

**1 9 9 3**

# *SERVICE MANUAL*

---

## *D&W 150-350 RAMCHARGER*



## *REAR WHEEL DRIVE TRUCK*

---





**AUTHENTIC  
RESTORATION™  
PRODUCT**

MOPAR, JEEP, DODGE, HEMI, PLYMOUTH and CHRYSLER are trademarks of Chrysler LLC under license. © Chrysler LLC 2008

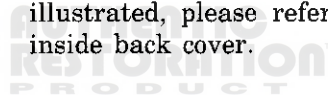
THIS SHOP MANUAL, OWNERS MANUAL OR PARTS BOOK IS A REPRINT OF AN ORIGINAL CHRYSLER LLC SHOP MANUAL, OWNERS MANUAL OR PARTS BOOK. IT IS REPRINTED AND PUBLISHED BY R&B HOLT ENTERPRISES, UNDER LICENSE AND WITH PERMISSION FROM CHRYSLER LLC. THE REPRESENTATIONS AND SPECIFICATIONS HAVE NOT BEEN UPDATED OR MODIFIED SINCE THE ORIGINAL PUBLICATION DATE AND SHOULD NOT BE RELIED UPON FOR CURRENT APPLICATION. CHRYSLER LLC DISCLAIMS ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS INCLUDING ANY MISLEADING INFORMATION OR INCORRECT STATEMENTS MADE HERIN. © Chrysler LLC 2008

# CHRYSLER CORPORATION

## SERVICE MANUAL

### 1993 DODGE TRUCKS

To order the special service tools used and illustrated, please refer to the instructions on inside back cover.



NO PART OF THIS PUBLICATION MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM, OR TRANSMITTED, IN ANY FORM OR BY ANY MEANS, ELECTRONIC, MECHANICAL, PHOTOCOPYING, RECORDING, OR OTHERWISE, WITHOUT THE PRIOR WRITTEN PERMISSION OF CHRYSLER CORPORATION.

Chrysler Corporation reserves the right to make changes in design or to make additions to or improvements in its products without imposing any obligations upon itself to install them on its products previously manufactured.

## FOREWORD

The information contained in this service manual has been prepared for the professional automotive technician involved in daily repair operations. This manual does not cover theory of operation, which is addressed in service training material. Information describing the operation and use of standard and optional equipment is included in the Owner's Manual provided with the vehicle.

Information in this manual is divided into groups. These groups contain general information, diagnosis, testing, adjustments, removal, installation, disassembly, and assembly procedures for the components.

The Component and System Index of this manual identifies the correct group for the component or system to be serviced. In addition, a Service Manual Comment form is included at the rear of this manual. Use the form to provide Chrysler Corporation with your comments and suggestions.

To assist in locating a group title page, use the Group Tab Locator on the following page. The solid bar after the group title is aligned to a solid tab on the first page of each group. The first page of the group has a contents section that lists major topics within the group.

Tightening torques are provided as a specific value throughout this manual. This value represents the midpoint of the acceptable engineering torque range for a given fastener application. These torque values are intended for use in service assembly and installation procedures using the correct OEM fasteners. When replacing fasteners, always use the same type (part number) fastener as removed.

Chrysler Corporation reserves the right to change testing procedures, specifications, diagnosis, repair methods, or vehicle wiring at any time without prior notice or incurring obligation.

**NOTE:** The acronyms, terminology and nomenclature used to identify emissions related components in this manual may have changed from prior publications. These new terms are in compliance with S.A.E. recommended practice J1930. This terminology standard (J1930) is required to comply with the 1993 California Air Research Board (CARB) requirements.

Navigation Tools: Click on the "Group" below, or use the Bookmarks to the left.

## GROUP TAB LOCATOR

Introduction

**0** Lubrication and Maintenance

**2** Front Suspension and Axle

**3** Rear Suspension and Axles

**5** Brakes

**6** Clutch

**7** Cooling System

**8** Electrical

**9** Engines

**11** Exhaust System and Intake Manifold

**13** Frame and Bumpers

**14** Fuel System

**16** Propeller Shafts

**19** Steering

**21** Transmission and Transfer Case

**22** Wheels and Tires

**23** Body Components

**24** Heating and Air Conditioning

**25** Emission Control Systems

Component and System Index

Service Manual Comment Forms

(Rear of Manual)



AUTIST  
RES



# INTRODUCTION

## CONTENTS

	page		page
DESIGNATIONS, LABELS/PLATES/DECALS, CODES AND DIMENSIONS/WEIGHTS .....	1	MEASUREMENT AND TORQUE SPECIFICATIONS .....	11

## DESIGNATIONS, LABELS/PLATES/DECALS, CODES AND DIMENSIONS/WEIGHTS

### INDEX

	page		page
Engine and Transmission/Transfer Case Identification .....	2	Trailer Towing Specifications .....	4
Engine/Transmission/GVWR .....	4	Vehicle Code Plate .....	2
Equipment Identification Plate .....	3	Vehicle Designations .....	1
International Vehicle Control and Display Symbols .....	10	Vehicle Dimension .....	4
Major Component Identification .....	3	Vehicle Identification Number (VIN) Plate .....	1
		Vehicle Safety Certification Label .....	1
		Vehicle Weights .....	4

### VEHICLE DESIGNATIONS

The Vehicle Code chart lists description and code for Ram Truck and Sport Utility vehicles. The codes are used to identify vehicle types in charts, captions and in service procedures. The vehicle codes are different than the Vehicle Identification Number (VIN) or the wheelbase/model code.

### VEHICLE SAFETY CERTIFICATION LABEL

A certification label is attached to the left side B-pillar. The label certifies that the vehicle conforms to Federal Motor Vehicle Safety Standards (FMVSS). The label also lists the:

- Month and year of vehicle manufacture
- Gross Vehicle Weight Rating (GVWR). The gross front and rear axle weight ratings (GAWR's) are based on a minimum rim size and maximum cold tire inflation pressure
- Vehicle Identification Number (VIN)
- Type of vehicle
- Type of rear wheels (single or dual)
- Bar code
- Month, Day and Hour (MDH) of final assembly

### VEHICLE IDENTIFICATION NUMBER (VIN) PLATE

The Vehicle Identification Number (VIN) plate is attached to the top left side of the instrument panel. The VIN contains 17 characters that provide data concerning the vehicle. Refer to the decoding chart to determine the identification of a vehicle.

