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A/C LUBRICANT SPECIFICATION & REPLACEMENT GUIDELINES

When it comes to A/C compressors these days, you never know what to expect in terms of the type and amount of lubricant inside. Some A/C compressors are shipped with mineral oil, some with PAG and some with Ester. Some compressors are shipped dry, while others contain enough lubricant for the entire A/C system. To be safe, it is always best to refer to the OE manufacturer's specifications when installing a new or remanufactured compressor. In the event that OE specifications are not available, the following information may be used as a guide.

Recommended Service Procedures

When major repairs are being performed, or if the total amount of lubricant in the A/C system is in question, it is a good service practice to liquid flush the entire system. This procedure insures that all components are free of debris/sludge as well as removing all the original lubricant. The proper amount of lubricant may then be added back into the A/C system. When adding lubricant to the A/C system, it is recommended that ½ of the total system capacity be placed in the compressor and the other ½ be placed in the accumulator dryer (A/D) or receiver dryer (R/D). For example, if the total capacity of an A/C system calls for 8 oz. of lubricant, put 4 oz. into the compressor and 4 oz. into the A/D or R/D. This helps to insure that the compressor does not start up "dry" and that the lubricant is distributed evenly throughout the system. ***Once the lubricant is added to the compressor and the hoses are reattached, it is critical that the compressor shaft be rotated manually a minimum of 10 times.*** This procedure prevents "oil slugging" during startup which in turn prevents potential internal damage to the compressor.

Determine Lubricant Type

To determine the type of lubricant used in an A/C system, once again, it is best to refer back to the OE manufacturer's specifications. However, there are general guidelines that may be observed in their absence. If R-12 is the refrigerant being used, it is a safe bet that mineral oil is the lubricant. If the system being serviced is a 1993 or older vehicle, more than likely R-12 is the refrigerant being used and mineral oil is the lubricant. If the system is 1995 or newer, R-134a and PAG will be the factory fill. In 1994, the transition was in full swing from R-12 to R-134a so there were both R-12 and R-134a vehicles being produced. If the vehicle being serviced has been retrofitted from R-12 to R-134a, Ester has been the most popular lubricant choice. However, bear in mind that PAGs were recommended by the OE's for a retrofit lubricant so look for the retrofit service label under the hood of the vehicle to help identify which lubricant was used.

Determine Lubricant Viscosity

After determining the type of lubricant in the A/C system (mineral oil, Ester or PAG), it is important to determine the viscosity. There was one predominant viscosity of mineral oil used with R-12 A/C systems which was 525 SUS (Saybolt Universal Seconds). When R-134a was introduced to the A/C industry, synthetic lubricants known as PAGs and Esters were chosen that used viscosity ratings known as ISO (International Organization for Standardization). The most popular viscosity for Ester today is an ISO 100. PAG lubricants may be found in 3 different viscosities – ISO 46, 100 and 150. Depending on the auto manufacturer, the PAG to be used in a particular vehicle may vary. If the OE specifications are not available, some technicians have chosen to use PAG 100 in all factory R-134a A/C systems because of its universal viscosity and for the convenience of not having to stock 3 different viscosities. For additional information on the OEM recommendation for PAG viscosity by vehicle/compressor model, see the Johnsen's R-134a OEM A/C Lubricant Specifications Guide below.

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A/C Lubricant Capacity Guide

Refer to the OEM specifications if available. If not, the chart listed below is a total system capacity guideline.

