

# **FORD**

**SIERRA RS** **COSWORTH**

**and**

**ESCORT RS** **COSWORTH**

## **Workshop Manual**



**Volume I**

**Volume II**



This Workshop Manual reproduces pages from the Ford Sierra RS Cosworth and Ford Escort RS Cosworth service microfiche and details technical service information required for components not already covered in previously issued Dealer literature. Note that, unlike the previous issue, CG473, covering the Sierra RS Cosworth only, this manual does not include system test sections. For vehicle system tests, reference should be made to the appropriate Vehicle System Test Manual.

The manual is designed primarily for use by Ford dealerships and gives repair and adjustment procedures together with component illustrations, technical data and details of special tools or equipment which may be required. The repair and adjustment procedures are intended as a guide for both the fully qualified and the less experienced technician.

The repair operations numbering sequence used in all Sections corresponds to that used in the Ford Car Labour Time Schedule.

FOR ALL REPAIR OPERATIONS AND PROCEDURES WHICH ARE NOT DESCRIBED IN THIS MANUAL, REFERENCE SHOULD BE MADE TO THE FORD SIERRA '87 ONWARDS SERVICE MICROFICHE (CG1464), FORD SIERRA RS COSWORTH SERVICE MICROFICHE (CG534) OR THE FORD ESCORT/ORION '91 SERVICE MICROFICHE (CG1524) AS NECESSARY.

OWNERS AND OPERATORS ARE ADVISED TO ALLOW ONLY AUTHORISED FORD DEALERSHIPS TO CARRY OUT THE MORE COMPLEX REPAIRS SUCH AS THE OVERHAUL OF A TRANSMISSION OR DIFFERENTIAL ASSEMBLY, PARTICULARLY THOSE REQUIRING SPECIALISED TOOLING AND KNOWLEDGE.

#### REPLACEMENT PARTS

Behind all FORD and MOTORCRAFT products are the vast resources of the worldwide Parts Supply Operations which can supply replacement parts made to the same exacting standards as the original factory fitted components.

FOR THIS REASON, INSIST THAT ONLY GENUINE FORD OR MOTORCRAFT PARTS ARE USED AS SERVICE REPLACEMENTS.

#### SPECIAL TOOLS

The Special Service Tool recognition chart given at the start of each section shows all European sourced tools desirable or necessary to carry out a satisfactory repair. When possible, illustrations are given to assist in identifying the tool needed.

Special Service Tools may be ordered from:

V.L. Churchill Ltd.  
P.O. Box No.3  
London Road  
Daventry  
Northants NN11 4NF  
ENGLAND

V. Löwener  
W 4018 Langenfeld  
Postfach 2262  
Industriestrasse 67  
GERMANY

O.P.T.O.M. S.A.  
Polígono Industrial Del Henares  
(Ampliación)  
Parcela No. 5B  
19080 Guadalajara  
SPAIN

# **FORD**

SIERRA RS **COSWORTH**

**and**

ESCORT RS **COSWORTH**

## **Workshop Manual**



**Volume I**



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For operations and sections not included in this manual, refer to either the Sierra '87 Microfiche or the Escort/Orion '91 Microfiche, as appropriate.



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**FORMAT**Groups

The manual is divided into six main groups:

0 - General Information	2 - Engine	4 - Body
1 - Chassis	3 - Electrical	5 - Maintenance

Sections

Each group is then sub-divided into section, eg:

Group 2 - Engine comprises:

21 - Engine	23 - Fuel System	25 - Exhaust System	29 - Engine Management
22 - Ignition System	24 - Cooling System	26 - Starting System	

**USAGE**Section Contents

Where applicable, each section comprises the following:

Index This will be found at the beginning of the section and is an itemised list and page location of the content of the section. It also includes a list and page location of each operation covered in the section.

Technical Data - A listing of essential information required during service and repair operations, eg. tightening torques, ignition timings, critical dimensions etc.

Special Service Tool Recognition - This is an illustrated list of special tools and suitable equipment required to carry out the repair procedures described.

Service and Repair Operations - A series of procedures selected to give coverage of the normal repairs undertaken in the workshop.

The removal and installation of some components is not covered in detail because the procedure is essentially simple and straight forward. Where a repair procedure is not covered, it may be for one of the following reasons:

1. The component may have been introduced after the repair operations were issued.
2. The component may be classed as not repairable due to the requirement for specialist equipment to ensure its correct function and adjustment after repair. (Non-service Item).
3. The component may be classed as not economical to repair, with renewal being less costly than dismantling and overhaul.
4. The repair may be of specialist nature, possibly covered in another FORD publication. For instance: Tyre repairs, fuel injection equipment testing, overhaul and calibration.