### VEHICLE CODE DESIGNATIONS

VEHICLE CODE = AD (DODGE RAM PICKUP & CHASSIS CAB)		
VEHICLE FAMILY LINE		DESCRIPTION
AD1 AD2 AD3	D150 D250 D350	PICKUP 4 x 2
AD5 AD6 AD7	W150 W250 W350	PICKUP 4 x 4
AD2 AD3	D250 D350	CHASSIS CAB 4 x 2
AD6 AD7	W250 W350	CHASSIS CAB 4 x 4
AD4 AD4	AD100 AD150	SPORT UTILITY 4 x 2
AD8 AD8	AD100 AD150	SPORT UTILITY 4 x 4

MFD BY	CHRYSLER CORPORATION	DATE OF MFR	GVWR
GAWR FRONT	WITH TIRES	RIMS AT	PSI COLD
GAWR REAR	WITH TIRES	RIMS AT	PSI COLD
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.			
VIN:	TYPE:	SINGLE	DUAL
<b>BAR CODE</b>			
MDH:	VEHICLE MADE IN	4648503	J911N-25

**Fig. 1 Vehicle Safety Certification Label**

The Vehicle Identification Number is also imprinted on the:

- Body Code Plate
- Equipment Identification Plate
- Vehicle Safety Certification Label
- And on a frame rail.

**VEHICLE CODE PLATE**

A metal vehicle code plate (Fig. 2) is attached to top, right side of cowl below cowl grille. There can be a maximum of seven rows of vehicle information imprinted on the plate. The information should be read from left to right, starting with line 1 at the bottom of the plate up to line 7 (as applicable) at the top of the code plate.

Refer to the decoding chart to decode lines 1 through 3.

Lines 4 through 7 on the plate are imprinted in sequence according to the following descriptions:

- 3-character sales code
- 3-digit numerical code
- 6-digit SEC code

If there is not enough space left in the row for all of the 6-digit SEC code:

- The unused space will remain blank
- The code will be listed in the next row.

The last nine positions of row 7 will contain a 2-digit code and a 6-digit serial number.

The last code on a vehicle code plate will be followed by the imprinted word END. When two plates are required, the last available spaces on the first plate will be imprinted with the letters CTD (for continued).

When a second vehicle code plate is necessary, the first four spaces on each row will not be used because of the plate overlap.

To retrieve information from a vehicle code plate:

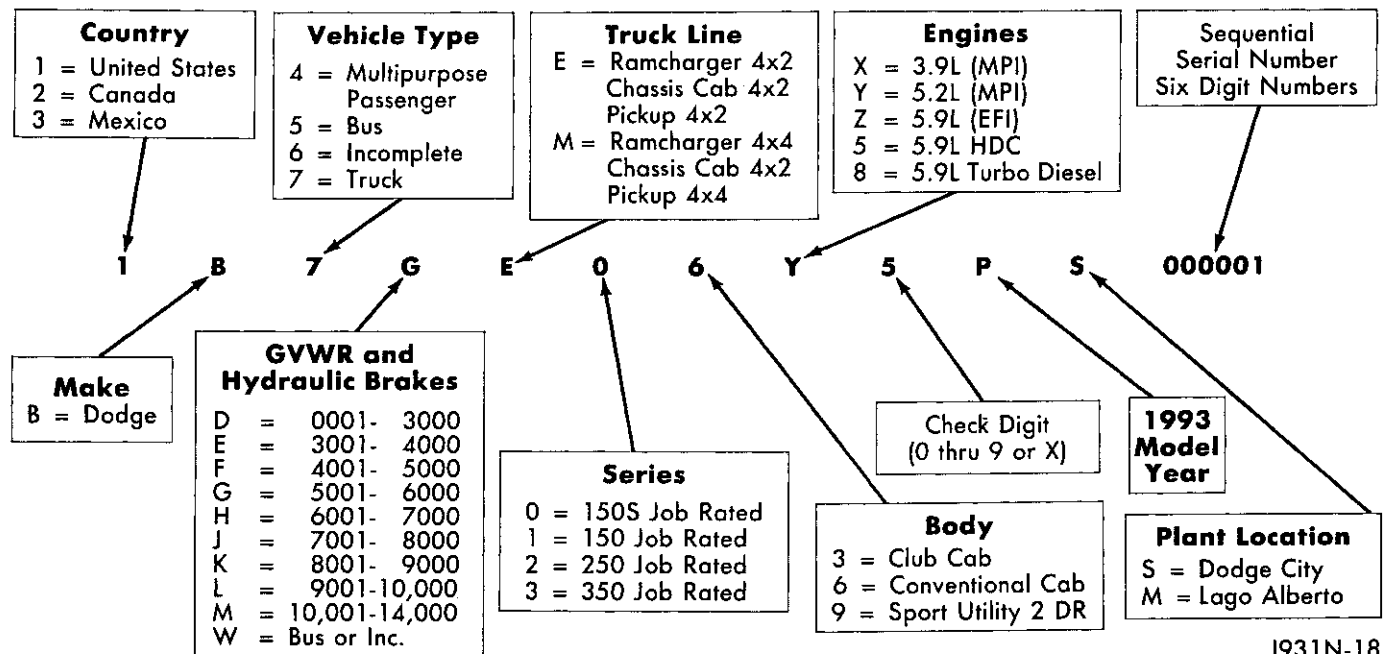
- Illuminate the plate with a shop light
- View the plate via the cowl grille slots
- Record the needed coded information.

**ENGINE AND TRANSMISSION/TRANSFER CASE IDENTIFICATION**

Refer to Group 9—Engines for all engine identification data.

Refer to Group 21—Transmissions for all transmission/transfer case identification data.

**VEHICLE IDENTIFICATION NUMBER (VIN) DECODING**



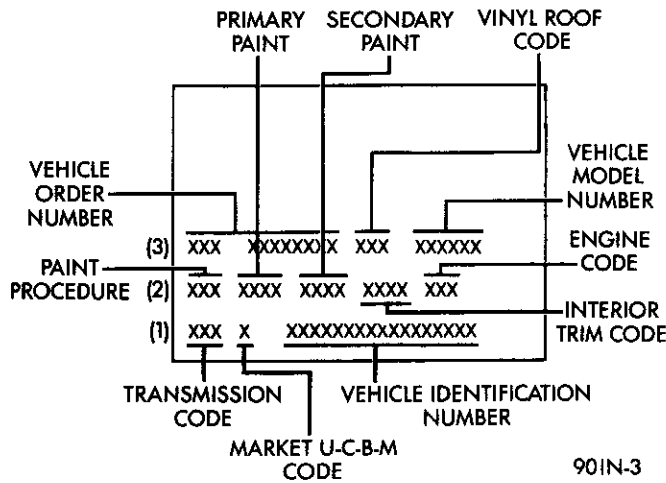


Fig. 2 Vehicle Code Plate

**VEHICLE CODE DECODING**

Line #1	Digit 1-3	Transmission Sales Code
	Digit 4	Open Space
	Digit 5	Market Code - U-C-B-M
	Digit 6	Open Space
	Digit 7-23	Vehicle Identification No.
Line #2	Digit 1-3	Paint Procedure
	Digit 4	Open Space
	Digit 5-8	Primary Paint
	Digit 9	Open Space
	Digit 10-13	Secondary Paint
	Digit 14	Open Space
	Digit 15-18	Trim Code
	Digit 19	Open Space
	Digit 20-22	Engine Sales Code
	Digit 23	Open Space
Line #3	Digit 1-12	Vehicle Order Number
	Digit 13	Open Space
	Digit 14-16	Vinyl Roof Code (Door Combo Code - Pillette)
	Digit 17	Open Space
	Digit 18-23	Model

J901N-20

**MAJOR COMPONENT IDENTIFICATION**

Refer to the applicable group for identification data.

