



# EA08-021

## 1995-2003 Ford Windstar



### Engine Compartment Fires Fact Sheet



# Contents

- Summary
- Alleged Failure
- Background
- Peer Vehicles
- Previous Engine Compartment Fire Actions
- Peer Complaint Comparison
- Complainant Evidence
- VRTC Testing



# Summary

**EA Opened:** 17-Sep-08

**Alleged Defect:**

Engine Compartment Fires

**Subject Vehicles:**

1995-2003 Ford Windstar

**Population:** 1,643,432

**Complaints:**

**ODI – 185**

**Ford – 325 (Cat A or S)**

**Total – 510**

**Warranty Claims:**

**Ford – 146 (Cat A or S)**

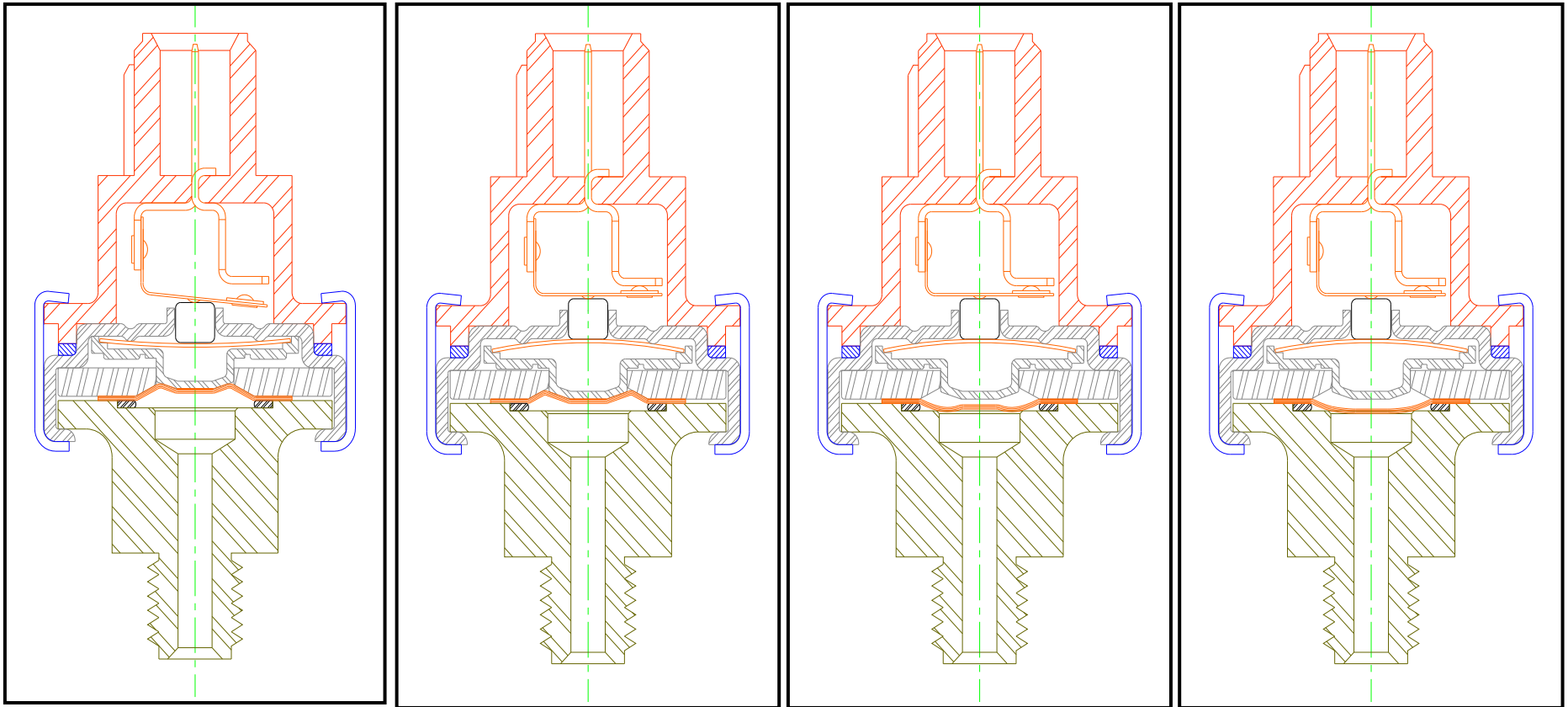




# Alleged Failure

- The Speed Control Deactivations Switch (SCDS) develops an internal leak that allows brake fluid to escape the brake system.
- The brake fluid that leaks past the seals in the SCDS can potentially result in a vehicle fire in two separate ways
  - The brake fluid leak within the SCDS results in a short circuit internal to the SCDS. The SCDS then catches fire and the fire spreads to the engine compartment of the vehicle. This scenario can lead to a fire while the vehicle is running or to a fire that starts while the vehicle is running and then spreads after the vehicle is parked.
  - The brake fluid that leaks past the SCDS migrates through the vehicle wire harness to the ABS module. Once the brake fluid reaches the ABS module, a fire can start at any time as the ABS module has power to it at all times. The fire can then spread from the ABS module to the underbody of the vehicle.

# Kapton Motion (“Oil Can”)



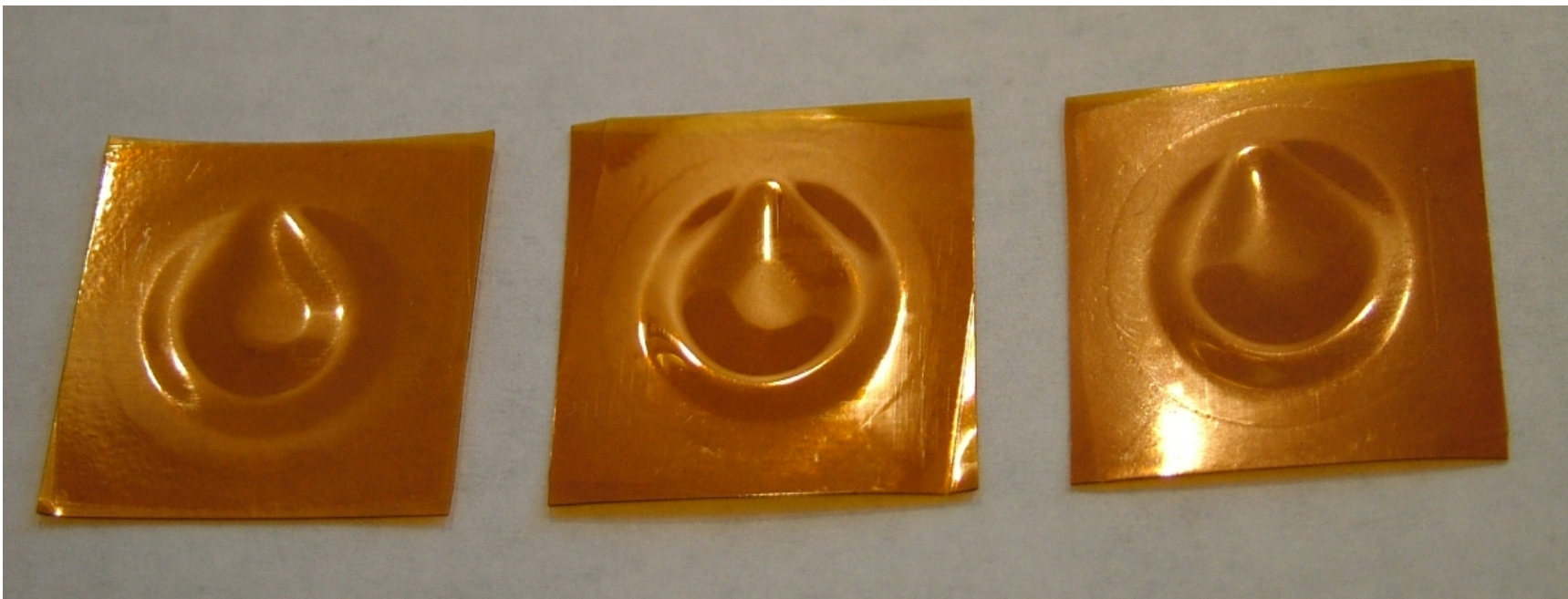
- Kapton Seal Position Starting From Full Pressure Moving To Vacuum



# New SCDS Kapton



- Kapton From New SCDS Off Master Cylinder Replacement Part Ordered for MY2000 F150



- Seal 1

- Seal 2

- Seal 3



# Background

- ODI has conducted 3 investigations involving Ford vehicles manufactured with the Texas Instruments (TI) Speed Control Deactivation Switch (SCDS).
- These 3 investigations resulted in 7 recalls of over 12 million vehicles
- Ford has indicated that they manufactured approximately 16 million vehicles that included the TI SCDS as original equipment.
- The vehicles that Ford has recalled to date have all had SCDS that were powered at all times (PAT) regardless of key position.
- Ford did not originally recall the Windstar vehicles because they had a low rate of fire and they were not PAT.
- ODI has received 510 complaints on Windstar vehicles indicating a potential failure of the SCDS. Of these complaints 166 mention fire, smoke, or burn. Of the 166 Windstar complaints that mention fire, smoke, or burn 3 resulted in structure fires.
- 12 of the fire complaints involved the ABS module (post 1998 MY). The ABS module is powered at all times and these fires can occur while the vehicle is parked.
- During the previous investigations it was discovered that the SCDS could wear out and leak as a result of the internal Kapton seals “oil canning”. This phenomenon was discovered to occur as a result of vacuum pressures developing on the brake system when the brake pedal is released.





# NHTSA Go, No-Go Complaint Analysis

## SCDS Caused Fire

- **Yes: The following criteria must be met.**
  - (1) Eye witness to fire directly on the SCDS after opening the hood.
  - Or;
  - (2) The fire originated in the area where the speed control deactivation switch is located (left-rear corner of the engine compartment, at the master cylinder). This origin point would be evidenced by burn patterns seen in photographs or by eye witness account.
  - And (3) or (4);
  - (3) There was evidence of speed control deactivation switch failure prior to the fire (e.g., inoperable speed control, speed control deactivation switch fuse open – sometimes repeatedly, difficulty shifting out of PARK, evidence of brake fluid leakage from the switch)
  - (4) Evidence of speed control switch failure discovered during post-fire forensic examination.
- **Maybe: The following criteria must be met.**
  - (1) The fire originated in the area where the speed control deactivation switch is located (left-rear corner of the engine compartment, at the master cylinder). This origin point would be evidenced by burn patterns seen in photographs or by eye witness account.
  - Or;
  - (2) There was evidence of speed control deactivation switch failure prior to the fire (e.g., inoperable speed control, speed control deactivation switch fuse open – sometimes repeatedly, difficulty shifting out of PARK, evidence of brake fluid leakage from the switch, or ABS/Brake warning lights showing on the dash)
  - Or,
  - (3) Evidence of speed control switch failure discovered during post-fire forensic examination.
- **No: The following criteria must be met.**
  - (1) The fire originated away from the master cylinder. This origin point would be evidenced by burn patterns seen in photographs or by eye witness account.
  - Or;
  - (2) Physical evidence exists that indicate the fire did not start at the SCDS.





# Current Go, No-Go Analysis

## Fires

Failure	Yes	Maybe	No	Unknown
SCDS Fires	97	8	2	1
ABS Fires	17	2	0	0
Property Damage	0	1	1	2
Unknown Origin				60
<b>Total</b>	<b>114</b>	<b>11</b>	<b>3</b>	<b>63</b>

## Non Fires

SCDS Leak	124
Brake Fluid @ ABS	17
Brake/ABS Light On	153
Speedometer Fail	53

Failure	Count	Rate (R/100k)
SCDS Fire	106	6.4
ABS Fire	19	1.2
SCDS + ABS Fires	125	7.6
Unk Eng Comp Fire	60	3.7
<b>Total Fires</b>	<b>185</b>	<b>11.3</b>
SCDS Leaks	124	7.5
<b>Total Leaks + Fires</b>	<b>309</b>	<b>18.8</b>

Population 1,643,432

Failure	Fire = Yes			Fire = No			
	SCDS Fire	ABS Fire	Unknown	SCDS Leak	Brake Fld @ ABS	Brake/ABS Lights On	Speedometer Fail
Count	97	17	60	124	17	153	54
Ignition On	46	1	29	11	1		
Ignition Off	12	7	16	0	0		
Ignition Unk	39	9	15	113	16		
ABS/Brake Light On	15	7	8	62	12		
Speedometer Fail	9	5	2	34	5	37	
Parked < 30 Min	1	1	7	0	0		
Property Damage	0	0	2	0	0		
1995	7	0	9	2	0	4	0
1996	19	0	10	2	0	3	1
1997	3	0	2	1	0	1	1
1998	3	0	21	10	2	5	1
1999	15	2	2	11	0	6	5
2000	21	0	3	31	4	17	19
2001	18	5	7	31	3	40	14
2002	8	10	3	26	5	41	10
2003	3	0	3	10	3	36	3

Note: Some vehicles had both a SCDS and an ABS failure



# Peer Vehicles

(1995 – 2003 MY Mini Vans)

- 1995 – 2003 Chrysler Mini Vans
  - Town & Country
  - Voyager
  - Caravan
  - Grand Caravan
- 1995 – 2003 Honda Odyssey
- 1998 – 2003 Toyota Sienna