VEHICLE IDENTIFICATION 02

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## CODE DEFINITION (cont'd)

(Box 13) VERSION Provision for locally required codes by certain territories.

(BOX 14) BODY COLOUR

- A - Black '69 (XSC 632)
- B - Diamond White '73 (XSC 691)
- C -
- D - Galaxy Blue '87 (XSC 2101A)
- E - Burgundy '87 (XSC 2079A)
- F - Maritime Blue '91 (XSC 2009A)
- G -
- H -
- J - Pacifica Blue (XSC 2360CM)
- K - Tasman '86 (XSC 1903C)
- L - Aqua Jade '91 (XSC 2240C)
- M -
- N - Verona Green '91 (XSC 2398C) Polaris Grey (XCS 2455C)
- P - Radiant Red '89 (XSC 2251A)
- Q - Mercury Grey '87 (XSC 2076C)
- R -
- S -
- T - Flint Grey '89 (XSC 2228C)
- U - Crystal Blue '87 (XSC 2028C)
- V - Strato Silver '91 (XSC 1056C)
- W -
- X -
- Y - Special Vehicles
- Z -
- 0 - Aztec Gold '91 (XSC 2387C)
- 1 - Magenta '89 (XSC 2159CM)
- 2 -
- 3 - Biscayne Blue
- 4 - Mallard Green (XSC 2683 CM)
- 5 - Moonstone Blue '89 (XSC 1903C)
- 6 - Moondust Silver '91 (XSC 2431C)
- 7 -
- 8 - Olympic Gold '91 (XSC 2231C)
- 9 -

For vehicles built in Britain the second digit of the paint code denotes the current model year.  
For vehicles built on the continent the second digit of the paint code denotes the model year the colour was introduced.

Box 15 EXHAUST EMISSIONS

Code	7	U	
Exhaust Emission Level	15:04	83 US	





## CODE DEFINITION

(Box 7) STEERING

Code	1 or A	2 or B
Drive	Left-hand drive	Right-hand drive

(Box 8) ENGINE

Code	N 5		
Type	DOHC/I-4 EFI Turbo		
Capacity	litres	2,0	
Power	kw (DIN)	4 x 2 150,0 4 x 4 161,0	

(Box 9) TRANSMISSION

Code	J	L	8
Type	Man (5-speed) Borg Warner T5	Man (5-speed) Borg Warner	Man (5 speed) MT-75

(Box 10) AXLE

Code	3	U	
Axle ratio	3,64	3,62	

(Box 11) INTERIOR TRIM

Code	J	L	M	S	
Colour	Bluestone	Shadow	Mace	Raven	

(Box 12) TYPE

1st letter	2nd letter	3rd letter	4th & 5th letter	6th & 7th letter
Model	Body Type	Year of Homologation	20 = 2,0 litre	-
A = Escort B = Sierra	B = 3 Door F = 4 Door	G = 1986	Belgium & Luxemburg only	Identification not required



## CODE DEFINITION

(Box 1) NATIONAL TYPE APPROVAL NUMBER

A unique code required by certain territories.

(Box 2) VEHICLE IDENTIFICATION NUMBER (VIN)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
*	W	F	O	F	X	X	G	B	B	F	K	C	1	2	3	4	5	*

eg Sierra 4-door saloon, manufactured in Genk, West Germany during September 1989.

(Digit 1): Constant asterisk - (\*)A) (Digit 2 - 4): World Manufacturer Indicator

Ford Werke A.G. - West Germany - WFO (European vehicles) - WF1 (Federal vehicles)

B & G) (Digit 5 & 11): Model Variant:- BB - Saloon 3 door saloon BF - Sierra 4 door saloon  
AM - Escort CosworthC) (Digit 6 & 7): Constant XD) (Digit 8): Product Source Company:- G - Ford of Germany - Own assemblyE) (Digit 9): Assembly Plant:- B - GenkF) (Digit 10): Model Range:- A - Escort B - SierraH) (Digit 12): Date of Manufacture - Year:- G - 1986 H - 1987 J - 1988  
K - 1989 L - 1990 M - 1991  
N - 1992 P - 1993I) (Digit 13): Date of Manufacture - Month

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1988	B	R	A	G	C	K	D	E	L	Y	S	T
1989	J	U	M	P	B	R	A	G	C	K	D	E
1990	L	Y	S	T	J	U	M	P	B	R	A	G
1991	C	K	D	E	L	Y	S	T	J	U	M	P
1992	B	R	A	G	C	K	D	E	L	Y	S	T
1993	J	U	M	P	B	R	A	G	C	K	D	E

