9, 721.8, 722.7, 723.6, 724.5, 725.4, 726.3, 727.2, 728.1, 729.0, 730.0, 730.9, 731.8, 732.7, 733.6, 734.5, 735.4, 736.3, 737.2, 738.1, 739.0, 740.0, 740.9, 741.8, 742.7, 743.6, 744.5, 745.4, 746.3, 747.2, 748.1, 749.0, 750.0, 750.9, 751.8, 752.7, 753.6, 754.5, 755.4, 756.3, 757.2, 758.1, 759.0, 760.0, 760.9, 761.8, 762.7, 763.6, 764.5, 765.4, 766.3, 767.2, 768.1, 769.0, 770.0, 770.9, 771.8, 772.7, 773.6, 774.5, 775.4, 776.3, 777.2, 778.1, 779.0, 780.0, 780.9, 781.8, 782.7, 783.6, 784.5, 785.4, 786.3, 787.2, 788.1, 789.0, 790.0, 790.9, 791.8, 792.7, 793.6, 794.5, 795.4, 796.3, 797.2, 798.1, 799.0, 800.0, 800.9, 801.8, 802.7, 803.6, 804.5, 805.4, 806.3, 807.2, 808.1, 809.0, 810.0, 810.9, 811.8, 812.7, 813.6, 814.5, 815.4, 816.3, 817.2, 818.1, 819.0, 820.0, 820.9, 821.8, 822.7, 823.6, 824.5, 825.4, 826.3, 827.2, 828.1, 829.0, 830.0, 830.9, 831.8, 832.7, 833.6, 834.5, 835.4, 836.3, 837.2, 838.1, 839.0, 840.0, 840.9, 841.8, 842.7, 843.6, 844.5, 845.4, 846.3, 847.2, 848.1, 849.0, 850.0, 850.9, 851.8, 852.7, 853.6, 854.5, 855.4, 856.3, 857.2, 858.1, 859.0, 860.0, 860.9, 861.8, 862.7, 863.6, 864.5, 865.4, 866.3, 867.2, 868.1, 869.0, 870.0, 870.9, 871.8, 872.7, 873.6, 874.5, 875.4, 876.3, 877.2, 878.1, 879.0, 880.0, 880.9, 881.8, 882.7, 883.6, 884.5, 885.4, 886.3, 887.2, 888.1, 889.0, 890.0, 890.9, 891.8, 892.7, 893.6, 894.5, 895.4, 896.3, 897.2, 898.1, 899.0, 900.0, 900.9, 901.8, 902.7, 903.6, 904.5, 905.4, 906.3, 907.2, 908.1, 909.0, 910.0, 910.9, 911.8, 912.7, 913.6, 914.5, 915.4, 916.3, 917.2, 918.1, 919.0, 920.0, 920.9, 921.8, 922.7, 923.6, 924.5, 925.4, 926.3, 927.2, 928.1, 929.0, 930.0, 930.9, 931.8, 932.7, 933.6, 934.5, 935.4, 936.3, 937.2, 938.1, 939.0, 940.0, 940.9, 941.8, 942.7, 943.6, 944.5, 945.4, 946.3, 947.2, 948.1, 949.0, 950.0, 950.9, 951.8, 952.7, 953.6, 954.5, 955.4, 956.3, 957.2, 958.1, 959.0, 960.0, 960.9, 961.8, 962.7, 963.6, 964.5, 965.4, 966.3, 967.2, 968.1, 969.0, 970.0, 970.9, 971.8, 972.7, 973.6, 974.5, 975.4, 976.3, 977.2, 978.1, 979.0, 980.0, 980.9, 981.8, 982.7, 983.6, 984.5, 985.4, 986.3, 987.2, 988.1, 989.0, 990.0, 990.9, 991.8, 992.7, 993.6, 994.5, 995.4, 996.3, 997.2, 998.1, 999.0, 1000.0, 1000.9, 1001.8, 1002.7, 1003.6, 1004.5, 1005.4, 1006.3, 1007.2, 1008.1, 1009.0, 1010.0, 1010.9, 1011.8, 1012.7, 1013.6, 1014.5, 1015.4, 1016.3, 1017.2, 1018.1, 1019.0, 1020.0, 1020.9, 1021.8, 1022.7, 1023.6, 1024.5, 1025.4, 1026.3, 1027.2, 1028.1, 1029.0, 1030.0, 1030.9, 1031.8, 1032.7, 1033.6, 1034.5, 1035.4, 1036.3, 1037.2, 1038.1, 1039.0, 1040.0, 1040.9, 1041.8, 1042.7, 1043.6, 1044.5, 1045.4, 1046.3, 1047.2, 1048.1, 1049.0, 1050.0, 1050.9, 1051.8, 1052.7, 1053.6, 1054.5, 1055.4, 1056.3, 1057.2, 1058.1, 1059.0, 1060.0, 1060.9, 1061.8, 1062.7, 1063.6, 1064.5, 1065.4, 1066.3, 1067.2, 1068.1, 1069.0, 1070.0, 1070.9, 1071.8, 1072.7, 