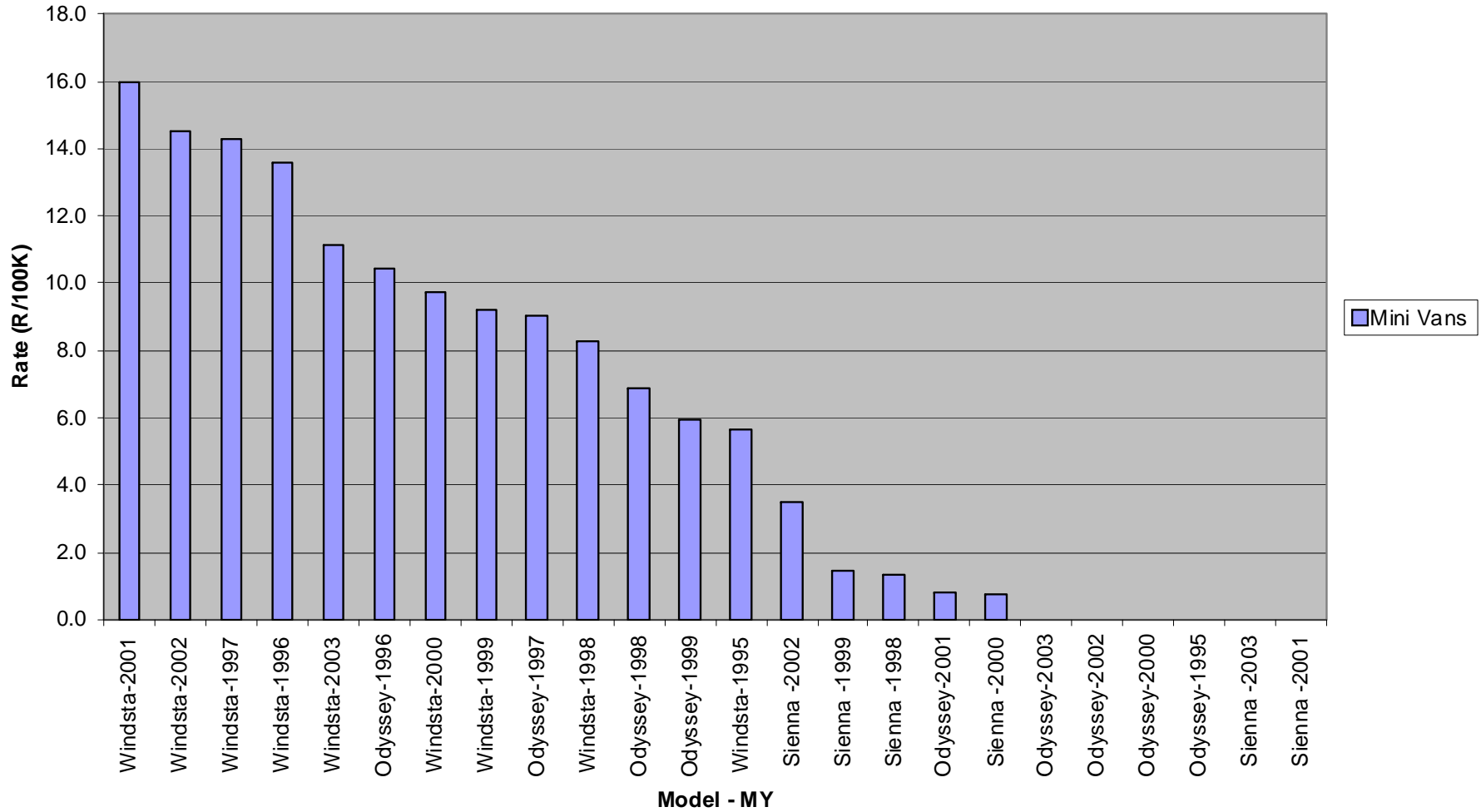


# Engine Fire Related Recalls On Peer Vehicles

- Chrysler vans
  - 95V-236 1996 MY vans (80,000) the fuel tank rollover valve can allow fuel to pass into the vapor canister resulting in the potential for fuel leakage.
  - 96V-006 1996 MY vans (40,000) in certain vehicles, the engine cylinder head oil galley plug does not seal properly.
  - 99V-216 1996 MY vans (635,469) the fuel tank rollover valve can allow fuel to pass into the vapor canister resulting in the potential for fuel leakage.
  - 00V-268 1996 - 2000 MY vans (1,163,000) 3.3l and 3.8l engines have fuel rails with nitrole rubber o-ring seals that can degrade over time. Fuel leakage from the underhood fuel injection fuel rail could result, increasing the likelihood of a vehicle fire.
  
- Odyssey
  - None
  
- Sienna
  - None

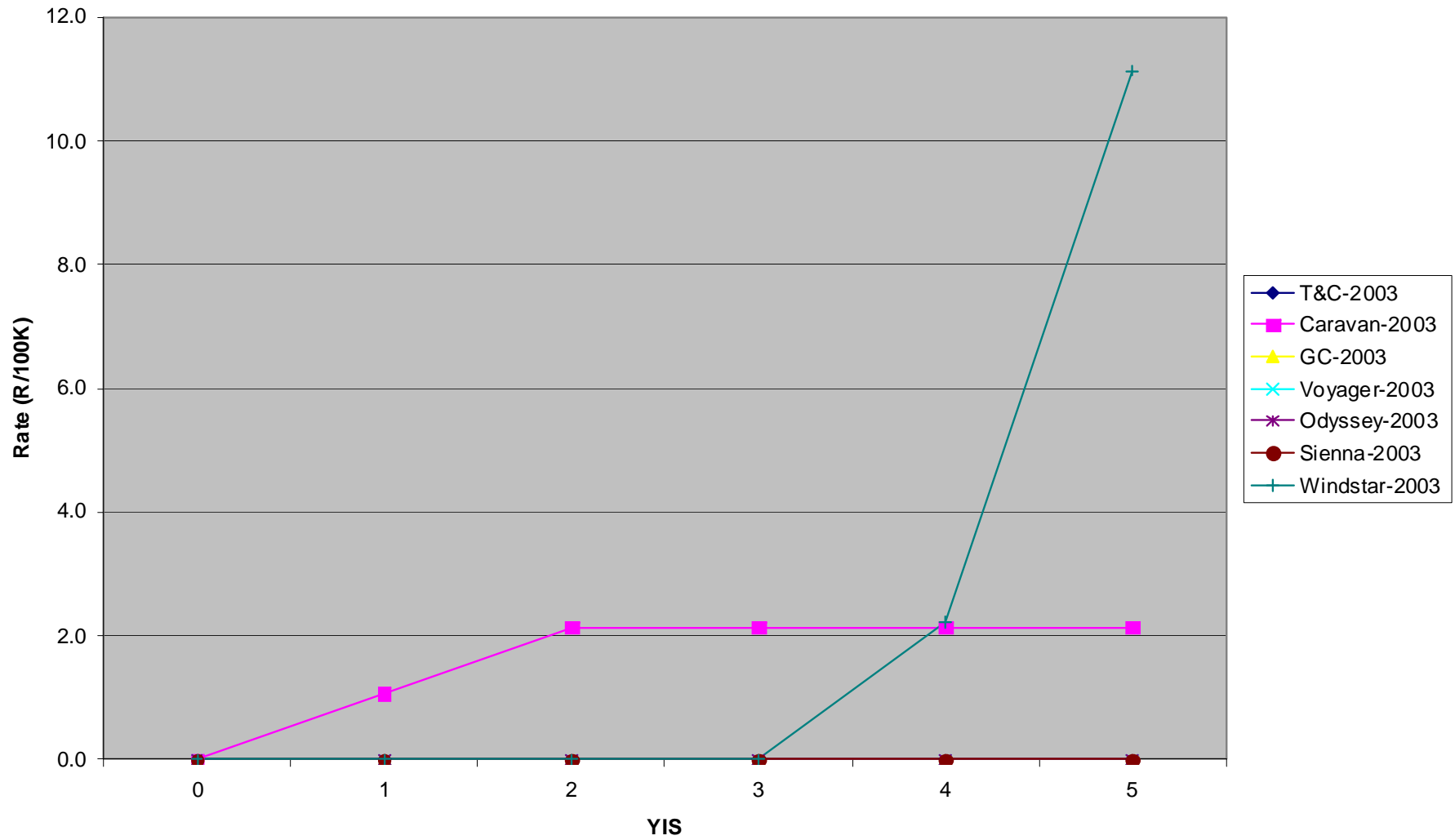


1995 - 2003 MY Mini Van Engine Compartment Fire Rates  
Chrysler Vans Removed Due To Engine Fire Related Recalls  
(ODI Data Only)  
Running and Parked Fires



