1.0 Introduction

These operating fluids specifications describe the standards which are necessary for approval and application for BMW automobiles. Operating fluids are arranged in vehicle group category and are approved for all assemblies. Any reference to a particular fluid contained in an active Service Information Bulletin since January 1987 will be listed next to the fluid's part number. Before applying operating fluids, it is important to make sure that the specifications and manufacturing codes on the container conform with those on the enclosed specification list.

Prior to their approval, all operating fluids are tested in detail on test stands, in laboratories, and in cars during field tests. As new information is received, the Operating Fluids Manual will be updated. Some lubricants or fluids may be listed in more than one specific group. For example, Part No. 81 22 1 468 879 (Pentosin CHF7.1 Fluid) is listed under Group 32 (Steering) as well as in Group 37 (Integrated Suspension Systems). BMW Car Care products are listed in Group 99.

BMW of North America has also approved various fluids for use which are not available through the Parts Department, but may be obtained locally. A list of these approved fluids is found on sections 4.0 and 5.0.

Some fluids have been phased out of PDC inventory. Such fluids will be marked by an asterisk (*) after the part number along with the name(s) of alternate supplier(s) and the product name/part number.

A binder containing the Material Safety Data Sheets (MSDS) for BMW NA distributed Chemical Products was sent out with Parts Bulletin 99 05 97. Questions on the use of this information may be directed to the Safety and Health Officer (201-307-3623) or to the Parts Consultant Group (800-272-0202).

2.0 Corrosion Protection For Vehicle In Long-term Storage

Location - inside of a building whenever possible or covered parking lot (especially convertibles).

Replace engine oil and filter after engine reaches operating temperature. Run engine several minutes after replacing oil. Engine oil must be replaced every 12 months. Factory engine oil (in new cars) can remain in the engine up to 12 months.

Check/correct electrolyte level in battery cells.

Disconnect battery ground lead to avoid discharging battery through current draw of electrical equipment. Or, switch off battery main disconnect switch (if equipped).

Recharge battery according to S.I. Bulletin B 61 07 88.

Inspect undercoating for damage and repair as necessary.

Inspect wax coating in engine compartment, on engine, underbody and axles. Repair as necessary.

Operate air conditioner monthly for 10 minutes in order to lubricate the seals and the expansion valve. Note: The air conditioner will only work at temperatures above 37°F/3°C.

Pre-Delivery Cars

Replace brake fluid if car has been parked outdoors longer than six (6) months.

Fill the vehicle fuel tank with fresh fuel in order to prevent condensation inside the tank (applies only to metal fuel tanks).

Check, and if needed, correct the coolant level and concentration of long-term antifreeze and corrosion inhibitor.

Apply brakes to dry the brake discs of any moisture and spray them with a corrosion inhibitor. Spray the complete brake assemblies after parking the car at its final storage location.

Do not apply the parking brake. Brake linings could seize when the parking brake is applied for an extended period of time. Rather, engage first gear (manual transmissions) or “park” position (automatic transmissions) to hold vehicle stationary.

Increase inflation pressure on all road tires to 50 psi.

Thoroughly clean the entire car, including underside, engine and engine compartment.

Exterior Finish

Repair any damage to the paint finish. Wash entire vehicle exterior with BMW Car Wash Shampoo (Part No. 82 14 9 400 129) or equivalent. Polish painted and chrome finishes with Car Polish Cream - 3M Part No. 6055 (former BMW Part No. 82 14 9 400 131) or equivalent.

Polishing the vehicle with abrasive cleaners and/or cleaner waxes may have a detrimental effect on the appearance of the paint. Waxing of Paint Sealer treated vehicles may still be done, but only if non-abrasive cleaners or non-abrasive cleaner-waxes are used.

Wax painted and chrome finishes with BMW Car Wax (Part No. 83 12 9 408 527) or equivalent.

Wax painted and chrome plated parts if storage period is 12 months or longer. Dewax and rewax cars every six (6) months if stored outside.

Check convertible top for damage.

3.0 Conversion Table

Liters	US Gallons	US Pints	Liters	US Gallons	US Pints
0.5	0.132	1.055	8.0	2.112	16.904
1.0	0.264	2.113	9.0	2.376	19.017
2.0	0.538	4.226	10.0	2.640	21.130
3.0	0.792	6.339	11.0	2.904	23.243
4.0	1.056	8.452	12.0	3.168	25.356
5.0	1.320	10.565	13.0	3.432	27.469
6.0	1.584	12.678	14.0	3.696	29.582
7.0	1.848	14.791	15.0	3.960	31.695

Conversion Factors:

Liters in US Gallons x 0.264

US Gallons in Liters x 3.785

Liters in US Pints x 2.113

US Pints in Liters x 0.473

4.0 Alternate Universal Lubricants And Workshop Supplies

BMW P/N	Description/Application	3M P/N	Wűrth P/N	Loctite P/N
81 22 9 400 208*	**Lubricant/Contact Cleaner Spray** Stops electrical and mechanical faults due to water, moisture, rust, dirt and friction. Colorless, neutral, free of grease and silicone, suitable for all applications. Examples: Stops moisture on distributor, generator, ignition coil, starter, spark plugs, coils, relays, contacts, etc. Prevents metal parts from corroding. Stops rubber and plastic parts from aging prematurely. Applications: from -50°C to +150°C.		**89360/1**	**24379**
81 22 9 400 229*	**Hand Cleaner** Removes stubborn stains and grit without attacking skin. Contains special skin protectant. Does not clog pipes.		**893900**	**25108**
81 22 9 400 720*	**Molybdenum Disulfide (MOS_2) Spray** Loosens rust, eliminates squeaking and similar noises, prevent rust seizure. Displaces water on ignition components to allow quick starting. Insulates electrical systems against moisture and stops corrosion.	**8876**		**24378**
81 22 9 407 138*	**Stain Remover** Removes tar, oil and grease stains from seat covers, leather upholstery and painted plastic components.		**89024**	
81 22 9 407 174*	**Bearing Grease** A water repellent high-pressure grease for lubricating flywheel gear rings, starter motor pinions, etc., and also as an acid-proof grease for battery terminal posts.		**893530**	
81 22 9 407 301*	**Loctite 574** Anaerobic, silicone sealant for aluminum flange surfaces. Provides instant sealing when flanges are assembled.		**893574**	**24018**
81 22 9 407 388*	**Adhesive Remover** Removes all residual or excess adhesive, sealing and coating compounds, wax, grease or oil films from painted and plastic surfaces, i.e. before installing front or rear spoilers and décor strips.	**8984**		
81 22 9 407 394*	**Loctite 380** Black cyanacrylate adhesive for joining metals, rubber, PVC.	**8155**	**893 4103**	**38050**
81 22 9 407 524*	**Contact Cement** Powerful adhesive for leather and leatherette, rubber moldings, seats, rubber mats, noise-absorbent materials, etc. Has good heat resistance and does not attack paint. See S.I. Bulletins B 54 02 95 and B 54 01 93 (3754).	**1357HP**		
81 22 9 407 629*	**High-Adhesion Lubricant** Long-life high-adhesion lubricant for clutch and brake linkages, spring struts, stabilizers, idler levers and pivots.	**8878**		**20029**
81 22 9 407 711*	**Universal Lube Spray** Colorless lubricant with high lubricant content. Eliminates squeaks and grating noises from spring seat bases. Lubricates door stops and locks, seat adjustment mechanism, etc. Resistant to	**8878**	**893106**	**20029**

temperatures between -50°C and 120°C.

***These items are no longer available through BMW NA Parts Department.**

The above alternate suppliers can be contacted below:

3M 19460 Victor Parkway Livonia, MI 48152 (800) 521-8180	Wűrth USA, Inc. 93 Grant Street Ramsey, NJ 07446 (800) 526-5228	Kem Krest, Inc. (Loctite) 1919 Superior Street Elkhart, IN 46515 (800) 285-5917

5.0 Approved Operating Fluids Sources

Group	Description, S.I. Bulletin	Product Name, Source	Telephone
11	Engine Oil, SAE 5W-50	"Syntec FSX" Castrol Inc., Piscataway, NJ	732-980-9100
11	Oxygen Sensor Lubricant	Bostik "Never-Seez" NSBT-16 Bostik Findley, Middleton, MA	888-603-8558
11	Intake & Vacuum System Leak Detector S.I. Bulletin B 11 03 92 (3500)	"LiquiMoly (Lubro Moly) Motor Lecksucher" 2021 W.A.W.D.	800-477-9293
11	Cold Weld Epoxy	"J-B Weld" J-B Weld Company, Sulphur Springs, TX	903-885-7696
13	Loctite 290 Throttle Housing Fasteners S.I. Bulletin B 13 06 91 (3440)	"Loctite 290" Kem Krest, Inc., Elkhart, IN	800-285-5917
18	Copper Paste Exhaust System Joints S.I. Bulletin B 18 03 89 (1954)	"8945" 3M Automotive Trades Division, Livonia, MI	800-521-8180
23	Synthetic Transmission Fluid	"Mobil SHC 630" Mobil Oil Corporation	800-582-3645
34	Brake Component Lubricant S.I. Bulletins B 34 02 94 & B 34 05 98	Bostik "Never-Seez" NSBT-16 Bostik Findley, Middleton, MA	888-603-8558
36	Loctite 638 (green) Affix wheel hub covers	"Loctite 680" Kem Krest, Inc., Elkhart, IN	800-285-5917
36	Loctite Cleaner 755 Loctite 242 M5 Wheel Covers S.I. Bulletin B 36 03 90 (3182)	"Loctite Cleaning Solvent 755" "Loctite 242" Kem Krest, Inc., Elkhart, IN	800-285-5917
41	Structural Adhesive S.I. Bulletin B 41 01 95 (4150)	"DP420 Epoxy Adhesive with 3M EPX Applicator" 3M Industrial Tapes and Specialties Division, Livonia, MI	800-521-8180
54	Renax GL1	"Poliplex #1" Fuchs Lubricants Corp., Harvey, IL	800-323-7755
61	Rubberized Super Glue	"893 4103" Wűrth USA, Inc., Ramsey, NJ	800-526-5228
62	Contact Cleaner Spray IC Acoustic Transmitter S.I. Bulletin B 62 04 92 (3539)	"CRC QD Contact Cleaner Spray 5101" CRC Industries, Warminster, PA	800-272-8963
63	Silicone Gasket Material Turn Signals	"Permatex Form-A-Gasket 6B-80627" Kem Krest, Inc., Elkhart, IN	800-285-5917

	S.I. Bulletin B 63 05 91 (3313)		
64	AC System Disinfectant S.I. Bulletin B 64 08 91 (3373)	“Airguard” J.J. Products, Inc., East Orange, NJ	800-654-2356
		“Airsept” The Auto Doctor, Tucker, GA	404-662-6778
64	AC System Treatment	“893540-U” Wűrth USA, Inc., Ramsey, NJ	800-526-5228

Group	**Description, S.I. Bulletin**	**Product Name, Source**	**Telephone**
97	Brushable Seam Sealer Seals spot-welded, riveted, or bolted seams and joints. Brushable consistency remains flexible. Retains brush marks appearance.	“8901021” Wűrth USA, Inc., Ramsey, NJ	800-526-5228
97	Body Seal, Beige Underbody Seal, Black Permanent, flexible protection against stone chipping damage. Fast drying and paintable.	“0892091 U” “0893075 U” Wűrth USA, Inc., Ramsey, NJ	800-526-5228
97	Seam Sealer, Grey Fast drying, paintable, silicone-free sealant for special spray gun application.	“0893228 U” Wűrth USA, Inc., Ramsey, NJ	800-526-5228
99	Paint Cleaner	“Machine Cleaner 1” and “Hi-Tech Cleaner 2” Meguiar’s Inc., Irvine, CA	800-854-8073
99	Machine Glaze	“Mirror Glaze 3” Meguiar’s Inc., Irvine, CA	800-854-8073
99	Paint Sealer	“Sealer and Reseal Glaze 7” Meguiar’s Inc., Irvine, CA	800-854-8073
99	Paint Swirl Remover	“Hi-Tech Swirl Remover 9” Meguiar’s Inc., Irvine, CA	800-854-8073
99	Paint Carnauba Paste Wax	“Hi-Tech Yellow Wax 26” Meguiar’s Inc., Irvine, CA	800-854-8073

1.0 General Information

The specified engine oil is extremely important for the operation and service life of an engine.

Engine oil requirements will depend on the engine design, operating conditions, oil change intervals and, in the case of diesel engines, the fuel grade.

A modern engine oil provides more than just a lubrication function. The following qualities are required:

Good Wear Protection and Friction Reduction

Frictional losses will lead to a reduction of engine power and efficiency. An approved engine oil will minimize frictional losses. Excessive wear will lead to a reduction in service life (e.g. wear of bearings, piston rings, cam lobes) or to mechanical failure.

Limited Tendency to Produce Combustion Residue

During engine operation, a limited amount of oil enters the combustion chamber, where it is burned. Combustion residues or deposits, which build up in the combustion chamber, lead to unwanted increases in compression and promote surface ignition (“pinging”). Any approved engine oil will help prevent such a condition.

Favorable Viscosity Temperature Behavior

Viscosity is the tendency of oil to resist flowing. Engine oil, when cold, should be thin enough so that the engine can be cranked over. Hot oil should be thick enough to maintain proper lubrication.

Anti-Foaming

The oil is forcefully mixed with air during engine operation. Heavy foaming will lead to impaired lubrication and reduction in oil flow rate. To prevent foaming, antifoaming additives are mixed with the oil.

Good Corrosion Inhibition

The engine oil must prevent corrosion on engine components under all circumstances. Corrosion and rust inhibitors are added to displace water and acids from metal surfaces so that oil coats them.

Mixing Ability/Compatibility

It must be possible to mix all engine oils with each other, even synthetic with mineral oils, without causing any incompatibility problems. A further requirement is the compatibility with all materials contacted by oil, in particular oil seals, hoses and paint.

Good Thermal Conductivity/Good Cooling Property

Engine oil makes an important contribution to the cooling of an engine. It must transfer heat from friction surfaces, and combustion heat away from affected areas. The oil absorbed heat is carried back to the oil pan where it is transferred to the surrounding air.

Good Dispersant/Detergent Qualities

To limit or slow down the formation of combustion deposits and acidic components, together with abrasive particles and dirt from the intake air, good engine oils contain a detergent additive. Deposits of carbon and dirt are loosened and suspended in the oil, being drained away at the next oil change.

Oxidation Inhibitors and Aging Stability

Oxidation can be described as the oxygen absorption of hydrocarbons formed in the oil. The results of oxidation have a negative impact on viscosity causing corrosion on certain metals and the formation of sludge. Inhibitors are added to prevent oxidation from occurring. A good engine oil must maintain its stability during the required oil change intervals.

Good Lubricating Oil Must:
1. Lubricate moving parts to minimize wear.
2. Lubricate moving parts to minimize loss from friction.
3. Remove heat from engine parts by acting as a cooling agent.
4. Absorb shocks between bearings and other engine parts, reducing engine noise and extending engine life.
5. Form a good seal between piston rings and cylinder walls.
6. Act as a cleaning agent.

2.0 Grading Of Oils

Viscosity Number

A method of classifying an oil by number, based on its resistance to flow at a high temperature.
These numbers are usually prefixed by SAE which is the abbreviation for the Society of Automotive Engineers.
A lower SAE Number (i.e. SAE 5W) indicates a thinner oil with a higher flow rate, for use at lower temperatures.
A higher SAE Number (i.e. SAE 30) indicates a thicker oil with a slower flow rate, for use at higher temperatures.

Multigrade Oils

A multigrade, or multiviscosity oil has the qualities of a lower number oil at low temperatures and those of a higher number oil at high temperatures. Multigrade oils have numbers such as SAE 5W- 30 and SAE 10W-40. For reliable engine performance in all temperature ranges mineral based engine oil viscosity must be matched to the temperature range at which the vehicle will be operated.