**EQUIPMENT IDENTIFICATION PLATE**

The Equipment Identification Plate is located at the right, front corner of the inner hood panel. The plate lists information concerning the vehicle as follows:

- The model
- The wheelbase
- The VIN (Vehicle Identification Number)
- The T.O.N. (order number)
- The optional and special equipment installed on the vehicle

Refer to the information listed on the plate when ordering replacement parts.

EQUIPMENT IDENTIFICATION		4215000
MODELS	V.I.N.	T.O.N.
CODE NO.	DESCRIPTION	CODE NO. DESCRIPTION

J901N-37

Fig. 3 Equipment Identification Plate



### VEHICLE DIMENSIONS

VEHICLE FAMILY	WHEELBASE AVAILABLE	CAB TO AXLE	BODY TYPE	STANDARD BODIES AVAILABLE					
				NOMINAL LENGTH	LOAD SPACE DIMENSIONS (2)				
					LENGTH	MAX. WIDTH	HEIGHT	VOLUME	
AD-1 AD-5	2921 mm (115 in)	—	Sweptline	1981 mm (6.5 ft)	1981 mm (78 in)	1778 mm (70 in)	485 mm (19.1 in)	1.71 m <sup>3</sup> (60.35 ft <sup>3</sup> )	
AD-1 AD-2 AD-3 AD-5 AD-6 AD-7	3327 mm (131 in)	—	Sweptline	2438 mm (8 ft)	2489 mm (98 in)	1778 mm (70 in)	485 mm (19.1 in)	2.15 m <sup>3</sup> (75.8 ft <sup>3</sup> )	
AD-2 AD-3 AD-7	3327 mm (131 in)	1422 mm (56 in)	Chassis Cab	2438 mm (8 ft)	—	—	—	—	
AD-3 AD-7	3249 mm (135 in)	1524 mm (60 in)	Chassis Cab	2896 mm (9.5 ft)	—	—	—	—	
AD-3	4039 mm (159 in)	2134 mm (84 in)	Chassis Cab	3810 mm (12.5 ft)	—	—	—	—	
AD-4	2692 mm (106 in)	—	Sport Utility 4 x 2	—	1778 mm (70 in) ①	1588 mm (62.5 in)	1062 mm (41.8 in)	2.99 m <sup>3</sup> (105.8 ft <sup>3</sup> )	
AD-8	2692 mm (106 in)	—	Sport Utility 4 x 4	—	1778 mm (70 in) ①	1588 mm (62.5 in)	1062 mm (41.8 in)	2.99 m <sup>3</sup> (105.8 ft <sup>3</sup> )	
AD-1	3378 mm (133 in)	—	Sweptline	1981 mm (6.5 ft)	1984 mm (78.1 in)	1778 mm (70 in)	485 mm (19.1 in)	1.71 m <sup>3</sup> (60.4 ft <sup>3</sup> )	
AD-1 AD-2 AD-5 AD-6	3785 mm (149 in)	—	Sweptline Club Cab	2438 mm (8 ft)	2489 mm (98 in)	1778 mm (70 in)	485 mm (19.1 in)	2.15 M <sup>3</sup> (75.8 ft <sup>3</sup> )	

① Driver seat to tailgate.

② Based on S.A.E. procedure J1100.

J90IN-34

#### VEHICLE DIMENSION

The Vehicle Dimension chart provides the dimensions for each type of Ram Truck, Ram Chassis Cab and Ramcharger vehicle.

#### ENGINE/TRANSMISSION/GVWR

The Engine/Transmission/GVWR chart provides the maximum load data for each vehicle combination.

#### VEHICLE WEIGHTS

The Vehicle Weights chart provides:

- The Gross Vehicle Weight Rating (GVWR),
- The payload
- The curb weight for each vehicle type/wheelbase

#### TRAILER TOWING SPECIFICATIONS

The Trailer Towing Specifications chart provides:

- The maximum trailer tongue weight
- The maximum trailer weight
- The maximum combined weight of the trailer/load/towing vehicle with a specific engine/transmission/axle combination.

**ENGINE/TRANSMISSION/GVWR**

**RAM PICKUP**

VEHICLE LINE	WHEELBASE	GVWR	ENGINE & SALES CODE					TRANSMISSION				
			3.9L EFI EHB	5.2L EFI ELG	5.9L EFI EMG	5.9L EFI EMJ	5.9L DIESEL ETA	5-SP MAN. O.D.	4-SP MAN. O.D.	4-SP MAN.	3-SP AUTO	4-SP AUTO O.D.
D150 4 x 2	2921 mm (115 in)	2495 kg (5500 lbs)	S					S		O	O	
				O					S	O	O	O
	3327 mm (131 in)	2722 kg (6000 lbs)	S		O			S		O	O	
				O					S	O	O	O
	3378 mm (133 in) 3785 mm (149 in)	2722 kg (6000 lbs)		S						S		O
					O					S		O
D250 4 x 2	3327 mm (131 in)	3357 kg (7400 lbs)	S							SⓄ		O
				O						SⓄ	O	O
					O						S	
	3785 mm (149 in)	3357 kg (7400 lbs)		S						S		O
					O					S		O
	3327 mm (131 in) 3785 mm (149 in)	3860 kg (8510 lbs)			S					S		O
						O	S			O		
D350 4 x 2	3327 mm (131 in)	3946 kg (8700 lbs)			S					S		O
							O	S			O	
		4581 kg (10,100 lbs)				S				S		O
W150 4 x 4	2921 mm (115 in)	2858 kg (6300 lbs)	SⓄ							S		O
				O						SⓄ		O
	3327 mm (131 in)	2903 kg (6400 lbs)			O					S		O
				S						SⓄ		O
3785 mm (149 in)	2903 kg (6400 lbs)			O					S		O	
			S						SⓄ		O	
W250 4 x 4	3327 mm (131 in) 3785 mm (149 in)	3402 kg (7500 lbs)		S						SⓄ		O
					O					S		O
	3327 mm (131 in) 3785 mm (149 in)	3860 kg (8510 lbs)			S					S		O
							O	S			O	
W350 4 x 4	3327 mm (131 in)	3946 kg (8700 lbs)			S					S		O
							O	S			O	
		4581 kg (10,100 lbs)				S				S	O	
						O	S			O		