1073.6, 1074.5, 1075.4, 1076.3, 1077.2, 1078.1, 1079.0, 1080.0, 1080.9, 1081.8, 1082.7, 1083.6, 1084.5, 1085.4, 1086.3, 1087.2, 1088.1, 1089.0, 1090.0, 1090.9, 1091.8, 1092.7, 1093.6, 1094.5, 1095.4, 1096.3, 1097.2, 1098.1, 1099.0, 1100.0, 1100.9, 1101.8, 1102.7, 1103.6, 1104.5, 1105.4, 1106.3, 1107.2, 1108.1, 1109.0, 1110.0, 1110.9, 1111.8, 1112.7, 1113.6, 1114.5, 1115.4, 1116.3, 1117.2, 1118.1, 1119.0, 1120.0, 1120.9, 1121.8, 1122.7, 1123.6, 1124.5, 1125.4, 1126.3, 1127.2, 1128.1, 1129.0, 1130.0, 1130.9, 1131.8, 1132.7, 1133.6, 1134.5, 1135.4, 1136.3, 1137.2, 1138.1, 1139.0, 1140.0, 1140.9, 1141.8, 1142.7, 1143.6, 1144.5, 1145.4, 1146.3, 1147.2, 1148.1, 1149.0, 1150.0, 1150.9, 1151.8, 1152.7, 1153.6, 1154.5, 1155.4, 1156.3, 1157.2, 1158.1, 1159.0, 1160.0, 1160.9, 1161.8, 1162.7, 1163.6, 1164.5, 1165.4, 1166.3, 1167.2, 1168.1, 1169.0, 1170.0, 1170.9, 1171.8, 1172.7, 1173.6, 1174.5, 1175.4, 1176.3, 1177.2, 1178.1, 1179.0, 1180.0, 1180.9, 1181.8, 1182.7, 1183.6, 1184.5, 1185.4, 1186.3, 1187.2, 1188.1, 1189.0, 1190.0, 1190.9, 1191.8, 1192.7, 1193.6, 1194.5, 1195.4, 1196.3, 1197.2, 1198.1, 1199.0, 1200.0, 1200.9, 1201.8, 1202.7, 1203.6, 1204.5, 1205.4, 1206.3, 1207.2, 1208.1, 1209.0, 1210.0, 1210.9, 1211.8, 1212.7, 1213.6, 1214.5, 1215.4, 1216.3, 1217.2, 1218.1, 1219.0, 1220.0, 1220.9, 1221.8, 1222.7, 1223.6, 1224.5, 1225.4, 1226.3, 1227.2, 1228.1, 1229.0, 1230.0, 1230.9, 1231.8, 1232.7, 1233.6, 1234.5, 1235.4, 1236.3, 1237.2, 1238.1, 1239.0, 1240.0, 1240.9, 1241.8, 1242.7, 1243.6, 1244.5, 1245.4, 1246.3, 1247.2, 1248.1, 1249.0, 1250.0, 1250.9, 1251.8, 1252.7, 1253.6, 1254.5, 1255.4, 1256.3, 1257.2, 1258.1, 1259.0, 1260.0, 1260.9, 1261.8, 1262.7, 1263.6, 1264.5, 1265.4, 1266.3, 1267.2, 1268.1, 1269.0, 1270.0, 1270.9, 1271.8, 1272.7, 1273.6, 1274.5, 1275.4, 1276.3, 1277.2, 1278.1, 1279.0, 1280.0, 1280.9, 1281.8, 1282.7, 1283.6, 1284.5, 1285.4, 1286.3, 1287.2, 1288.1, 1289.0, 1290.0, 1290.9, 1291.8, 1292.7, 1293.6, 1294.5, 1295.4, 1296.3, 1297.2, 1298.1, 1299.0, 1300.0, 1300.9, 1301.8, 1302.7, 1303.6, 1304.5, 1305.4, 1306.3, 1307.2, 1308.1, 1309.0, 1310.0, 1310.9, 1311.8, 1312.7, 1313.6, 1314.5, 1315.4, 1316.3, 1317.2, 1318.1, 1319.0, 1320.0, 1320.9, 1321.8, 1322.7, 1323.6, 1324.5, 1325.4, 1326.3, 1327.2, 1328.1, 1329.0, 1330.0, 1330.9, 1331.8, 1332.7, 1333.6, 1334.5, 1335.4, 1336.3, 1337.2, 1338.1, 1339.0, 1340.0, 1340.9, 1341.8, 1342.7, 1343.6, 1344.5, 1345.4, 1346.3, 1347.2, 1348.1, 1349.0, 1350.0, 1350.9, 1351.8, 1352.7, 1353.6, 1354.5, 1355.4, 1356.3, 1357.2, 1358.1, 1359.0, 1360.0, 1360.9, 1361.8, 1362.7, 1363.6, 1364.5, 1365.4, 1366.3, 1367.2, 1368.1, 1369.0, 1370.0, 1370.9, 1371.8, 1372.7, 1373.6, 1374.5, 1375.4, 1376.3, 1377.2, 1378.1, 1379.0, 1380.0, 1380.9, 1381.8, 1382.7, 1383.6, 1384.5, 1385.4, 1386.3, 1387.2, 1388.1, 1389.0,								