COMPRESSOR MFG.	*COMPRESSOR MODEL*	*TOTAL SYSTEM CAPACITY*
Bosch		6 oz.
Chrysler	C171	9 oz.
Chrysler	A590	9 oz.
Chrysler	6C17	8 oz.
Ford	FS6, FX15, FS10	10 oz.
Harrison	A6	11 oz.
Harrison	R-4	8 oz.
Harrison	HR6, DA6, HR6H	8 oz.
Harrison	V5	8 oz.
Hitachi	Axial	10 oz.
Hitachi	Radial	oz.
Matsushita		5 oz.
Mitsubishi		6 oz.
Nihon Calsonic		5 oz.
Nippondenso	6P	7 oz.
Nippondenso	10P	8 oz.
Nippondenso	6E	13 oz.
Nippondenso	2 Cyl. Upright	6 oz.
Panasonic	NA130	5 oz.
Sanden	SD508	6 oz.
Sanden	SD510, 709	5 oz.
Sanden	TR 70	4 oz.
Sanden	TR 105	7 oz.
Seiko-Seiki		5 oz.
Seltec		5 oz.
	HG 850	11 oz.
	HG 1000	11 oz.
York	206	11 oz.
York	209, 210	11 oz.
	DCV, DKV, KC-	5 oz.
	DCW, DKS	6 oz.

If simply replacing an A/C component, use this as a guideline for oil replacement:

Component	Amount Of Lubricant To Add
Accumulator	2 oz.
Condenser	1 oz.
Evaporator	2 oz.
Filter Drier	1 oz.

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JOHNSEN'S R-134a OEM A/C LUBRICANT SPECIFICATIONS

OEM	*COMPRESSOR MFG.*	*COMPRESSOR MODEL*	*OEM P/N*	*OEM LUBRICANT*	*ISO VISCOSITY*	*JOHNSEN'S PRODUCT*
Acura	Denso	10P, 10PA	38899-PR7-A01, 38899-POA-A10	ND8	46	PAG 46
Alfa Romero	Denso	SC8		ND8	46	PAG 46
	Sanden	SDV		SP10	46	PAG 46
Audi	Denso	7SB, 10P	G-052-200-A2	ND8	46	PAG 46
	Sanden	SDV		SP10	46	PAG 46
	Zexel (Diesel Kiki,Tama)	DCW17	G-052-300-A2	ZXL100	46	PAG 46
BMW	Denso	7SB,10P,10PA	82-11-1-468-042	ND8	46	PAG 46
	Seiko-Seiki			SP20	100	PAG 100
Caterpillar	Sanden	SD		SP20	100	PAG 100
Chrysler/Jeep	Mitsubishi	FX80, FXA80, FX105, FX105VS, MSC105	82300592	PAG 56	46	PAG 46
	Denso	6C17,10P(A)	82300102	ND8	46	PAG 46
	Sanden	SD709,7H15	82300349	SP20	100	PAG 100
	Sanden	TRS-090, 105	82300350, 04886129AA	SP10, SP15	46	PAG 46
Citroen	Harrison	V5		UCON-488	133	PAG 150
	Sanden	SD		SP20	100	PAG 100
	Sanden	SDV		SP10	46	PAG 46
Ferrari	Sanden	SDV		SP10	46	PAG 46
Fiat	Denso	SC8		ND8	46	PAG 46
	Sanden	SD		SP20	100	PAG 100
Ford	Ford	FS10, FX15, FS6	F2AZ-19577-AC	YN-12a, YN-12b	46	PAG 46
	Harrison	A6		UCON-488	133	PAG 150
	Denso	10P		ND8	46	PAG 46
	Panasonic				46	PAG 46
	Sanden	SD		SP20	100	PAG 100
	Sanden	TR, TRS		SP10	46	PAG 46
General Motors	Harrison	A6, R4, HR6	12345923	UCON-488	133	PAG 150
	Harrison	V5	12346305	UCON-488	133	PAG 150
	Denso	10P, 10PA		ND8	46	PAG 46
	Denso	TV	08885-09117	ND9	150	PAG 150
	Sanden	SD		SP20	100	PAG 100
Honda	Denso	10P, 10PA	38897-PR7-A01AH	ND8	46	PAG 46
	Sanden	TR	38897-P13-A01AH	SP10	46	PAG 46
Hyundai	Ford	FS10, FX15		YN-12a, YN-12b	46	PAG 46
	Denso	10P, 10PA		ND8	46	PAG 46
	Sanden	SD709		SP20	100	PAG 100
	Sanden	TR-090		SP10	46	PAG 46
Infiniti	Calsonic	V6	KLHOO-PAGS1, KLHOO-PAGS2	PAG S (ZXL100)	46	PAG 46
	Zexel (Diesel Kiki,Tama)	DKS-16H	KLHOO-PAGS1, KLHOO-PAGS2	PAG S	46	PAG 46
	Zexel (Diesel Kiki,Tama)	DKV-14C	KLHOO-PAGR1, KLHOO-PAGR2	PAG R	100	PAG 100
Isuzu	Zexel (Diesel Kiki,Tama)	KC50		ZXL200	100	PAG 100
J.I. Case	Sanden	SD		SP20	100	PAG 100
Jaguar	Harrison	A6		UCON-488	133	PAG 150
	Denso	10PA		ND8	46	PAG 46
	Sanden	SD510, SD709		Ester	100	Ester
John Deere	Denso	10P		ND8	46	PAG 46
Lamborghini	Sanden	SD		SP20	100	PAG 100