S = STANDARD

O = OPTIONAL

Ⓞ = Not available in California

J901N-39

**ENGINE/TRANSMISSION/GVWR (CONT'D)****RAM CHASSIS CAB**

VEHICLE LINE	WHEELBASE	GVWR	ENGINE & SALES CODE					TRANSMISSION						
			3.9L EFI EHB	5.2L EFI ELG	5.9L EFI EMG	5.9L EFI EMJ	5.9L DIESEL ETA	5-SP MAN. O.D.	4-SP MAN. O.D.	4-SP MAN.	3-SP AUTO	4-SP AUTO O.D.		
D250 4 x 2	3327 mm (131 in)	3357 kg (7400 lbs)			S								S	
		3860 kg (8510 lbs)			S <sup>ⓐ</sup>						S			O
						S <sup>ⓑ</sup>					S			
D350 4 x 2	3327 mm (131 in)	3946 kg (8700 lbs)			S <sup>ⓐ</sup>							S		O
						S <sup>ⓑ</sup>					S			O
	3429 mm (135 in) 4039 mm (159 in)	4581 kg (10,100 lbs) 4763 kg (10,500 lbs)				S						S		O
									O	S				O
W250 4 x 4	3327 mm (131 in)	3860 kg (8510 lbs)			S <sup>ⓐ</sup>							S		O
						S <sup>ⓑ</sup>					S		O	
								O	S				O	
W350 4 x 4	3327 mm (131 in)	3946 kg (8700 lbs)			S <sup>ⓐ</sup>							S		O
						S <sup>ⓑ</sup>					S		O	
								O	S				O	
	3429 mm (135 in)	4581 kg (10,100 lbs) 4989 kg (11,000 lbs)				S						S		O
							O	S				O		

**RAMCHARGER SPORT UTILITY**

D100 4 x 2	2692 mm (106 in)	2540 kg (5600 lbs)		S									S
D150 4 x 2	2692 mm (106 in)	2540 kg (5600 lbs)			S								S
W100 4 x 4	2692 mm (106 in)	2722 kg (6000 lbs)		S								S	O
W150 4 x 4	2692 mm (106 in)	2722 kg (6000 lbs)			S							S	O
		2903 kg (6400 lbs)			S						S <sup>ⓐ</sup>		O
					S						S		O

S = STANDARD  
O = OPTIONAL

ⓐ = Not available in California.  
ⓑ = California Only.

**VEHICLE WEIGHTS**

**RAM PICKUP**

MODEL/ FAMILY	BODY(3) STYLE	GVWR		PAYLOAD ALLOWANCE (1)		CURB WEIGHT (2)	
		kg	lbs	kg	lbs	kg	lbs
D150 AD1 4 x 2	61	2495 kg	5500 lbs	853 kg	1880 lb	1642 kg	3620 lbs
	62	2495 kg 2722 kg	5500 lbs 6000 lbs	804 kg 1021 kg	1772 lbs 2252 lbs	1691 kg 1700 kg	3728 lbs 3748 lbs
	31	2722 kg	6000 lbs	852 kg	1878 lbs	1870 kg	4122 lbs
	32	2722 kg	6000 lbs	787 kg	1736 lbs	1934 kg	4264 lbs
D250 AD2 4 x 2	62	3357 kg 3860 kg	7400 lbs 8510 lbs	1527 kg 1952 kg	3366 lbs 4304 lbs	1830 kg 1908 kg	4034 lbs 4206 lbs
	32	3357 kg 3860 kg	7400 lbs 8510 lbs	1369 kg 1846 kg	3019 lbs 4070 lbs	1987 kg 2014 kg	4381 lbs 4440 lbs
D350 AD3 4 x 2	62(4)	3946 kg 4581 kg	8700 lbs 10,100 lbs	2001 kg 2485 kg	4411 lbs 5478 lbs	1945 kg 2097 kg	4289 lbs 4622 lbs
W150 AD5 4 x 4	61	2858 kg	6300 lbs	978 kg	2156 lbs	1880 kg	4144 lbs
	62	2903 kg	6400 lbs	966 kg	2131 lbs	1936 kg	4269 lbs
	32	2903 kg	6400 lbs	789 kg	1740 lbs	2114 kg	4660 lbs
W250 AD6 4 x 4	62	3402 kg 3860 kg	7500 lbs 8510 lbs	1364 kg 1769 kg	3007 lbs 3899 lbs	2038 kg 2092 kg	4493 lbs 4611 lbs
	32	3402 kg 3860 kg	7500 lbs 8510 lbs	1259 kg 1664 kg	2775 lbs 3668 lbs	2143 kg 2196 kg	4725 lbs 4842 lbs
W350 AD7 4 x 4	62	3946 kg	8700 lbs	1749 kg	3855 lbs	2198 kg	4845 lbs

(1) Payload includes maximum weight of driver, passengers, cargo and optional equipment not included in payload or GVW package - Payload allowance for Chassis Cabs is not supplied due to large variations of body equipment installed.

(2) Includes base engine

(3) Body Style	Cab	Bed Length
61	Std.	1981 mm (6.5 ft)
62	Std.	2438 mm (8.0 ft)
31	Club	1981 mm (6.5 ft)
32	Club	2438 mm (8.0 ft)
63	Std.	N.A.
64	Std.	N.A.
71	Sport Utility	N.A.

(4) Dual Rear Wheels

### VEHICLE WEIGHTS (CONT'D)

#### RAM CHASSIS CAB

MODEL/ FAMILY	BODY(3) STYLE	GVWR		PAYLOAD ALLOWANCE (1)		CURB WEIGHT (2)	
		kg	lbs	kg	lbs	kg	lbs
D250 4 x 2	AD2 62	3357 kg 3860 kg	7400 lbs 8510 lbs	(1)		1721 kg 1740 kg	3794 lbs 3835 lbs
D350 4 x 2	AD3 62	3946 kg	8700 lbs	(1)		1794 kg	3954 lbs
	63(4) (4)	4581 kg 4763 kg	10,100 lbs 10,500 lbs	(1)		1963 kg 1972 kg	4327 lbs 4347 lbs
	64(4) (4)	4581 kg 4763 kg	10,100 lbs 10,500 lbs	(1)		2032 kg 2043 kg	4479 lbs 4505 lbs
W250 4 x 4	AD6 62	3860 kg	8510 lbs	(1)		1886 kg	4158 lbs
W350 4 x 4	AD7 62	3946 kg	8700 lbs	(1)		2038 kg	4494 lbs
	63(4) (4)	4581 kg 4990 kg	10,100 lbs 11,000 lbs	(1)		2136 kg 2145 kg	4709 lbs 4729 lbs