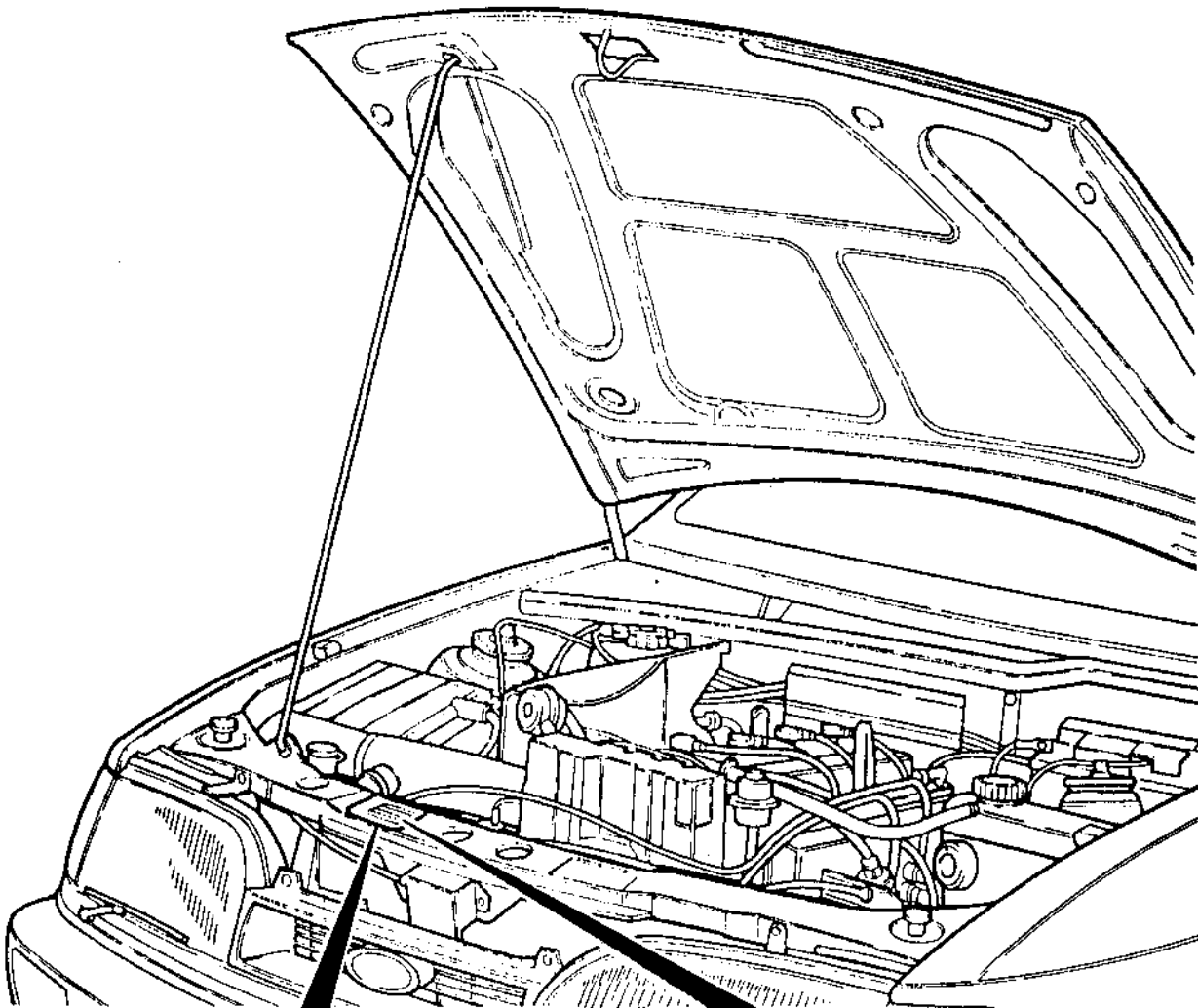
J) (Digit 14 - 18): Vehicle Sequence Number:- Five digits.(Digit 19): Constant asterisk - (\*)(Box 3) GROSS VEHICLE MASS Indicates maximum legal laden mass, in territories where this is required.(Box 4) GROSS TRAIN MASS Indicates the maximum combined mass of vehicle and trailer or caravan.(Box 5) PERMITTED FRONT AXLE LOADING Maximum permissible load on the front wheels of the vehicle.(Box 6) PERMITTED REAR AXLE LOADING Maximum permissible load on the rear wheels of the vehicle.



CODE DEFINITION

Vehicle Identification (VIN) Plate Location

The vehicle identification plate which is rivetted to the front upper cross-member of each vehicle has embossed alpha-numerical codes which are explained on the following page. These codes indicate details of vehicle specifications in respect of type, permissible loading weights, engine, gear ratio, body paint colour, trim within the vehicle etc. They are therefore useful when procuring replacement parts. During production the two-language plate was replaced by a four-language plate. Both versions are shown in Fig.1.