Single Grade Oils

A single grade viscosity oil has a limited temperature/viscosity range compared with multigrade oils. Due to the limited temperature/viscosity range of these oils they are no longer used in BMW engines and thus no longer listed in the BMW Engine Oil Temperature/Viscosity Table.

Oil Classifications

A method of classifying oil was jointly developed by the SAE, API (American Petroleum Institute), and ASTM (American Society for Testing and Materials). Engine oils are rated according to two engine use categories:
C = Compression Ignition (i.e. CC)

Compression Ignition (C) oils are those that are used for diesel engines. The current service ratings for diesel-engine lubricating oils are: CA, CB, CC, CD, CE, CF and CG. The oils differ in their properties and in the additives they contain.
S = Spark Ignition (i.e. SE)

Spark Ignition (S**)** oils are those that are used for gasoline engines. The current service ratings for gasoline-engine lubricating oils are: SA, SB, SC, SD, SE, SF, SG, SH and SJ. These oils differ in their properties and in the additives they contain.

Another method of classifying minimum performance standards for gasoline-fueled engine oils has been developed through ILSAC (International Lubrication Standardization Approval Committee). Oils that meet ILSAC GF-1 performance standards must have a “starburst” certification mark displayed on the print of the oil product packaging.

3.0 Engine Oil Requirements and Specifications

Approved Engine Oils

— For BMW gasoline engines with two valves per cylinder, all reputable multiple grade engine oils* which meet or exceed the API classification of SH. (Combination with diesel oil specifications CD or CE quality classifications are also permitted, e.g. SH/CE etc.)

For BMW gasoline engines with four valves per cylinder, only reputable multiple grade engine oils* which meet or exceed the API classification of SH. (Combination with diesel oil specifications CD or CE quality classifications are also permitted, e.g. SH/CE etc.)

— For BMW turbocharged diesel engines, all reputable multiple grade engine oils* which meet or exceed the API classification CD/CE.

*Engine oil may be mineral or synthetic based.

Special Oils category has been replaced by BMW **High Performance Synthetic** Engine Oil (5W-30). It eliminates the need for seasonal oil changes since it covers all ambient temperature ranges.

BMW of North America has introduced a line of exclusively formulated High Performance Engine Oils which exceed existing international quality specifications (SAE/CCMC) for motor oils. BMW part numbers are:

SAE 5W-30 (SJ/CF) BMW High Performance Synthetic Oil	1 quart	Part No. 07 51 0 017 866
SAE 15W-40 (SJ/CF) BMW High Performance Mineral Oil	1 quart	Part No. 07 51 0 017 868

Motorsport Engines
E46 M3 / S54E36 M roadster, M coupe / S54 from start of production
E90 M3 / S65 M3 from start of production
E92 M3 / S65 M3 from start of production
E93 M3 / S65 M3 from start of production
E39 M5 / S62 Up to 3/2000
E52 Z8 / S62 Up to 3/2000

E60 M5 / S85 From start of production
E63 M6 From start of production
E64 M6 From start of production
E85 Z4 M Coupe / Z4 M Roadster From start of production
BMW High Performance Synthetic Oil Castrol RS SAE 10W-60 also called Castrol TWS Motorsport SAE 10W-60 Synthetic Oil Part No. 07 51 0 009 420 (1quart)

E39 M5 / S62 From 3/2000
E52 Z8 / S62 From 3/2000
BMW High Performance Synthetic Oil SAE 5W-30 Part No. 07 51 0 017 866 Or BMW High Performance Synthetic Oil Castrol RS SAE 10W-60 also called Castrol TWS Motorsport SAE 10W-60 Synthetic Oil Part No. 07 51 0 009 420 (1quart)

BMW High Performance Synthetic Oil 5W-30 and 10W-60 offer several benefits over conventional mineral based oils.

Superior thermal stability

The synthetic based oil resists thickening at very low ambient temperatures providing improved flow, lubrication and less internal engine resistance during cold starts.

Under high heat conditions, the oil resists thermal breakdown/shearing which causes a loss of lubrication quality compared with conventional oils.

Superior lubrication throughout the life of the oil

Compared to conventional engine oils, BMW High Performance Synthetic Oil is better able to keep engine combustion contaminants in suspension and is less susceptible to the harmful effects of oxidation.

The oil resists sludge buildup thus allowing extended oil change intervals. Synthetic based oils also have a lower volatility which makes them less susceptible to evaporation thereby reducing oil consumption.

This oil has been durability tested on BMW engines and supplies superior lubrication under all operating conditions and over the extended BMW oil change intervals.

4.0 Engine Oil Change Intervals

With the introduction of the 1999 Model Year vehicles BMW has introduced an extended oil change interval of approximately 15,000 miles (depending on engine operating conditions) on most models.

To coincide with the increased oil change interval, BMW has also introduced “BMW High Performance Synthetic Oil” which must be used on all 1999 Model Year vehicles (except E36 318ti, 323is/iC, 328is/iC, M3, M Roadster and M Coupe models) whenever a service is necessary to avoid engine damage.

Note: Only if it is necessary to top up the engine oil between oil changes is it permissible to use synthetic low viscosity engine oils which conform to the API classification SJ or higher.

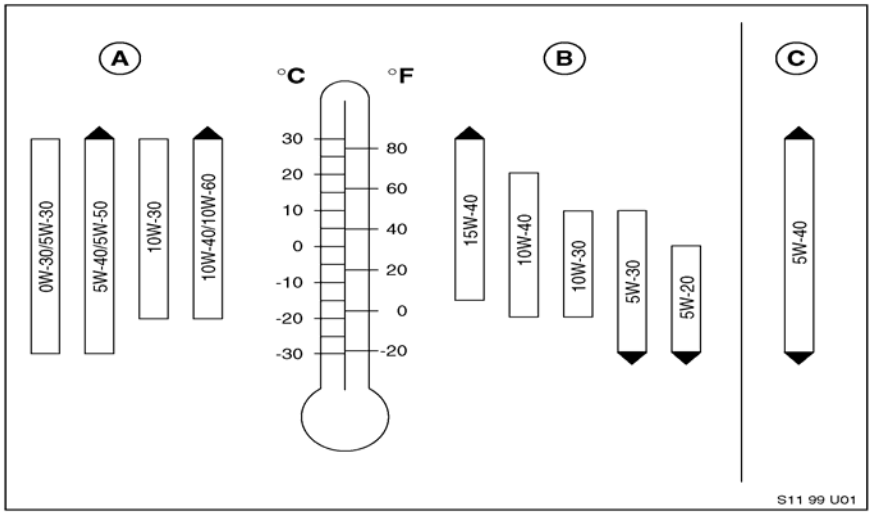
A label in the engine compartment states the oil specifications and refers to the BMW website (www.bmwusa.com) and toll free number (1-800-831-1117) for additional information.

BMW High Performance Synthetic Engine Oil may also be used on Model Year 1999 E36 (3-Series and M models) as well has Model Year 1998 and earlier BMW models.

The oil change intervals should not be extended due to the greater durability of a fully synthetic engine oil. The engine oil and filter should always be changed as per the vehicle's Service Interval Indicator when the "Oil Service" or the "Inspection" display appears regardless of the type of oil being used.

BMW mineral-based High Performance engine oil is also offered for model year 1998 and earlier BMW models. However, for reliable engine performance in all temperature ranges mineral-based engine oil viscosity must be matched to the temperature range at which the vehicle will be operated. See Engine Oil Temperature/Viscosity Table below.

BMW Engine Oil Temperature/Viscosity Table



A/B: Brand name oils approved per API or ACEA (CCMC)

A = Diesel engines

B = Spark-ignition engines

C: BMW High Performance Synthetic Oil

C = Valid for spark-ignition and diesel engines

Other Oil Changes For Cars Without Service Indicator:

Model Year(s)	**Mileage**
1980 and later	7,500
1975 thru 1979	6,500
1974 or earlier	4,000

Including oil filter. However, at least twice annually, preferably before and after the winter season.

Under severe driving conditions it is recommended to increase the number of oil services.

5.0 Condition Based Service

Models: E82, E88, E90, E91, E92, E93, E60, E61, E63, E64 E65, E66, E70, E71

Condition Based Service measures, monitors, and determines the required maintenance of several service items independent from each other. This technology prompts the customer to bring the vehicle for service whenever one of the CBS items requires maintenance or replacement. CBS strikes a compromise between too frequent maintenance and too rigid service intervals that call for the replacement of service items which may still have substantial remaining useful life. CBS also details the recommended, due, and overdue required maintenance during and after the BMW Vehicle Maintenance Program Agreement. Thus, CBS allows BMW customers to experience a technology that makes service more convenient, transparent and structured.

Refer to applicable New Vehicle Preparation and Maintenance Requirements Service Information Bulleting in TIS.

6.0 Engine Oil Additives

The use of engine oil additives is not recommended and not necessary on BMW engines. Instead, it is mandatory to use BMW High Performance Synthetic Oil in 1999 model year and later BMW models and recommended to use either BMW High Performance Synthetic Oil, BMW High Performance Mineral Oil or one of today's highly advanced brand name lubricating oils conforming to API classification SH or higher in 1998 and earlier BMW models.

7.0 Break-In Instructions

During the break-in period of a new engine or parts of a reconditioned engine (new bearings, crankshaft, pistons, etc.) BMW engines do not require special break-in oils.

All of the multiple grade engine oils can be used, as long as they conform with BMW specifications.

8.0 N52, N52KP and N54 Front and Rear Radial Seal Sealant

When replacing the front or rear radial crankshaft seals on new generation 6 cylinder engines, a special Loctite® sealant must be applied to fill the seal grooves at the bedplate seam. Follow the appropriate repair instruction in TIS:

RA 11 14 005 – Front radial crankshaft seal replacement

RA 11 14 151 – Replacing crankshaft radial seal (rear)

All special tools required to perform these repairs have been sent out through the automatic tool shipment program and are listed in S.I. Bulletin 04 01 06.

Required Materials:

P/N 83 19 7 536 051 - Loctite® 128357 sealant compound\

P/N 83 19 7 515 683 - Loctite® 171000 primer

P/N 83 19 7 515 684 - Stamp

9.0 Engine Oil Applied to Engine Exhaust Studs

Refer to S.I. Bulletin B 11 02 91 (3219).

10.0 Lubricant For Oxygen Sensor

Apply Bostik NEVER-SEEZ® (Part No. NSBT-16) to threads of oxygen sensor.

11.0 Oil Consumption

All engines normally consume a certain amount of oil. This is necessary in order to properly lubricate the cylinder walls, pistons, piston rings etc. In addition, engines with less than 6,000 miles will generally consume additional oil because the components are not fully seated. Therefore, oil consumption complaints received prior to 6,000 miles cannot be considered.

Once a new or rebuilt engine has accumulated 6,000 miles this procedure should be used if there is a drastic change in the oil consumption rate (i.e. the oil consumption rate triples) under similar driving conditions or if the oil consumption rate exceeds 1 qt. per 750 miles at any time. Refer to S.I. Bulletin B 11 05 84 (888).

All Motorsport Engines:

Due to their increased output and maximum engine speeds, these engines are allowed a maximum consumption of 2.5 quarts per 1,000 miles.

12.0 References

See S.I. Bulletin B 11 04 00 for Engine Oil Level Check.

See S.I. Bulletin B 11 08 98 for BMW Engine Oils.

See S.I. Bulletin B 11 11 90 for BMW Engine Oil Capacities.

13.0 Operating Fluids Table and Alternate Suppliers

BMW Part Number	Description / Application	3M	Würth	Loctite	CRC
11 12 1 262 571*	**Silicone Sealant**	**8661**		**80050/PX66BR**	
81 12 9 400 086*	**Hylogrip/Loctite 270 Thread Sealant** Secures and seals bolts, studs, nuts, threaded inserts, screw plugs against impact and vibration. Fastens ball, roller and sliding bearings onto shafts or in housings, with play up to 0.25mm. Quick setting. Oil filter flange bolt – See S.I. Bulletin B 11 02 87.		**8932700**	**21438**	
81 22 9 400 243*	**Sealer** Low viscosity, non-hardening, removeable. For sealing off against mineral oils, grease, gases, air and many chemicals. Application: from -40°C to approx. 200 °C. Tacking cylinder gasket – See S.I. Bulletin B 11 02 88.			**Permatex 3D Aviation Form a Gasket 80017**	
81 22 9 400 339	**Hylomar SQ32M Sealant** Universal sealing compound, applicable by brush. For sealing interfaces between surfaces that require excellent temperature resistance and sealing elasticity. Material: Polyester-urethane mixture.				
81 22 9 407 394*	**Loctite 380 Epoxy Cement** Black cyanacrylate adhesive for joining metals, rubber, PVC. See S.I. Bulletin B 11 06 89.	**8155**	**8934103**	**38050**	

***These items are no longer available through BMW NA Parts Department.**

BMW Part Number	Description / Application	3M	Würth	Loctite	CRC
81 22 9 400 794*	**Copper Paste** Multi-purpose grease for all detachable joints at high temperatures and corrosive conditions, also after long operating periods. Able to withstand high pressures, protection against	**8945**			**3046010**

	undesired weld contact, seizure and corrosion, active adhesion properties, effective as lubricant and separator up to 1100 °C. Applications: parts subject to high temperatures, such as bolts and flanges on exhaust system, engine, disk brakes, etc.				
81 22 9 407 439*	**Silicone Sealer**	**8670**		**81157/PX16B**	
07 58 9 062 376*	A black colored silicone-based sealant for large areas. Resists temperatures up to 250 °C. For engine or gearbox; particularly suitable for sealing the timing case on M70 engine, and eliminating oil seepage from E36 M42 cylinder head. See S.I. Bulletins B 11 07 90, B 11 02 88, B 11 09 93.	**8661**		**80050/PX66BR**	
81 22 9 407 760*	Engine Cleaner Spray Fast acting cleaner for dirty engines and engine parts. Does not attack painted, rubber, or plastic parts.	**8899**	**890923**	**80043**	**14045**
N/A	**Lubro Moly Lecksucher** Intake and vacuum system leak detector. See S.I. Bulletin B 11 03 92.				
N/A	**J-B Weld** Repairs pitting in cylinder head sealing surfaces. See S.I. Bulletin B 11 10 93.				
N/A	**Bostik Never-Seez** Thread lubricant for oxygen sensors.				

***These items are no longer available through BMW NA Parts Department.**

1.0 Fuels for Gasoline Engines

Use only unleaded gasoline in vehicles equipped with a catalytic converter.

Fuels containing **up to and including 10%** of ethanol or other oxygenates with up to 2.8% oxygen by weight, that is, 15% MTBE (methyl tertiary butyl ether) or 3% methanol plus an equivalent amount of co-solvent, **will not void** the applicable warranties with respect to defects in materials or workmanship.

Although, usage of such alcohol fuel blends may result in drivability, starting, and stalling problems due to reduced volatility and lower energy content of the fuel. Those drivability problems may be especially evident under certain environmental conditions, such as: high or low ambient temperatures and high altitude.

Only specially adapted vehicles (FFV - Flexible Fuel Vehicles) can run on high alcohol fuel blends. BMW, for the various technical and environmental reasons explained below, does not offer FFV models.

Usage of E85, or any other high alcohol content blend (e.g. E30) in BMW vehicles, will cause various drivability complaints (cold start problems, stalling, reduced performance, poor fuel economy, etc.), may cause excessive emissions, and may cause irreversible damage to engine, emission control and fuel delivery systems due to incompatibility of materials with alcohols.

General Notes Regarding E85 Fuel.

E85 fuel contains 85% (by volume) of ethanol and 15% of gasoline. Ethanol can be produced chemically from ethylene or biologically from grains, agricultural wastes, or any organic material containing starch or sugar. In the US, ethanol is mainly produced from corn and is classified as a renewable fuel.

Similar to gasoline, ethanol contains hydrogen and carbon; with additional oxygen molecules build into its chemical chain. This chemical structure makes ethanol's burning process slightly cleaner compared to the gasoline (lower tailpipe emissions).