**Engineering Analysis – EA02-018  
Eaton Corporation – Information for Section 9**

9. Provide a summary table listing the five largest replacement market distributors of the subject part. For each distributor, provide its name, address, and telephone number, a buyer contact name, and the approximate number of TR-600 HP tire valves it sold per year from 1998 through 2001.

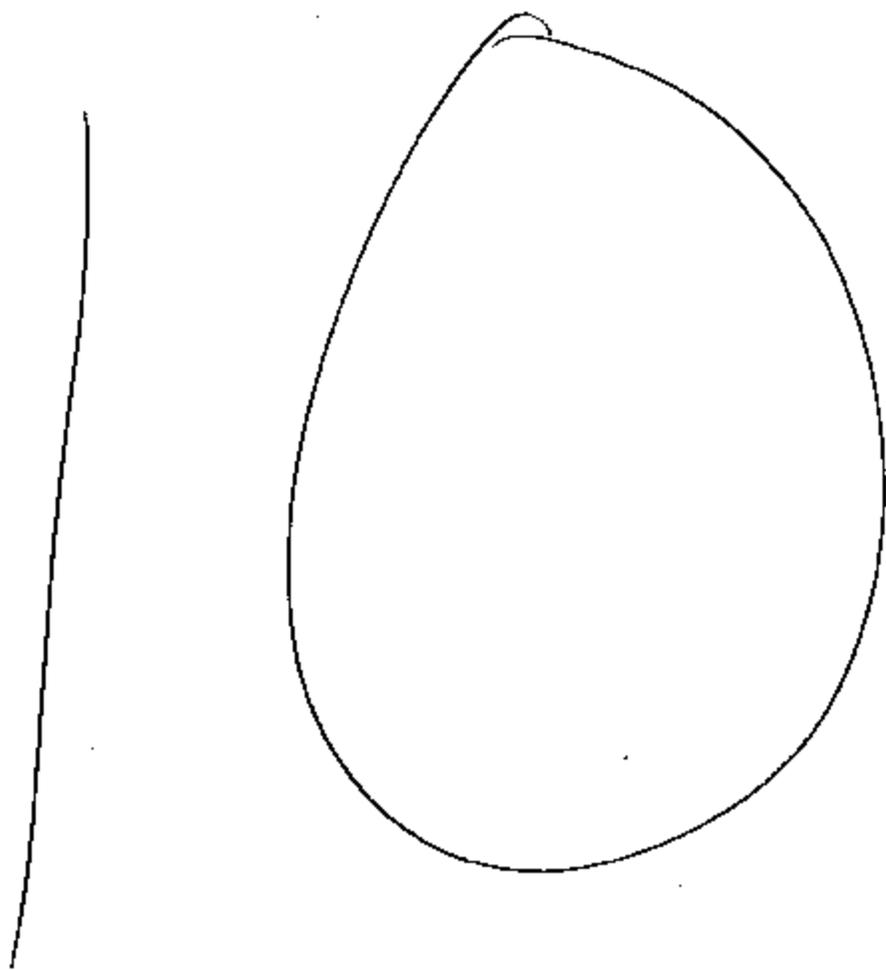
**Response:**

**Top Five Aftermarket Customers of Subject Valve**

Customer	1998	2000	2001
Discount Tire	328,800	444,300	678,800
Sears, Roebuck	234,550	298,050	304,900
Bridgestone/Firestone	95,850	102,800	172,300
Tire-Ex Supply	21,000	50,000	62,500
Canadian Tire	24,000	23,000	46,500