Ford		FORD MOTOR COMPANY LTD			
DRIVE	(7)	(1)			
COND.					
ENGINE	(8)	(2)			
MOTEUR					
		(3)	kg		
TRANS.	(9)	(4)	kg		
TRANS.					
AXLE	(10)	1 - (5)	kg		
PT. AR.					
TRIM	(11)	2 - (6)	kg		
GARN.					
(12)	(13)	(14)	(15)		
TYPE		VERSION	COLOUR	COULEUR	EXH. EMISS.

Ford		FORD MOTOR COMPANY LTD				
LENK. DRIVE	(7)	(1)				
COND.						
MOTOR ENGINE	(8)	(2)				
MOTEUR						
		(3)	kg			
GEAR TRANS	(9)	(4)	kg			
TRANS.						
ACHSE AXLE	(10)	1 - (5)	kg			
EJE PT. AR.						
POLST. TRIM	(11)	2 - (6)	kg			
TAPIC. GARN.						
(12)	(13)	(14)	(15)			
TYP. TIPO. TYPE		VERSION	FARBE	COLOR	COULEUR	EXH. EMISS.

COS-06-02

T

Fig.1 VIN Plate Location (Both two and four-language versions shown - Sierra illustrated).



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## FUEL CONSUMPTION

Legal requirements in certain territories require that, for new passenger cars, official fuel consumption figures are included in service literature intended for presentation to the first purchaser of the vehicle.

A copy of the official fuel consumption figures for Sierra RS Cosworth models is published on page 04-03.

The fuel consumption of each class of car is determined in accordance with specified test procedures and three sets of data are given.

- a) Simulated Urban Driving (ECE 15 cycle, see below for details)
- b) Constant Speed Driving at 90 km/h (56 mph)
- c) Constant Speed Driving at 120 km/h (75 mph)

A passenger car prepared for testing shall have been run-in and driven for at least 3000 km (1875 miles). It shall be clean, have its windows and air intakes closed, have any manually controlled device on the carburettor inlet in the "Summer" position, have in use only the equipment necessary for normal operation, have its heating system or air conditioner system switched off and have any temperature controlled radiator fan or any supercharger in the normal operating condition. The tyres shall be of a type normally fitted and inflated to the manufacturer's recommended pressures.

In addition to the above, the driving weight of the car, the type of fuel used, the lubricants used and the ambient air conditions during the test are controlled by the Regulations.

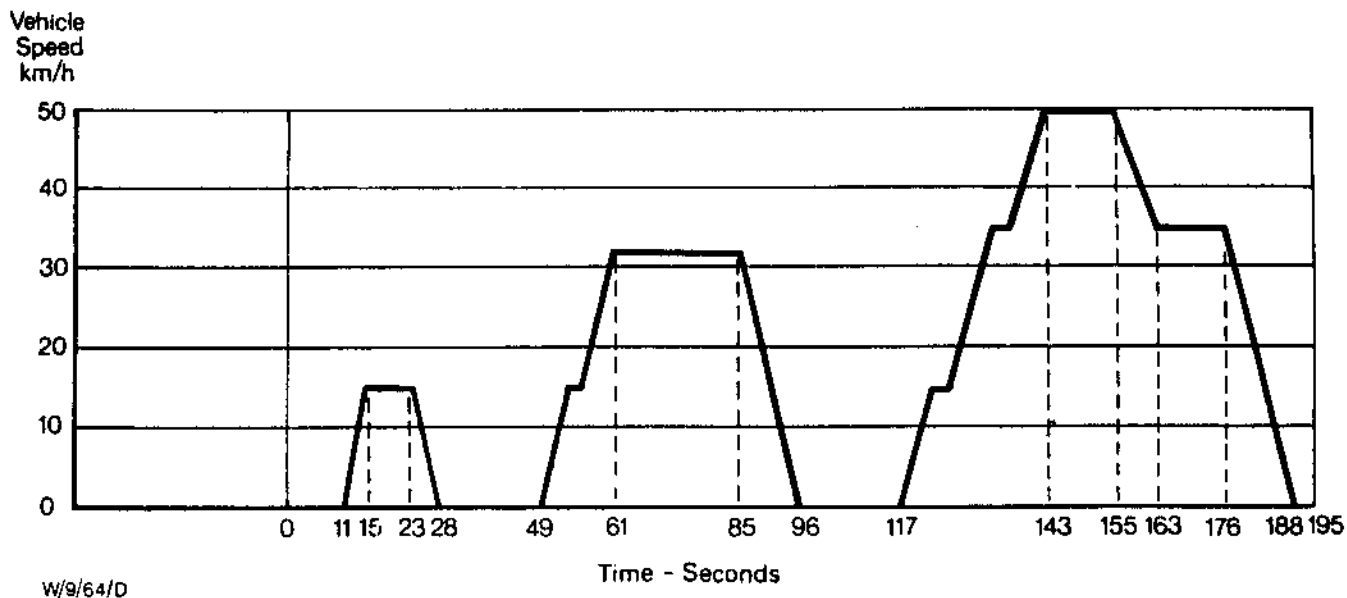
SIMULATED URBAN DRIVING

Fig.1. Simulated Urban Driving (ECE 15 Cycle).