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JOHNSEN'S R-134a OEM
A/C LUBRICANT SPECIFICATIONS (continued)

OEM	*COMPRESSOR MFG.*	*COMPRESSOR MODEL*	*OEM P/N*	*OEM LUBRICANT*	*ISO VISCOSITY*	*JOHNSEN'S PRODUCT*
Lancia	Denso	6CA17		ND8	46	PAG 46
	Sanden	SD7		SP20	100	PAG 100
Land Rover	Sanden	SD7		Ester	100	Ester
Lotus	Sanden	SD7		SP20	100	PAG 100
Mack	Sanden	SD		SP20	100	PAG 100
Mazda	Denso		W257-61-K39	ND8	46	PAG 46
	Denso		FD15-61-K39	ND9	150	PAG 150
	Panasonic		H760-61-K39	DS-83P (ZXL100)	46	PAG 46
	Sanden		UHY8-61-K39	SP20	100	PAG 100
	Zexel (Diesel Kiki,Tama)		H760-61-K39	ZXL100PG	46	PAG 46
Mercedes-Benz	Harrison	A6, R4		UCON-488	133	PAG 150
	Denso	6SE, 7SB, 10P, 10PA	001-989-08-03	ND8	46	PAG 46
	Sanden	SD6V		SP10	46	PAG 46
	York	210		Ester	100	Ester
M-B Smart Car	Seiko-Seiki			SP20	100	PAG 100
Mitsubishi	Mitsubishi	FX80, FXA80, FX105, FX105VS, MSC105	82300592	PAG-56	46	PAG 46
	Denso	10P		ND8	46	PAG 46
New Holland	Sanden	SD		SP20	100	PAG 100
Nissan	Atsugi	NVR140S	KLHOO-PAGR1, KLHOO-PAGR2	Type R	100	PAG 100
	Calsonic	V6	KLHOO-PAGS1, KLHOO-PAGS2	PAG S (ZXL100)	46	PAG 46
	Ford	FS10, FX15	KLHOO-PAGQF	FD46	46	PAG 46
	Hitachi	MJS170	KLHOO-PAGS1, KLHOO-PAGS2	PAG S(ZXL100)	46	PAG 46
	Seiko-Seiki			SP20	100	PAG 100
	Zexel (Diesel Kiki,Tama)	DKS-16H	KLHOO-PAGS1, KLHOO-PAGS2	PAG S (ZXL100)	46	PAG 46
	Zexel (Diesel Kiki,Tama)	DKV-14C	KLHOO-PAGR1, KLHOO-PAGR2	Type R, ZXL200	100	PAG 100
Opel	Harrison	V5		UCON-488	133	PAG 150
	Denso	6CA		ND8	46	PAG 46
	Sanden	7SB		SP10	46	PAG 46
	Zexel (Diesel Kiki,Tama)	KC45, KC50			100	PAG 100
Peterbilt	Sanden	SD		SP20	100	PAG 100
Peugeot	Sanden	SD		SP20	100	PAG 100
	Sanden	SDV		SP10	46	PAG 46
Porsche	Denso	6P, 6E, 7SB, 10P, 10PA	PNA-573-001, PNA-573-002	ND8	46	PAG 46
Renault	Harrison	V5		UCON-488	133	PAG 150
	Sanden	SD		SP20	100	PAG 100
	Sanden	SDV		SP10	46	PAG 46
	Sanden	TR	38897-P13-A01AH	SP10	46	PAG 46
	Zexel (Diesel Kiki,Tama)	DKS-15CH		ZXL100, PAGR100	46	PAG 46
Rover	Denso	10PA		ND8	46	PAG 46
	Sanden	SD		SP20	100	PAG 100
	Sanden	SDV		SP10	46	PAG 46
Saab	Denso	7SB		ND8	46	PAG 46
	Sanden			Ester	100	Ester
	Seiko-Seiki		4074787	SP20	100	PAG 100
Saturn	Zexel (Diesel Kiki,Tama)	DKV	21030821	ZXL200PG	100	PAG 100