On the other hand, due to lower carbon content, ethanol provides 27% less energy (for identical volume) then gasoline, resulting in the reduced fuel economy of E85 vehicles (approximately 22% higher consumption). Increased fuel consumption requires the appropriately enlarged fuel tank capacities (usually 30% increase), and the specific DME calibrations for the E85 lower Stoichiometric air/fuel ratio (10 compared to 14.7 for gasoline engines).

E85 fuel volatility is typically lower then gasoline (RVP 6-10 psi, compared to 8-15 psi for gasoline). Lower fuel volatility will reduce vehicle evaporative emissions, but it may cause cold starting problems especially with lower ambient temperatures.

Under certain environmental conditions, mainly lower ambient temperatures, ethanol separates from gasoline/alcohol mixture and absorbs water. The ethanol absorbed water molecules are heavier then gasoline or ethanol, they remain at the bottom of fuel tank and when introduced into combustion process they tend to form an extremely lean mixture resulting in misfire, rough idle and cold starting problems.

Certain materials, commonly used with gasoline are totally incompatible with alcohols. When these materials come in contact with ethanol, they may dissolve in the fuel, which may damage engine components and may result in poor vehicle drivability.

Some metals (e.g. zinc, brass, lead, aluminum) become degraded by long exposure to ethanol fuel blends. Also, some nonmetallic materials used in automotive industry such as: natural rubber, polyurethane, cork gasket material, leather, polyvinyl chloride (PVC), polyamides, methyl-methacrylate plastics, and certain thermo & thermoset plastics degrade when in contact with fuel ethanol.

In order to safely and effectively operate a motor vehicle running on E85, the vehicle must be compatible with alcohol use. Some manufacturers have developed vehicles called FFV (Flexible Fuel Vehicle) that can operate on any blend of ethanol and gasoline (from 0% ethanol and 100% gasoline, up to 85% ethanol and 15% gasoline). Ethanol FFVs are similar to gasoline vehicles, with main differences in materials used in fuel management and delivery systems, and DME control module calibrations. In some cases, also E85 vehicles require special lubricating oils.

Aftermarket conversions of gasoline-powered vehicles to ethanol-fueled vehicles, although possible, are not recommended due to internal materials and DME software incompatibility, as well, as the high costs of conversion.

TOP TIER Detergent Gasoline

Deposit-control additives have been required by the EPA in all gasoline from 1995, however, since the introduction of the lowest additive concentration (LAC) most gasoline manufacturers have actually reduced the concentration level of detergent additives by up to 50%.

Low content of cleaning additives results in an excessive accumulation of deposits on fuel injectors, the intake valves, the exhaust manifold or inside the combustion chamber. Due to deposits build-up, customers may experience various drivability problems (e.g. cold start problems, rough idle), increased emissions with Service Engine Soon light illumination, reduced engine performance and poor fuel economy.

In order to increase the level of detergent additives in gasoline, the TOP TIER Detergent Gasoline requirements were approved by four automotive companies (BMW, GM, Honda and Toyota).
Usage of the TOP TIER Gasoline will help keep engines cleaner, and will reduce deposits-related concerns.

A number of gasoline retailers have already met the TOP TIER Detergent Gasoline requirements and are offering this product in all octane grades in all of their respective marketing areas. The current TOP TIER Gasoline retailers are: QuickTrip®, ChevronTexaco®; ConocoPhillips®; 76®; Shell®; Entec Stations®; MFA Oil Company®; Kwik Trip®/Kwik Star®; The Somerset Refinery, Inc.®; Aloha Petroleum®; Jiffy Mart®; Mahalo®; Trip-Par Oil Company®. All gasoline outlets carrying the brand of the approved retailer must conform to TOP TIER requirements on products advertised as such.

BMW recommends using TOP TIER Detergent Gasoline of minimum octane rating of AKI 91 and with alcohol content of less then 10% by volume (or any other oxygenates with up to 2.8% of oxygen by weight). Only the exclusive usage of TOP TIER Gasoline provides the full benefit of reducing deposits build-up. BMW customers may find more information related to TOP TIER Gasoline on the official website http://www.toptiergas.com.

Alcohol Detection Procedure

Fuel Blends containing a high percentage (10%and above) of alcohol, mainly ethanol, are becoming more commercially available. Usage of E85, or any other high alcohol content blend (e.g. E30) in BMW vehicles, will cause various drivability complaints (cold start problems, stalling, reduced performance, poor fuel economy, etc.), may cause excessive emissions, and may cause irreversible damage to engine, emission control and fuel delivery systems due to incompatibility of materials with alcohols. Refer to SI B13 01 06 Alcohol Fuel Blends in BMW Vehicles for complete details.
In order to correctly diagnose various drivability complaints caused by fuel blends with a high level of ethanol content, BMW is providing you with an alcohol detection test tool.
Distribution of the following tool will be through the Automatic Tool Shipment Program. Additional tools may be purchased through your PDC. All prices on this bulletin are introductory prices and are only valid during the Automatic Tool Shipment.

Procedure
Safety Precautions:
Gasoline is highly flammable; observe normal precautions for working with flammable liquids. Perform all tests away from any source of ignition. A class B fire extinguisher must be available. Wear protective eye protection with side shields and

Nitrile rubber gloves for handling syringe. Please adhere to any applicable OSHA regulations when handling Gasoline. Dispose of the mixture according to local, state and federal regulations.

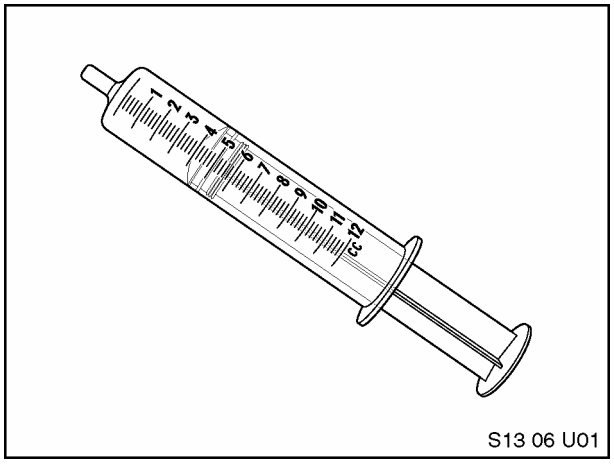
Fill a clean container with gasoline drawn from the fuel system of the affected vehicle then fill another container with water. Only a small amount of fuel is needed to perform the test (5 ounces of each fluid).
Slowly draw 3cc of water into the syringe. Note: To remove air, draw at least 5cc to 6cc of water, invert the syringe and squirt the water out until the top rim of the rubber plunger is at the 3cc mark.
Slowly draw gasoline into the syringe until the fluid reaches the 12cc mark.
Place your finger over the tip of the syringe, vigorously shake the syringe for one minute. Relieve built-up pressure by occasionally removing your finger.
Place the syringe on a flat surface with the nozzle pointing up, allow the syringe to stand for one minute.
If alcohol is present in the fuel, it will separate from the gasoline and dissolve in the water. This water/alcohol mixture will be in the lower part of the syringe. Record the reading at the boundary of the two liquids, refer to the table below to determine the percentage of alcohol in the fuel.

Empty the syringe and rinse thoroughly with water, allow drying and apply a silicone lubricant to the rubber plunger before storing.

Boundary Line	% Alcohol	Boundary Line	% Alcohol
9.0cc	0%	5.0cc	45%
8.6cc	5%	4.5cc	55%
8.1cc	10%	4.1cc	60%
7.7cc	15%	3.6cc	65%
7.2cc	20%	3.2cc	70%
6.8cc	25%	2.7cc	75%
6.3cc	30%	2.3cc	80%
5.9cc	35%	1.8cc	85%
5.4cc	40%	1.4cc	90%

Warranty Information

Components damage/malfunctions, or any drivability problems caused by use of fuels containing more then 10% ethanol (or other oxygenates with more then 2.8% oxygen by weight) will not be covered under BMW warranties with respect to defects in materials or workmanship. Please document the results found on the vehicle repair order whenever performing this test



Alcohol Detection Test Tool
Order PN 83 30 0 420 667

Anti-knock Properties

The anti-knock value is the quality rating for gasoline and is a requirement for controlled combustion. Anti-knock value is expressed with an octane number. A higher number indicates better anti-knock properties of a gasoline. Internationally approved methods are used to determine the Research Octane Number (RON) and the Motor Octane Number (MON). In the United States the Anti-Knock Index (AKI) is displayed at the gas pumps.

$$AKI = \frac{RON + MON}{2}$$

Boiling Range and Vapor Pressure

Gasolines must be highly volatile. The boiling range and vapor pressure values are used for evaluation. Gasolines do not have a boiling “point”, but rather a boiling “line”, since they are produced from a mixture of various hydrocarbon components.
The boiling line (boiling range) and therefore vapor pressure have influence on, for example,

- vapor lock
- starting behavior
- evaporation loss
- transition and driving behavior
- engine oil dilution
- perfect combustion

The boiling range is different for summer and winter gasolines. The vapor pressure test is another means of determining the behavior of a gasoline.

Specific Gravity

The specific gravity is determined by gasoline components. The volume changes with the temperature. Due to the different compositions there are different values for premium grade and regular grade gasolines.

Calorific Value

The calorific value expresses the power content of a gasoline. The calorific value of a combustible fuel/air mixture is of prime importance for the power output of engines.

Purity, Combustion Deposits

Gasolines must be free of contamination. Pumps, jets, injectors, valves and lines must not be clogged or plugged up. Residue and deposits in the intake system and combustion chamber will impair engine operation. The solid residue from evaporation of gasoline provides information on the degree of contamination.

Sulfur Content

The sulfur content of all gasolines should be as low as possible. In this manner there will be less sulfuric acids or sulfur acids in the combustion residue, which would lead to corrosion and sulfuric emissions on an engine running without reaching operating temperature.

1.1 Minimum Octane and AKI Ratings for Gasoline Engines

Up to 2005 model year

	Leaded Gasoline	
	Premium Grade	**Regular Grade**
RON (Research Octane No.)		at least 91.0
MON (Motor Octane No.)		at least 82.7
AKI*	at least 93.0	at least 87.0

	Unleaded Gasoline		
	Premium Grade	**Mid-Range**	**Grade Regular Grade**
RON	at least 98.0	at least 95.0	at least 91.0
MON	at least 88.0	at least 85.0	at least 82.5
AKI*	at least 93.0	at least 90.0	at least 87.0

*Anti-Knock Index $AKI = \frac{RON + MON}{2}$

1.2 Summary of Fuel Grade Requirements

Engine	Vehicle	Model	Model Year	Unleaded Gasoline Regular (AKI at least 87.0)	Unleaded Gasoline Premium (AKI at least 93.0)
M10	E30	318i	'84-'85	X	
M20	E30	325e/es	'85-'88	X	
	E30	325i/iX	thru '91	X	
	E30	325iC	thru '93	X	
	E28	528e	thru '88	X	
	E34	525i	'89-'90	X	
M30	E28	535i	'85-'88	X	
	E34	535i	thru '93	X	
	E24	635CSi, L6	thru '89	X	
	E23	735i/iL, L7	thru '87	X	
	E32	735i/iL	thru '92	X	
M42	E30	318i/is/iC	'91-'92		X
	E36	318i/is/iC/ti	thru '95		X
M44	E36	318i, Z3	'96-'98		X
	E36	318is/iC	'96-'97		X
	E36	318ti	'96-'99		X
M50	E36	325i/is	'92		X
	E34	525i/iT	'91-'92		X
M50TU	E36	325i/is	'93-'95		X
	E36	325iC	'94-'95		X
	E34	525i/iT	'93-'95		X

Engine	Vehicle	Model	Model Year	Unleaded Gasoline Regular (AKI at least 87.0)	Unleaded Gasoline Premium (AKI at least 93.0)
M52	E36	323is/iC	'98-'99		X
	E36	328i	'96-'98		X
	E36	328is/iC	'96-'99		X
	E36	Z3	'97-'98		X
	E39	528i	'97-'98		X
M52TU	E46	323i, 328i	'99-'00		X
	E46	323Ci, 328Ci	'00		X
	E36	Z3 2.3/2.8	'99-'00		X
	E39	528i/iT	'99-'00		X
N52	E60	525i, 530i	'05- present		X
	E61	525xiT, 530xiT	'05- present		X
	E90	325i, 330i	'05-present		X
M54	E36	Z3	'01-'03		X
	E46	325i/Ci/CiCiT	'01- present		X
	E46	325xi/xiT	'01- present		X
	E46	330i/Ci/CiC	'01- present		X
	E46	330xi	'01- present		X
	E39	525i/iT	'01- present		X

	E39	530i	’01- present		X
	E53	X5 3.0i	‘01- present		X
	E60	525i, 530i	’03- present		X
	E83	X3	’04- present		X
	E85	Z4	’03- present		X
M60	E34	530i/iT, 540i	‘94-’95		X
	E32	740i/iL	‘93-’94		X
	E38	740i/iL	‘95		X
	E31	840Ci	‘94-’95		X
M62	E39	540i	‘97-’03		X
	E39	540iT	‘99-’03		X
	E38	740i/iL	‘96-’01		X
	E31	840Ci	‘96-’97		X
	E53	X5	’00-‘03		X
N62	E53	X5	’04-‘05		X
	E60	545i	’03-‘05		X
	E63	645Ci	‘04-‘05		X
	E64	645CiC	’04-‘05		X
	E65	745i	’02-‘05		X
	E66	745Li	’02-‘05		X
N62TU	E53	X5	’05- present		X
	E60	550i	’03- present		X
	E63	650Ci	‘04- present		X
	E65	750i	’05- present		X
	E66	750Li	’05- present		X
M70	E32	750iL	‘88-’94	X	
	E31	850i/Ci	‘91-’94	X	
M73	E38	750iL	‘95-’01		X
	E31	850Ci	‘95-’97		X
N73	E66	760Li	’04- present		X
S14	E30	M3	‘88-’91		X
S38	E24	M6	‘87-’88		X
	E28	M5	‘88		X
	E34	M5	‘91-’93		X
S50	E36	M3	‘95		X
S52	E36	M3	‘96-’99		X
	E36	MZ3	‘98-’00		X
S54	E36	MZ3	’01-’02		X
	E46	M3	’01-’02		X
S62	E39	M5	’00-‘03		X
	E52	Z8	’00- present		X
S70	E31	850CSi	‘94-’95		X

2.0 Fuel System Cleaner Plus

Recent field experiences have shown a significant increase in various drivability complaints due to excessive carbon deposits in engine’s combustion chambers, on the intake valves and fuel injectors.

The overall rise in carbon deposits accumulation is generally attributed to poor gasoline quality, namely, low level of cleaning additives and fuel contamination.

TECHNICAL BACKGROUND

Combustion chamber deposit formation is a by-product of the gasoline burning process. Fuel injector and intake valve deposits may become less troublesome with the recently introduced Top Tier Detergent Gasoline deposit control standards, which are exceeding the detergent requirements imposed by the EPA since 1995.

However, vehicles that do not exclusively use a Top Tier Detergent Gasoline, or are regularly driven in severe service conditions, such as stop-and-go traffic, high ambient temperatures, and high altitude can experience performance problems caused by intake system and combustion chamber deposits.

The most common customer complaints may include:

FUEL INJECTORS
Deposits at the injector's tip can impact fuel flow, upsetting the air/fuel mixture ratio.

Symptoms: Hesitation or stumble during acceleration, even loss of power. Poor fuel efficiency. Increased emissions of HC and CO. "Service Engine Soon" light illumination due to intermittent misfire faults, or lean mixture adaptation values

INTAKE VALVES:
Deposits at the valves and on the intake manifold ports can absorb fuel during the warm-up phase, leaning out the air/fuel mixture ratio. Carbon build-up may disturb mixture flow at low throttle conditions/idle speeds.

Symptoms: Poor drivability, loss of power, unstable/rough idle, increased emissions of HC, CO and NOx. "Service Engine Soon" light illumination due to intermittent misfire faults.