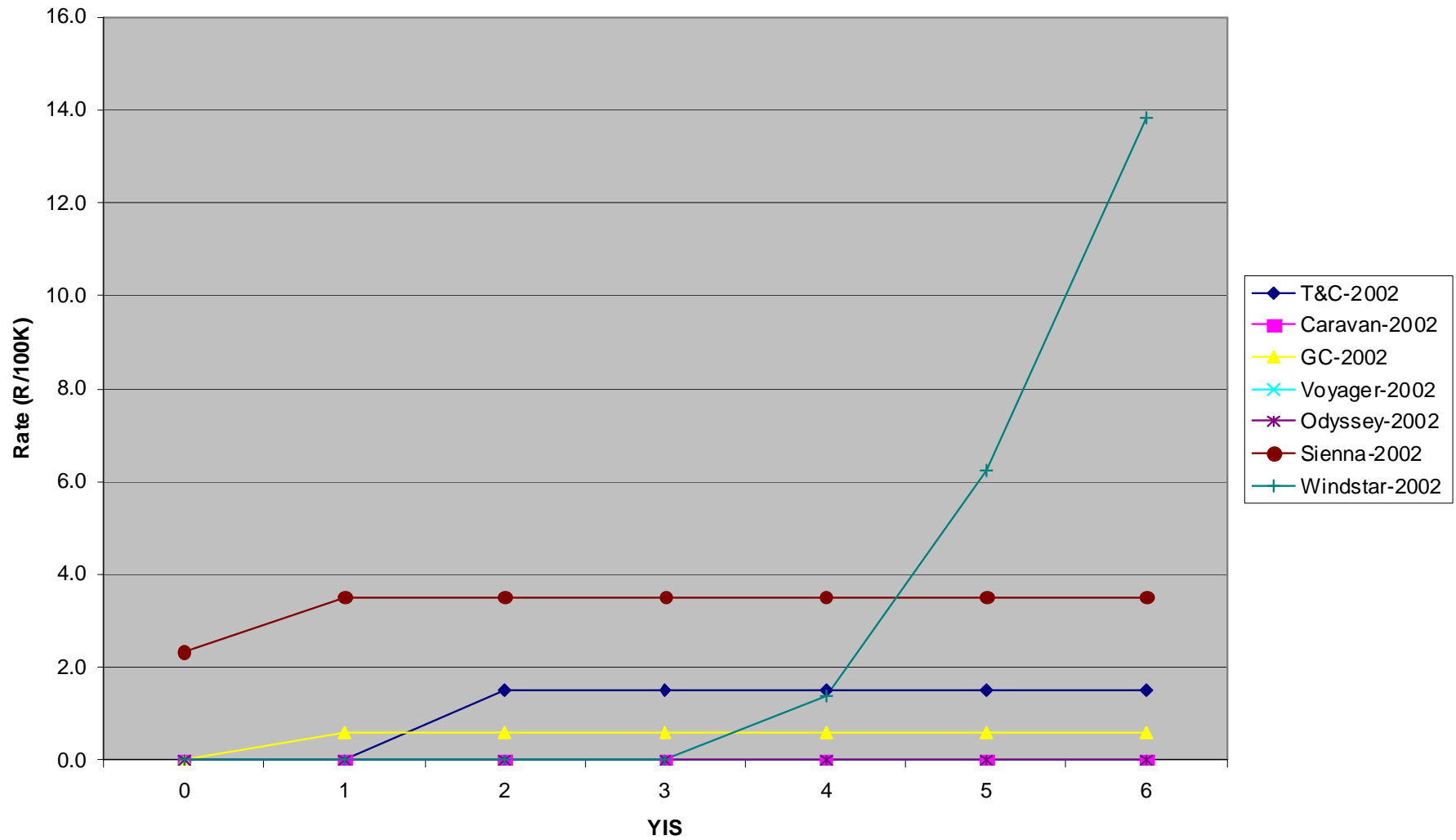


### 2003 MY Mini Vans Cumulative Engine Fire Rate vs. YIS



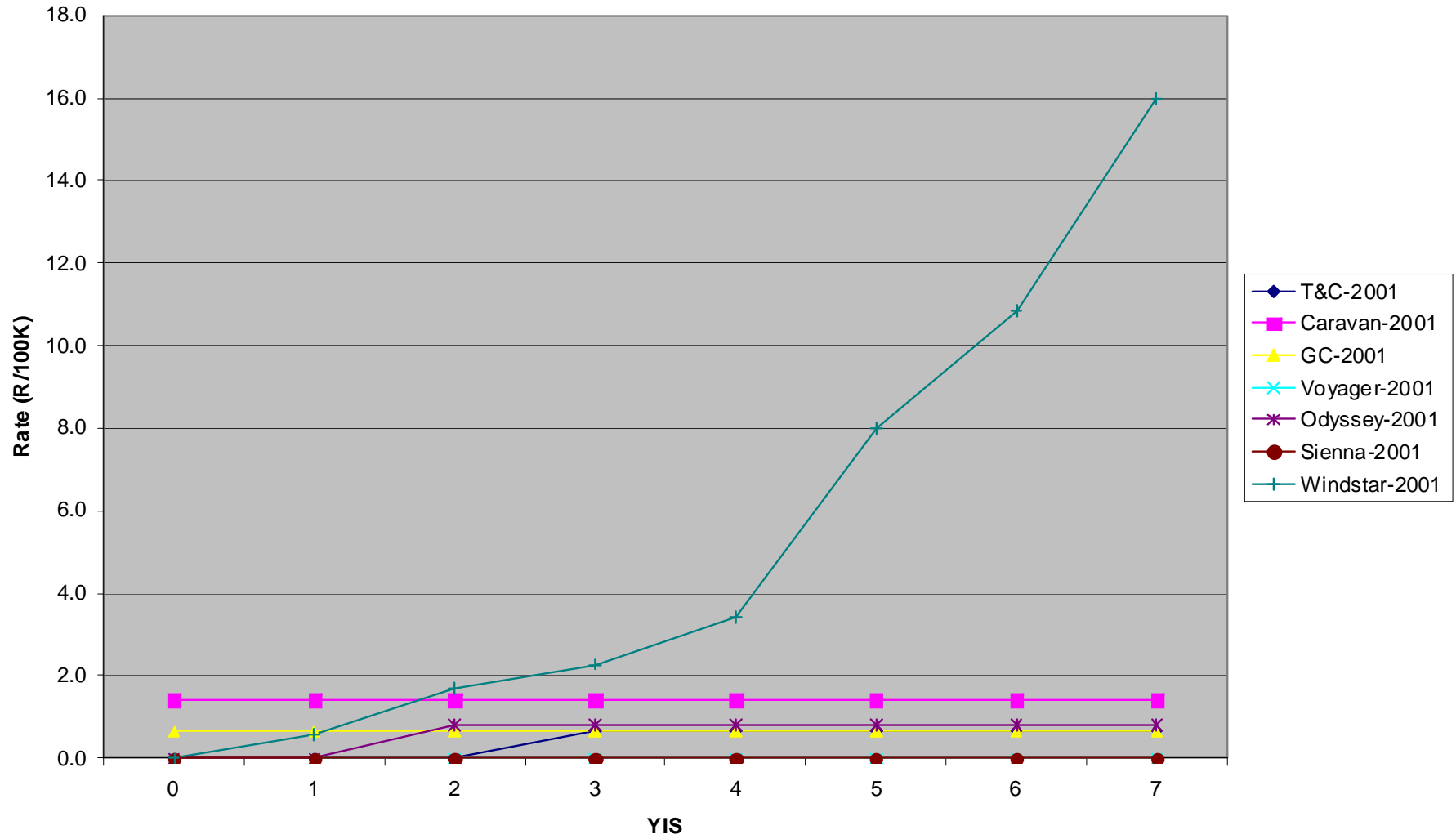


### 2002 MY Mini Vans Cumulative Engine Fire Rate vs. YIS





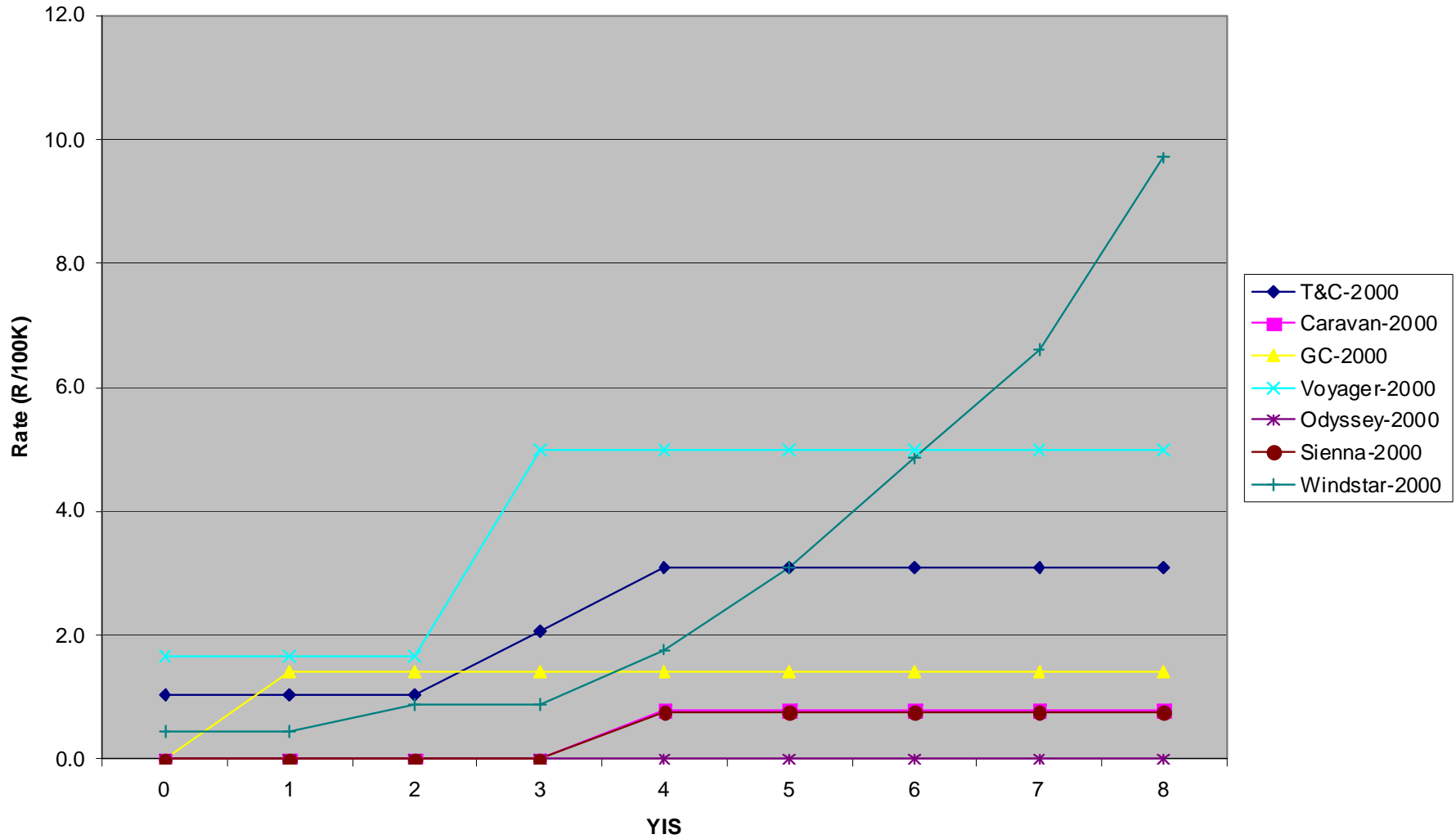
### 2001 MY Mini Vans Cumulative Engine Fire Rate vs. YIS