#### RAMCHARGER – SPORT UTILITY

MODEL/ FAMILY	BODY(3) STYLE	GVWR		PAYLOAD ALLOWANCE(1)		CURB WEIGHT(2)	
		kg	lbs	kg	lbs	kg	lbs
D100 4 x 2	AD4 71	2540 kg	5600 lbs	603 kg	1330 lbs	1937 kg	4270 lbs
D150 4 x 2	AD4 71	2540 kg	5600 lbs	606 kg	1336 lbs	1934 kg	4264 lbs
W100 4 x 4	AD8 71	2722 kg	6000 lbs	618 kg	1363 lbs	2103 kg	4637 lbs
W150 4 x 4	AD8 71	2722 kg 2903 kg	6000 lbs 6400 lbs	621 kg 796 kg	1369 lbs 1755 lbs	2102 kg 2107 kg	4631 lbs 4645 lbs

(1) Payload includes maximum weight of driver, passengers, cargo and optional equipment not included in payload or GVW package – Payload allowance for Chassis Cabs is not supplied due to large variations of body equipment installed.

(2) Includes base engine

(3) Body Style

























Body Style	Cab	Bed Length
61	Std.	1981 mm (6.5 ft)
62	Std.	2438 mm (8.0 ft)
31	Club	1981 mm (6.5 ft)
32	Club	2438 mm (8.0 ft)
63	Std.	N.A.
64	Std.	N.A.
71	Sport Utility	N.A.

(4) Dual Rear Wheels

**TRAILER TOWING SPECIFICATIONS**

ALLOWABLE TONGUE WEIGHTS				
Model	GVWR		Max. Tongue Weight	
D/W150/150S Ramcharger	All		800	
D/W250	All		900	
D/W350	All		1000	
Single Rear Wheels	All		1200	
Dual Rear Wheels	All		1200	
GCWR – GROSS COMBINED WEIGHT RATING (Total truck, trailer, cargo, people & fluids)				
ENGINE TRANSMISSION	AXLE RATIOS			
	3.54	3.90	4.10	4.56
<b>D-150</b>				
3.9L Man. 5-spd.	8,000	8,000		
Auto. 3-spd.	8,800	9,200		
Auto. 4-spd. O/D	8,800	9,200		
5.2L Auto. 3-spd.	11,500	12,500		
Auto. 4-spd. O/D	10,500	10,500		
Auto. 4-spd. H.D.	11,500	12,500		
5.9L Auto. 4-spd H.D.	12,000	13,000	13,500	14,000
<b>D-250</b>				
3.9L Auto. 3-spd.	8,800	9,200		
5.2L Auto. 4-spd. O/D	10,500	10,500		
Auto. 4-spd. H.D.	11,500	12,500		
5.9L Auto. 4-spd. H.D.	12,000	13,000	13,500	14,000
<b>D-350</b>				
5.9L Auto. 4-spd. H.D.	12,000	13,000	13,500	14,000
<b>W-150</b>				
3.9L Auto. 4-spd. H.D.	8,800	9,200		
5.2L Auto. 4-spd. H.D.	11,500	12,500		
5.9L Auto. 4-spd. H.D.	12,000	13,000	13,500	14,000
<b>W-250</b>				
5.9L Auto. 3-spd.	12,000	13,000	13,500	14,000
<b>W-350</b>				
5.9L Auto. 3-spd.	12,000	13,000	13,500	14,000
Auto. 4-spd. H.D.	12,000	13,000	13,500	14,000
<b>Ramcharger 4 x 2</b>				
5.2L Auto. 4-spd. H.D.	11,500	12,500		
5.9L Auto. 4-spd. H.D.	12,000	13,000	13,500	14,000
<b>Ramcharger 4 x 4</b>				
5.2L Auto. 4-spd. H.D.	11,500	12,500		
5.9L Auto. 4-spd. H.D.	12,000	13,000	13,500	14,000

### INTERNATIONAL CONTROL AND DISPLAY SYMBOLS

					
HIGH BEAM	FOG LIGHTS	HEADLIGHTS, PARKING LIGHTS, PANEL LIGHTS	TURN SIGNAL	HAZARD WARNING	WINDSHIELD WASHER
					
WINDSHIELD WIPER	WINDSHIELD WIPER AND WASHER	WINDSCREEN DEMISTING AND DEFROSTING	VENTILATING FAN	REAR WINDOW DEFOGGER	REAR WINDOW WIPER
					
REAR WINDOW WASHER	FUEL	ENGINE COOLANT TEMPERATURE	BATTERY CHARGING CONDITION	ENGINE OIL	SEAT BELT
					
BRAKE FAILURE	PARKING BRAKE	FRONT HOOD	REAR HOOD (TRUNK)	HORN	LIGHTER

93IN-9

### INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS

The graphic symbols illustrated in the chart below are used to identify various instrument controls. The symbols correspond to the controls and displays that are located on the instrument panel.

## MEASUREMENT AND TORQUE SPECIFICATIONS

### INDEX

	page		page
Metric and English/SAE Conversion .....	11	Torque Specifications .....	11
Specification Notations .....	11		

### SPECIFICATION NOTATIONS

**WARNING: THE USE OF INCORRECT ATTACHING HARDWARE CAN RESULT IN COMPONENT DAMAGE AND/OR PERSONAL INJURY.**

It is important to retain the original attaching hardware for assembly of the components. If the attaching hardware is not reusable, hardware with equivalent specifications must be used.

### METRIC AND ENGLISH/SAE CONVERSION

The following chart will assist in converting metric units to equivalent English and SAE units, or vice versa.

### TORQUE SPECIFICATIONS

#### TORQUE CHARTS

A torque chart for fasteners is provided at the end of each group (of service information). Refer to the Standard Torque Specifications chart to determine torque values not listed in the group (Figs. 1 and 2).

It is important to be aware that the torque values listed in the chart are based on clean and dry bolt

threads. Reduce the torque value by 10 percent when the bolt threads are lubricated and by 20 percent if new.

### BOLT THREAD AND GRADE/CLASS IDENTIFICATION

#### THREAD IDENTIFICATION

SAE and metric bolt/nut threads are not the same. The difference is described in the Thread Notation chart.

#### GRADE/CLASS IDENTIFICATION

The SAE bolt strength grades range from grade 2 to grade 8. The higher the grade number, the greater the bolt strength. Identification is determined by the line marks on the top of each bolt head (Fig. 1). The actual bolt strength grade corresponds to the number of line marks plus 2.