CUSTOMER	ADDRESS	CITY	STATE	ZIP	COUNTRY	Buyer Name	Buyer Number
		Toronto	ON	M4P 2V8	Canada		
		Cottsdale	AZ	85254	USA		
		Rolling Meadows	IL	60008	USA		
		Hoffman Estates	IL	60179	USA		
		Edmonton	AB	T5S 1V3	Canada		

Data for 1998 is not available. Eaton's standard procedure is to purge shipping records every three years.



**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 10**

10. State whether there are there any differences between the Eaton tire valves used on the Ford F350, F450, F550, E450, and E550 vehicles and those used on other Ford vehicles, on competitor's vehicles, or those sold in the aftermarket. Please describe all differences in detail.

**Response**

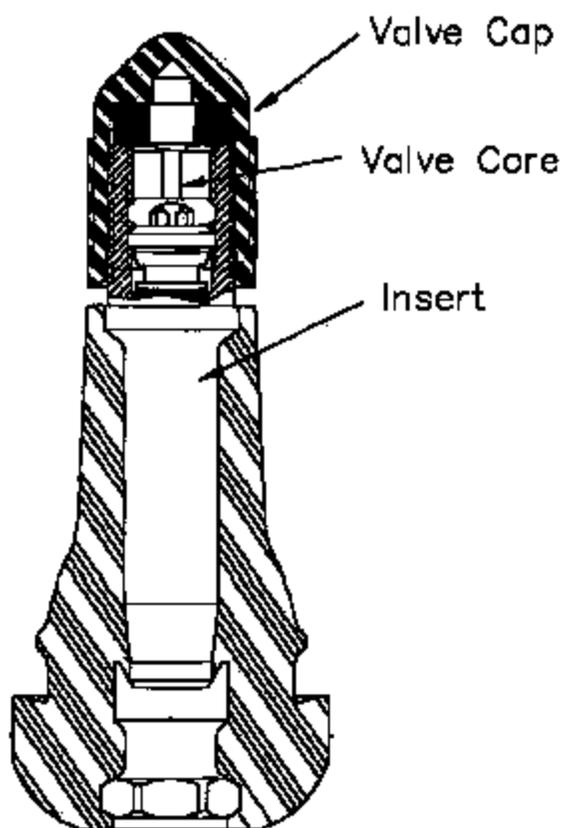
The valves that Eaton sells to Ford, its competitor's or in the aftermarket are of the same design and manufactured with the same processes and materials.

Ford F350, F450, F550, E450, and E550 vehicles use either the subject valve (TR 600 HP snap-in) or clamp-in valves. The TR 600 HP is designated as a high pressure snap-in valve rated to 100 psig cold inflation. The valve consists of an insert molded to a rubber base, valve core and cap. The insert houses the valve core to control the flow of air into and out of the tire. It also house the valve cap to protect the valve core from contamination and if of the sealing type, provides a redundant seal. This type of valve is installed in a rim by either pulling or pushing on the insert. The installation force on the insert causes the rubber to elongate allowing the valve to pass through the rim hole. Upon releasing the installation force, the rubber expands against the rim hole creating a seal.