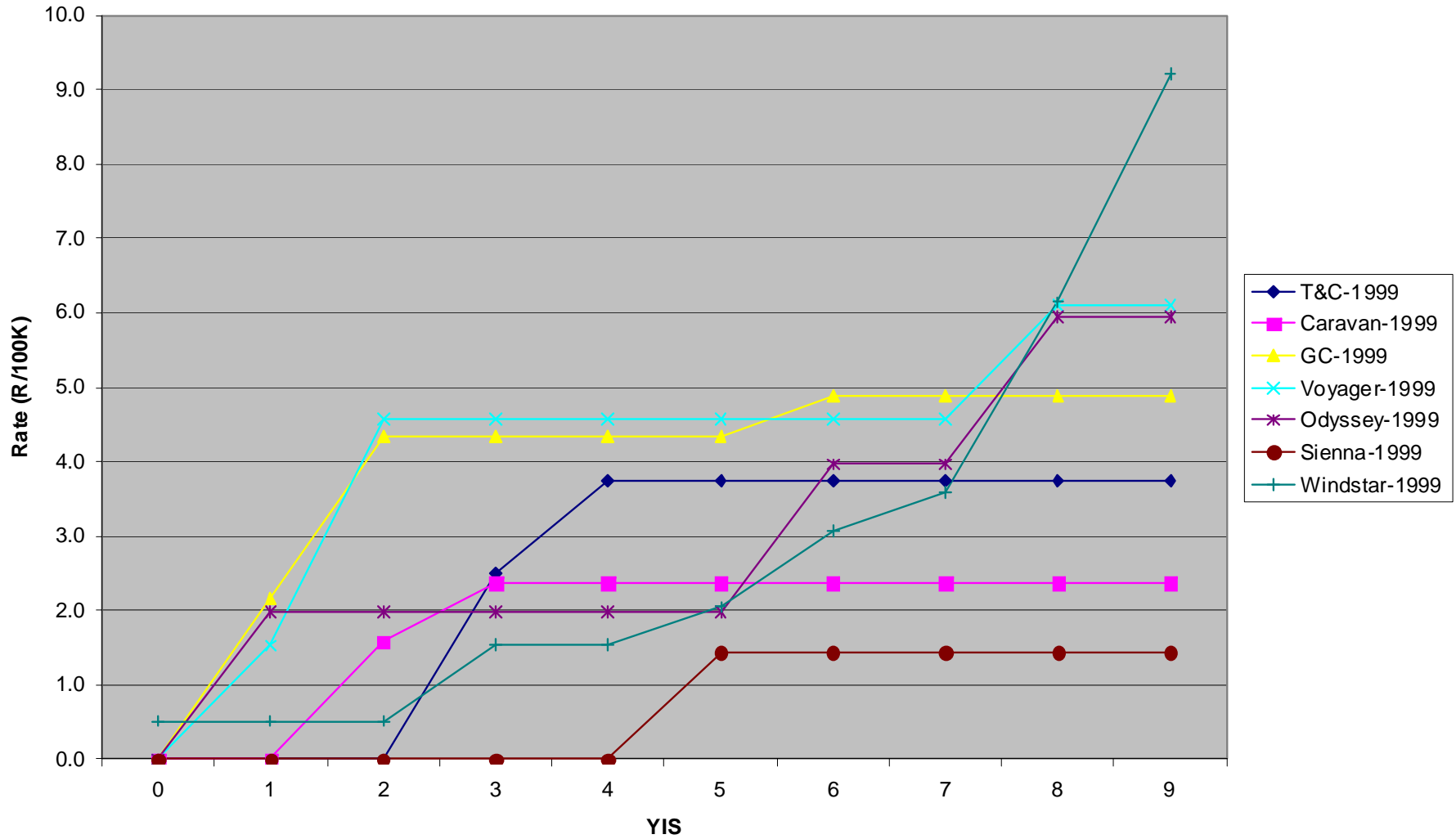


### 2000 MY Mini Vans Cumulative Engine Fire Rate vs. YIS



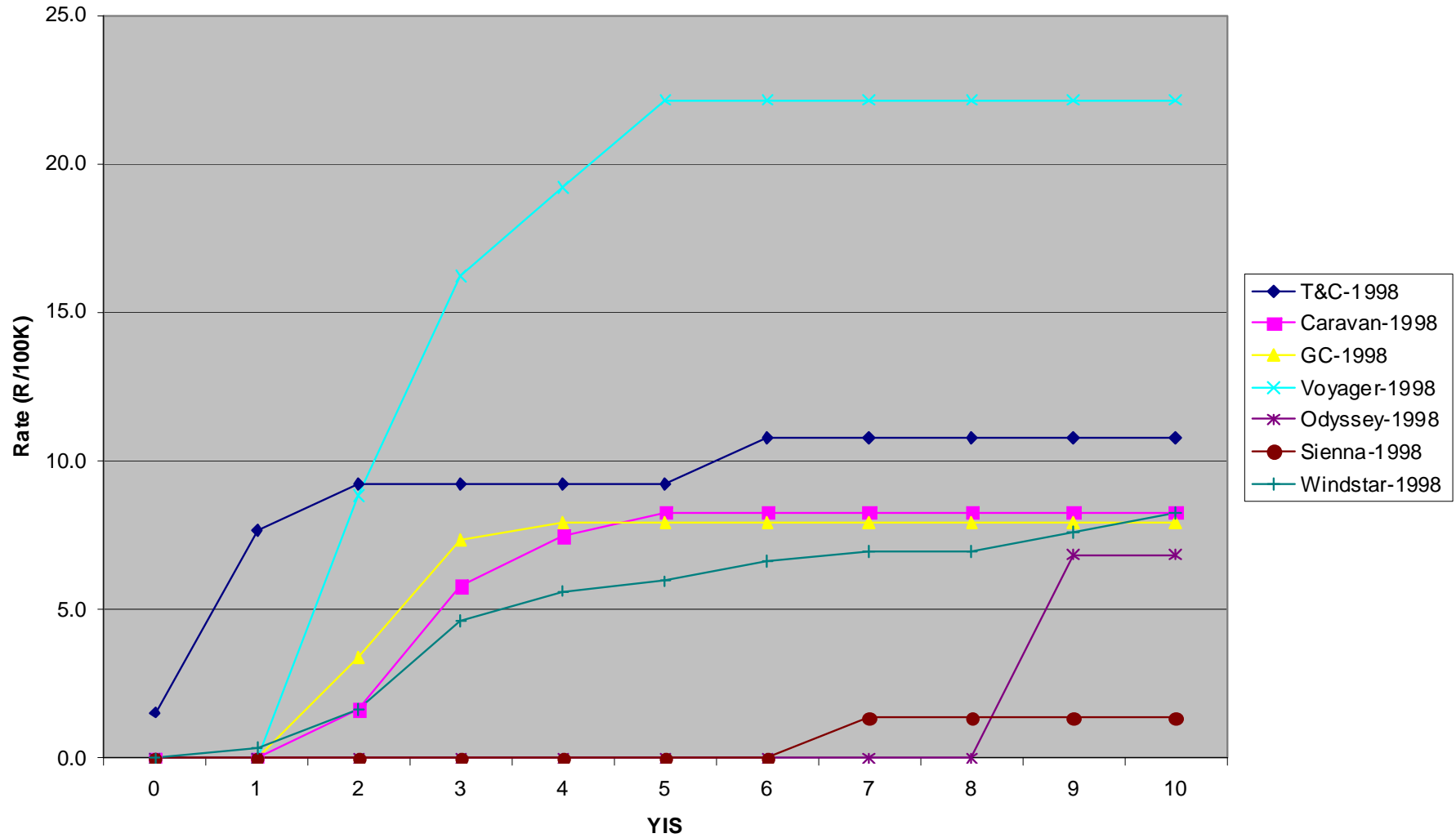


### 1999 MY Mini Vans Cumulative Engine Fire Rate vs. YIS



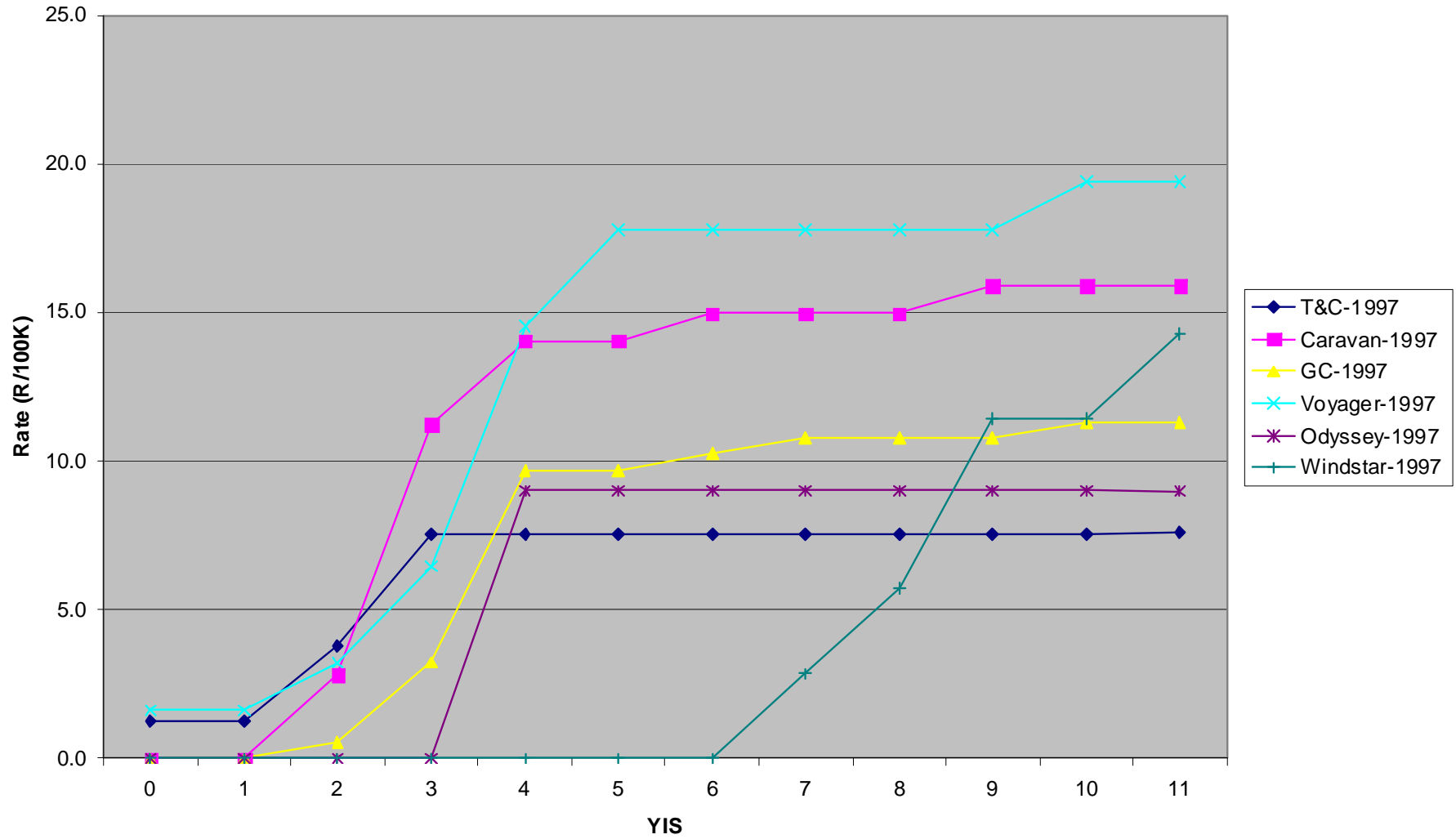


### 1998 MY Mini Vans Cumulative Engine Fire Rate vs. YIS



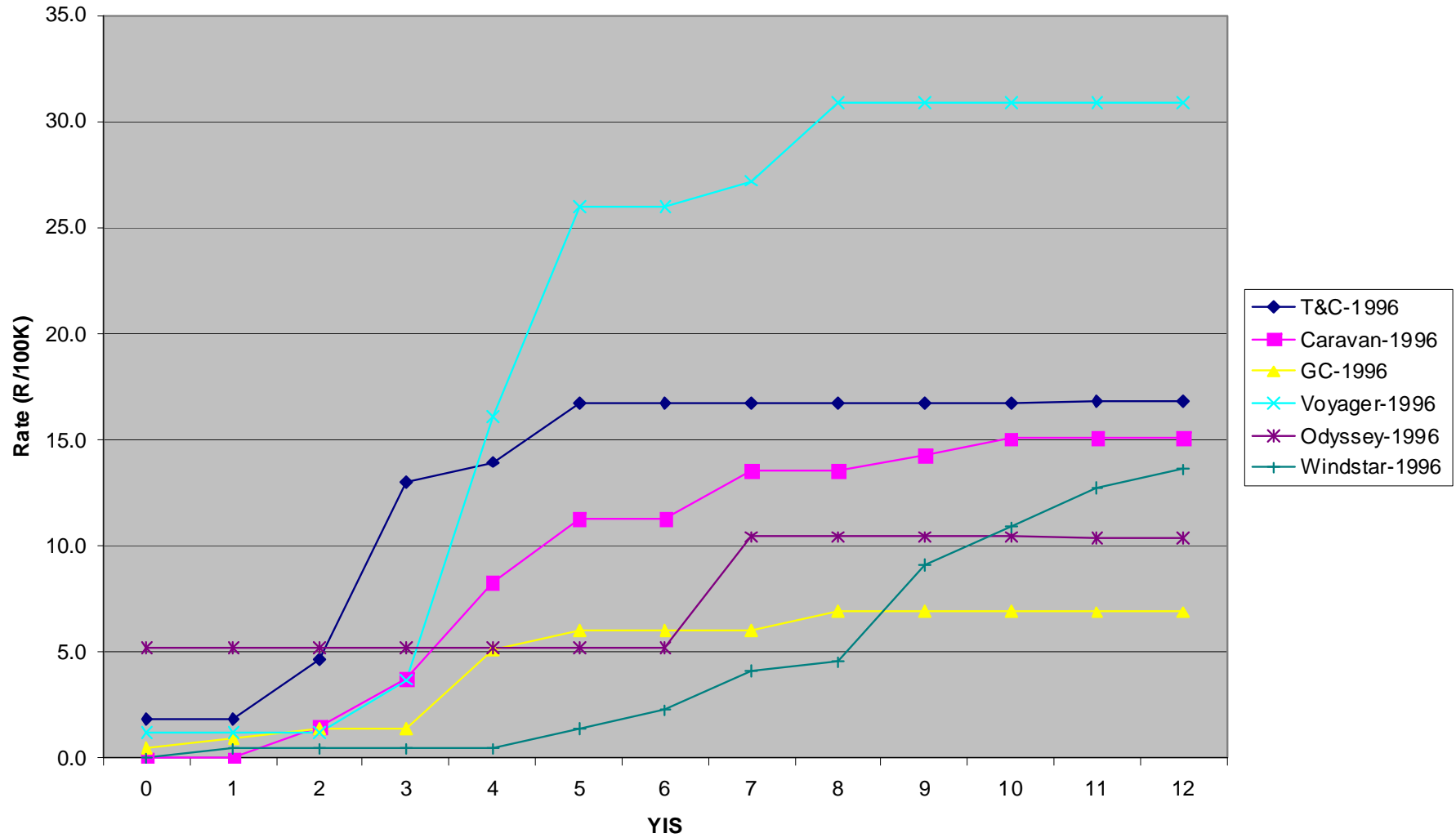


### 1997 MY Mini Vans Cumulative Engine Fire Rate vs. YIS



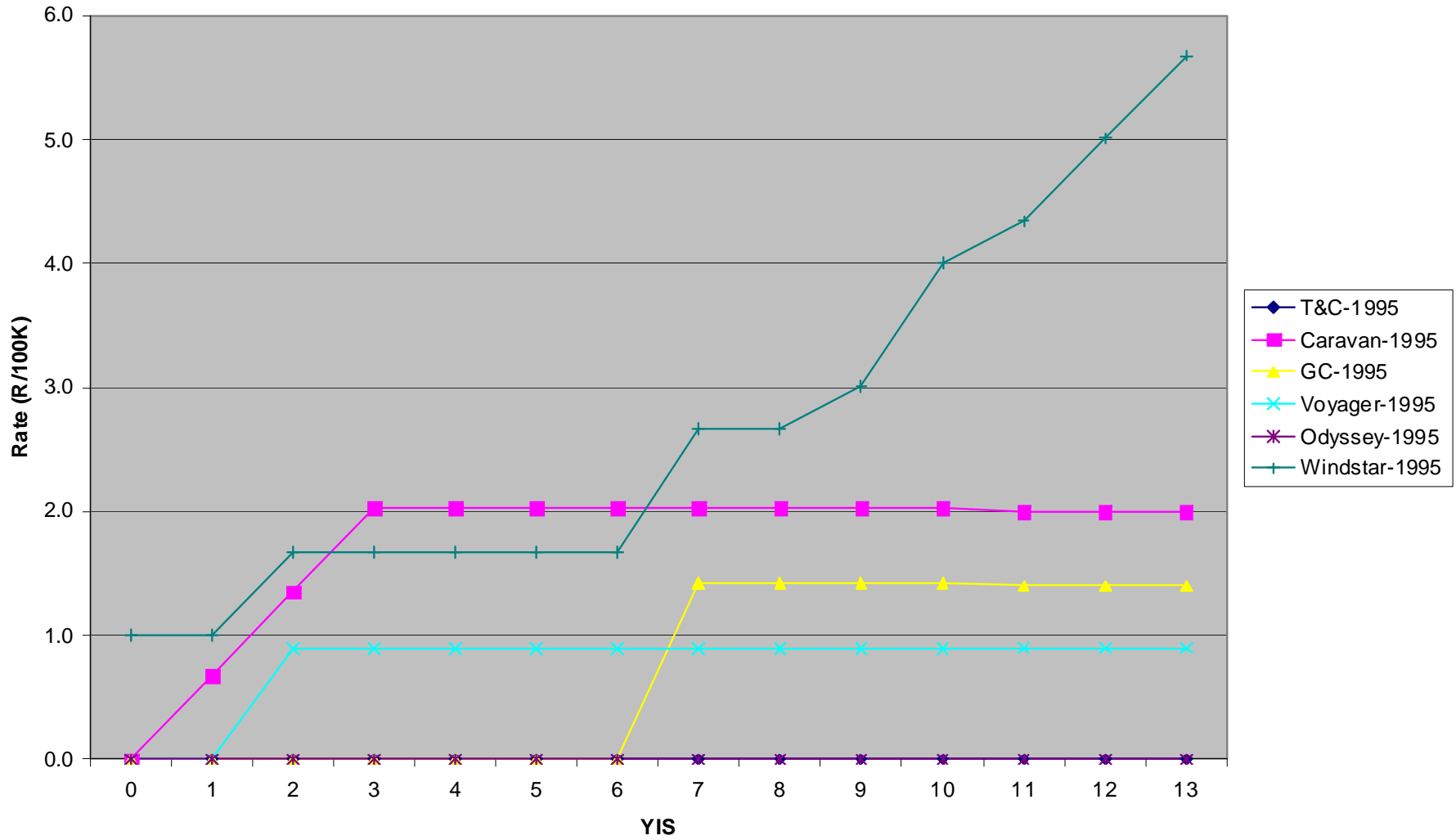


### 1996 MY Mini Vans Cumulative Engine Fire Rate vs. YIS





### 1995 MY Mini Vans Cumulative Engine Fire Rate vs. YIS





# Previous Engine Compartment Fire Investigations

Model	Production	Rate @ Close	First MY	Last MY	Investigatio	Recall
FORD FOCUS	690,045	2.0	2000	2002	EA02-014	02V-288
VOLKSWAGEN PASSAT	345,642	23.1	2000	2003	EA07-014	08V-156
FORD CONTOUR/MERCURY MYSTIQUE	262,559	3.0	1995	1995	EA00-005	00V-367
WINDSTAR Current	1,643,432	10.1	1995	2003	EA08-021	
WINDSTAR At Close EA05-005 (Estimated Prod)	1,708,381	2.2	1995	2003		

Peer Investigations With Engine Compartment Fire, Electrical Cause, No Fuel Leak, >250K Production, Key On/Unk