- A grade 2 bolt has no line marks on top of the bolt head
- A grade 5 bolt has 3 line marks on top of the bolt head
- A grade 7 bolt has 5 line marks on top of the bolt head

### CONVERSION FORMULAS AND EQUIVALENT VALUES

Multiply	By	To Get	Multiply	By	To Get
in-lbs	x 0.11298	= Newton-Meters (N·m)	N·m	x 8.851	= in-lbs
ft-lbs	x 1.3558	= Newton-Meters (N·m)	N·m	x 0.7376	= ft-lbs
Inches Hg (60°F)	x 3.377	= Kilopascals (kPa)	kPa	x 0.2961	= Inches Hg
psi	x 6.895	= Kilopascals (kPa)	kPa	x 0.145	= psi
Inches	x 25.4	= Millimeters (mm)	mm	x 0.03937	= Inches
Feet	x 0.3048	= Meters (M)	M	x 3.281	= Feet
Yards	x 0.9144	= Meters (M)	M	x 1.0936	= Yards
Miles	x 1.6093	= Kilometers (Km)	Km	x 0.6214	= Miles
mph	x 1.6093	= Kilometers/Hr. (Km/h)	Km/h	x 0.6214	= mph
Feet/Sec.	x 0.3048	= Meters/Sec. (M/S)	M/S	x 3.281	= Feet/Sec.
Kilometers/Hr.	x 0.27778	= Meters/Sec. (M/S)	M/S	x 3.600	= Kilometers/Hr.
mph	x 0.4470	= Meters/Sec. (M/S)	M/S	x 2.237	= mph

#### COMMON METRIC EQUIVALENTS

1 Inch = 25 Millimeters	1 Cubic Inch = 16 Cubic Centimeters
1 Foot = 0.3 Meter	1 Cubic Foot = 0.03 Cubic Meter
1 Yard = 0.9 Meter	1 Cubic Yard = 0.8 Cubic Meter
1 Mile = 1.6 Kilometers	



**STANDARD TORQUE SPECIFICATIONS**

BOLT SIZE	BOLT TORQUE			
	GRADE 5		GRADE 8	
	N·m	ft-lbs (in-lbs)	N·m	ft-lbs (in-lbs)
1/4-20	11	(95)	14	(125)
1/4-28	11	(95)	17	(150)
5/16-18	23	(200)	31	(270)
5/16-24	27	20	34	25
3/8-16	41	30	54	40
3/8-24	48	35	61	45
7/16-14	68	50	88	65
7/16-20	75	55	95	70
1/2-13	102	75	136	100
1/2-20	115	85	149	110
9/16-12	142	105	183	135
9/16-18	156	115	203	150
5/8-11	203	150	264	195
5/8-18	217	160	285	210
3/4-16	237	175	305	225

J89IN-9

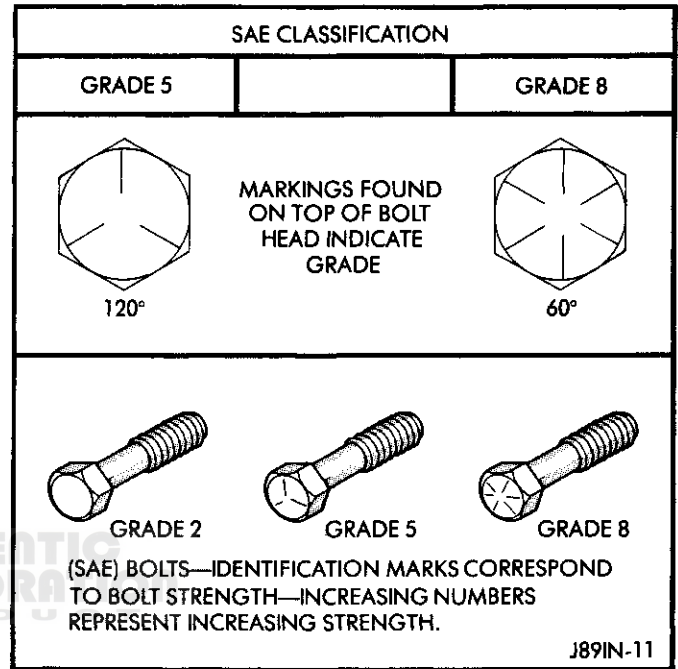
**THREAD NOTATION—SAE AND METRIC**

INCH		METRIC	
5/16-18		M8 X 1.25	
THREAD MAJOR DIAMETER IN INCHES	NUMBER OF THREADS PER INCH	THREAD MAJOR DIAMETER IN MILLIMETERS	DISTANCE BETWEEN THREADS IN MILLIMETERS

PR606B

- A grade 8 bolt has 6 line marks on top of the bolt head

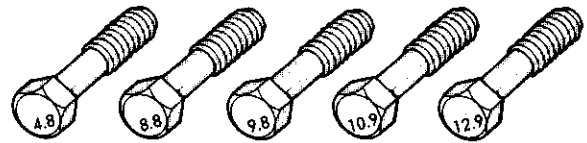
The most commonly used metric bolt strength classes are 9.8 and 12.9. The metric strength class identification number is imprinted on the head of the bolt (Fig. 2). The higher the class number, the



J89IN-11

**Fig. 1 SAE Bolt Grade Identification**

greater the bolt strength. Some metric nuts are imprinted with a single-digit strength class on the nut face.



METRIC BOLTS—IDENTIFICATION CLASS NUMBERS CORRESPOND TO BOLT STRENGTH— INCREASING NUMBERS REPRESENT INCREASING STRENGTH.

J89IN-10

**Fig. 2 Metric Bolt Class Identification**

**METRIC CONVERSION**

Refer to the Metric Conversion chart to convert torque values listed in metric Newton-meters (N·m). Also, use the chart to convert between millimeters (mm) and inches (in.)

