



## 1.0 Air Conditioner Refrigerant

## 2.0 Refrigeration Oil

## 3.0 Air Conditioning Unit Disinfectants

## 4.0 Air Conditioner Refrigeration/Oil Fill Capacities

### 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  $-29.8^{\circ}\text{C}$  (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  $113^{\circ}\text{F}/45^{\circ}\text{C}$  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

- 64 Always wear eye protection and gloves while handling refrigerant or servicing air conditioning systems.
- 64 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.
- 64 If refrigerant or compressor oil contacts the skin or eyes, large quantities of cool water should be used to flush the affected area.
- 64 Never heat a refrigerant container with an open flame. Keep all refrigerants away from open flames, since burning refrigerant can produce poisonous gas.
- 64 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.
- 64 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.

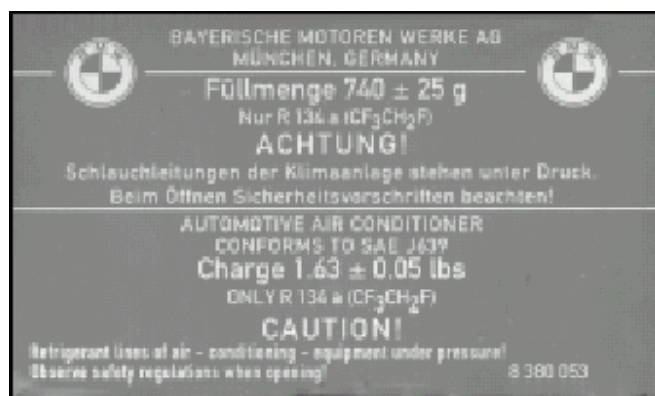
### Oil Used in R-134a-Charged Systems:

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) <sup>5</sup>	64 50 8 391 026 <sup>4</sup>
3/E36, R-12	Modine Condenser <sup>1</sup>	9/91 – 3/92 <sup>1</sup>	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 <sup>3</sup>	1000 ± 25 (2.20 ± 0.05)	120 ± 20 (4.1 ± 0.7) <sup>5</sup>	64 50 8 391 524 <sup>4</sup>
3/E36, R-134a	Z3 except M coupe and M roadster	All	900 ± 25 (1.98 ± 0.05)	120 ± 20 (4.1 ± 0.7) <sup>5,6</sup> 150 ± 10 (5.1 ± 0.3) <sup>5,7</sup>	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) <sup>5,6</sup> 150 ± 10 (5.1 ± 0.3) <sup>5,7</sup>	64 50 8 367 947
3/E46, R-134a	All	All	740 ± 25 (1.63 ± 0.05)	160 ± 10 (5.4 ± 0.3) <sup>5,6</sup>	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 <sup>2</sup>	1450 ± 25 (3.19 ± 0.05)	160 ± 20 (5.4 ± 0.7) <sup>5</sup>	64 50 8 391 751 <sup>4</sup>
5/E34, R-134a	All Others	All from 9/92	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) <sup>5</sup>	64 50 8 391 523 <sup>4</sup>
5/E39, R-134a	All	Up to 9/98	1210 ± 25 (2.67 ± 0.05)	160 ± 15 (5.4 ± 0.5) <sup>5,6</sup> 180 ± 20 (6.1 ± 0.7) <sup>5,7</sup>	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) <sup>5,6</sup> 180 ± 20 (6.1 ± 0.7) <sup>5,7</sup>	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 <sup>2</sup>	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) <sup>5</sup>	64 53 1 382 614
7/E32, R-134a	735i, 735iL	From 3/92 <sup>3</sup>	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) <sup>5</sup>	64 50 8 391 523
7/E32, R-134a	740i, 740iL, 750iL	From 9/92 <sup>2</sup>	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) <sup>5</sup>	64 50 8 391 523 <sup>4</sup>
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) <sup>5,6</sup> 180 ± 20 (6.1 ± 0.7) <sup>5,7</sup>	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 (1.54 ± 0.02)	Refer to repair Instruction 64 52 ...	64 50 6 917 364
X6/xDrive35i	All	All	700 ± 10 (1.54 ± 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 from 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