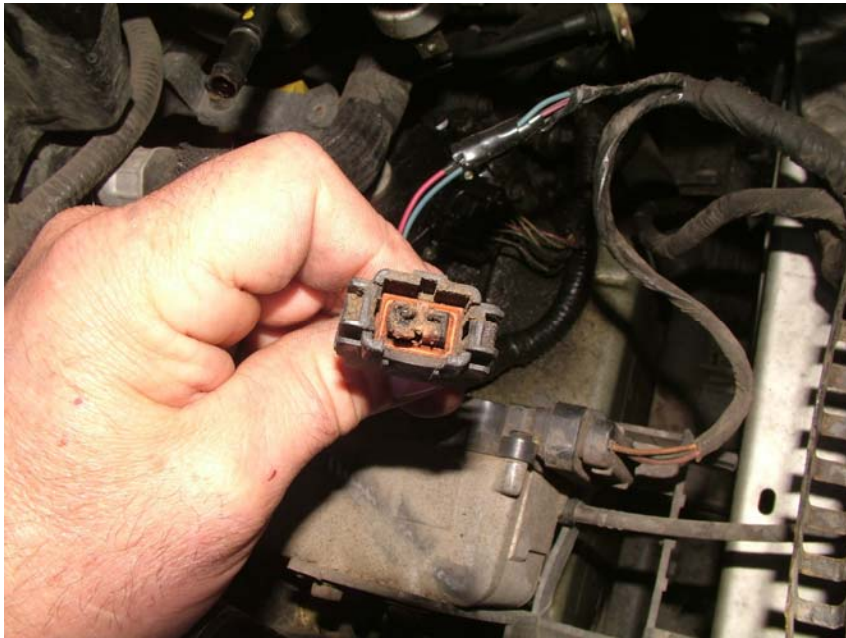


# Complainant Evidence



- 2002 Windstar, Bakersfield, CA, July 2008 ODI #10233254
  - Leak at SCDS
  - Brake fluid spreads to Neutral Safety Switch

# Complainant Evidence



- 2000 Windstar, Chillicothe, OH, March 2009 Ford #568300639
  - Leak at SCDS
  - Brake fluid spreads to Neutral Safety Switch



# Complainant Evidence



- 2001 Windstar, Ontario, Canada, May 2009 ODI #10269848
  - Leak at SCDS
  - Brake fluid spreads to Neutral Safety Switch



## Complainant Evidence



- 1995 Windstar, Portland, OR, July 2007 ODI #10196226
  - Fire at SCDS
  - Fire spread to Neutral Safety Switch
  - Fire Extinguished



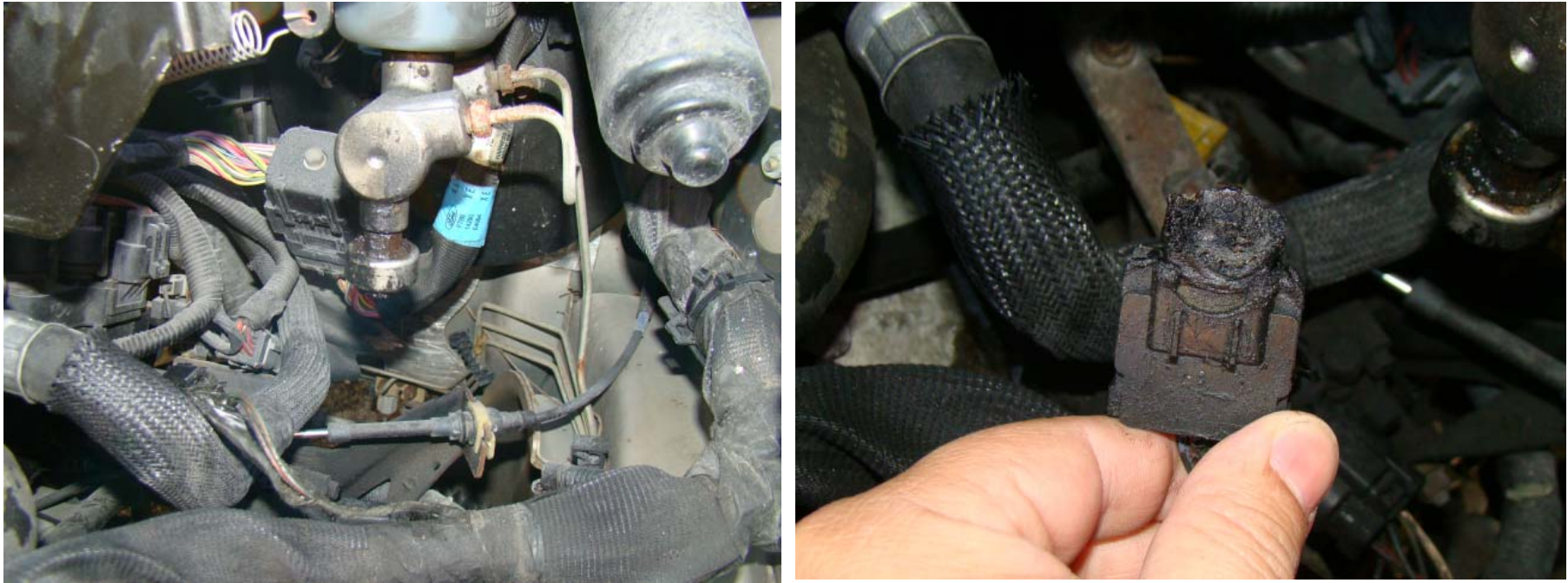
# Complainant Evidence



- 1996 Windstar, Seekonk, MA, September 2008 ODI #10248707
  - Fire at SCS



## Complainant Evidence



- 1998 Windstar, Miami, FL, October 2008 ODI #10248843
  - Fire at SCDS

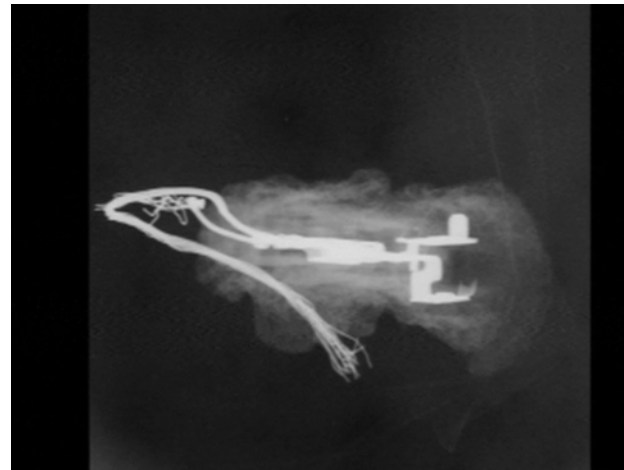
## Complainant Evidence



- 2000 Windstar, Easley, SC, March 2007 ODI #10188784
  - Fire at SCDS



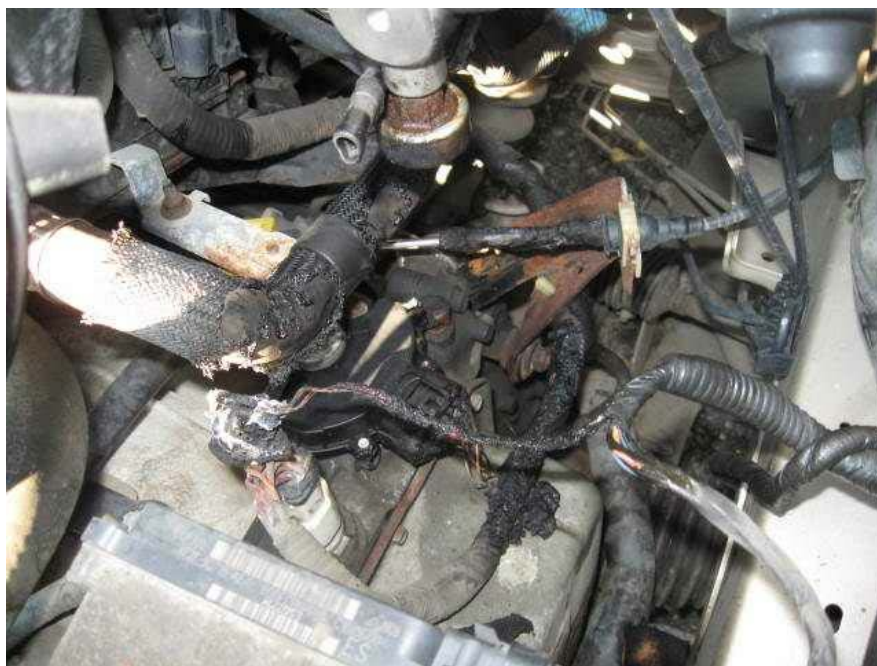
# Complainant Evidence



- 2001 Windstar, Orlando, FL, May 2007 ODI #10189990
  - Fire at SCDS
  - Fire spread to structure



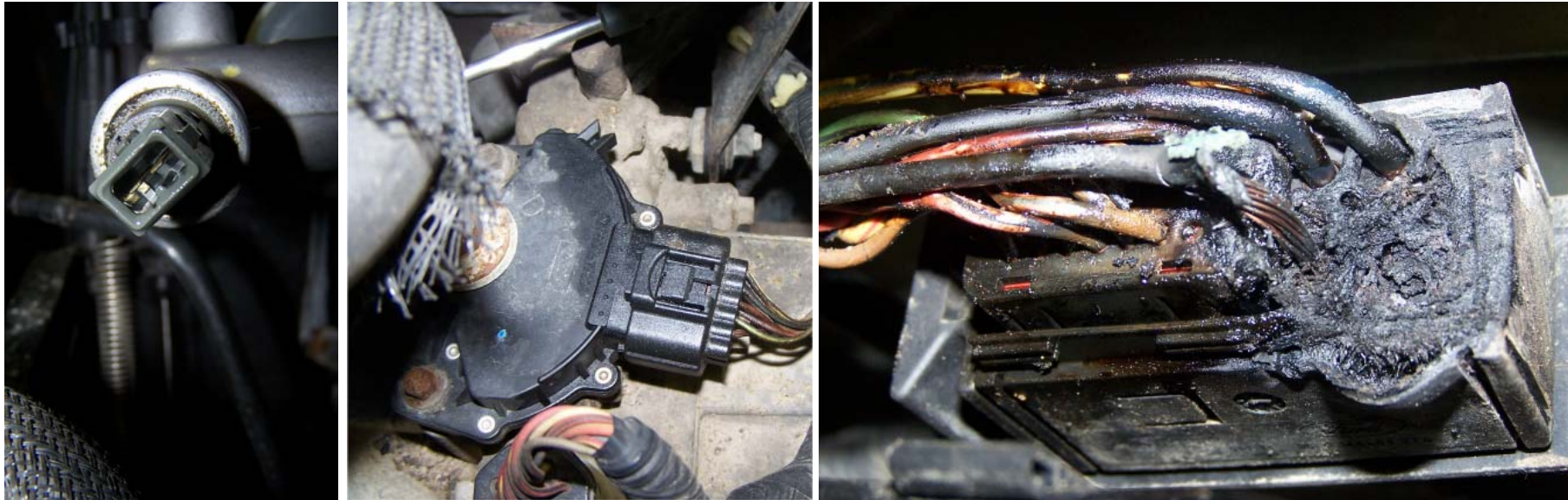
## Complainant Evidence



- 2000 Windstar, Gordonsville, VA, September 2008 ODI #10242836
  - Fire at SCDS



## Complainant Evidence



- 2002 Windstar, Bennington, VT, September 2007 ODI #10202250
  - Brake fluid leak at SCDS
  - Brake fluid migrates to ABS module thru wire harness
  - Fire at ABS Module
  - Fire Extinguished

## Complainant Evidence



- 2002 Windstar, Covington, TN, December 2008 ODI #10251326
  - Brake fluid leak at SCDS
  - Brake fluid migrates to ABS module thru wire harness
  - Fire at ABS Module
  - Fire Extinguished





# Complainant Evidence



- 2001 Windstar, Gloucester, MA, June 2008 Ford #610101638
  - Brake fluid leak at SCDS
  - Brake fluid migrates to ABS module thru wire harness
  - Fire at ABS Module
  - Fire Extinguished

# Complainant Evidence



- 2002 Windstar, Denver, CO, January 2009 ODI #10254284
  - Brake fluid leak at SCDS
  - Brake fluid migrates to ABS module thru wire harness
  - Fire at ABS Module
  - Fire Extinguished



# VRTC Testing

- VTRC was contacted to conduct live burn tests on the subject vehicles to determine
  - How a fire might spread from the SCDS if it were to catch fire
  - How a fire might spread from the ABS module if it were to catch fire
  - The burn patterns that would result from a fire caused by a burning SCDS
  - The burn patterns that would result from a fire caused by a burning ABS
- Three vehicles were found and used for testing
  - Vehicle 1 (Blue Van):
    - 2000 FORD WINDSTAR LX
    - EXTENDED SPORT VAN 3.8L V6 SFI
  - Vehicle 2 (Green Van):
    - 2002 FORD WINDSTAR LX
    - EXTENDED SPORT VAN 3.8L V6 SFI OHV
  - Vehicle 3 (White Van):
    - 1999 FORD WINDSTAR SE
    - EXTENDED SPORT VAN 3.8L V6 SFI





# Live Burn Testing



- SCDS Fire Spread Test 1







# Live Burn Testing



- SCDS Fire Spread Test 2



- [Under Hood Fire Footage \(click\)](#)
- [Exterior Fire Footage \(click\)](#)



# Live Burn Testing



- ABS Module Fire Spread Test



- [Under Body Fire Footage \(click\)](#)