COMBUSTION CHAMBER:
Combustion Chamber Deposit Interference, or CCDI, occurs when there is a contact between carbon deposits on the piston crown and cylinder head. The noise can be confused or misdiagnosed as ping, knock or other noises that could indicate a mechanical failure. CCDI occurs first as a cold start noise that can fade as the engine warms to operating temperature. The noise will reoccur at the next cold start. As deposits build, there is an increase in compression temperature that may cause pre-ignition detonations.

Symptoms: Knocking, pinging, run-on, poor acceleration, octane requirement increase, increased emissions of NOx, engine idle speed surges.

Depending on the manufacturer, fuels may contain various additives such as: oxidation and corrosion inhibitors, metal deactivators, emulsifiers, anti-icing agents & dyes, plus they are required to include some form of an intake system deposit control package. Unfortunately, not all fuels are created equal, and some additive packages are not effective enough to maintain integrity of the intake systems in high performance engines, or engines operating in severe environmental conditions. Even worse, the intake system deposit control additives in some fuels may actually contribute to the combustion chamber deposits accumulation, and to the problems associated with those deposits: knock, run-on and increased emissions of oxides of nitrogen.

RECOMMENDATION

BMW recommends using TOP TIER Detergent Gasoline of minimum octane rating of AKI 91 and with alcohol content of less then 10% by volume (or any other oxygenates with up to 2.8% of oxygen by weight). Only the exclusive usage of TOP TIER Detergent Gasoline provides the full benefit of reducing deposits formation. For more information related to TOP TIER Gasoline refer to SI B13 02 06.

If the TOP TIER Detergent Gasoline is unavailable, we recommend BMW Group Fuel System Cleaner Plus (PN 82 14 0 413 341) be added to the gas tank. For optimum cleaning and deposits control, add a 20 fl. oz. bottle every 3,000 miles when refueling.

Regular use of BMW Group Fuel System Cleaner Plus can help address carbon deposits related symptoms listed above. By removing these deposits, an engine may experience restored power, performance and fuel efficiency, a smoother idle running, lower emissions, and reduced octane requirement.

BMW Group Fuel System Cleaner Plus uses polyether amine TECHRON® based technology developed and patented by Chevron. BMW Group Fuel System Cleaner Plus has proven to clean up deposits in fuel injectors, ports & intake valves and reduces the harmful effects of combustion chamber deposits. It helps restore performance lost due to deposit build-up.

Chevron and BMW have run an extensive “no harm” tests with polyether amine technology. When used as directed, it will not harm catalytic converters, oxygen sensors, or any other mechanical components of the engine, or fuel delivery system.

The effectiveness of the additive depends on its presence in the gasoline in large concentrations for short periods of time. One treatment is usually sufficient, but a second treatment (one 20 oz bottle per each, consecutive full tank of gas) may give additional benefits. To keep your fuel intake system clean, we recommend usage at every 3000 miles.

Additionally, vehicle’s fuel sending units equipped with silver plated resistor card/contacts are especially vulnerable to attacks by elemental sulfur and/or hydrogen sulfide found in fuels. Adding BMW Group Fuel System Cleaner Plus immediately upon noticing erratic fuel gauge behavior may, in many cases, restore proper performance due to the additive’s ability to remove the harmful sulfur compounds from the sending unit’s contact surface. Additionally, BMW Group Fuel System Cleaner Plus can help protect the fuel gauge from future malfunctioning by coating all metal surfaces of the fuel system.

BMW Group Fuel System Cleaner Plus.
PN 82 14 0 413 341,
1 bottle, 20 fl. oz.
Ordering in multiples of 6 bottles per case.

WARRANTY INFORMATION

Because carbon deposit build-up is related to fuel quality, it cannot be considered as a defect in vehicle’s materials or workmanship. Consequently, usage of BMW Group Fuel System Cleaner Plus is not covered under the terms of the BMW New Vehicle Limited Warranty or maintenance plan.

3.0 Fuels for Diesel Engines

Diesel fuel is obtained from distilled crude oil. The distilling process is highly complicated, involving precise control of temperatures and pressures. The diesel fuel quality will vary depending on the refining process and the crude oil source.

BMW of North America recommends using automotive diesel Fuel No. 2 with a minimum cetane rating of 45 for use in the BMW 524td. Never use other fuels such as marine fuel or heating oil, since these fuels do not have the appropriate additives or cetane values.

The cetane number is a measure of the fuel’s ignition quality, which influences both the ease of starting and combustion stability.

A high cetane number diesel fuel promotes spontaneous burning of the fuel, which is beneficial in a diesel.

Factors which are important qualities of diesel fuel are the Cloud Point (the temperature at which wax forms in diesel fuel) and the Pour Point (the temperature at which fuel stops flowing). These qualities become very important during low temperature operation. As the temperature drops, wax can sometimes form in the fuel tank, fuel lines and/or fuel filter. If this occurs, the fuel supply lines will become clogged and resulting hard starting and rough running problems.

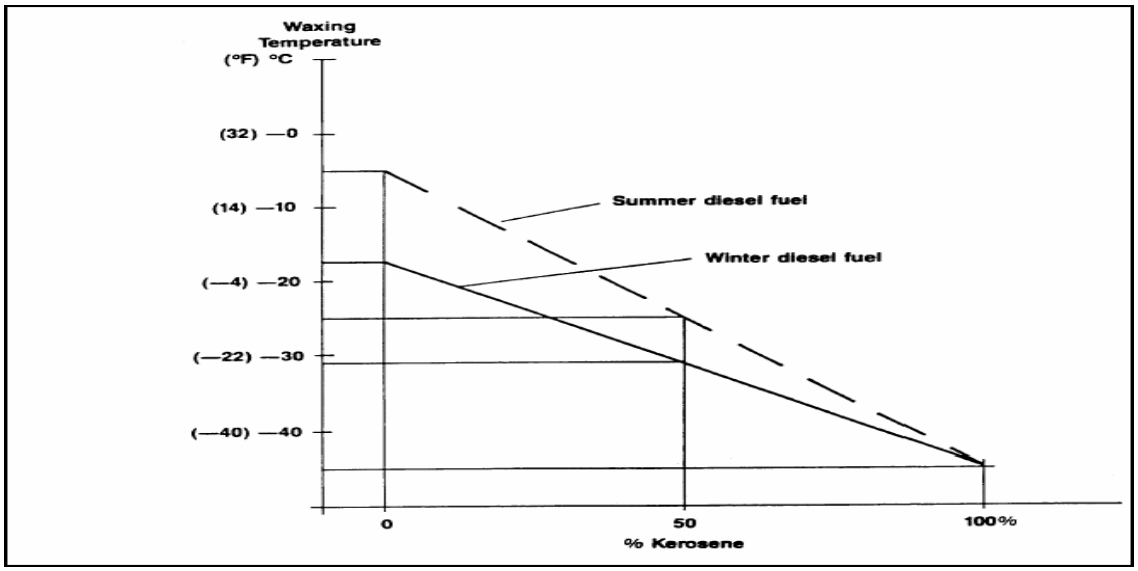
Temperatures below 20°F (-7°C) are critical to the formation of wax crystals. The following guidelines should solve any cold weather problems which may arise:

Note: BMW 524td's are equipped with an integral fuel heater, pre-delivery fuel pump, large capacity fuel filter/water separator, and block heater for cold weather operation which should be sufficient for all but the most extreme cold weather.

If outside temperature is above 20°F (-7°C):
*Use Diesel Fuel No. 2

If outside temperature is below 20°F (-7°C):

- Diesel Fuel No. 1, if available, should be used.
- Customers should ask if diesel fuel is winterized.
- Diesel Fuel Flow Improver can be added to diesel fuel No. 2 to lower the Cloud Point of the fuel.
  Note: (1) 100 ml can of additive will treat 1 tank full of diesel fuel; additional quantities will not lower the Cloud Point any further.
  Diesel Fuel Flow Improver - Würth Part No. 893532 (former BMW Part No. 81 22 9 407 289)
- Diesel Fuel No. 2 can be mixed with kerosene in the proportions shown on the graph. Engine performance will be reduced with more than a 50% mixture of kerosene.



* Significant improvement in operation can be achieved by using a combination of both kerosene and the diesel fuel flow improver since the kerosene lowers the point at which the wax formation occurs and the additive modifies the structure of the wax crystals for better flow.

4.0 Other Fluids

The throttle housing studs are to be coated with Loctite 290 on 1991-92 E30 with M42 engine.
See S.I. Bulletin B 13 06 91 (3440).

The throttle body assembly of M42 engines in E36 vehicles produced from 1/94-6/94 are to be lubricated with Optimoly Paste TA Spray, BMW Part No. 83 23 1 468 932.
See S.I. Bulletin B 13 03 94 (4042).

1.0 General Information On Long-Term Antifreeze And Corrosion Inhibitors

The cooling system of BMW cars must only be filled with reputable brand name ethylene glycol long-term antifreeze having corrosion inhibitors that are compatible with aluminum radiators.

Coolants must fulfill four basic requirements.

— Guarantee sufficient cooling.

— Protect various metals (gray cast iron, steel, aluminum alloys, brass, copper and solder) against corrosion.

— Prevent excessive silicate gel precipitation, which may cause clogging of the cooling system.

— Guarantee operation of cooling system in winter (prevent freezing of coolant) and in summer by boosting the boiling point.

The quality or grade of a long-term antifreeze and corrosion inhibitor is very important to be able to protect metal (gray cast iron, steel, aluminum alloys, brass, copper and solder) in the cooling system against corrosion. It guarantees full operation of the cooling system in winter and also increases the boiling point at high outside temperatures and under heavy loads.

Initial Filling in Factory

The factory fills the cooling system for protection against freezing, for the U.S. and Canada, down to -34°F (-37°C). This means an antifreeze ratio of 50% antifreeze and 50% water. In severely cold areas, the antifreeze can be increased to 60% which provides freezing protection down to -62°F (-52°C). Do not exceed a 60% ratio of antifreeze.
The specified antifreeze ratio is important, since an insufficient amount would impair antifreezing and corrosion inhibiting protection. An excessive amount would not improve freezing protection, but instead reduce freezing protection.

Change Intervals

Regular checking of coolant concentration is part of Inspection I or II. Refer to applicable Model Year Service Maintenance Checklist for change intervals.

Long-Term Coolant

The BMW engine coolant has a long-term rating, except when the cooling system requires repairs. This coolant does not require a service interval if no repairs are made to the vehicles cooling system. Drained coolant is not to be re-used. Top up with new coolant.

Remarks and Limitations

Only tap water of drinking quality with the following properties may be used as coolant.

Appearance	—	colorless, clear
Residue	—	without suspended matter
pH value	—	6.5 - 8.0
Total hardness	—	max. 357 PPM Calcium Carbonate
Chloride content	—	max. 100 mg/l
Sulfate content	—	max. 100 mg/l

The antifreeze concentration in a cooling system should be checked before the beginning of winter. When determining the mixture concentration it is important to make sure that there is sufficient protection against freezing.

A hydrometer (radiator antifreeze tester) is required for correct determination of antifreeze concentration. The composition of long-term antifreezes and corrosion inhibitors differs between manufacturers.

BMW Anti-Freeze/Coolant contains no nitrites or phosphates and has been formulated to prevent excessive silicate drop-out. Order the 1gallon container under BMW Part No. 82 14 1 467 704.

Note: Do not mix BMW Anti-Freeze/Coolant with different antifreezes which contain nitrites and/or phosphates and a high silicate formulation.

2.0 Coolant Additives

No aftermarket coolant additives, including but not limited to those which provide additional corrosion inhibition or seal off minor leaks are approved by BMW.

Use of non-approved coolant additives may cause reduced heat transfer from the cylinder head to the coolant and the formation of hot spots. This can cause the burning through of cylinder head gaskets and/or cracking of the cylinder head.

BMW NA cannot accept the liability for the resulting effects and consequential damage caused by the use of coolant additives.

1.0 General Information

Detachable joints such as exhaust manifold bolts and exhaust system flange connections can be treated with a grease able to withstand high temperatures and corrosive conditions.

Use Copper Paste (former BMW Part No. 81 22 9 400 794).

3M	Part No. 8945
CRC	Part No. 3046010

See S.I. Bulletin B 18 03 89 (1954).

Operating Fluids

Group 21 Clutch

February 2007

Technical Service

1.0 General Information

Brake fluid is used as an operating fluid for hydraulic clutch operation.

Refer to Group 34 - Brakes - for complete details about brake fluid.
See S.I. Bulletin 21 01 93 (3789) of 5/93.

2.0 SMG: Sequential Manual Gear Box

All models SMG Hydraulic Unit require the use of Pentosin CHF 11S fluid.

3.0 Other Operating Fluids

Clutch Component Grease

Use UNIREX S2 (replaces Klueber Microlube GL 261) for the lubrication of splines on the transmission input shaft, lubricating groove of the clutch release bearing, piston rod sleeve, clutch master cylinder and front push rod of the clutch slave cylinder.

UNIREX S2 Grease BMW Part No. 83 23 9 416 138
See S.I. Bulletin 23 01 99 of 2/99.

As of 11/93 the clutch release bearings are available as a replacement part which have plastic sliding sleeves instead of aluminum. Such updated bearings should not be lubricated at all. This applies to all models with manual transmission except for 8 Series models.
See S.I. Bulletin 21 01 94 (3953) of 1/94.

1.0 General Information on Gear Lubricants

Gear lubricants for manual transmissions must conform to the following requirements due to the different transmission designs with considerable variation in loads, temperature and speeds.

The qualities of a recommended gear lubricant are:

A. Load carrying capacity, i.e. high-pressure resistance.

B. Noise reduction.

C. Non-corrosive to various metals.

D. Non-foaming.

E. Non-separation of additives at operating temperatures.

F. Non-sludge forming.

G. Prevention of swelling, hardening and shrinking of seals.

These properties are already provided in manual transmission oil by:

— High-pressure additives.

— Corrosion inhibitors.

— Oxidation inhibitors (inhibitors which limit or prevent chemical reactions).

— Anti-foaming agents.

2.0 Oil Additives

BMW manual transmissions are designed so that they do not require aftermarket oil additives.

BMW disapproves the use of any oil additives and cannot accept the liability for any consequential damage that results from using oil additives.

3.0 Manual Transmission Oil Requirements and Specifications

A. All reputable brand mineral-based transmission oils of viscosity class SAE 80 according to specifications MIL-L-2105 or API GL-4 (**no label** on transmission bell housing).

B. Synthetic transmission fluid, Mobil SHC 630 (325e/528e without dual mass flywheel, produced before mid-1986). Manual transmissions which are filled with Mobil SHC 630 synthetic gear lube have a **green label** with the words "Special Oil" located next to the oil filter plug.

Note: Mobil SHC 630 is available in 5-gallon pails or 55-gallon drums from:

Mobil Oil Corporation - Contact your local Mobil oil distributor (see Yellow Pages) or call 1-800-582-3645.

Filling BMW transmissions with unapproved synthetic gear lubes could cause the following damage:

— Premature synchromesh ring wear
— Reduced service life of bearings
— Tooth profile damage
— Faster wear of selector forks
— Damage to radial shaft oil seals

Transmission gear clashing will eventually result.

Note: Do not use synthetic fluid Mobil SHC 630 in other vehicles. The transmission synchronizers of cars other than listed above are not compatible with synthetic fluid and premature wear will result.

Note: To reduce the physical effort required to change gear at low ambient temperatures, the following oils can be used in the transmission during the winter:

— Single-grade HD mineral engine oils SAE40, SAE30, SAE20
— In countries where the ambient temperatures are particularly low, ATF oils can also be used.

This has the disadvantage that the transmission tends to rattle or knock while in neutral at higher temperatures.

CAUTION! These transmissions must never be filled with synthetic engine oils or multigrade engine oils, since these oils contain coefficient of friction-reducing agents that can adversely affect operation of the synchromesh mechanism.