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JOHNSEN'S R-134a OEM A/C LUBRICANT SPECIFICATIONS (continued)

OEM	*COMPRESSOR MFG.*	*COMPRESSOR MODEL*	*OEM P/N*	*OEM LUBRICANT*	*ISO VISCOSITY*	*JOHNSEN'S PRODUCT*
Seat	Sanden	SDV		SP10	46	PAG 46
Skoda	Sanden	SD		SP20	100	PAG 100
Subaru	Calsonic		73019AA100	PAG R(ZXL200)	100	PAG 100
	Sanden			SP20	100	PAG 100
	Zexel (Diesel Kiki,Tama)	1993 MY	K0010FS100	ZXL200PG, PAG100	100	PAG 100
	Zexel (Diesel Kiki,Tama)	DKS-15CH(1992 MY)	73019AA110	ZXL100, PAGR100	46	PAG 46
Toyota	Denso	6P, 10P, 10PA	08885-09107	ND8	46	PAG 46
	Denso	TV	08885-09117	ND9	150	PAG 150
Vauxhall	Harrison	V5		UCON-488	133	PAG 150
Volkswagen	Sanden	7SB		SP10	46	PAG 46
	Sanden	SD508, SD510, SD709	G-052-154-A2	SP20	100	PAG 100
	Sanden	SDV710	G-052-100-A2	SP10	46	PAG 46
	Zexel (Diesel Kiki,Tama)	DCW		ZXL100	46	PAG 46
Volvo	Harrison	R4		UKON-488	133	PAG 150
	Sanden	SD508, SD510, SD709		Ester	100	Ester
	York	210		Ester	100	Ester
	Zexel (Diesel Kiki,Tama)	DKS-13		Ester	100	Ester
	Zexel (Diesel Kiki,Tama)	DKS-15CH		ZXL100, PAGR100	46	PAG 46

JOHNSEN'S R-134a A/C OIL CHARGES

PART #	*DESCRIPTION*	*VISCOSITY*	*STD PKG.*	*APPLICATIONS / COMMENTS*
6415	PAG Oil Charge	ISO 100	4 oz.	For use in Original Equipment or retrofitted R-134a A/C systems using PAG Lubricant. Convenient way to add 2 oz. of lubricant without discharging system.
6715	Ester Oil Charge	ISO 100	4 oz.	For use in retrofitted R-134a A/C systems using Ester Lubricant. Convenient way to add 2 oz. of lubricant without discharging system.

MISC. JOHNSEN'S A/C OILS

PART #	*DESCRIPTION*	*VISCOSITY*	*STD PKG.*	*APPLICATIONS / COMMENTS*
6912	Refrigeration Oil	500 SUS	Qt. / Gal.	All R-12 A/C Systems
6915	Vacuum Pump Oil	170 SUS	12 oz.	All R-12 and R-134a Vacuum pumps (Oil sump types)

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