The test cycle shown in Fig.1. can be described as follows:

Idle for 11 seconds, accelerate in 1st gear to 15 km/h (9,4 miles/h) in 4 seconds, maintain this for 8 seconds, decelerate to rest in 5 seconds. Idle for 21 seconds, accelerate to 32 km/h (20 miles/h) in 12 seconds (changing from 1st to 2nd gear at 15 km/h) hold this speed for 24 seconds, decelerate to rest in 11 seconds. Idle for 21 seconds, accelerate to 50 km/h (31,2 miles/h) in 26 seconds (changing from 1st to 2nd gear at 15 km/h and 2nd to 3rd gear at 35 km/h), hold this speed for 12 seconds, decelerate to 35 km/h (21,9 miles/h) in 8 seconds and hold this speed for a further 13 seconds, change to 2nd gear and decelerate to rest in 12 seconds. Idle for a final 7 seconds. This cycle should be carried out five times to ensure that the vehicle is at normal operating temperature. The complete fuel consumption test check comprises six consecutive test cycles, after the engine is at normal operating temperature, carried out without interruption. The total test cycle time is 19,5 minutes, the average speed is 19 km/h (11,9 miles/h) and the distance covered is 6,075 km (3,77 miles).



## OWNER LITERATURE

To comply with the requirements of certain territories, Owner Handbooks contain official fuel consumption figures.

## FUEL CONSUMPTION FIGURES

For reference purposes, the official fuel consumption figures for Sierra RS Cosworth vehicles are provided below. These figures were correct at the time of going to press. The consumption figures are the same for all trim levels of a particular engine variant, except where otherwise stated.

NOTE: All references to 'gallons' are Imperial gallons (1,2 U.S. Gallons).

The results do not express or imply any guarantee of the fuel consumption of any particular car. Individual vehicles are not tested and there are inevitably differences between different cars of the same model. In addition, any car may incorporate particular modifications. Furthermore the driver's style and road and traffic conditions, as well as the extent to which the car has been driven and the standard of maintenance, will all affect its fuel consumption.

MODEL/ ENGINE	BODY STYLE	TRANS- MISSION	FINAL DRIVE	TYRE SIZE	EMISS. LEVEL	FUEL CONSUMPTION					
						Miles per Gallon			Litres per 100 km		
						A	B	C	A	B	C
2,0 Sierra DOHC Turbo	Saloon Hatch.	Man 5-sp	3,64	205/50VRx15	15:04	22,8	38,2	30,1	12,4	7,4	9,4
2,0 Sierra DOHC Turbo	Saloon Notch.	Man 5-sp	3,64	205/50VRx15	15:04	22,1	35,3	27,7	12,8	8,0	10,2
2,0 Sierra DOHC Turbo 4x4	Saloon Notch.	Man 5-sp	3,64	205/50VRx15	15:04	22,1	37,2	30,4	12,8	7,6	9,3
2,0 Sierra DOHC Turbo 4x4	Saloon Notch.	Man 5-sp	3,64	205/50VRx15	83 US	20,8	34,5	28,3	13,6	8,2	10,0
Escort 2,0 DOHC Turbo 4x4	Saloon Hatch.	Man 5-sp	3,64	205/50VRx15	83 US	22,8	33,6	30,1	12,4	8,4	9,4

- A - Simulated Urban Driving (ECE 15 cycle)
- B - Constant Speed Driving at 56 mph (90 km/h)
- C - Constant Speed Driving at 75 mph (120 km/h)



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## HEALTH AND SAFETY PRECAUTIONS

Many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health. This section lists, alphabetically, some of these hazardous operations and the materials and equipment associated with them. The precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures, and the handling of materials, should be carried out with health and safety in mind.

**ACIDS AND ALKALIS** - See also Battery acids.

eg. caustic soda, sulphuric acid.

Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Causes burns.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective gloves and goggles. Can destroy ordinary protective clothing. Do not breathe mists.

Ensure access to water and soap is readily available for use after splashing accidents.

**ADHESIVES AND SEALERS** - See Fire, Chemical materials - General

Highly Flammable, Flammable, Combustible.