**METRIC CONVERSION**

**in-lbs to N•m**

**N•m to in-lbs**

in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m
2	.2260	42	4.7453	82	9.2646	122	13.7839	162	18.3032	.2	1.7702	4.2	37.1747	8.2	72.5792	12.2	107.9837	16.2	143.3882	
4	.4519	44	4.9713	84	9.4906	124	14.0099	164	18.5292	.4	3.5404	4.4	38.9449	8.4	74.3494	12.4	109.7539	16.4	145.1584	
6	.6779	46	5.1972	86	9.7165	126	14.2359	166	18.7552	.6	5.3107	4.6	40.7152	8.6	76.1197	12.6	111.5242	16.6	146.9287	
8	.9039	48	5.4232	88	9.9425	128	14.4618	168	18.9811	.8	7.0809	4.8	42.4854	8.8	77.8899	12.8	113.2944	16.8	148.6989	
10	1.1298	50	5.6492	90	10.1685	130	14.6878	170	19.2071	1	8.8511	5	44.2556	9	79.6601	13	115.0646	17	150.4691	
12	1.3558	52	5.8751	92	10.3944	132	14.9138	172	19.4331	1.2	10.6213	5.2	46.0258	9.2	81.4303	13.2	116.8348	17.2	152.2393	
14	1.5818	54	6.1011	94	10.6204	134	15.1397	174	19.6590	1.4	12.3916	5.4	47.7961	9.4	83.2006	13.4	118.6051	17.4	154.0096	
16	1.8077	56	6.3270	96	10.8464	136	15.3657	176	19.8850	1.6	14.1618	5.6	49.5663	9.6	84.9708	13.6	120.3753	17.6	155.7798	
18	2.0337	58	6.5530	98	11.0723	138	15.5917	178	20.1110	1.8	15.9320	5.8	51.3365	9.8	86.7410	13.8	122.1455	17.8	157.5500	
20	2.2597	60	6.7790	100	11.2983	140	15.8176	180	20.3369	2	17.7022	6	53.1067	10	88.5112	14	123.9157	18	159.3202	
22	2.4856	62	7.0049	102	11.5243	142	16.0436	182	20.5629	2.2	19.4725	6.2	54.8770	10.2	90.2815	14.2	125.6860	18.5	163.7458	
24	2.7116	64	7.2309	104	11.7502	144	16.2696	184	20.7889	2.4	21.2427	6.4	56.6472	10.4	92.0517	14.4	127.4562	19	168.1714	
26	2.9376	66	7.4569	106	11.9762	146	16.4955	186	21.0148	2.6	23.0129	6.6	58.4174	10.6	93.8219	14.6	129.2264	19.5	172.5970	
28	3.1635	68	7.6828	108	12.2022	148	16.7215	188	21.2408	2.8	24.7831	6.8	60.1876	10.8	95.5921	14.8	130.9966	20	177.0225	
30	3.3895	70	7.9088	110	12.4281	150	16.9475	190	21.4668	3	26.5534	7	61.9579	11	97.3624	15	132.7669	20.5	181.4480	
32	3.6155	72	8.1348	112	12.6541	152	17.1734	192	21.6927	3.2	28.3236	7.2	63.7281	11.2	99.1326	15.2	134.5371	21	185.8736	
34	3.8414	74	8.3607	114	12.8801	154	17.3994	194	21.9187	3.4	30.0938	7.4	65.4983	11.4	100.9028	15.4	136.3073	22	194.7247	
36	4.0674	76	8.5867	116	13.1060	156	17.6253	196	22.1447	3.6	31.8640	7.6	67.2685	11.6	102.6730	15.6	138.0775	23	203.5759	
38	4.2934	78	8.8127	118	13.3320	158	17.8513	198	22.3706	3.8	33.6342	7.8	69.0388	11.8	104.4433	15.8	139.8478	24	212.4270	
40	4.5193	80	9.0386	120	13.5580	160	18.0773	200	22.5966	4	35.4045	8	70.8090	12	106.2135	16	141.6180	25	221.2781	

**ft-lbs to N•m**

**N•m to ft-lbs**

ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m
1	1.3558	21	28.4722	41	55.5885	61	82.7049	81	109.8212	1	.7376	21	15.9888	41	30.2400	61	44.9913	81	59.7425	
2	2.7116	22	29.8280	42	56.9444	62	84.0607	82	111.1770	2	1.4751	22	16.2264	42	30.9776	62	45.7289	82	60.4801	
3	4.0675	23	31.1838	43	58.3002	63	85.4165	83	112.5328	3	2.2127	23	16.9639	43	31.7152	63	46.4664	83	61.2177	
4	5.4233	24	32.5396	44	59.6560	64	86.7723	84	113.8886	4	2.9502	24	17.7015	44	32.4527	64	47.2040	84	61.9552	
5	6.7791	25	33.8954	45	61.0118	65	88.1281	85	115.2444	5	3.6878	25	18.4391	45	33.1903	65	47.9415	85	62.6928	
6	8.1349	26	35.2513	46	62.3676	66	89.4840	86	116.6004	6	4.4254	26	19.1766	46	33.9279	66	48.6791	86	63.4303	
7	9.4907	27	36.6071	47	63.7234	67	90.8398	87	117.9562	7	5.1629	27	19.9142	47	34.6654	67	49.4167	87	64.1679	
8	10.8465	28	37.9629	48	65.0793	68	92.1956	88	119.3120	8	5.9005	28	20.6517	48	35.4030	68	50.1542	88	64.9545	
9	12.2024	29	39.3187	49	66.4351	69	93.5514	89	120.6678	9	6.6381	29	21.3893	49	36.1405	69	50.8918	89	65.6430	
10	13.5582	30	40.6745	50	67.7909	70	94.9073	90	122.0236	10	7.3756	30	22.1269	50	36.8781	70	51.6293	90	66.3806	
11	14.9140	31	42.0304	51	69.1467	71	96.2631	91	123.3794	11	8.1132	31	22.8644	51	37.6157	71	52.3669	91	67.1181	
12	16.2698	32	43.3862	52	70.5025	72	97.6189	92	124.7352	12	8.8507	32	23.6020	52	38.3532	72	53.1045	92	67.8557	
13	17.6256	33	44.7420	53	71.8583	73	98.9747	93	126.0910	13	9.5883	33	24.3395	53	39.0908	73	53.8420	93	68.5933	
14	18.9815	34	46.0978	54	73.2142	74	100.3316	94	127.4468	14	10.3259	34	25.0771	54	39.8284	74	54.5720	94	69.3308	
15	20.3373	35	47.4536	55	74.5700	75	101.6862	95	128.8026	15	11.0634	35	25.8147	55	40.5659	75	55.3172	95	70.0684	
16	21.6931	36	48.8094	56	75.9258	76	103.0422	96	130.1586	16	11.8010	36	26.5522	56	41.3035	76	56.0547	96	70.8060	
17	23.0489	37	50.1653	57	77.2816	77	104.3980	97	131.5144	17	12.5386	37	27.2898	57	42.0410	77	56.7923	97	71.5435	
18	24.4047	38	51.5211	58	78.6374	78	105.7538	98	132.8702	18	13.2761	38	28.0274	58	42.7786	78	57.5298	98	72.2811	
19	25.7605	39	52.8769	59	79.9933	79	107.1196	99	134.2260	19	14.0137	39	28.7649	59	43.5162	79	58.2674	99	73.0187	
20	27.1164	40	54.2327	60	81.3491	80	108.4654	100	135.5820	20	14.7512	40	29.5025	60	44.2537	80	59.0050	100	73.7562	