C. Automatic Transmission Fluid (ATF) of Dexron® II or Dexron® III formulation on any of the following:

— Dual mass flywheel
— Direct drive fifth gear as of 9/90
— Six-speeds

Manual transmissions which are filled with ATF have 17mm external hex plugs in the filler and drain openings as well as an **orange label** on the transmission bell housing next to the filler plug.

D. From model year 1998 (9/97 production) all manual transmissions are filled with Esso/Exxon "MTF-LT-1" long-term fluid.
A **yellow label** with the letters "MTF-LT-1" is located next to the oil filler plug.

No oil change is required for the entire service life of these transmissions.

In the event of a repair, the transmission must only be filled with the long-term oil.
Esso/Exxon MTF-LT-1
BMW P/N 83 22 9 408 942.

E. From model year 2004 some manual transmissions are filled with Castrol “MTF-LT-2” long-term fluid. This fluid has the same properties as the “MTF-LT-1” fluid indicated above in section D. The “MTF-LT-1” fluid may be mixed and/or substituted for the “MTF-LT-2” manual transmission fluid.

2006 MY and later E60 M5 and E63/64 M6 equipped with and without SMG utilizes only MTF-LT-2 fluid.

2006 MY and later E85 M Roadster and Coupe require MTF-LT-2 fluid.

2008 MY and later E90, E92 and E93 M3 require MTF-LT-2 fluid for conventional manual transmissions. This fluid is not to be used in the Dual-Clutch Manual Transmission (M DCT Drive logic). Refer to Operating Fluids, Group 28 for the Dual-Clutch Manual Transmission ((M DCT Drive logic) recommended lubricant.

MTF-LT-2 Fluid
BMW P/N 83 22 0 309 031

F. From Model Year 2006 all vehicles equipped with a manual transmission and the N52 engine require the MTF-LT-3 long-term fluid.

N52 equipped vehicles:
- E60 from 3/2005 production
- E85 from 9/2005 production
- E86 from 1/2006 production
- E90/91 from 3/2005 production
- E92/93 from 7/2006 production
- E83 from 9/2006 production
- E82 from 3/2008 production
- E88 from 3/2008 production

MTF-LT-3
BMW P/N 83 22 0 409 878

No oil change is required for the entire service life of these transmissions.

Manual Transmission Cold Shift Effort

Note: The following information does not apply to transmissions filled with long-term fluid.

Transmission cold shift effort is reduced by replacing the original oil (SAE 80 or Mobil SHC 630) with a reputable brand single-grade HD engine mineral oil of API-SE standards (SAE 20, SAE 30, or SAE 40). Thinner oils will run the risk of increased gear noise.

A further reduction in shift effort can be obtained by using ATF, but gear noise will be more noticeable compared to single-grade engine mineral oils.

For summer operation it is recommended that ATF or engine oil be drained and replaced by the original lubricant, either SAE 80 or Mobil SHC 630 (as specified) transmission fluid.

CAUTION: Never fill a manual transmission with synthetic engine oils or multigrade mineral-based engine oils, since they have friction-reducing components that could impair the function of the synchronizers.

4.0 Transmission Oil Change Interval

Refer to Service Maintenance checklists for the respective model year.

Starting with 1998 models all manual transmissions are filled with long-term fluid and require no fluid changes for the life of the vehicle.

5.0 SMG: Sequential Manual Gear Box

All models SMG Hydraulic Unit require the use of Pentosin CHF 11S fluid.

1.0 General Information On Automatic Transmission Fluids

Automatic Transmission Fluid was developed especially for automatic transmissions. It requires additives which arecarefully matched with each other, a high viscosity index and a solidification point below -40°F/-40°C.

Friction behavior of Automatic Transmission Fluid in plate-type clutches under very different operating conditions is extremely important. Other important factors are:

— Wear protection
— Oil film shear resistance
— Adhesive property
— Oxidation resistance
— Corrosion inhibition
— Sludge prevention
— Temperature-dependent viscosity changes
— Compatibility with sealing materials.

2.0 Oil Additives

Automatic transmissions are designed so that oil additives are not necessary. BMW disapproves the use of any oil additives and cannot accept the liability for any consequential damage which results from using oil additives.

3.0 Approved Automatic Transmission Fluids For Initial Fillings and Correcting Fluid Levels

3.1 GM Transmissions

USE OF ANY OTHER OIL WILL CAUSE A NON WARRANTABLE TRANSMISSION FAILURE

***Transmission identification plate can be utilized to determine proper transmission fitted in vehicle**

A4S 270R (THM-R1W)

E36
318i/is/iC/ti from 1996 to 1999 production
323i/is/iC from 1998 to 1999 production

328i/is/iC from 1996 to 1998 production
Z3 1.9 from 1996 to 1999 production
Z3 2.3/2.8 from 1997 to 2000 production

All reputable brand name Automatic Transmission Fluids of the Dexron® III formulation.

E39
528i/iT from1997-1999 production

All reputable brand name Automatic Transmission Fluids of the Dexron® III formulation.

A4S 310R (THM-R1)

E34
525i from 1990 to 1995 production

All reputable brand name Automatic Transmission Fluids of the Dexron® III formulation.

E36
318i/is/iC/ti from 1992 to 1995 production
325i/is/iC from 1992 to 1995 production

All reputable brand name Automatic Transmission Fluids of the Dexron® III formulation.

A5S 360R (GM5)

E46
323i/Ci/Cic from 6/98 to 3/00 production
323iT from 1//00 to 3/01 to production
328i/Ci/Cic from 6/98 to 3/01 production

The transmission oil pan will be labeled with either Texaco ETL – 7045 or Dexron® III, please fill or top off with the proper fluid only. Do not mix Texaco ETL – 7045 and Dexron® III fluids.
See S.I. Bulletin B 24 01 98.

A5S 390R (GM 5)

E46
330xi from 6/00 production to present
325xiT from 9/00 production to present

E53
X5 3.0 from 8/03 production to present

E83
X3 2.5, 3.0 from 8/03 production to present

The transmission oil pan will be labeled with either Texaco ETL – 7045 or Dexron® III, please fill or top off with the proper fluid only. Do not mix Texaco ETL – 7045 and Dexron® III fluids.
See S.I. Bulletin B 24 01 98.

E85
Z4 3.0 from 9/02 production to present
Z4 2.5 from 9/02 production to present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 71141, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

GA6L45R (GM6)

DEXRON-VI Automatic Transmission Fluid

E82
128i from 12/07 production to present

E83
X3 LCI from 9/06 production to present

E88
128i from 12/07 production to present

E90
328Xi from 9/06 production to present

E91
328Xi from 9/06 production to present

The fluid can be sourced locally until a BMW PN is available. If the fluid cannot be sourced locally contact your Regional Technical Specialist via PuMA

3.2 ZF Transmissions

USE OF ANY OTHER OIL WILL CAUSE A NON WARRANTABLE TRANSMISSION FAILURE

***Transmission identification plate can be utilized to determine proper transmission fitted in vehicle**

ZF 3HP22, 4HP22, 4HP24

Utilizes Castrol TQ or Texaco Havoline Automatic Transmission Fluids of the Dexron® III formulation. Never mix any other oil with this transmission fluid when doing repairs or topping up.

A5S 310Z (5HP18)

E36
M3 from 1995 to 1999 production

Utilizes a lifetime filling of synthetic transmission fluid, ESSO LT 71141, no subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 71141, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E34
530i/iT from 1993 through 1995 production

Utilizes Castrol TQ or Texaco Havoline Automatic Transmission Fluids of the Dexron® III formulation. Never mix any other oil with this transmission fluid when doing repairs or topping up.

A5S325Z (5HP19)

E46
323i/Ci/Cic from 3/00 to 8/00 production
325iT from 4/01production to present
330i/Ci/Cic from 6/00 production to present
325i/Ci/Cic from 9/00 production to present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.

ESSO LT 71141, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E39
525i/iT from 3/01 production to present
530i from 3/01 production to present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 71141, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

A5S 440Z (5HP24)

E31
840Ci from 9/96 to the present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 71141, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E38
740i/iL from 1/97 production to present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 71141, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E39
540i/iT from 1/97 production to present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 711 41, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.
E53
X5 4.4i from 9/99 production to present
X5 4.6i from 9/01 production to present

No subsequent transmission fluid changes are necessary. Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 711 41, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

A5S 560Z (5HP30)

E31
840Ci equipped with M60 engine

Utilizes a lifetime fill of transmission fluid, no subsequent oil changes are necessary on this transmission. If transmission fluid is required for repair purposes, use only the oil approved for this transmission. It is not permitted to mix this oil with other grades of transmission fluid.
Shell LA 2634, BMW Part No. 83 22 9 407 765.
See S.I. Bulletin B 24 01 98.

E31
840Ci equipped with M62 engine
850Ci equipped with M73 Engine

Utilizes lifetime fill of transmission fluid, no subsequent transmission fluid changes are necessary.

Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 711 41, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E32
740i/iL from 1993 through 1994 production

Utilizes a lifetime fill of transmission fluid, no subsequent oil changes are necessary on this transmission. If transmission fluid is required for repair purposes, use only the oil approved for this transmission. It is not permitted to mix this oil with other grades of transmission fluid.
Shell LA 2634, BMW Part No. 83 22 9 407 765.
See S.I. Bulletin B 24 01 98.

E34
540i/iT from 1993 through 1995 production

Utilizes a lifetime fill of transmission fluid, no subsequent oil changes are necessary on this transmission. If transmission fluid is required for repair purposes, use only the oil approved for this transmission. It is not permitted to mix this oil with other grades of transmission fluid.
Shell LA 2634, BMW Part No. 83 22 9 407 765.
See S.I. Bulletin B 24 01 98.

Effective with model year 1995 and later:

E31
850Ci from 10/94 to 6/97 production
840Ci from 12/95 to 8/96 production

Utilizes lifetime fill of transmission fluid, no subsequent transmission fluid changes are necessary.
Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 711 41, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E38
750iL from 1/95 production to present
740i/iL from 7/94 to 12/96 production

Utilizes lifetime fill of transmission fluid, no subsequent transmission fluid changes are necessary.
Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 711 41, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

E39
540i/iT from 3/96 to 12/96 production

Utilizes lifetime fill of transmission fluid, no subsequent transmission fluid changes are necessary.
Never mix any other oil with this transmission fluid when doing repairs or topping up.
ESSO LT 711 41, BMW Part No. 83 22 9 407 807.
See S.I. Bulletin B 24 01 98.

GA6HP19Z

E82/E88
135i All
The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

E90/91/92
325i, 328i, 330i, 335i, All

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

E60/61
525i, 530i from 8/03 production to present

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

GA6HP19ZTU

E70
3.0i from start production to present
The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

E71
X6 xDrive35i
The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

GA6HP26Z

E60
545i from 8/03 production to present
550i All

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

E63, E64
645Ci, 645CiC from start of production to present
650Ci, 650CiC All

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

E65
745i from 11/2001 production to present
750i All

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. B00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

E66
745Li from 3/2002 production to present
750Li All
760Li from 9/2002 production to present

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. Bulletin B 00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up.
Shell M-1375.4, BMW Part No. 83 22 0 142 516.

GA6HP26ZTU

E70
X5 4.8i from start production to present

The transmission fluid has a Condition Based Service interval of approximately 100,000 miles; please refer to S.I. Bulletin B 00 07 02 for further information. Never mix any other oil with this transmission fluid when doing repairs or topping up. Shell M-1375.4, BMW Part No. 83 22 0 142 516.

4.0 Checking Transmission Fluid Level

Due to the substantial expansion of transmission fluid when heated it is only possible to measure the oil level correctly at specified oil temperatures (after driving a distance of about 12 mi./20 km). All transmissions should be checked between a

ZF 3HP and 4HP

Due to the substantial expansion of transmission fluid when heated it is only possible to measure the oil level correctly at specified oil temperatures (after driving a distance of about 12 mi./20 km).
See S.I. Bulletins B 24 02 85 (1027) and B 24 01 98.

A5S 560Z, A5S440Z, GA6HP19Z, GA6HP26Z, GA6HP26Z, A5S325Z, A5S 310Z

All 5 and 6 speed transmissions require the fluid to be checked when fluid temperature is between 30-50° Celsius using DIS Plus or GT1. Do not check fluid level after temperature has exceeded 50° Celsius.
See S.I. Bulletin B 24 01 98.

A4S 270R, A4S 310R and A5S 360R

For vehicles with or without a dipstick see S.I. Bulletin B 24 01 98.

5.0 Transmission Fluid Change Intervals (If Applicable)

Please refer to applicable Service and Maintenance Checklist for each vehicle.

1.0 General Information

Components of the gear shift mechanism located outside of the transmission housings, such as ball cups, bearing bushings, gearshift joints, etc. may be lubricated with Polylub GLY 801 (BMW Part No. 81 22 9 407 647).

1.0 General Information

The locating tabs of the drive shaft to the transmission output flange may be lubricated with any high temperature resistant, long-term grease (available locally).

1.0 Transfer Case Operating Fluids

Model:	Fluid:	BMW Part Number:
E30 325iX	ATF Dexron® III formulation	
E46/16 325xi/xiT, 330xi	MTF-LT-1	83 22 9 408 942 (MTF-LT-2 = 5 Liters)
E53 All models produced up to 2/2005 with NV125 transfer case	ATF Dexron® III formulation	
E53 All models with X-Drive transfer case	TF0870	83 22 0 397 244 (1 Liter)
E60 All models	TF0870	83 22 0 397 244 (1 Liter)
E61 All models	TF0870	83 22 0 397 244 (1 Liter)
E70 All models	TF0870	83 22 0 397 244 (1 Liter)
E71 All models	TF0870	83 22 0 397 244 (1 Liter)
E83 All models with X-Drive transfer case	TF0870	83 22 0 397 244 (1 Liter)
E90, E91 and E92 All models	TF0870	83 22 0 397 244 (1 Liter)

Note: Before opening the container, shake the container to evenly mix the additives with the oil.

1.0 Dual-Clutch Transmission Fluid (M DCT Drive logic)

E90, E92 and E93 M3 vehicles with S65 Engine and Dual-Clutch Manual Transmissions require BMW DCT OIL 1.

This fluid is a Long-Life type fluid, requiring no service intervals.

Currently the fluid is not available via your Parts Distribution Center. If fluid is required enter a PuMA Case.

1.0 General Information on High Temperature Multi-Purpose Grease

High temperature multi-purpose grease consists of a lithium complex soap in a mineral oil product with a selected combination of additives. Extremely fine soap is contained in the oil, and serves as the basic ingredient.

This lubricating grease possesses the following properties:

— Very good thermal resistance and penetration stability

The structure and consistency must be maintained over long service life with temperatures from -22°F to +302°F

(-30°C to +150°C) in continuous operation and very high loads.

— Oxidation stability

A lubricating grease contains effective inhibitors (which limit or prevent chemical reactions) in order to stop oxidation at very high operating temperatures.

— Water resistance and corrosion inhibition

A high temperature multi-purpose grease is water resistant. At the same time lubricated parts are given maximum protection against rust by the corrosion inhibitors.

2.0 Approved High Temperature Multi-purpose Grease

High temperature multi-purpose grease is used for the lubrication of wheel bearings.

Ball Bearings (E24 from mid 1982, E28, E30, E31, E32 and all following)

Provided with lifetime lubrication.

No subsequent lubrication approved!

Tapered Roller Bearings (E23, E21)

50 grams grease packing in wheel hub and 20 grams in wheel hub grease cap per wheel.

Grease type: Retinax A

CRC Part No. SL 3131 (former BMW Part No. 81 22 9 407 710)

3.0 Approved Front Axle Final Drive Oils

Approvals are the same as for rear axle final drive oils. Refer to Group 33 Rear Axle.

1.0 ZF Gemmer Steering

The ZF Gemmer steering is permanently filled with oil. There is no drain plug.

2.0 ZF Rack and Pinion Steering Without Power Assist

The ZF rack and pinion steering is lubricated for its service life and therefore does not require servicing.

In case of repair, steering components on E21 vehicles are to be lubricated with a sodium-based grease, with a temperature range of -30℃ to +75℃.