Generally should be stored in "No Smoking" areas; cleanliness and tidiness in use should be observed e.g. disposable paper covering benches; should be dispensed from applicators where possible; containers, including secondary containers, should be labelled appropriately.

Solvent based adhesives/sealers - See Solvents

Follow manufacturers instructions.

Water based adhesives/sealers

Those based on polymer emulsions and rubber lattices may contain small amounts of volatile toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

Follow manufacturers instructions.

Hot Melt Adhesives

In the solid state, they are safe. In the molten state they may cause burns, and health hazards may arise from the inhalation of toxic fumes.

Use thermostatically controlled heaters with thermal cut-out, adequate extraction and appropriate protective clothing.

Resin-based adhesives/sealers e.g. epoxide and formaldehyde resin based.

Mixing should only be carried out in well ventilated areas as harmful or toxic volatile chemicals may be released.

Skin contact with uncured resins and hardeners can result in irritation; dermatitis; and absorption of toxic or harmful chemicals through the skin. Splashes can damage the eyes.

Provide adequate ventilation and avoid skin and eye contact. Follow manufacturers instructions.

Anaerobic, cyanoacrylate and other acrylic adhesives.

Many are irritant, sensitizing or harmful to the skin. Some are eye irritants.

Skin and eye contact should be avoided and the manufacturers instructions followed.

Cyanoacrylate adhesives (super-glues) must not contact the skin or eyes. If skin or eye tissue is bonded, cover with a clean moist pad and get medical attention. Do not attempt to pull tissue apart. Use in well ventilated areas as vapours can cause irritation of the nose and eyes.

For two-pack systems see Resin based and isocyanate adhesives/sealers.

Isocyanate (polyurethane) adhesives/sealers  
See Resin based adhesives.

Individuals suffering from asthma or respiratory allergies should not work with or near these materials as sensitivity reactions can occur.

Any spraying should preferably be carried out in exhaust ventilated booths removing vapours and spray droplets from the breathing zone.

Individuals working with spray applications should wear air-fed respirators.

**ANTIFREEZE** - See Fire, Solvents e.g. isopropanol, ethylene glycol, methanol.

Highly Flammable, Flammable, Combustible.

Used in vehicle coolant systems, brake air pressure systems, screenwash solutions.

Vapours may be given off from coolant antifreeze (glycol) when heated. Avoid breathing these vapours.

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze, if swallowed, can be fatal and medical attention should be sought immediately.

These products must not be used in any cooling or industrial water system which is connected or linked to general, food preparation or drinking water supplies.





ARC-WELDING - See Welding.

ASBESTOS - See also Warning Symbols.

Breathing asbestos dust may cause lung damage or, in some cases, cancer.

Used in Brake and Clutch linings, Transmission brake bands and gaskets. Ford original production and replacement items for this model are asbestos free.

The use of drum cleaning units, vacuum cleaning or damp wiping is preferred.

Asbestos dust waste should be dampened, placed in a sealed container and marked to ensure safe disposal. If any cutting or drilling is attempted on materials containing asbestos the items should be dampened and only hand tools or low speed power tools used.

BATTERY ACIDS - See also Acids and Alkalis.

Gases released during charging are explosive. Never use naked flames or allow sparks near charging or recently charged batteries.

Ensure adequate ventilation.

BRAKE AND CLUTCH FLUIDS (polyalkylene glycols) - See Fire

Splashes to the skin and eyes are slightly irritating. Avoid skin and eye contact as far as possible. Inhalation vapour hazards do not arise at ambient temperatures because of the very low vapour pressure.

BRAZING - See Welding.

CHEMICAL MATERIALS - GENERAL - See Legal Aspects

Chemical materials such as solvents, sealers, adhesives, paints, resin foams, battery acids, antifreeze, brake fluids, fuels, oils and grease should always be used with caution and stored and handled with care. They may be toxic, harmful, corrosive, irritant or highly inflammable and give rise to hazardous fumes and dusts.

The effects of excessive exposure to chemicals may be immediate or delayed; briefly experienced or permanent; cumulative; superficial; life threatening; or may reduce life-expectancy.

#### DO'S

Do remove chemical materials from the skin and clothing as soon as practicable after soiling. Change heavily soiled clothing and have it cleaned.

Do carefully read and observe hazard and precaution warnings given on material containers (labels) and in any accompanying leaflets, poster or other instructions. Material health and safety data sheets can be obtained from Manufacturers.

Do organise work practices and protective clothing to avoid soiling of the skin and eyes; breathing vapours/aerosols/dusts/fumes; inadequate container labelling; fire and explosion hazards.

Do wash before job breaks, before eating, smoking, drinking or using toilet facilities when handling chemical materials.

Do keep work areas clean, uncluttered and free of spills.