**in. to mm**

**mm to in.**

in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
.01	.254	.21	5.334	.41	10.414	.61	15.494	.81	20.574	.01	.00039	.21	.00827	.41	.01614	.61	.02402	.81	.03189		
.02	.508	.22	5.588	.42	10.668	.62	15.748	.82	20.828	.02	.00079	.22	.00866	.42	.01654	.62	.02441	.82	.03228		
.03	.762	.23	5.842	.43	10.922	.63	16.002	.83	21.082	.03	.00118	.23	.00906	.43	.01693	.63	.02480	.83	.03268		
.04	1.016	.24	6.096	.44	11.176	.64	16.256	.84	21.336	.04	.00157	.24	.00945	.44	.01732	.64	.02520	.84	.03307		
.05	1.270	.25	6.350	.45	11.430	.65	16.510	.85	21.590	.05	.00197	.25	.00984	.45	.01772	.65	.02559	.85	.03346		
.06	1.524	.26	6.604	.46	11.684	.66	16.764	.86	21.844	.06	.00236	.26	.01024	.46	.01811	.66	.02598	.86	.03386		
.07	1.778	.27	6.858	.47	11.938	.67	17.018	.87	22.098	.07	.00276	.27	.01063	.47	.01850	.67	.02638	.87	.03425		
.08	2.032	.28	7.112	.48	12.192	.68	17.272	.88	22.352	.08	.00315	.28	.01102	.48	.01890	.68	.02677	.88	.03465		
.09	2.286	.29	7.366	.49	12.446	.69	17.526	.89	22.606	.09	.00354	.29	.01142	.49	.01929	.69	.02717	.89	.03504		
.10	2.540	.30	7.620	.50	12.700	.70	17.780	.90	22.860	.10	.00394	.30	.01181	.50	.01969	.70	.02756	.90	.03543		
.11	2.794	.31	7.874	.51	12.954	.71	18.034	.91	23.114	.11	.00433	.31	.01220	.51	.02008	.71	.02795	.91	.03583		
.12	3.048	.32	8.128	.52	13.208	.72	18.288	.92	23.368	.12	.00472	.32	.01260	.52	.02047	.72	.02835	.92	.03622		
.13	3.302	.33	8.382	.53	13.462	.73	18.542	.93	23.622	.13	.00512	.33	.01299	.53	.02087	.73	.02874	.93	.03661		
.14	3.556	.34	8.636	.54	13.716	.74	18.796	.94	23.876	.14	.00551	.34	.01339	.54	.02126	.74	.02913	.94	.03701		
.15	3.810	.35	8.890	.55	13.970	.75	19.050	.95	24.130	.15	.00591	.35	.01378	.55	.02165	.75	.02953	.95	.03740		
.16	4.064	.36	9.144	.56	14.224	.76	19.304	.96	24.384	.16	.00630	.36	.01417	.56	.02205	.76	.02992	.96	.03780		
.17	4.318	.37	9.398	.57	14.478	.77	19.558	.97	24.638	.17	.00669	.37	.01457	.57	.02244	.77	.03032	.97	.03819		
.18	4.572	.38	9.652	.58	14.732	.78	19.812	.98	24.892	.18	.00709	.38	.01496	.58	.02283	.78	.03071	.98	.03858		
.19	4.826	.39	9.906	.59	14.986	.79	20.066	.99	25.146	.19	.00748	.39	.01535	.59	.02323	.79	.03110	.99	.03898		
.20	5.080	.40	10.160	.60	15.240	.80	20.320	1.00													



# LUBRICATION AND MAINTENANCE

## CONTENTS

	page		page
<b>CHASSIS AND BODY</b> .....	<b>28</b>	<b>ENGINE MAINTENANCE</b> .....	<b>14</b>
<b>DRIVETRAIN</b> .....	<b>22</b>	<b>GENERAL INFORMATION</b> .....	<b>1</b>

## GENERAL INFORMATION

### INDEX

	page		page
Classification of Lubricants .....	3	Routine Maintenance .....	2
Components Requiring No Lubrication .....	4	Starting Assistance (Jump Starting) .....	9
Fuel Requirements .....	2	Vehicle Lifting Recommendations .....	10
Introduction .....	1	Vehicle Noise Control .....	2
Lubrication and Replacement Parts Recommendation .....	3	Vehicle Towing Recommendations .....	11

### INTRODUCTION

Lubrication and maintenance is divided into required and recommended service tasks. The required service tasks must be completed to verify the emission controls function correctly. The recommended service tasks should be completed to maintain safety and durability.

This information will assist the service personnel in providing maximum protection for each owner's vehicle.

Conditions can vary with individual driving habits. It is necessary to schedule maintenance as a time interval as well as a distance interval.

It is the owner's responsibility to determine the applicable driving condition. Also to have the vehicle serviced according to the maintenance schedule, and to pay for the necessary parts and labor.

Vehicles with a Gross Vehicle Weight Rating (GVWR) of 3 855 kg (8,500 lbs.) or less must conform to light duty emission standards. Vehicles with a Gross Vehicle Weight Rating (GVWR) of 3 856 kg (8,501 lbs.) or more must conform to heavy duty emission standards.

The GVWR for each vehicle is listed on the Safety Certification Label. This label is affixed to the driver side door pillar (Fig. 1).

Additional maintenance and lubrication information is listed in the Owner's Manual.

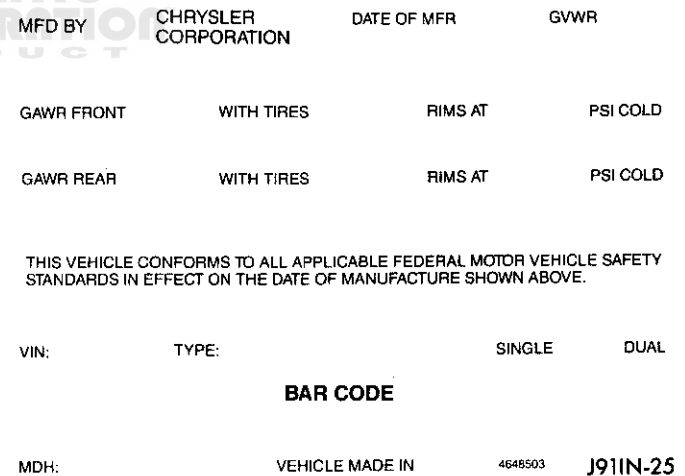


Fig. 1 Vehicle Safety Certification Label

### SEVERE DRIVING CONDITIONS

Vehicles subjected to severe driving conditions should decrease the interval between component maintenance. Severe driving conditions are defined as:

- Frequent short trip driving less than 24 km (15 miles)
- Frequent driving in dusty conditions
- Trailer towing
- Extensive engine idling
- Sustained high speed operation
- Desert operation
- Frequent starting and stopping
- Cold climate operation