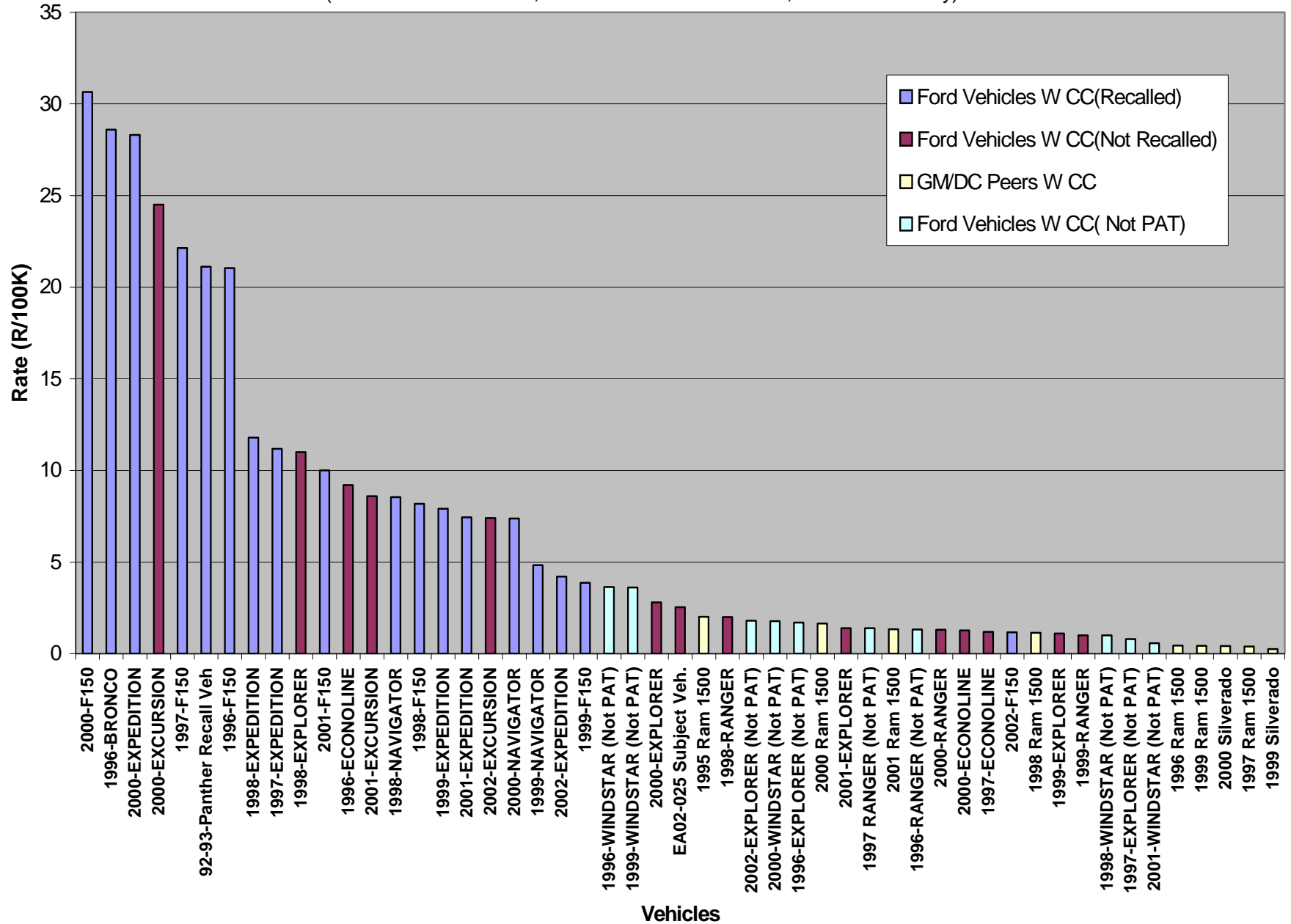


# VRTC Testing

## Findings and Conclusions

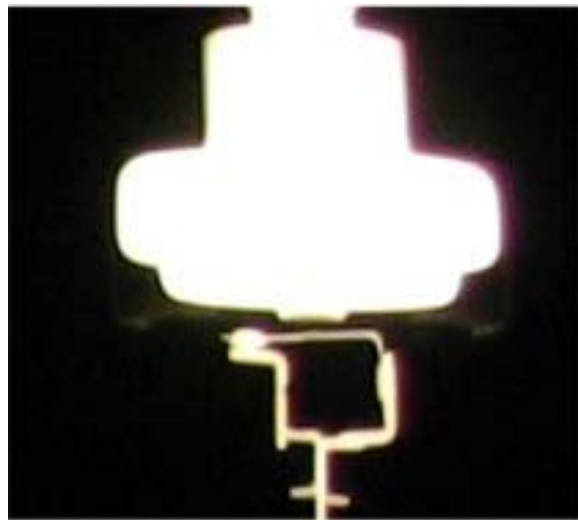
- A SCDS that is on fire and drops down to the engine allows for the fire to spread to the engine compartment and the remainder of the vehicle. This fire spread can occur whether the engine is running or not.
- If brake fluid in the ABS module does catch on fire, the fire can spread to the underbody of the vehicle and potentially the engine compartment of the vehicle.
- Burn patterns generated on the test vehicles support allegations on complainant vehicles that SCDS or brake fluid leaking from the SCDS to the ABS module caused a fire.

Ford Vehicles W/ TI SCDS  
 ODI Data Only  
 (Recalled As Of 8-19-05, Non-Recalled As Of 11/4/05, "Good VINs" Only)





# SCDS Dendrite Growth



# SCDS Dendrite Growth



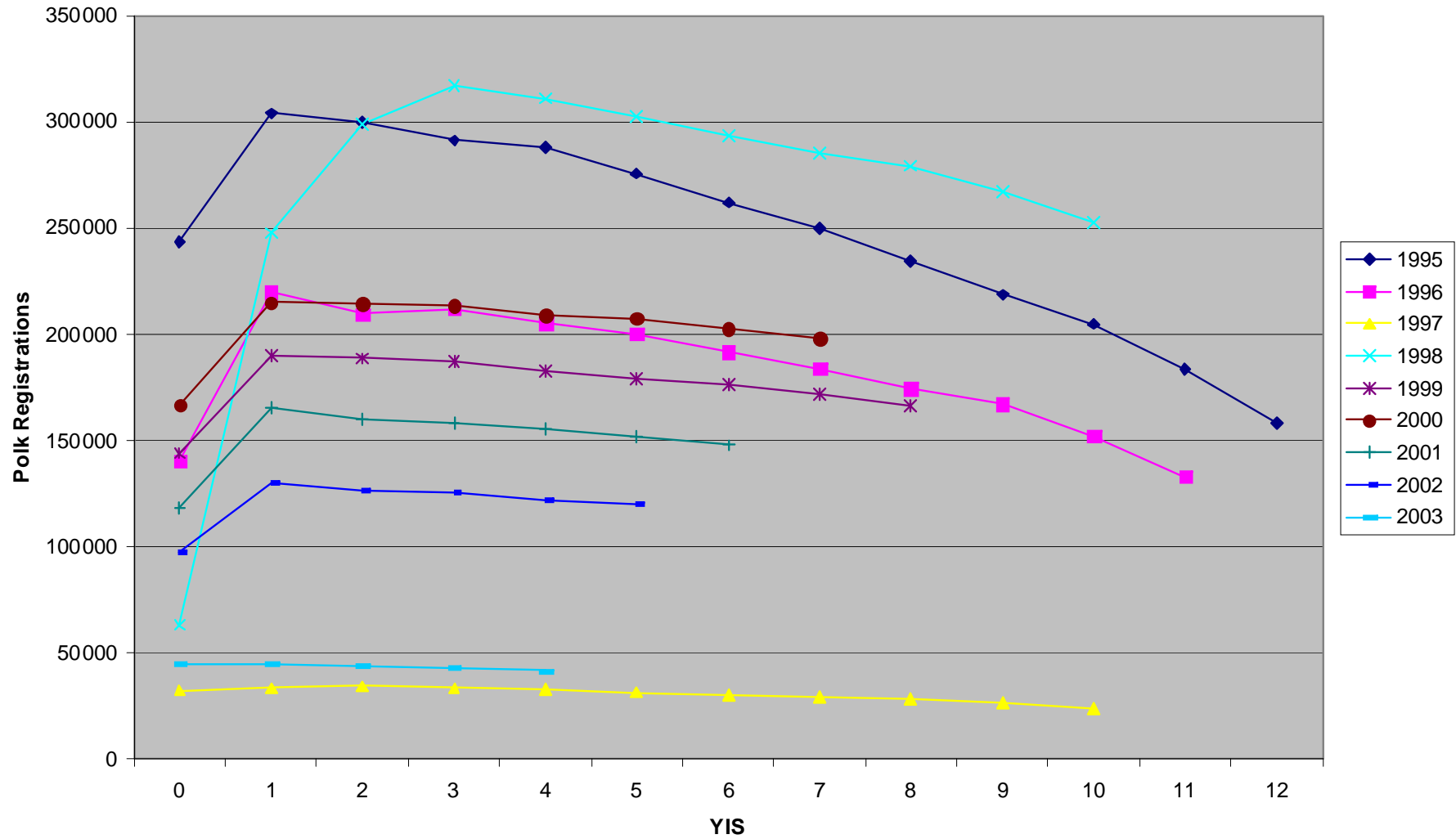


## Ford Complaint Data (S & A Categories Only)

MY	Calendar Year												
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1995	3	4	2	1	2	1	0	0	1	4	3	0	0
1996	-	2	1	0	0	2	1	6	5	14	3	8	3
1997	-	-	0	0	0	1	1	3	1	2	4	2	5
1998	-	-	-	0	0	1	0	2	1	3	13	11	7
1999	-	-	-	-	0	0	1	3	7	13	13	11	4
2000	-	-	-	-	-	1	2	3	13	15	27	23	17
2001	-	-	-	-	-	-	0	1	2	16	24	26	24
2002	-	-	-	-	-	-	-	1	2	5	13	19	19
2003	-	-	-	-	-	-	-	-	1	1	0	3	3



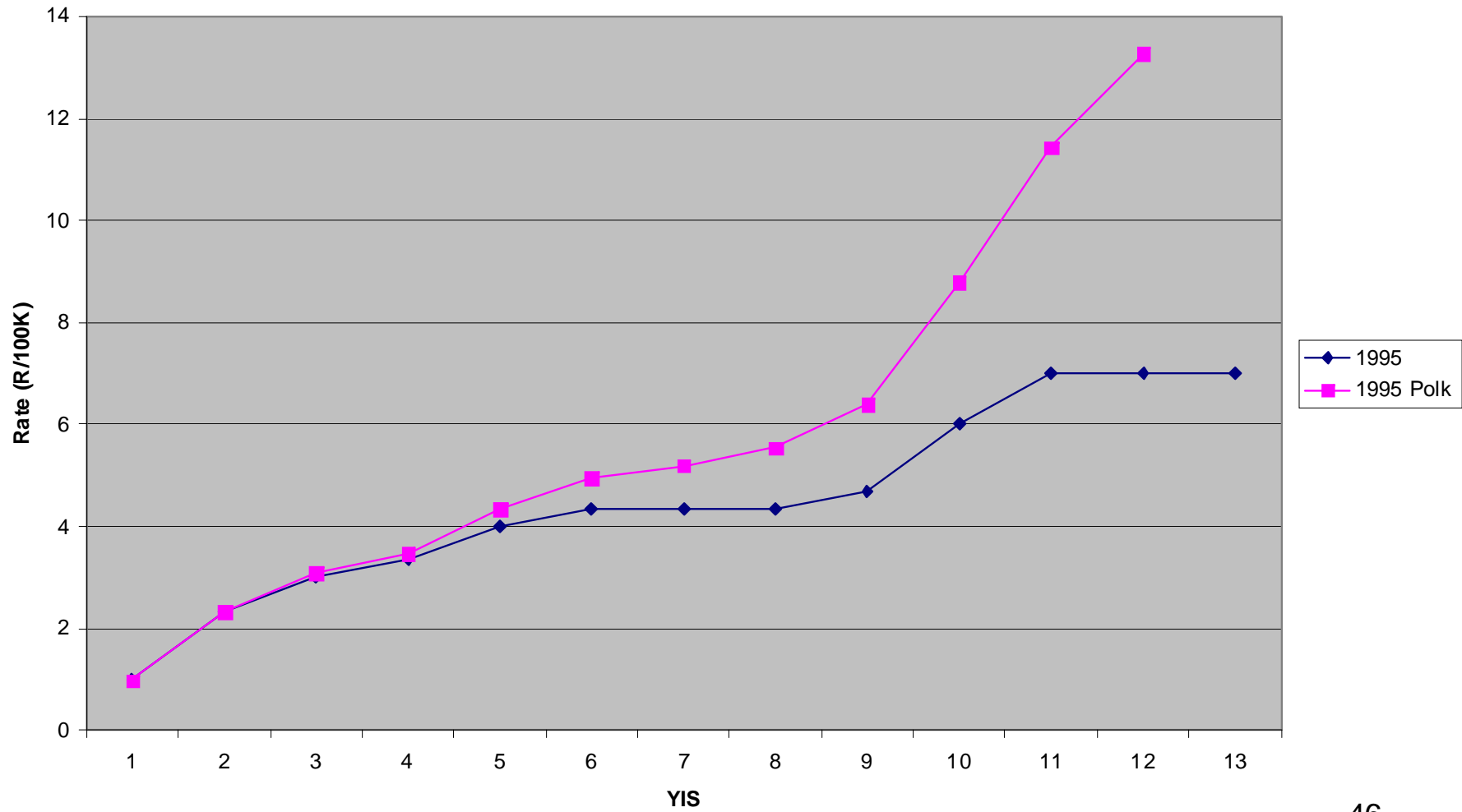
### Ford Windstar Polk Registrations vs. Years In Service