Do store materials and parts according to national and local regulations.

Do keep chemical materials out of the reach of children.

DO NOTS

Do not mix chemical materials except in accordance with the manufacturers instructions; some chemicals can form other toxic or harmful chemicals; give off toxic or harmful fumes; become explosive, when mixed together.

Do not spray chemical materials, particularly those based on solvents, in confined spaces e.g. when people are inside a vehicle.

Do not apply heat or flame to chemical materials except in accordance with the manufacturers' instructions. Some are highly inflammable and some may release toxic or harmful fumes.

Do not leave containers open. Fumes given off can build up to toxic, harmful or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas, pits etc.

Do not transfer chemical materials to unlabelled containers.

Do not clean hands or clothing with chemicals. Chemicals, particularly solvents and fuels will dry the skin and may cause irritation and dermatitis. Some can be absorbed through the skin in toxic or harmful quantities.

Do not use emptied containers for other materials except when they have been cleaned under supervised conditions.

Do not sniff or smell chemical materials. Brief exposure to high concentrations of fumes can be toxic or harmful.

CHLOROFLUOROCARBONS (CFC)

There is concern in the scientific community that CFC's and Halons are depleting the upper ozone layer which filters out harmful ultraviolet radiation. Decreased filtration of ultraviolet radiation may result in increases in skin cancer, cataracts and immune system suppression in humans, as well as decreased productivity of crops and aquatic systems.

CFC's are used primarily as a refrigerant in vehicle air conditioning systems and as an aerosol propellant. Halons are used as fire extinguishants.

Ford supports worldwide elimination of CFC usage and it is recommended that Company subsidiaries and affiliates should phase out CFC usage as soon as acceptable substitutes are commercially available.

CLUTCH FLUIDS - See Brake and clutch fluids.

CLUTCH LININGS AND PADS - See Asbestos.

CORROSION PROTECTION MATERIALS - See Solvents, Fire.

Highly flammable, flammable

These materials are varied and the manufacturers instructions should be followed. They may contain solvents, resins, petroleum products etc. Skin and eye contact should be avoided. They should only be sprayed in conditions of adequate ventilation and not in confined spaces.

CUTTING - See Welding

DEWAXING - See Solvents and Fuels (Kerosene)

DUSTS

Powder, dusts or clouds may be irritant, harmful or toxic. Avoid breathing dusts from powdery chemical materials or those arising from dry abrasion operations. Wear respiratory protection if ventilation is inadequate.

Fine dusts of combustible material can present an explosion hazard in high concentrations and in the presence of sources of ignition.

ELECTRIC SHOCK

Electric shocks can result from the use of faulty electrical equipment or from the misuse of equipment even in good condition.

Ensure that electrical equipment is maintained in good condition and frequently tested.

Ensure that flexes, cables, plugs and sockets are not frayed, kinked, cut, cracked or otherwise damaged.

Ensure that electric equipment is protected by a fuse of the correct rating.

Never misuse electrical equipment and never use equipment which is in any way faulty. The results could be fatal.

Ensure that the cables of mobile electrical equipment cannot get trapped and damaged, such as in a vehicle hoist.

Use air operated mobile equipment where possible in preference to electrical equipment.

In cases of electrocution:

- switch off electricity before approaching victim

- if this is not possible, push or drag victim from source of electricity using dry non-conductive material

- commence resuscitation if trained to do so

- SUMMON MEDICAL ASSISTANCE

ENGINE OILS - See Lubricants and Greases

**EXHAUSTS**

Acids - See Acids and Alkalis

Catalytic systems may be subject to the build up of a small amount of sulphuric acid inside the converter. Care should be taken when removing converters so that no spillage occurs.

Fumes

These contain asphyxiating, harmful and toxic chemicals and particles such as carbon oxides, nitrogen oxides, aldehydes, lead and aromatic hydrocarbons. Engines should only be run under conditions of adequate extraction or general ventilation and not in confined spaces.

Systems

Catalytic systems operate at extremely high temperatures. Care should be taken when handling these systems by the use of heat resistant gloves.

Gasolene (petrol) engine

There may not be adequate warning properties of odour or irritation before immediate and delayed toxic or harmful effects arise.

Diesel engine

Soot, discomfort and irritation usually give adequate warning of hazardous fume concentrations.

**FIBRE INSULATION** - See Dusts

Used in noise and sound insulation

The fibrous nature of surfaces and cut edges can cause skin irritation. This is usually a physical and not a chemical effect.

Precautions should be taken to avoid excessive skin contact through careful organisation of work practices and the use of gloves.

**FIRE** - See Welding, Foams, Legal Aspects

Many of the materials found on or associated with the repair of vehicles are highly flammable. Some give off toxic or harmful fumes if burnt.