Calypsol D 4024 BMW Part No. 32 11 1 116 929

3.0 Ball and Nut or Rack and Pinion Power Steering

Only reputable brand Automatic Transmission Fluid (ATF) of Dexron® III formulation may be used for the power steering and power steering pump.

In case of brief hydraulic noise after starting at low outside temperatures, we recommend replacing the red ATF with green CHF or LHM oil (see below).

4.0 ZF Ball and Nut Power Steering with H31 System

The approved oils for BMW models with power steering and the H31 brake booster system are identical with those oils approved for power steering without the H31 system **except** for the following:

E32 models with self-leveling rear suspension and mutual oil supply tank in the engine compartment (see Group 37 Integrated Suspension Systems).

Countries with very low outside temperatures (e.g. Canada) had their power steering systems filled at the factory with Pentosin CHF 7.1 since 9/87 through 9/91. This is also to be used on vehicles built before 9/87.

Since 9/91, vehicles now use Pentosin CHF 11S instead of CHF 7.1.

Pentosin CHF 7.1 BMW Part No. 81 22 1 468 879
Pentosin CHF 11S BMW Part No. 82 11 1 468 041

These cars are marked with a pertinent label located close to the oil tank.

LHM oils (green color) of the following manufacturers may also be used instead of Pentosin (CHF 7.1):
Shell LHM
Castrol LHM
Exxon LHM

The mixing of CHF, LHM oils and ATF is not permitted.

Pentosin CHF 4548 was used on vehicles built before 9/87 but is no longer available. However, mixing of Pentosin CHF 7.1 with residual quantities of Pentosin CHF 4548 are permitted in these earlier vehicles. Mixing of these two oils is not permitted for E32 / E38 vehicles.

The hydraulic system for power steering and power-assisted brakes must be drained as completely as possible when changing from one type of oil to the other.

All oil supply reservoirs are marked with the type of oil being used — ATF or CHF.

5.0 Oil Change for Power Steering

Regular oil changing is not necessary. However, it is recommended to replace the oil after completion of repairs (unit or line replacement). Use ATF of Dexron® III formulation.

6.0 Horn Slip Rings

Approved grease is a copper paste (former BMW Part No. 81 22 9 400 794).

3M Part No. 8945
CRC Part No. 3046 010

See S.I. Bulletin B 61 04 90 (3082).

1.0 General Information On Final Drive Oil

Final Drive oil or hypoid gear lubricant must conform with the following requirements because of the high loads which occur on the profiles of the hypoid gear teeth:

— Load carrying capacity.

— Sufficient protection against seizure.

— Good wear protection.

— Optimal friction and temperature behavior.

— Seal compatibility.

— Aging resistance.

These and other properties are already contained in brand-name hypoid gear lubricants because of the high content of EP additives (EP = extreme pressure).

Oil Additives

The factory has **not approved** oil additives for hypoid gear lubricants.

All final drives are designed in such a manner that they do not require any type of oil additives. Any type of additives is fundamentally rejected by the factory. BMW NA cannot accept any liability for follow-up damage resulting from the use of additives.

2.0 Approved Final Drive Oils For Front And Rear Axle Final Drives With And Without Limited Slip Or Viscous Coupling

Mineral based final drive oils are no longer recommended due to the release of synthetic final drive oils for all vehicles with or without limited slip differentials.

Limited Slip Differentials

With the introduction of the Z3 roadster a new synthetic final drive oil for all vehicles with a multi-plate limited-slip differential has been released. The new BMW final drive oil SAF-XJ will replace the old final drive oil SAF-XLS.

The SAF-XLS final drive oil is not to be used in the final drive of the Z3 roadster.

Use only the SAF-XJ in the final drive of the Z3 roadster.

Note: If a non-limited slip differential oil is used in a limited slip differential a whining or chattering sound can be heard on very tight turns and will eventually result in a failure of the differential.

Description	Quantity	Part Number
BMW Synthetic Final Drive Oil (with multi-plate Limited Slip Differential)	55 liter drum (SAF-XJ)	83 22 1 470 080

<u>E71 X6 xDrive35i and X6 xDrive50i:</u>
<u>Rear Differential with Superposing Gear Units (QMVH)</u>
The rear differential assembly consists of three separate filler plugs, one in the center for the angle drive with differential gear and one additional filler plug on each of the left and right superposing gear units.

Angle drive with differential gear (center filler plug): PN 83 22 9 407 768 (SAF-XO)

Superposing gear units (two outer filler plugs): (SAF-CARBON) This fluid is not available at this time, please enter a PuMA case if fluid is needed.

For more information regarding filler plug locations and operation please refer to the TIS Website – Technical Training – ST710 E71 Complete Vehicle Workbook – E71 Chassis Dynamics Workbook.

<u>Motorsport Vehicles:</u>
All E46 M3, E60 M5, E63/E64 M6, E85 M roadster, E86 M coupe and E90/E91 and E92 M3 require SAF-XJ Fluid.

Non Limited Slip Differentials

Description	Quantity	Part Number
BMW Synthetic Final Drive Oil **(without multi-plate limited slip differential, or with viscous differential lock (325iX/iXA)**	55 liter drum (SAF-XO)	83 22 9 407 768

Note: See S.I. Bulletin B 33 01 92 for additional final drive oil info.

3.0 Final Drive Oil For BMW M1 Motorsport Coupe

The final drive of a BMW M1 is integrated into the manual transmission and the oil supply is accomplished with a mutual oil filling.

Use reputable brand SAE 80 manual transmission oil conforming with specifications MIL-L-2105 A or API-GL 4.

4.0 Oil Change Intervals

Maintenance requirements per the vehicle's Service Booklet or the respective Service Maintenance Checklist.

Replacement final drives: same as for new vehicles.

All models as of 9/97 production are factory-filled with synthetic rear axle oil having a long-life service rating.
No oil changes are required for the life of the vehicle.

5.0 Cars Without Service Indicator (Including BMW M1)

First oil change at 600 miles
Further oil changes at 18,000 miles

Special rule for BMW 530i, 528i (E 12):

1st oil change at 600 miles after final drive replacement
2nd oil change at 4,500 miles after final drive replacement
Further oil changes at 9,000 miles intervals, beginning at 9,000 miles.

6.0 Cars With Service Indicator

Refer to Service Maintenance checklist for respective model year.

Break-In Procedures

Drive the car with changing engine speeds and road speeds during the first 1,200 miles/2,000 km, but never faster than 2/3rds of maximum speed in a selected gear. Avoid using full throttle and kick-down positions of the accelerator pedal during this period.

BMW M3/M5/M6	Up to 1,200 miles max. engine speed 5500 RPM Generally avoid full-throttle position of the accelerator.

These break-in procedures are, of course, also applicable to replacement final drives.

7.0 Output Shafts

The joints of output shafts have permanent grease lubrication and require no servicing.
The amount of joint grease required after repairing is supplied in the “dust cover repair kit”.

8.0 Wheel Bearings

Ball Bearings E24 (Since 5/82), E28, E30, E31, E32 And All Following

Bearing unit is lubricated for its service life, cannot be disassembled and does not require subsequent lubrication.

Grooved Ball Bearings E12, E21, E23, E24 Before 5/82

Grease type: Retinax A (former BMW Part No. 81 22 9 407 710)
CRC Part No. SL 3131

9.0 Differential Housing Final Drive Covers And Housing

On 735i/iL, 750iL, M6 and M5 (E28) models, the attaching bolts are to be installed with Hylogrip/Loctite 270 (green) thread sealant (former BMW Part No. 81 22 9 400 086).

Würth	Part No. 8932700
Loctite	Part No. 21438

See S.I. Bulletins B 33 01 89 (1869) and B 33 01 88 (1621).

Operating Fluids

February 2007

Group 34 Brakes

Technical Service

1.0 General Information

Brake fluid, (glycol-based) as used in BMW brake systems, must conform with the following requirements:

— High boiling point

— Good low temperature resistance

— Low compressibility

— Corrosion inhibition for all metal parts inside of brake system

— Compatibility with all rubber parts used in brake system

These requirements are fulfilled by reputable brand name DOT 4 brake fluids.

Silicone-based brake fluid has better compressibility, but because it cannot absorb moisture, is subject to vapor lock attemperatures above 212°F/ 100°C. At lower temperatures, it may even ice-up. **Silicone-based brake fluid is not approved by BMW.**

Glycol-based brake fluid absorbs moisture from the atmosphere (hygroscopicity) through the brake fluid reservoir, brake hoses, etc. This absorption of water lowers the original boiling point of brake fluid and active safety of the entire system. If there is extended use of the brakes while driving downhill at high speeds, the thermal loads could cause vapor bubbles in the brake fluid. This situation could lead to reduced braking effectiveness.

The original boiling point of factory-approved brake fluids is approximately 500°F/260°C. Due to the hygroscopic behavior of brake fluid, 2% of water within one year is permissible. The boiling point of brake fluid will drop by 100°C with 3% water absorption. It is essential to conform with brake fluid changing intervals in order to guarantee the safety and maximum effectiveness of a brake system.

It would not be sufficient simply to replace the brake fluid in the reservoir. Experience has shown that vapor bubbles will occur first on areas of the brake caliper. This area is subjected to high thermal loads and also exposed to heat transmission.

When replacing the brake fluid, the brake fluid used as the working fluid in the hydraulic clutch should also be replaced. This is done by draining the clutch operation system or bleeding with the help of the clutch slave cylinder.

The brake fluid should be replaced by filling the brake fluid reservoir. Make sure that each bleeder valve of all wheel cylinders or brake calipers is kept open until the escaping brake fluid is clear and without air bubbles. Never use brake fluid that has been drained from the system.

Storage of brake fluids also deserves your special attention. The aging process begins with the initial contact between the brake fluid and the atmosphere. This means immediately after a new container is opened.

To keep the boiling point of stored brake fluids as high as possible, we recommend conforming with the following points:

— Close all containers tightly.

— Select small size containers, which can be used up quickly.

— Avoid pouring contents of one container into a different container.

2.0 Handling Brake Fluids

Brake fluids could be mixed up accidentally with mineral oil products so it is important to leave them in their original containers and not pour them into a different container.

Caution

If brake fluid accidentally comes into contact with your skin, wash it off with soap and water immediately. Eyes should be thoroughly flushed with cold water if contacted by brake fluid. Vomiting should be induced if brake fluid is internally consumed and a physician should be consulted.

If brake fluid is spilled or drips on a painted surface, wash it off with water immediately to prevent damage to the paint finish. Never rub it off. Brake fluids should not have contact with grease or oil. Wash hands to remove grease and oil before working with brake fluids. Also make sure that grease cannot enter the brake system.

Drained brake fluid must never be discarded in the garbage, oil disposal tanks or water drains.

Read instructions on container label prior to use.

3.0 BMW Tested And Approved Brake Fluids

BMW Tested and Approved **DOT 4 ESL** Brake Fluid is available as follows:

12 fl. oz. bottle	BMW Part No. 81 22 0 142 156
1 gallon container	BMW Part No. 81 22 0 142 155

See S.I. Bulletin B 34 09 01.

4.0 Brake Fluid Change Intervals

All Models Brake fluid change interval every 2 years.

5.0 Other Operating Fluids

Anti-Squeak/Corrosion Paste

Bostik NEVER-SEEZ® to prevent disc brake squeaking. It is applied on cleaned recesses, pressure surfaces of piston crowns, brake pad backplates and possibly transfer plates - but not on friction liners.

To prevent corrosion between the ABS impulse sensor and the hole in the wheel suspension component, apply a thin coat of Bostik NEVER-SEEZ® to cleaned sensor and hole before assembly.

Bostik NEVER-SEEZ®	Part No. NSBT-16

See S.I. Bulletins B 34 02 94, B 34 05 98, and B 34 03 00.

Brake Cleaner Spray

Non-CFC spray (former BMW Part No. 81 22 9 407 704) for cleaning brakes, brake pads, brake shoes, drums, disks and other brake components. Also suitable for clutch pressure plates.

3M	Part No. 8895
Loctite	Part No. 82220
CRC	Part No. 08088

1.0 Tire Mounting Paste

Use only a lubricant specifically designed for this purpose (former BMW Part No. 81 22 9 407 288).
Würth Tire Mounting Paste Part No. 892800

Silicone sprays are not acceptable, as they are extremely slippery and don't dry. If applied to the tire bead, it is likely that the tire moves on the rim, causing an imbalance.

See S.I. Bulletins B 36 02 88 (1627) or B 36 01 88 (1569).

2.0 Wheel Cleaners

Liquids for cleaning the alloy wheels must be strong enough to lift brake dust, road dirt, etc. off the painted wheel surface with minimum manual agitation, yet not attack the wheel material. The following cleaner has been thoroughly tested for optimum cleaning action and long-term compatibility with the wheel's surfaces:
Wheel Cleaner Spray BMW Part No. 82 14 1 467 045

3.0 Wheel Hub Covers

Covers may be affixed to the alloy rim by using Loctite 638 (former BMW Part No. 07 58 9 056 030). Covers may only be used once.

Loctite 638 - Würth Part No. 8936010
- Loctite Part No. 21447

The cooling-turbine wheel covers of the M5 (E34) produced from March 1990 to October 1990 may be secured to the wheel by applying Loctite 242 to the attaching screw threads. First clean screw threads with Loctite Cleaning Solvent 755.

See S.I. Bulletin B 36 03 90 (3182).

4.0 Anti-Corrosion Paste

Apply small amounts of Plastilube paste evenly around the centering cone of the alloy wheel rim and onto the contact areas of the brake hub.

Plastilube BMW Part No. 81 22 9 407 103.

1.0 General Information

LHM hydraulic fluid has a favorable viscosity range and permits problem-free operation of the self-leveling rear suspension at very low and very high temperatures. The solidification point is -78°F/-61°C.

2.0 Approved Hydraulic Fluids

E24, E28 produced prior to 9/87

Pentosin CHF 4548 was used for initial factory filling.

For filling up and replacement the following oil is to be used:
Pentosin CHF 7.1 BMW Part No. 81 22 1 468 879

Pentosin CHF 4548 and CHF 7.1 can be mixed in these cars.

For complete system oil replacement:
Reputable brand name LHM oils (green color) can also be used (Shell, Castrol, Exxon, etc.)

Note: Mixing of CHF and LHM oils is not permitted.

E24, E28 produced since 9/87

Pentosin CHF 7.1 is used for initial factory filling.

For filling up and replacement use only Pentosin CHF 7.1
BMW Part No. 81 22 1 468 879

For complete oil replacement:
Reputable brand name LHM oils (green color) can also be used.

Note: Mixing of CHF 7.1 and LHM oils is not permitted.

E32 produced prior to 9/91

Use only Pentosin CHF 7.1.

Mixing with other oils is not permitted.

E32, E34 produced since 9/91

Use only Pentosin CHF 11S

Note: All cars have a label indicating the respective type on the hydraulic fluid reservoir. Since both Pentosin CHF 11S and CHF 7.1 are green in color, the reservoir label must be carefully checked prior to adding fluid.

Mixing CHF 11S and CHF 7.1 is not permitted.
Pentosin CHF 11S BMW Part No. 82 11 1 468 041

E38 produced since 1/94

Use only Pentosin CHF 11S

Note: All cars have a label indicating the respective type on the hydraulic fluid reservoir. Since both Pentosin CHF 11S and CHF 7.1 are green in color, the reservoir label must be carefully checked prior to adding fluid.

Mixing CHF 11S and CHF 7.1 is not permitted.
Pentosin CHF 11S BMW Part No. 82 11 1 468 041

3.0 Checking Hydraulic Fluid Levels

The hydraulic fluid level must be checked on an unloaded car and at every Inspection I or, for cars without a Service Indicator, at 10,000 mi/15,000 km intervals.

Note: Not required as of 1993 model year vehicles.

Special checking instructions apply to the E32 — always refer to the latest edition of the Repair Instructions.

Note: Never fill above the “max” mark. There are no replacement intervals for hydraulic fluid.