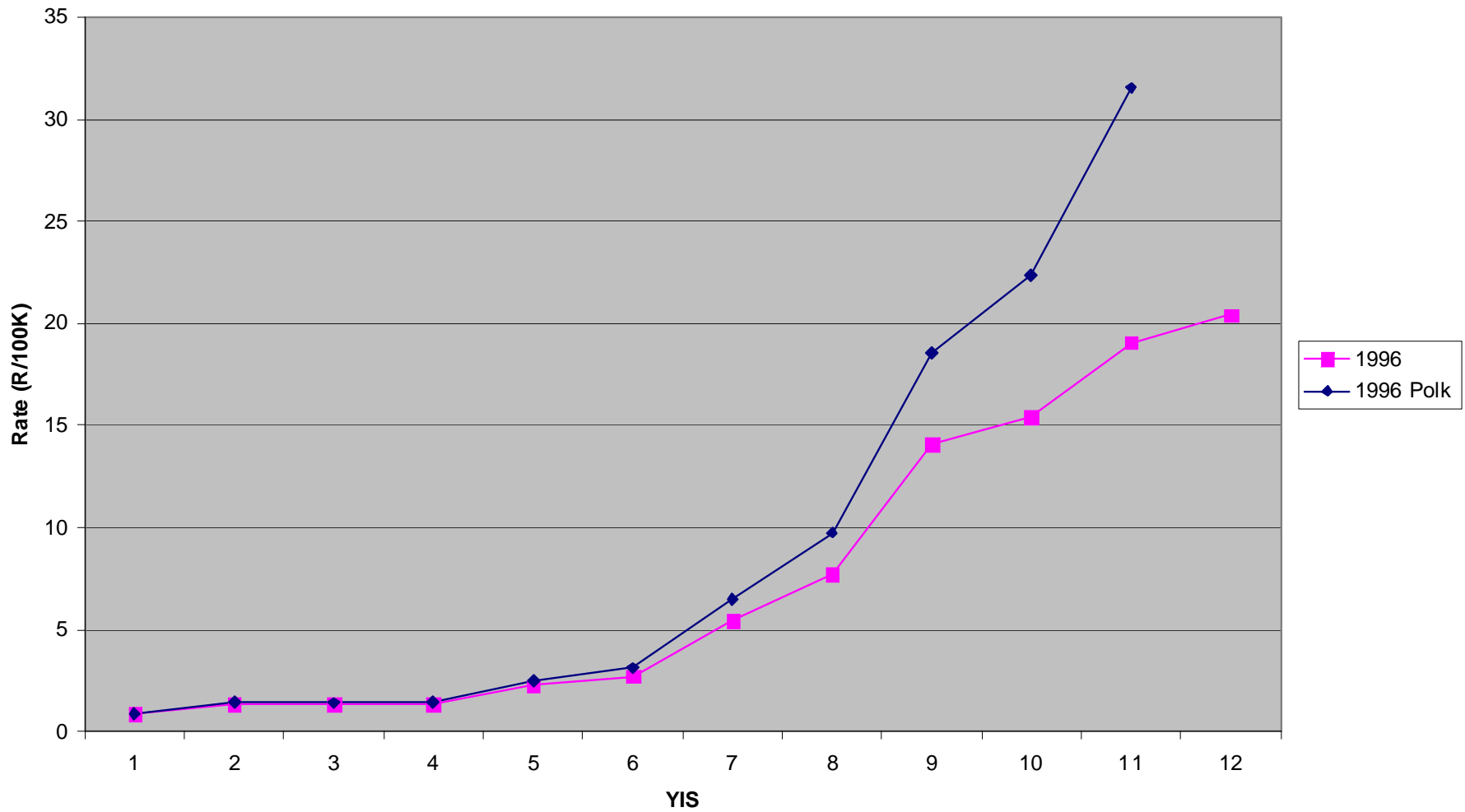


### Ford Engine Fire Complaints YIS vs Complaint Rate 1995 MY Windstar



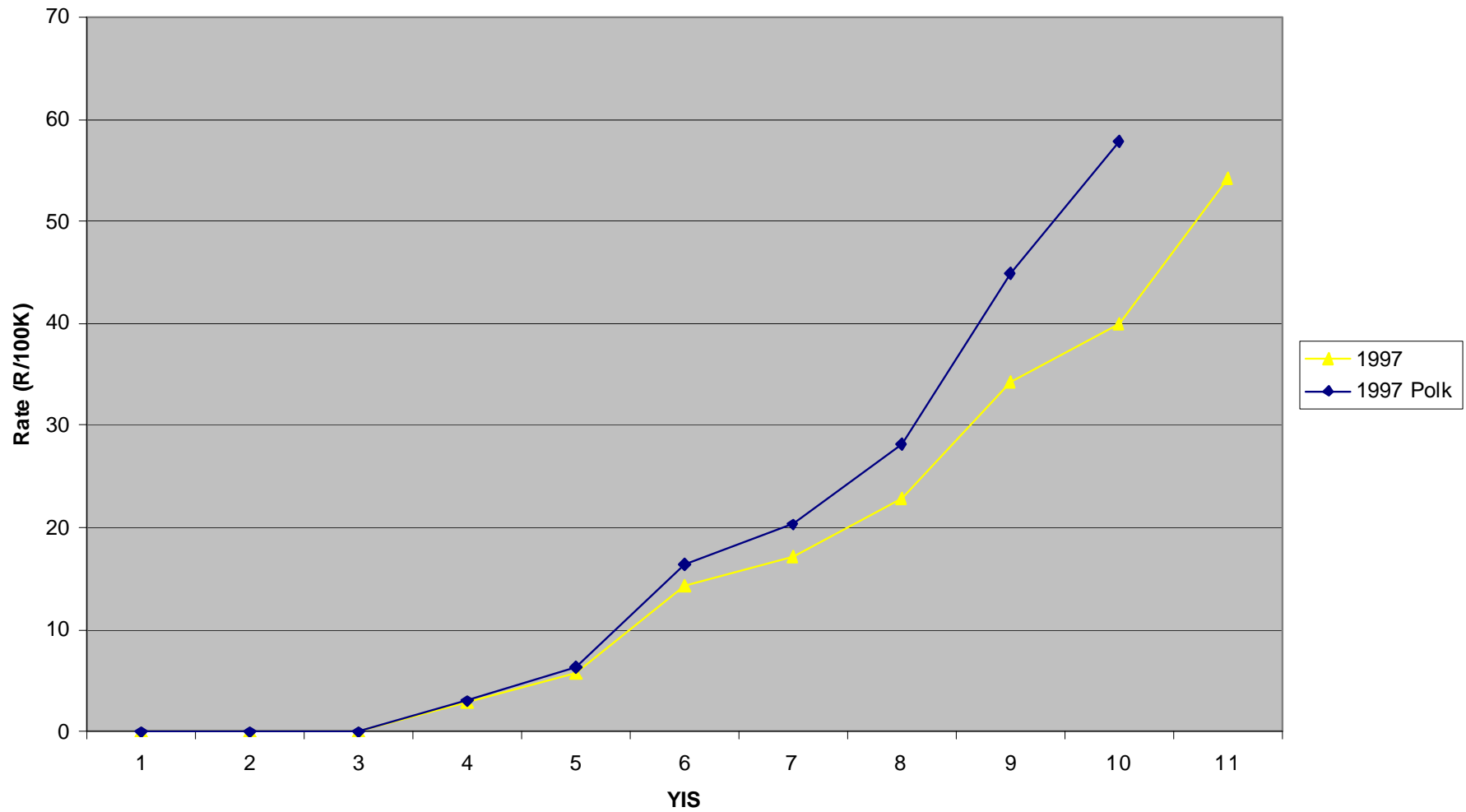


### Ford Engine Fire Complaints YIS vs Complaint Rate 1996 MY Windstar



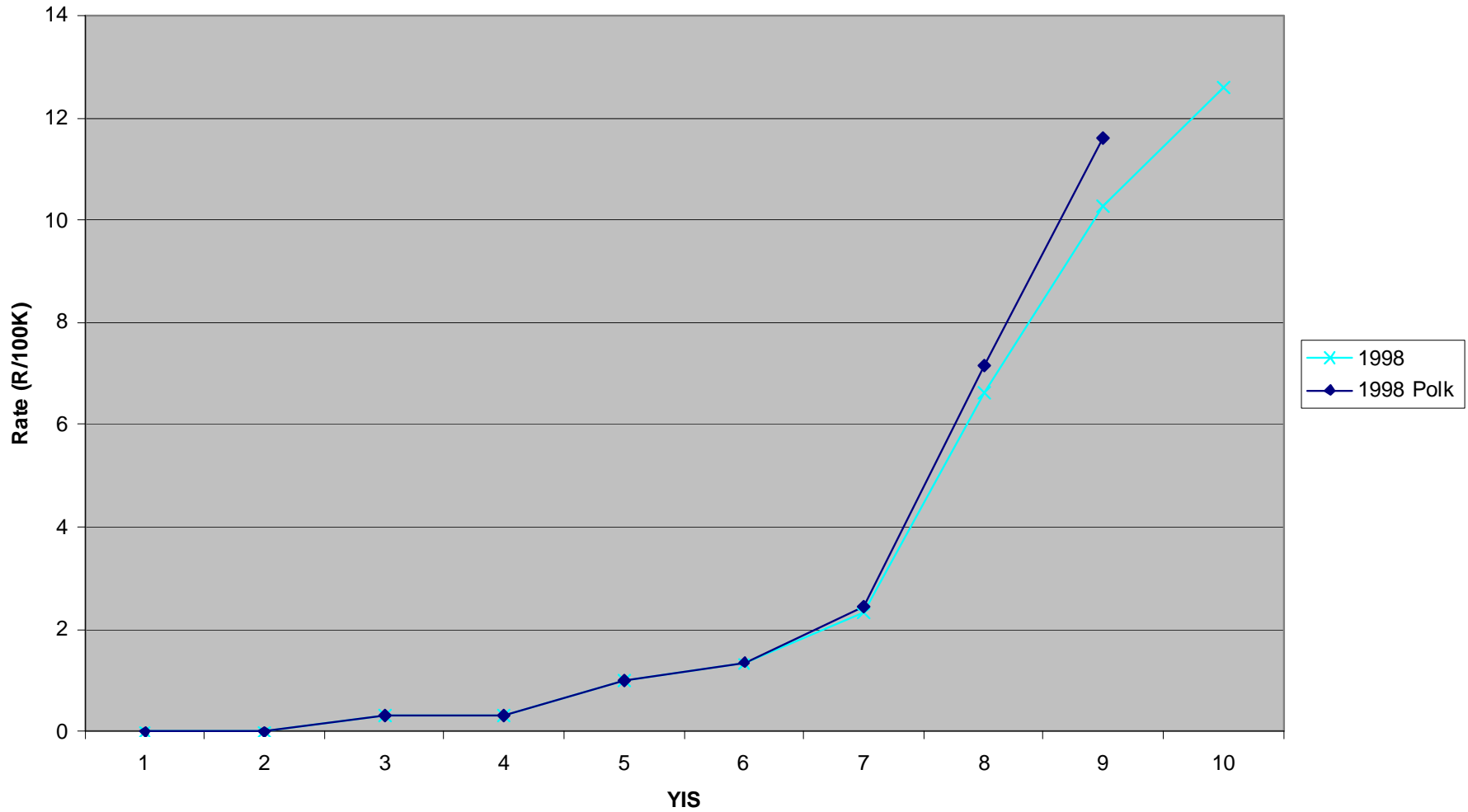


### Ford Engine Fire Complaints YIS vs Complaint Rate 1997 MY Windstar



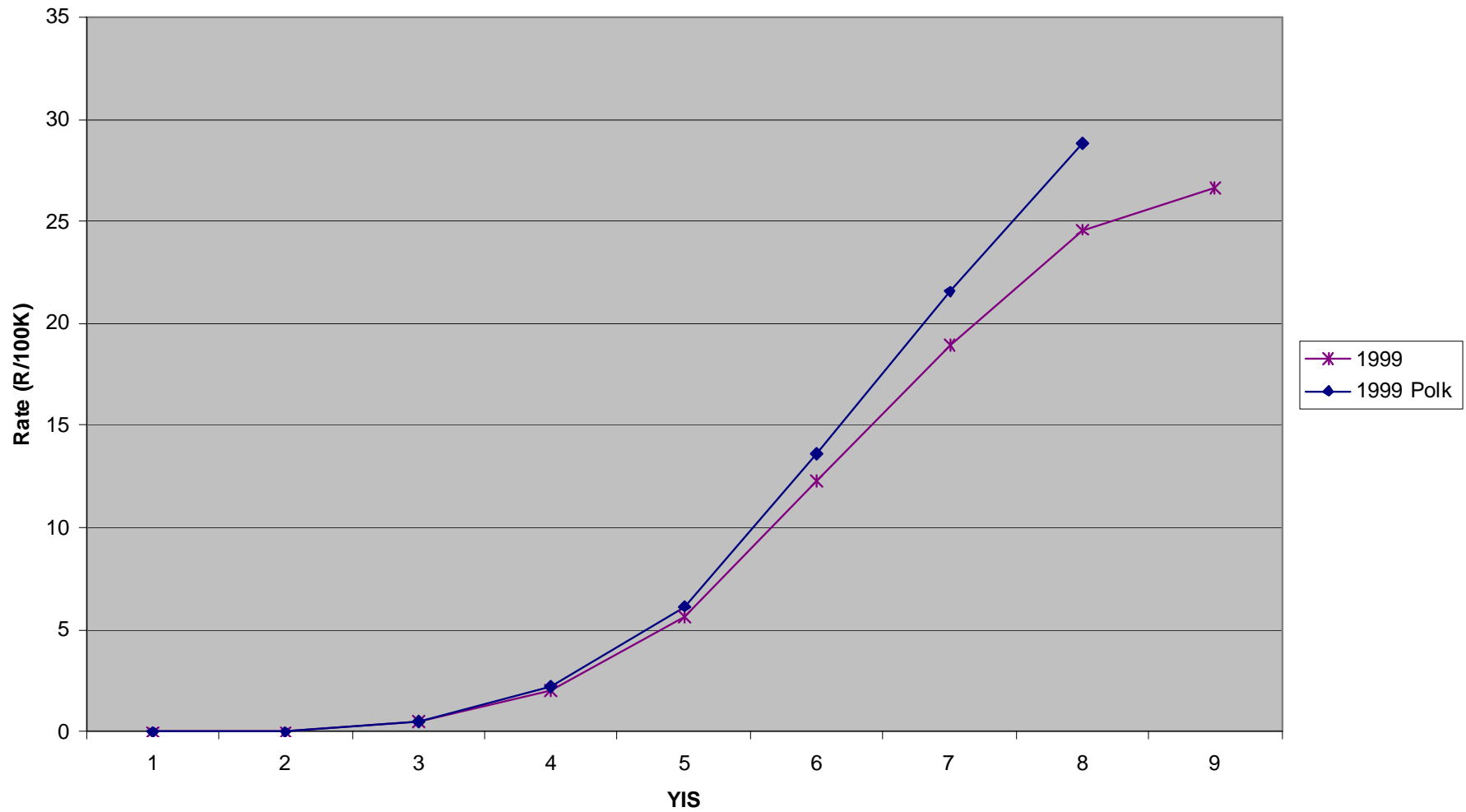


### Ford Engine Fire Complaints YIS vs Complaint Rate 1998 MY Windstar



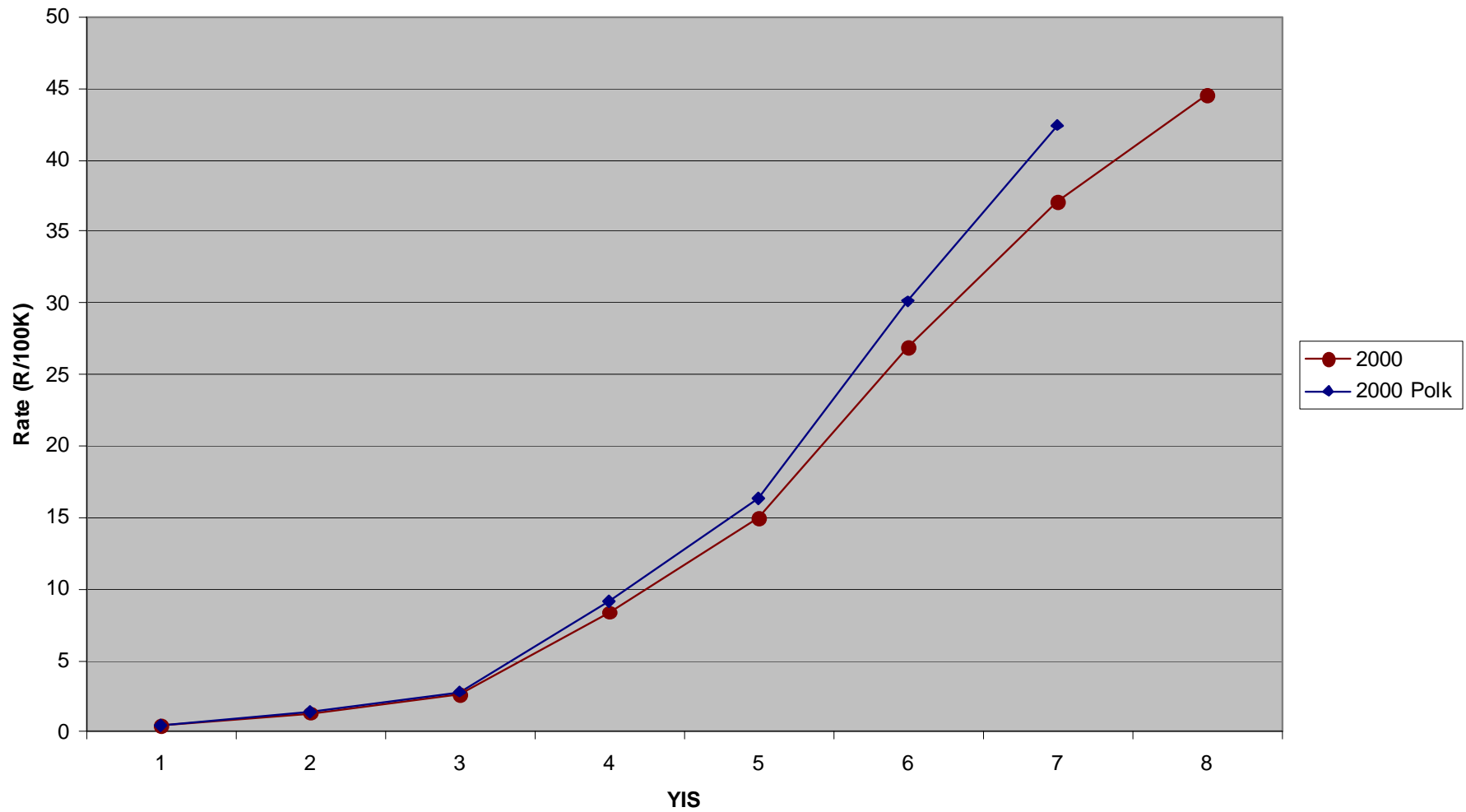