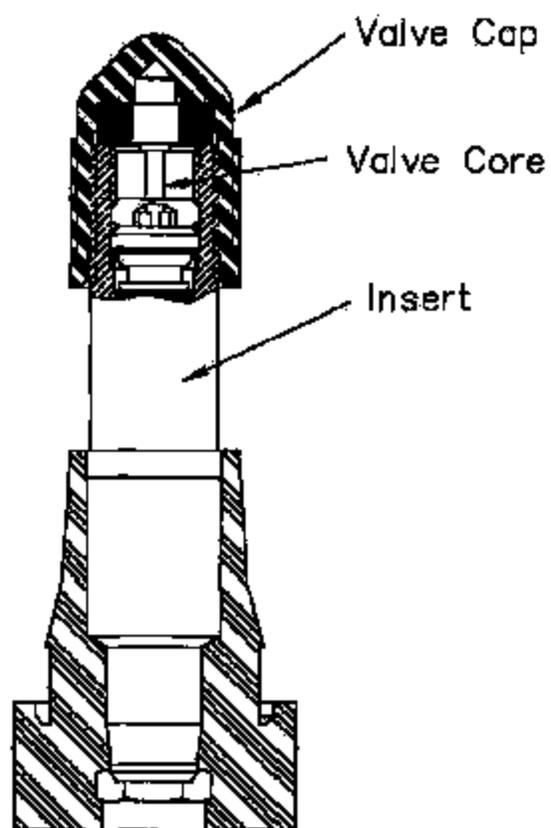
Clamp-in type valves are rated to 200 psig. Clamp-in valves consist of metal stem, rubber grommet, washer and nut, valve core and cap. The metal stem houses the valve core and valve cap in the same manner as the high pressure snap-in. Clamp-ins mount to rims by slip fitting the metal stem with grommet into the rim hole. A washer and nut are then fastened to the stem on the weather side of the rim. The nut is torqued to expand the grommet into the rim hole thereby creating a seal.

Passenger cars use a snap-in type valve that is rated a 65 psig maximum cold inflation. The manner in which they install in a rim hole is the same as the high-pressure snap-in. The design differences between the two valves are: more length of the insert on the high-pressure snap-in is exposed as a means to differentiate it between the snap-in valve rated at 65 psig and the insert of the high pressure snap-in extends further down to add strength.