1.0 Sealing Compounds

Seam Sealer, Sikaflex 221 may be used to seal adjoining sheet metal parts which create creaking noises due to interactive contact. High-adhesion, polyurethane-based, black-colored.

Sikaflex 221 Sealer
BMW Part No. 81 22 9 407 533

Other sealants for body panels are found in Group 97 (Body Cavity Sealings and Undercoatings).

2.0 Lubricants

BMW offers several lubricants which are formulated for specific components in Group 41. Some of these lubricants also appear in the “Universal Lubricants” group.

3.0 Door Hinges and Pivots

Moly spray for quieting squeaks and similar noises.
(former BMW Part No. 81 22 9 400 720)

3M	Part No. 8876
Loctite	Part No. 24378

4.0 Door Brakes

Grease for any sliding contact area, especially door brake mechanisms.
(former BMW Part No. 81 22 9 407 629)

3M	Part No. 8878
Loctite	Part No. 20029

5.0 Door Locks

Lock cylinder lubricant prevents locks from jamming in sub-freezing temperatures. Insert tip of spray can directly into keyslot.
(former BMW Part No. 81 22 9 407 421)

3M	Part No. 8878
Würth	Part No. 893051
Loctite	Part No. 20029

6.0 (HKL) Automatic Trunk Lid Lift Hydraulic Fluid

E65/E66 Automatic Trunk Lid Lift Hydraulic Fluid
BMW Part No. 51 24 7 066 901

1.0 Adhesives/Sealants for Glass

Sikaflex 255 Adhesive is a single component polyurethane with a minimum curing time of 4 hours at 72°F/22°C and 38% relative humidity.

The windshield or rear window must be installed within 10 minutes of applying the adhesive or a skin will form on the adhesive's surface and reduce the adhesive effectiveness.

Sikaflex 255, BMW Part No. 81 22 9 407 497 Cold Kit, or
Sika Ultrafast, BMW Part No. 83 19 9 407 714 in conjunction with Heater, BMW Part No. 83 19 9 407 820.

2.0 Other Fluids

Cleaning E53 black glossy exterior ornamental trim please use Meguiar's Mirror Glaze Number 9 Professional Swirl Remover 2.0

Glass treatment, all models: Aquapel® Glass Treatment, BMW Part No. 83 19 9 408 523.

3.0 Contact Cement

A powerful adhesive for leather and leatherette, rubber moldings, felt linings, insulating materials, convertible top adhesive, etc.
(former BMW Part No. 81 22 9 407 524)

3M 1357High Performance Contact Adhesive

4.0 Instant adhesive for rubber, metal and plastic surfaces.

Applications: Rubber profiles on windows, doors, bumpers (soft and hard rubber), seals, inner covers, buttons and controls (plastic/plastic, plastic/steel), circuit elements (electronics), rear lights, turn indicators, ornamental strips and moldings.
(former BMW Part No. 81 22 9 407 143)

3M	Part No. 8155
Loctite	Part No. 49450

5.0 Loctite 380

Black cyanacrylate adhesive for joining metals, but also rubber, PVC etc.
Particularly recommended for attaching rubber door seals on the BMW 5 Series (E34).
(former BMW Part No. 81 22 9 407 394)

3M	Part No. 8155
Würth	Part No. 893 4103
Loctite	Part No. 38050

6.0 Glass Adhesive

BMW Part No. 81 22 9 407 497.
See S.I. Bulletin B 51 09 98.

7.0 Premium Leather Care Kit

BMW Part No. 81 11 024 455.
See S.I. Bulletin B 51 05 02.

1.0 Seat Leather Care

“Karneol” leather care cleans the leather upholstery of mild stains or dirt. It also provides conditioners to prevent drying out. Not suitable for suede.

BMW Part No. 81 22 9 400 901.

2.0 Premium Leather Care Kit

BMW Part No. 81 11 024 455.
See S.I. Bulletin B 51 05 02.

1.0 Convertible Top Material

Cleaning Kit consists of three fluids for periodic maintenance of the top's outer surface:

— Car Shampoo

For cleaning the entire convertible top. Add 2 to 3 capfuls of shampoo to 2.5 gallons of water. Rinse with clean water.

— Glass Cleaner
Cleans the plastic rear window as well as the vehicle's glass windows. Spray on, wipe off with dry cloth.

— Impregnating Spray
After cleaning the top, apply this spray over a large area about 12 inches from the surface to seal the top against possible leaks.

Convertible Top Cleaning Kit
BMW Part No. 83 12 9 407 806

Impregnating Spray
BMW Part No. 83 12 9 407 802

2.0 Convertible Top Rear (Plastic) Window

Rear Window Cleaner

Meguiar's Mirror Glaze Professional Plastic Cleaner #17 removes hairline scratches on the surface.
BMW Part No. 82 14 1 467 128.

Rear Window Polish

Meguiar's Mirror Glaze Professional Plastic Polish #10 restores and maintains clarity, leaves surface static-free.
BMW Part No. 82 14 1 467 129

Contact Cement

Attaching soft top material to zip-out rear window trim plastic channel on E30 and E36 convertibles.
(former BMW Part No. 81 22 9 407 524)

3M 1357 High Performance Contact Adhesive
See S.I. Bulletin B 54 01 93 (3754).

3.0 Convertible Top Storage Lid Adhesive

E30 and E36 Convertible top storage lid covering adhesive

3M™ Super Trim Adhesive Yellow Part No. 08090
See S.I. Bulletins B 41 02 94 and B 41 01 91 for further information.

4.0 Convertible Top Sealing Frame Adhesive

E36 Z3 Sealing Frame Adhesive

One roll of Bostik 3/4" x 1/8" Butyl Tape, available in cases of 12 rolls from Springfield Paper Specialties, phone number 215-643 2800, fax number 215-643-0639. Refer to Parts Bulletin B 54 03 98 for ordering information.

5.0 Convertible Top Hydraulic Fluid

Model	BMW Part Number
E36/7	54 34 8 410 306
E46	54 34 7 117 733
E52	54 34 8 234 324
E64	54 34 7 717 733
E85	54 34 7 117 733
E88	54 34 0 394 395
E93	54 34 0 394 395

6.0 Sunroof

Cassette Lubricant

Würth Glide Grease	Part No. 0893898

Loctite 380

5 Series Touring double panel sunroof repairs.
(former BMW Part No. 81 22 9 407 394)

3M	Part No. 8155
Würth	Part No. 893 4103
Loctite	Part No. 38050

1.0 Battery

Only distilled water (available locally) is to be used when topping up the electrolyte level.
See S.I. Bulletin B 61 01 90 (3019).

If a new battery (delivered dry) is to be placed into service, use only battery electrolyte ("sulfuric acid"), available locally.

2.0 Sealant/Super Glue/Contact Cleaner

Sealant

Aftermarket accessory installations which require routing electrical wires through metal body panels are to have the access holes sealed.

See S.I. Bulletins B 61 04 89 (1836) and B 61 03 90 (3053).
(former BMW Part No. 81 22 9 400 013)

Würth Part No. 893430

Super Glue

The rubber seal around the trunk release button of E39 vehicles can be repositioned with Würth Rubberized Super Glue (Part No. 893 4103).

See S.I. Bulletin B 61 08 97.

3.0 Electrical Contact Enhancer and Contact Cleaner

Electrical Contact/Connector Grease

NyoGel 760G is resistive to moisture and can used for a lubrication of tin-lead type electrical connectors.

NyoGel 760G BMW Part No. 83 23 0 392 297

For additional information and use applications, please refer to Service Information B72 04 02 dated May 2003 and Service Measure B34 201 03 dated June 2004.

Electrical Contact Enhancer

Stabilant 22A evaporates and leaves a thin polymer film which is conductive between the mating surfaces, while staying non-conductive between adjacent pins. At the same time it prevents the formation of any further harmful deposits.

Würth Part No. 893622 (Stabilant 22A)

Note 1: Stabilant 22A must not be used on Oxygen Sensor connectors. To function, oxygen sensors require a flow of oxygen through the terminal connector to the sensor element. Stabilant 22A will affect this flow of oxygen, and will result in irreparable damage to the sensor.

Note 2: Stabilant 22A must not be used on plug connectors which carry fiber optics. Stabilant 22A may migrate to the fiber optic and attenuate the optical signal.

See S.I. Bulletin B 61 05 00.

Contact Cleaner Spray

Use to clean electrical and electronic components of dirt, grease, etc. Will not harm components or epoxy coverings. Allow to air dry. **Do not** dry with shop air supply as this may contaminate the connector.

Würth Part No. 89365 (Zero Residue Electrical Contact Cleaner)

See S.I. Bulletin B 61 05 00.

1.0 Air Conditioner Refrigerant

Freon®

The refrigerant Freon® R12 is used in most BMW automobiles with an air conditioner up through the 1992 model year. It has a boiling point of –29.8°C (sea level), at which the refrigerant is transformed from a liquid into a gaseous state. This boiling point, however, is not constant. It is displaced in the direction of higher temperatures as pressure increases.

Freon® R12 complies with the requirements expected of a safety refrigerant. Freon® is not combustible and does not turn into an explosive mixture with air. It is also odorless and non-toxic. Conformance with certain safety regulations is essential to the handling of refrigeration systems.

There are currently no BMW-approved alternative refrigerants to R12.
See S.I. Bulletin B 64 02 92 (3495).

Safety Warning

- 64 Avoid any contact with liquid refrigerant, since this could cause frostbite. Protect eyes with safety goggles and hands with gloves. Contact a doctor without delay in case of an accident.
- 64 Freon® R12 is heavier than air, so this refrigerant must not be discharged in closed rooms. There is danger of asphyxiation in a sunken work area (pit). Do not store bottles of refrigerant at temperatures above 113°F/45°C or heat them.
- 64 Never weld on or near a system filled with refrigerant. Heat could cause excessive pressure and an explosion. In addition, Freon® R12 will decompose at high temperature or when subjected to an open flame. The resulting decomposition products would be hazardous to health.
- 64 Make sure you read the container label instructions completely prior to use.
- 64 Obtain and use the correct type of refrigerant recovery/recycling machine. Follow the directions included in the machine's instruction manual.

HFC-134a

The refrigerant HFC-134a (also known as R-134a) is used as of the following models with an air conditioner:

- 64 1992 E32/M30 from March 1992 production
- 64 1993 E34, E36, 325iC. E31, E32 from August 1992 production

This environmentally friendly refrigerant performs similar functions as Freon® R12, but the refrigerants Freon® R12 and R-134a must NEVER be mixed or combined in any way under any circumstances.

See T.R.I. 64 01 92 (2121) for general information, S.I. Bulletin B 64 10 92 (3536) for overall description and diagnostic procedure, and S.I. Bulletin B 64 02 92 (3495) for non-approved refrigerants.

Safety Warning

- Always wear eye protection and gloves while handling refrigerant or servicing air conditioning systems.
- Avoid breathing R-134a and lubricant vapor or mist. Exposure may irritate eyes, nose, throat, and lungs. Use only approved service equipment to discharge A/C systems. If accidental system discharge occurs, ventilate work area before resuming service.
- If refrigerant or compressor oil contacts the skin or eyes, large quantities of cool water should be used to flush the affected area.
- Never heat a refrigerant container with an open flame. Keep all refrigerants away from open flames, since burning refrigerant can produce poisonous gas.
- Under no circumstances should R-134a service equipment or vehicle A/C systems be pressure tested with air/R-134a mixtures. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures.

The use of compressed air (shop air) for leak detection in R-134a systems could result in fire or explosion causing injury or property damage. In addition, introducing compressed air into A/C systems or components contaminates the system and/or refrigerant with moisture.

- Obtain and use the correct type of refrigerant recovery/recycling machine. Follow the directions included in the machine’s instruction manual.

2.0 Refrigeration Oil

Oil Used in Freon®-Charged Systems

A mineral-based oil is used. The oil level in the compressor must be checked before filling an air conditioner with refrigerant. It can be checked only if the system is without refrigerant.

Always check the oil level each time a new system is filled with Freon® R12 or after repairs. The oil level is very important for the entire air conditioning system. Part of the oil (approx. 25% depending on amount of refrigerant) is mixed with the refrigerant and is continuously circulated in the system. This oil lubricates the moving parts of the system, such as the expansion valve and compressor.

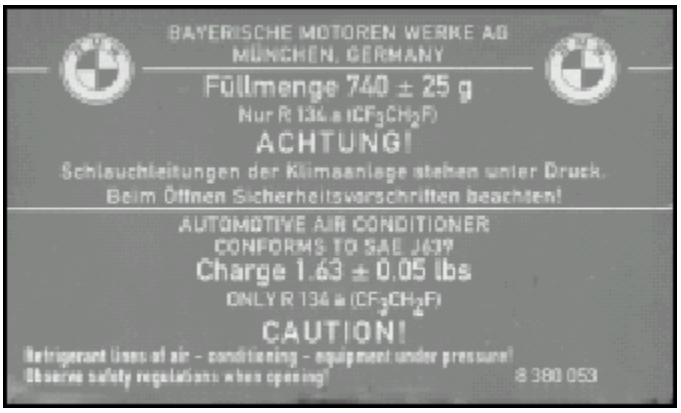
Oil Used in R-134a-Charged Systems:

A synthetic oil is used, which is totally different than the mineral-based oils used in Freon® R12 systems.

R-134a systems require Polyalkylene Glycol lubricants, often referred to as “PAG” oil. Use of R-12 compressor oil in R-134a systems will cause the compressor to seize and fail. The R-12 mineral oil does not stay in solution in R-134a. In addition, R-134a compressor should not be used in an R-12 system. Long term damage and corrosion will result.

The **GREEN** R-134a system labels, usually located near the top side of the fan shroud in the engine compartment, will display the refrigerant requirement for R-134a systems. An example is illustrated.

R-12 systems will have a **BLACK** label in a similar location.



PAG oil should only be stored in its original container, and sealed as tightly as possible. PAG oil is totally devoid of moisture when packaged, and will absorb moisture readily (hygroscopic) if exposed to the atmosphere, rendering it useless. Dispose of all extracted lubricants from A/C systems. Never reuse old compressor oil. Contaminated PAG oil should never be added to the air-conditioning system, and old PAG oil is typically contaminated with moisture. R-134a is even more sensitive to moisture contamination than R-12 systems, and because of the desiccant material change (refer to “Receiver-Dryer”), the capacity per volume of the receiver-dryer is typically less.

See T.R.I. 64 01 92.

PAG oil may be obtained from BMW of North America.
BMW Part No. 82 11 1 468 042.

3.0 Air Conditioning Unit Disinfectants

A musty odor may be detected in the vehicle, particularly when the air conditioner is first switched on.

This is caused by microorganisms growing on the evaporator from moisture condensation.

A disinfectant can be applied to the air conditioning system:
Refer to S.I. Bulletins B64 08 91 and B 64 04 03.

4.0 Air Conditioner Refrigeration/Oil Fill Capacities

Reference information for servicing BMW Air Conditioning systems is listed on the chart on page 6. Please refer to this chart when evacuating/recharging BMW A/C systems.

Note that some 1993 Model Year early production R-134a equipped vehicles have under-hood labels that specify higher charge values than those specified in the chart. Testing has confirmed that the values given are the optimum fill capacities. Consult the chart before refilling. Labels with the lower refrigerant charge amount specified on the chart have been phased into production as of 11/92.

When performing repairs to the A/C system that require recharging, only the specifications given in this chart should be used, as well as the label part numbers, as appropriate (see chart). However, inadvertent refrigerant charging up to the fill capacity given on an “original” (’93 MY production prior to 11/92) under-hood label will not cause any problems.