### Ford Engine Fire Complaints YIS vs Complaint Rate 1999 MY Windstar



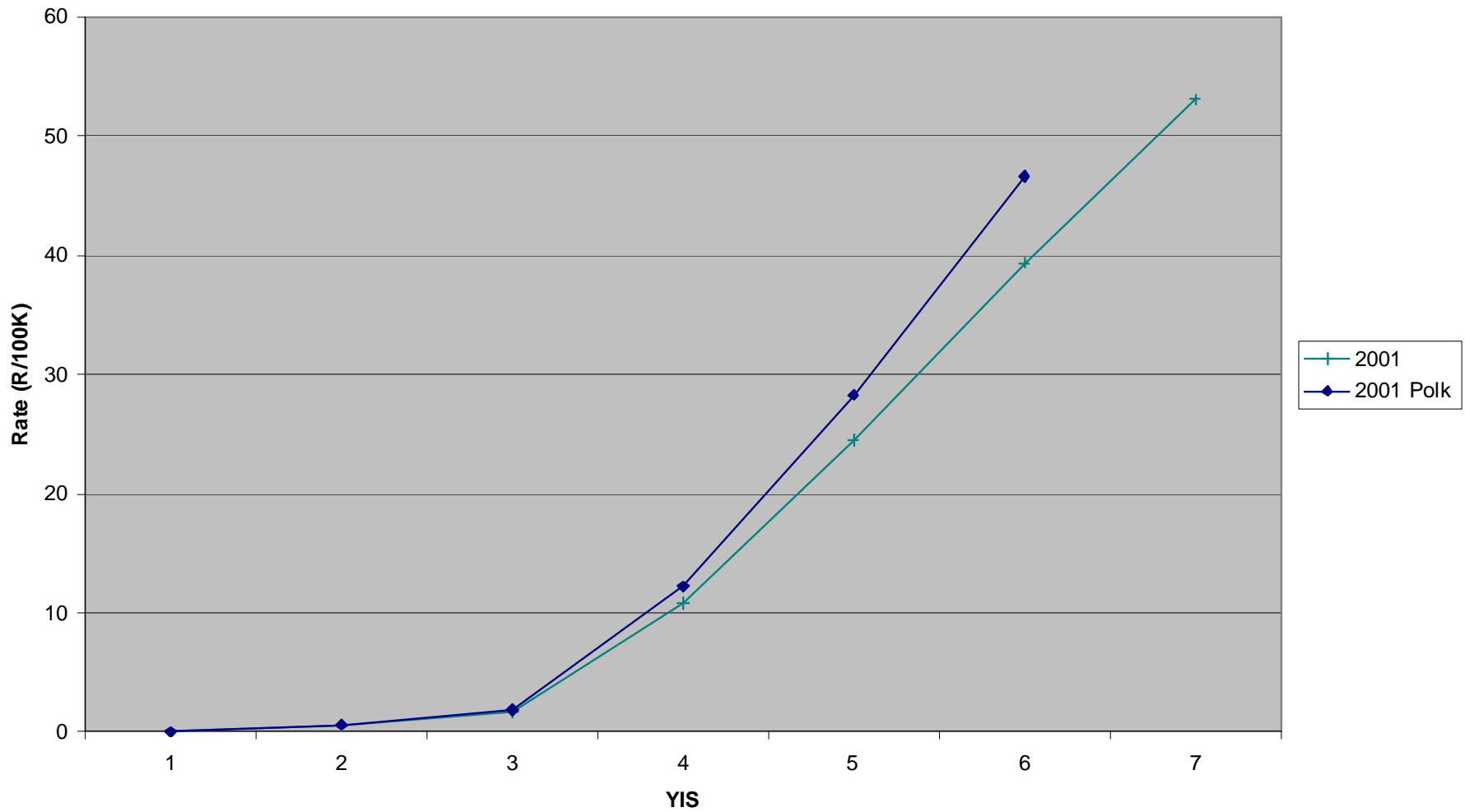


### Ford Engine Fire Complaints YIS vs Complaint Rate 2000 MY Windstar



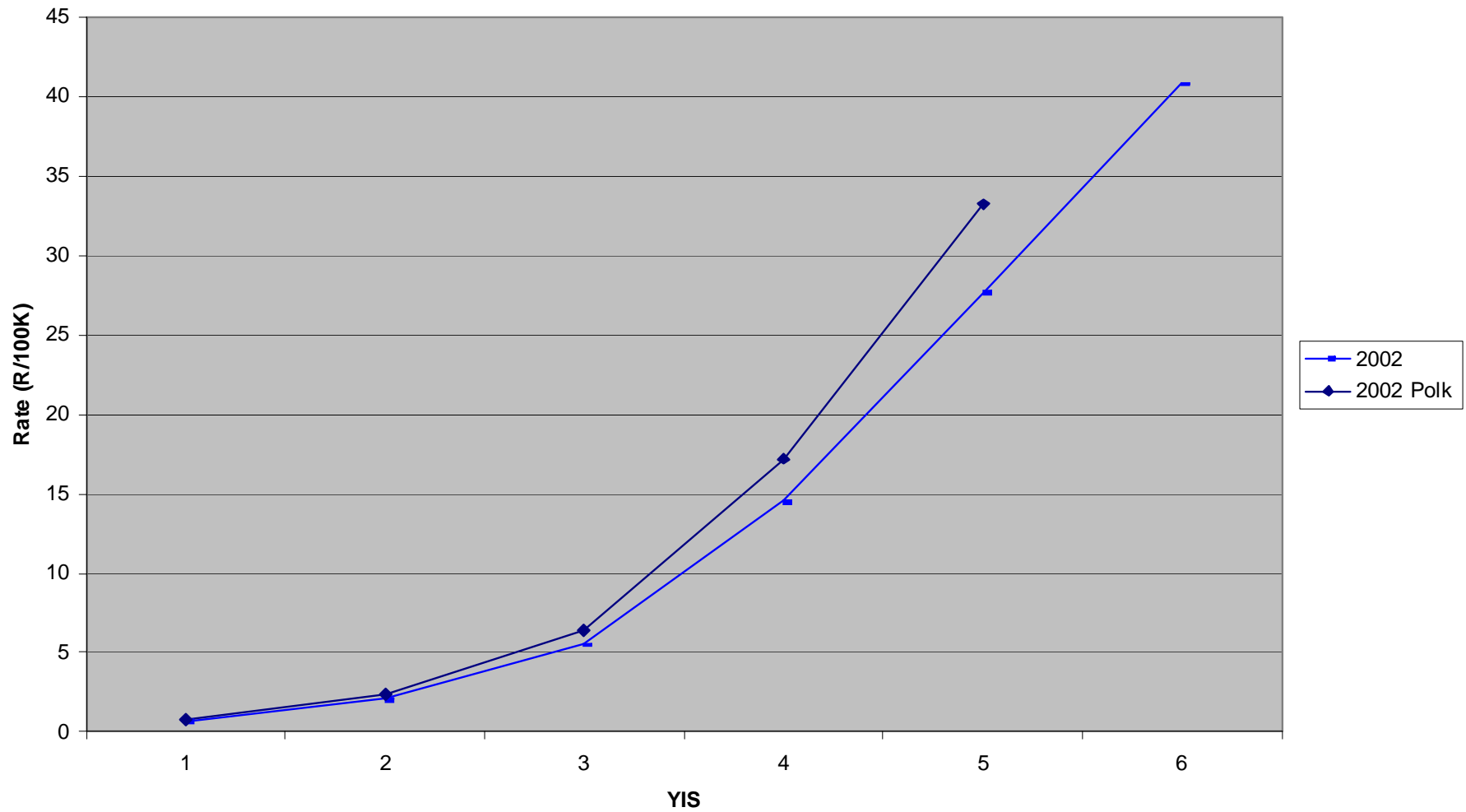


### Ford Engine Fire Complaints YIS vs Complaint Rate 2001 MY Windstar





### Ford Engine Fire Complaints YIS vs Complaint Rate 2002 MY Windstar







### Ford Engine Fire Complaints YIS vs Complaint Rate All MY Windstar Polk Registration