**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 10**

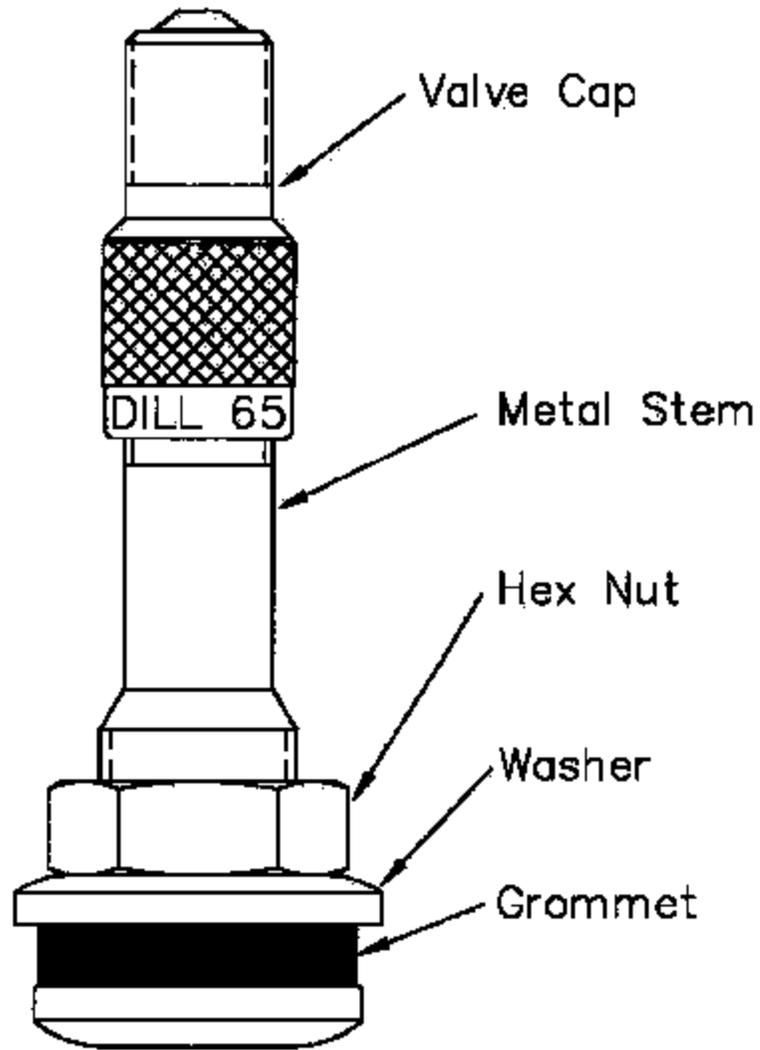


65 PSIG  
Snap-In

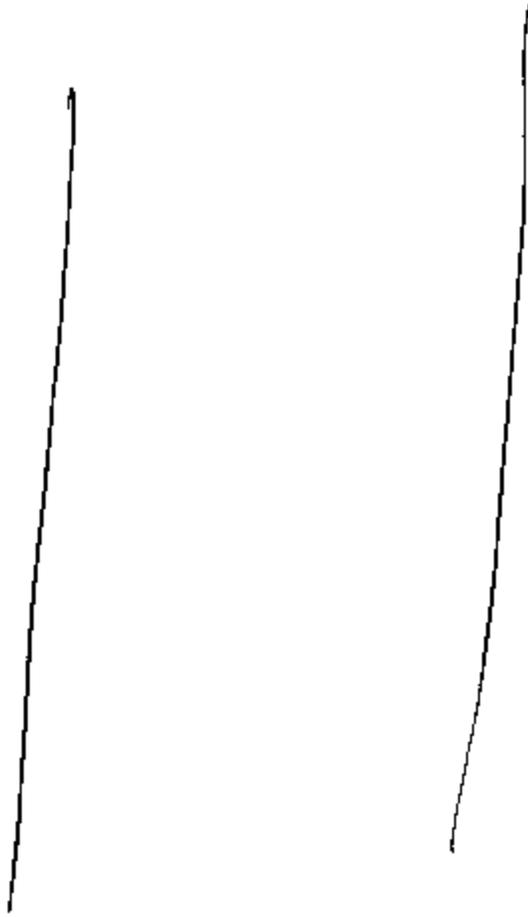


100 PSIG  
High Pressure Snap-In

**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 10**



200 PSIG  
Clamp-In Type Valve



**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 11**

11. Furnish Eaton's detailed opinion of the alleged defect in the subject vehicles. Please include an assessment of the following:
- a. The causal or contributory factors leading to a tire valve popping out of the rim (completely so that the valve is left on the roadway) while a vehicle is in motion;
  - b. The causal or contributory factors leading to a tire valve breaking into two pieces such that the rubber base remains inside the rim and the upper portion is left on the roadway while a vehicle is in motion;
  - c. The risk to motor vehicle safety that the alleged defect poses; and
  - d. The warnings, if any, that the operator and the other persons both inside and outside the vehicle would have that the tire valve was malfunctioning.

**Response**

- A. Eaton has never validated the valve popping out of the rim (completely so that the valve is left on the roadway) while the vehicle is in motion. It is our belief that in these incidents the valve has separated as in (b) and the rubber base is not recovered when the tire is dismounted.
- B. Our investigation of this issue along with Ford Motor Company brought us to the conclusion that damage to the valve during the installation into the rim was the most likely cause.
- C. The alleged defect could lead to a rapid loss of tire pressure, which may result in a loss of vehicle control.
- D. Internal to the vehicle, the operator may be warned by the hissing sound of air escaping or a popping sound. External warnings would be that the valve is "cocked" (not perpendicular to the rim surface). The presence of tears, cuts or abrasions on the rubber surface of the valve could also give warning. Coating the valve with a soap solution and observing for the formation of bubbles could also give a warning.

12

**Engineering Analysis – EA02-018**  
**Eaton Corporation -- Information for Section 12**

12. ODI is aware of over 450 incidents of valve stems popping out on subject Ford F350, F450, F550, E450, and E550 vehicles. Most reports of incidents were received from Ford, but several were reported directly to ODI. ODI has fewer than 100 tire valve reports in its database spanning more than the past two decades. While our database contains reports of failures of the valves on these vehicles, reports on other vehicles are notably absent. State Eaton's opinion as to why the subject valves appear to be popping out of Ford F350, F450, F550, E450, and E550 vehicles at a higher rate than the same or similar valves used on other vehicles.

**Response**

Eaton has no knowledge that there were over 450 incidents. To our knowledge there were approximately 20 incidents in late 1999 through 2000. We believed that these incidents were attributable to damage that occurred during installation as was reflected in the Ford recall of these vehicles.

13

**Engineering Analysis – EA02-018**  
**Eaton Corporation – Information for Section 13**

Provide the date(s) that Eaton ceased collecting information for use in responding to this Information Request. If more than one date applies, please provide the date for each information type (e.g., vehicle population, owner complaints, warranty, etc.)

**Response:**

Eaton ceased collecting information for use in responding to this Information Request on October 2, 2002.