Refrigerant, Special Features, Production Range, Fill Capacity g (lbs), Fill Capacity ml (oz), BMW P/N

Series/Body, Refrigerant	Model or Type Special Features	Production Range	Fill Capacity g (lbs)	Refrigerant Oil Total Fill Capacity ml (oz)	A/C Label BMW P/N
1/E82, R-134a	N52K,N54	All	590 ± 10 (1.30 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 985 512
1/E88, R-134a	N52K,N54	All	590 ± 10 (1.30 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 985 512

Series/Body, Refrigerant	Model or Type Special Features	Production Range	Fill Capacity g (lbs)	Refrigerant Oil Total Fill Capacity ml (oz)	A/C Label BMW P/N
3/E30, R-12	M3	All up to 9/92	875 ± 25 (1.93 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 50 1 381 958
3/E30, R-12	All Others	All up to 9/92	975 ± 25 (2.15 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 50 1 380 981
3/E30, R-134a	Convertible	All from 9/92	900 ± 25 (1.76 ± 0.05)	100 ± 20 (3.4 ± 0.7) [5]	64 50 8 391 026 [4]
3/E36, R-12	Modine Condenser [1]	9/91 – 3/92 [1]	1000 ± 25 (2.20 ± 0.05)	167 ± 20 (5.6 ± 0.7)	90 00 1 000 006
3/E36, R-12	Original Condenser	All up to 9/92	1200 ± 25 (2.65 ± 0.05)	200 ± 20 (6.8 ± 0.7)	71 21 2 122 023
3/E36, R-134a	All	9/92 – 11/92 [3]	1000 ± 25 (2.20 ± 0.05)	120 ± 20 (4.1 ± 0.7) [5]	64 50 8 391 524 [4]
3/E36, R-134a	Z3 except M coupe and M roadster	All	900 ± 25 (1.98 ± 0.05)	120 ± 20 (4.1 ± 0.7) [5,6] 150 ± 10 (5.1 ± 0.3) [5,7]	64 50 8 391 026
3/E36, R-134a	M coupe and M roadster	All	950 ± 26 (2.09 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 8 391 525
3/E36, R-134a	All	All from 11/92	825 ± 25 (1.82 ± 0.05)	120 ± 20 (4.1 ± 0.7) [5,6] 150 ± 10 (5.1 ± 0.3) [5,7]	64 50 8 367 947
3/E46, R-134a	All	All	740 ± 25 (1.63 ± 0.05)	160 ±10 (5.4 ± 0.3) [5,6]	64 50 8 380 053
3/E90/E91, R-134a	N52	All	500 ± 15 (1.10 ± 0.03)	Refer to repair Instruction 64 52 …	64 50 6 952 937
3/E90/E91/E92/E93, R134a	N52KP, N54	All	590 ± 10 (1.30 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 985 512
3/E90//E92/E93, R134a	S65	All	590 ± 10 (1.30 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 985 512
5/E28, R-12	524, 535, M5	All	975 ± 25 (2.15 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 981
5/E28, R-12	528e, 533	All	1275 ± 25 (2.81 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 984
5/E34, R-12	525i, 535i, 525iT	All up to 9/92	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 382 614
5/E34, R-12	M5	All up to 9/92	1500 ± 25 (3.31 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 378 247
5/E34, R-134a	M5	From 9/92 [2]	1450 ± 25 (3.19 ± 0.05)	160 ± 20 (5.4 ± 0.7) [5]	64 50 8 391 751 [4]
5/E34, R-134a	All Others	All from 9/92	1550 ± 25 3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) [5]	64 50 8 391 523 [4]
5/E39, R-134a	All	Up to 9/98	1210 ± 25 (2.67 ± 0.05)	160 ± 15 (5.4 ± 0.5) [5,6] 180 ± 20 (6.1 ± 0.7) [5,7]	64 50 8 362 434
5/E39, R-134a	All	From 9/98	750 ± 25 (1.65 ± 0.05)	160 ± 15 (5.4 ± 0.5) [5,6] 180 ± 20 (6.1 ± 0.7) [5,7]	64 50 8 387 412
5/E60, R-134a	All (Includes M5)	From 8/03	810 ± 10 (1.78 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 920 708
5/E61, R134a	All	All	810 ± 10 (1.78 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 920 708
6/E24, R-12	Rear Air Conditioner	All	1800 ± 25 (3.97 ± 0.05)	170 ± 20 (5.7 ± 0.7)	653 1 380 728
6/E24, R-12	All Others	All	1100 ± 25 (2.43 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 982
6/E63/E64, R-134a	All	From 8/03	810 ± 10 (1.78 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 920 708
7/E23, R-12	733, 735	All up to 9/85	1275 ± 25 (2.81 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 984

Series/Body, Refrigerant	Model or Type Special Features	Production Range	Fill Capacity g (lbs)	Refrigerant Oil Total Fill Capacity ml (oz)	A/C Label BMW P/N
7/E23, R-12	735	All from 9/85	1175 ± 25 (2.59 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 983
7/E32, R-12	750iL	All up to 11/92[2]	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 382 614
7/E32, R-12	735i, 735iL	All up to 3/92	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7)[5]	64 53 1 382 614
7/E32, R-134a	735i, 735iL	From 3/92[3]	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7)[5]	64 50 8 391 523
7/E32, R-134a	740i, 740iL, 750iL	From 9/922	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7)[5]	64 50 8 391 523[4]
7/E38, R-134a	All All	All up to 11/97 All from 11/97	1210 ± 25 (2.67 ± 0.05) 680 ± 25 (1.50 ± 0.05)	180 ± 30 (6.1 ± 1.0)[5,6] 180 ± 20 (6.1 ± 0.7)[5,7]	64 50 8 362 434 64 50 8 381 241
7/E65, R-134a	745i, 750i	All	810 ± 25 (1.78 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 6 920 708
7/E66, R-134a	745Li, 750Li	All	810 ± 25 (1.78 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 6 920 708
7/E66, R-134a	760Li	All	1120 ± 25 (2.46 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 6 924 568
8/E31, R-12	All	All up to 9/92	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 382 614
8/E31, R-134a	All	All from 9/92	1550 ± 25 (3.42 ± 0.05)	Nippon Denso 160 ± 30 (5.4 ± 1.0) Seiko Seiki 180 ± 20 (6.0 ± 0.7)	64 50 8 391 523
Z4/E85, R-134a	M54, N52, N52KP,S54	All	740 ± 10 (1.63 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 6 920 364
Z8/E52, R-134a	All	All	710 ± 25 (1.56 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 8 384 651
X5/E53, R-134a	3.0, 4.4i, 4.6i, 4.8iS	All	440 ± 10 (0.970 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 8 385 985
X5/E70, R-134a	3.0i, 4.8i	All	700 ± 10 (154.0 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 917 364
X6/xDrive35i	All	All	700 ± 10 (154.0 ± 0.02)	Refer to repair Instruction 64 52 …	64 50 6 917 364
X3/E83, R134a	2.5, 3.0	All	740 ± 25g (1.63 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 8 385 985
X3/E83, R134a	3.0Si	All	740 ± 25g (1.63 ± 0.05)	Refer to repair Instruction 64 52 …	64 50 8 380 053

Notes:

1. The Modine condenser was used in many E36 vehicles over the production range 9/91 - 3/92. This condenser has a smaller volume, and the A/C system must be charged accordingly. Refer to S.I. Bulletin B 64 09 92 (3529) for details concerning the identification and charging of E36 Modine condensers.

2. Production start of 1993 MY E34/S38 (M5) 9/92; E32/M70 (750iL) 11/92.

3. R-134a, the environmentally friendly air conditioning refrigerant, was introduced to the U.S. market beginning with 3/92 production E32/M30 (735i/iL) vehicles. Refer to S.I. Bulletin B 64 10 92 (3536) for information pertaining to R-134a.

4. Labels reflecting the proper charging volumes given on this chart are available form BMW Parts. These may be used in place of the original equipment labels on ‘93 model year vehicles produced before 11/92.

5. All vehicles equipped with R-134a refrigerant require special PAG lubricant. Refer to S.I. Bulletin B 64 10 92 (3536).

6. Nippon Denso

7. Seiko Seiki

1.0 General Information on Preservation Measures

The classic quality of BMW automobiles is based on the long-term comprehensive research and testing, the design, the applied materials and the manufacturing procedures in modern production plants.

BMW recommends cleaning the engine, engine compartment, vehicle underside, axles and engine/transmission at least twice annually, and then waxing the car or repairing the wax coating. This should be performed before or after the period of salt usage on streets.

New cars parked outdoors should be waxed at BMW centers before delivery to customers. This is to avoid deposits damaging to the paint finish, such as air-born rust particles, chemical dust, oil saturated soot, sulfur dioxide (acid) rain, etc. settling on the horizontal surfaces. Bird and insect droppings as well as tree resin could mar the paint finish, forming spots, swelling and pitting in the paint coat.

Wax films on the engine, engine compartment and A pillars (hinge areas) are intentional and prevent corrosion. Such wax film should not be removed.

Unwaxed cars should be washed at least once each week. Parked cars must never be protected with plastic or other non-porous material covers. This will damage the paint finish due to condensed water in conjunction with plastic softener diffusion and scratching.

2.0 Body Cavity Sealing

It is only necessary to rewax or seal the affected area after repairing the body.

Only BMW approved products may be used to comply with the six year warranty against rust perforation. These products protect cavities effectively and permanently against corrosion. Their excellent coating and waterproofing properties let them flow into all inaccessible corners and folds for unsurpassed overall protection.

Underbody and Body Cavity Sealing Compound

For sealing of body cavities, such as doors, A-pillars, front, side and cross members, etc.
(Former BMW Part No. 81 22 9 407 479)
3M Part No. 8891
Würth Part No. 892080

Also: Würth “Brushable Seam Sealer”, Part No. 8901021.

3.0 Body Corrosion Protection

To comply with the six year warranty against rust, specially selected waxes and additives produce an elastic, temperature-proof, corrosion inhibiting protectant. The corrosion protection thickness should measure a maximum of 30 microns,but can be varied as desired by repeating the spraying procedures accordingly.

Procedure:
Clean underside of car to remove grease, oil and dirt. Cover rotating parts and parts not undercoated, such as driveshaft, brake discs, brake hoses, springs, exhaust pipes, etc.

After completion of body repairs, the affected areas must have corrosion protection reapplied. This applies, also, if the BMW Annual Check shows that the corrosion protection has to be repaired.

Underbody Sealing

Quick-drying, rubber-based, paintable. Compatible with PVC-based undercoat, front apron and door sill coatings.
(Former BMW Part Nos. 81 22 9 407 001, 81 22 9 407 521/522)
3M Part No. 8883
Würth Part No. 892072
Loctite Part No. 81833 (or PX135EA)
CRC Part No. Siloo 28A

Also: Würth “Body Seal, beige”, Part No. 0892091 U.

Body Sealant, Light

Sealing compound for all joints and seams, can be painted over. Good adhesion, free of shrinkage, resistant to heat and cold temperatures, permanently elastic.
(Former BMW Part Nos. 81 22 9 400 013 and 81 22 9 407 313)
3M Part No. 8361
Würth Part No. 893430

Seam Sealer, White

Elasto-plastic sealing compound based on polyacrylate.
Applications: Protection of door and hood panel seams.
(Former BMW Part No. 81 22 9 407 675)
3M Part No. 8361
Würth Part No. 890100025

Also: Würth “Gray Seam Sealer”, Part No. 089228 U.

Transparent Wax

Prevents corrosion on painted and non-painted metal surfaces. Serves mainly for treating edges and folded-over seams.
(Former BMW Part No. 81 22 9 400 711)
3M Part No. 8892
Würth Part No. 893082

Anti-Chip Compound

Sprayable coating compound for outside and inside. For sealing, noise-insulation and as protection against flying stones. Quick-drying can be painted over, permanently elastic, heat and cold-resistant.
(Former BMW Part Nos. 81 22 9 407 001 and 81 22 9 407 416)
3M Part No. 8964
Würth Part No. 893075
Loctite Part No. 81833/PX135EA

4.0 Other Fluids

Adhesive Remover

(Former BMW Part No. 81 22 9 407 388)
3M Part No. 8984

Rust Remover

(Former BMW Part No. 81 22 9 407 121)
Würth Part No. 89091801
Loctite Part No. 82075

1.0 BMW Car Care Products And Alternate Suppliers

Item	BMW P/N	Description/Application	3M	Würth	Loctite	CRC
Glass Cleaner	82 14 9 400 349*	For effortless and intensive cleaning of windows and mirrors. This glass cleaner removes tenacious dirt, silicone and oil residues and dead insects.	8968	890925	82544	
	82 14 9 406 684*		8968	890925	82544	Siloo 68A
	82 14 9 406 685*		3585		82544	Siloo 68A
Window De-Icer	82 14 9 407 426*	For use on iced-over windows. Contains no methanol and is non-toxic.				Siloo 22A IceOff
Car Shampoo	83 12 0 004 826	For washing cars. Cleans and protects paint finish.				
Paint Cleaner	82 14 9 400 132*	For removing dirt imbedded in the paint finish. Leaves a new glossy look. Especially suited for older cars.	6049			
Car Polish-Cream	82 14 9 400 131*	For use on metallic as well as lacquer paint. Cleans and seals paint from detergent and weather. Produces an excellent shine and long-term protection. Best for older finishes.	6055	8909671		
Car Polish-Liquid	83 12 9 407 779*	Same as above except in liquid.	6005			
Car Wax	83 12 9 408 527	For the care of newer metallic and lacquer finishes. Cleans and seals paint from detergent and weather. Non-abrasive.				
Leather Care (Karneol)	81 22 9 400 901	Cleans leather upholstery of mild stains or dirt; provides conditioners.				
Plastic Cleaner	82 14 9 407 415*	For cleaning soiled plastic interior surfaces.	6046	89024		
Cockpit Spray	83 12 9 407 769	For cleaning door liners, head liner, and upholstery. Prevents materials from becoming brittle and has anti-static effect.				
Tar Remover	82 14 9 407 018*	For removing tar, asphalt, and oil stains.	3607	89026		
Insect Remover	81 22 9 407 444*	Removes insects rapidly and effortlessly from glass, paint, chrome and plastics.	3607	89026		

***These items are no longer available through BMW NA Parts Department.**

Item	BMW P/N	Description/Application	3M	Würth	Loctite	CRC
Chrome Polish	82 14 9 400 890*	A perfect cleaner which provides a genuine gloss and forms an invisible silicone film to protect the chrome work against bad weather, corrosion, dirt etc.	6049			
Engine Cleaner	81 22 9 407 760*	For removing grease and built-up dirt from engines and engine parts. Washes off with water. Will not harm paint, rubber, or plastics.	8899	890923	80043	14045
Rubber Care-Spray	82 14 9 400 195*	For use on gaskets, tires, weather stripping. Rubber care cleans, helps maintain elasticity, and renews color.	5959	890110	82333	
Rubber Care – Tube	82 14 9 407 015	Same as spray except in tube form.				
Car Care Kit	82 14 1 467 126	Kit contains: — BMW Wheel Cleaner Spray (P/N 82 14 1 467 045) — BMW Car Shampoo (P/N 82 14 9 400 129) — Sponge — Long-handled brush — Synthetic chamois — Bucket with BMW logo				
Car Wash Liquid	82 14 1 467 131	Meguiar's Hi-Tech Wash maintains optimum gloss on a continuing basis, by blending in conditioners and gloss enhancers while foaming away dirt and grime.				
Final Inspection	82 14 1 467 132	Meguiar's Spray Applicator to give a "show car shine". Removes light dirt without scratching, leaves high-gloss look. Ideal for maintaining perfect finish on display cars. Not for heavily soiled finishes.				
Vinyl/Rubber Cleaner	82 14 1 467 133	Meguiar's Cleaner/Conditioner thoroughly cleans, penetrates and rejuvenates the surface, and provides exceptionally durable protection against drying out and cracking.				
Cleaner Wax	82 14 1 467 134	Meguiar's Cleaner/Wax cleans, polishes and protects paint in one application. Removes light oxidation, adds depth of color and provides durable protection.				
Wheel Cleaner	82 14 1 467 045	Clean wheels and protect finish.				
Soft Top Cleaner	83 12 9 407 806	Clean soft top.				

***These items are no longer available through BMW NA Parts Department.**