Observe strict fire safety when storing and handling flammable materials or solvents, particularly near electrical equipment or welding processes.

Ensure before using electrical or welding equipment, that there is no fire hazard present.

Have a suitable fire extinguisher available when using welding or heating equipment.

**FIRST AID**

Apart from meeting any legal requirements, it is desirable for someone in the workshop to be trained in first aid procedures.

Splashes in the eye should be flushed carefully with clean water for at least ten minutes.

Soiled skin should be washed with soap and water.

Individuals affected by inhalation of gases, fumes etc. should be removed to fresh air immediately. If effects persist, consult a doctor.

If liquids are swallowed inadvertently, consult a doctor giving him the information on the container or label. Do not induce vomiting unless this action is indicated on the label.

**FLUROELASTOMER** - See 'Viton'.

**FOAMS** - POLYURETHANE - See Fire

Used in sound and noise insulation. Cured foams used in seat and trim cushioning. Closed cell rigid foam used in lower 'A' pillars.

Follow manufacturers instructions

Unreacted components are irritating and may be harmful to the skin and eyes. Wear gloves and goggles.

Individuals with chronic respiratory diseases, asthma, bronchial medical problems, or histories of allergic diseases, should not work with or near uncured materials.

The components, vapours, spray mists can cause direct irritation, sensitivity reactions and may be toxic or harmful.

Vapours and spray mists must not be breathed. These materials must be applied with adequate ventilation and respiratory protection. Do not remove respirator immediately after spraying, wait until vapour/mists have cleared.

Burning of the uncured components and the cured foams can generate toxic and harmful fumes. Smoking, open flames or the use of electrical equipment during foaming operations and until vapours/mists have cleared should not be allowed. Any heat cutting of cured foams or partially cured foams should be conducted with extraction ventilation (see Body Section 44 Legal and Safety aspects).

FUELS - See Fire, Legal Aspects, Chemicals - General, Solvents

Avoid skin contact with fuel where possible. Should contact occur, wash the affected skin with soap and water.

#### Gasolene (petrol)

Highly flammable. Observe "NO SMOKING" signs.

Swallowing can result in mouth and throat irritation and absorption from the stomach can result in drowsiness and unconsciousness. Small amounts can be fatal to children. Aspiration of liquid into the lungs e.g. through vomiting, is a very serious hazard.

Gasolene dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe smarting.

Motor gasolene may contain appreciable quantities of benzene, which is toxic upon inhalation, and the concentration of gasolene vapours must be kept very low. High concentrations will cause eye, nose and throat irritation, nausea, headache, depression and symptoms of drunkenness. Very high concentrations will result in rapid loss of consciousness.

Ensure there is adequate ventilation when handling and using gasolene. Great care must be taken to avoid the serious consequences of inhalation in the event of vapour build up arising from spillages in confined spaces.

Special precautions apply to cleaning and maintenance operations on gasolene storage tanks.

Gasolene should not be used as a cleaning agent. It must not be siphoned by mouth. See First Aid.

#### Kerosene (paraffin)

Used also as heating fuel, solvent and cleaning agent.

Flammable. Observe "NO SMOKING" signs.

Irritation of the mouth and throat may result from swallowing. The main hazard from swallowing arises if liquid aspiration into the lungs occurs. Liquid contact dries the skin and can cause irritation or dermatitis. Splashes in the eye may be slightly irritating.

In normal circumstances, the low volatility does not give rise to harmful vapours. Exposure to mists and vapours from kerosene at elevated temperatures should be avoided (mists may arise in dewaxing). Avoid skin and eye contact and ensure there is adequate ventilation.

#### Gas-oil (Diesel fuel) - See Fuels (Kerosene)

Combustible

Gross or prolonged skin contact with high boiling gas-oils may also cause serious skin disorders including skin cancer.

#### GAS CYLINDERS - See Fire

Gases such as oxygen, acetylene, argon and propane are normally stored in cylinders at pressures of up to 2000 lb/in<sup>2</sup>, (13,790 kn/m<sup>2</sup>) and great care should be taken in handling these cylinders to avoid mechanical damage to them or to the valve gear attached. The contents of each cylinder should be clearly identified by appropriate markings.

Cylinders should be stored in well ventilated enclosures, and protected from ice and snow, or direct sunlight. Fuel gases (e.g. acetylene and propane) should not be stored in close proximity to oxygen cylinders.

Care should be exercised to prevent leaks from gas cylinders and lines, and to avoid sources of ignition.

Only trained personnel should undertake work involving gas cylinders.

#### GASES - See Gas Cylinders

#### GASKETS (Flouroelastner) - See 'Viton'

#### GAS SHIELDED WELDING - See Welding

#### GAS WELDING - See Welding