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# Section 1001

## STANDARD TORQUE SPECIFICATIONS FOR 9000 SERIES EXCAVATORS



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### TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.


Grade 5 Bolts, Nuts, and Studs		
  		
Size	Pound-Feet	Newton metres
1/4 in	9-11	12-15
5/16 in	17-21	23-28
3/8 in	35-42	48-57
7/16 in	54-64	73-87
1/2 in	80-96	109-130
9/16 in	110-132	149-179
5/8 in	150-180	203-244
3/4 in	270-324	366-439
7/8 in	400-480	542-651
1.0 in	580-696	787-944
1-1/8 in	800-880	1085-1193
1-1/4 in	1120-1240	1519-1681
1-3/8 in	1460-1680	1980-2278
1-1/2 in	1940-2200	2631-2983


Grade 8 Bolts, Nuts, and Studs		
  		
Size	Pound-Feet	Newton metres
1/4 in	12-15	16-20
5/16 in	24-29	33-39
3/8 in	45-54	61-73
7/16 in	70-84	95-114
1/2 in	110-132	149-179
9/16 in	160-192	217-260
5/8 in	220-264	298-358
3/4 in	380-456	515-618
7/8 in	600-720	814-976
1.0 in	900-1080	1220-1465
1-1/8 in	1280-1440	1736-1953
1-1/4 in	1820-2000	2468-2712
1-3/8 in	2380-2720	3227-3688
1-1/2 in	3160-3560	4285-4827
NOTE: Use thick nuts with Grade 8 bolts.		

## TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or molydisulfide grease or oil is used.

<b>Grade 8.8 Bolts, Nuts, and Studs</b> 		
Size	Pound-Feet	Newton metres
M6	6-7	8-9
M8	14-17	20-23
M10	29-34	39-46
M12	50-59	68-80
M16	128-149	173-202
M20	249-291	337-393
M22	342-399	464-541
M24	431-503	584-681
M27	637-743	864-1008
M30	863-1007	1170-1365
M33	1180-1377	1600-1867
M36	1977-2307	2680-3127
M42	2434-2840	3300-3850
M45	3054-3563	4140-4830
M48	3658-4268	4960-5787
M52	4757-5549	6450-7525
M56	5908-6893	8010-9345
M64	8925-10413	12100-14117

<b>Grade 10.9 Bolts, Nuts, and Studs</b> 		
Size	Pound-Feet	Newton metres
M6	8-10	11-13
M8	20-24	28-32
M10	41-47	55-64
M12	71-83	96-112
M16	178-208	242-282
M20	350-408	475-554
M22	481-561	652-761
M24	606-707	821-958
M27	900-1050	1220-1423
M30	1217-1420	1650-1925
M33	1667-1945	2260-2637
M36	2124-2478	2880-3360
M39	2773-3235	3760-4387
M42	3422-3992	4640-5413
M45	4293-5009	5820-6790
M48	5141-5998	6970-8132
M52	6690-7805	9070-10582
M56	8334-9723	11300-13183
M64	12612-14714	17100-19950

### Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.



## TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
<b>37 Degree Flare Fittings</b>			
1/4 in 6.4 mm	7/16-20	6-12	8-16
5/16 in 7.9 mm	1/2-20	8-16	11-22
3/8 in 9.5 mm	9/16-18	10-25	14-34
1/2 in 12.7 mm	3/4-16	15-42	20-57
5/8 in 15.9 mm	7/8-14	25-58	34-79
3/4 in 19.0 mm	1-1/16-12	40-80	54-108
7/8 in 22.2 mm	1-3/16-12	60-100	81-135
1.0 in 25.4 mm	1-5/16-12	75-117	102-158
1-1/4 in 31.8 mm	1-5/8-12	125-165	169-223
1-1/2 in 38.1 mm	1-7/8-12	210-250	285-338

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
<b>Straight Threads with O-ring</b>			
1/4 in 6.4 mm	7/16-20	12-19	16-26
5/16 in 7.9 mm	1/2-20	16-25	22-34
3/8 in 9.5 mm	9/16-18	25-40	34-54
1/2 in 12.7 mm	3/4-16	42-67	57-91
5/8 in 15.9 mm	7/8-14	58-92	79-124
3/4 in 19.0 mm	1-1/16-12	80-128	108-174
7/8 in 22.2 mm	1-3/16-12	100-160	136-216
1.0 in 25.4 mm	1-5/16-12	117-187	159-253
1-1/4 in 31.8 mm	1-5/8-12	165-264	224-357
1-1/2 in 38.1 mm	1-7/8-12	250-400	339-542

<b>Split Flange Mounting Bolts*</b>		
Size	Pound- Feet	Newton metres
5/16-18	15-20	20-27
3/8-16	20-25	27-34
7/16-14	35-45	47-61
1/2-13	55-65	74-88
5/8-11	140-150	190-203

*\*NOTE: Use standard metric hardware torque for metric split flange mounting bolts.*

# TORQUE SPECIFICATIONS - O-RING FACE SEAL FITTINGS

Nom. SAE Dash Size	Tube OD	Thread Size	Pound- Feet	Newton metres	Thread Size	Pound- Feet	Newton metres
O-ring Face Seal End					O-ring Boss End Fitting or Lock Nut		
-4	1/4 in 6.4 mm	9/16-18	10-12	14-16	7/16-20	17-20	23-27
-6	3/8 in 9.5 mm	11/16-16	18-20	24-27	9/16-18	25-30	34-41
-8	1/2 in 12.7 mm	13/16-16	32-40	43-54	3/4-16	45-50	61-68
-10	5/8 in 15.9 mm	1-14	46-56	62-76	7/8-14	60-65	81-88
-12	3/4 in 19.0 mm	1-3/16-12	65-80	90-110	1-1/16-12	85-90	115-122
-14	7/8 in 22.2 mm	1-3/16-12	65-80	90-110	1-3/16-12	95-100	129-136
-16	1.0 in 25.4 mm	1-7/16-12	92-105	125-140	1-5/16-12	115-125	156-169
-20	1-1/4 in 31.8 mm	1-11/16-12	125-140	170-190	1-5/8-12	150-160	203-217
-24	1-1/2 in 38.1 mm	2-12	150-180	200-254	1-7/8-12	190-200	258-271



# Section 1002

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## FLUIDS AND LUBRICANTS



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**NOTE:** The J I Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

## CAPACITIES AND LUBRICANT SPECIFICATIONS

### Fuel Tank

Capacity ..... 63.4 U.S. gallons (240 litres)  
 Type of fuel ..... See Diesel Fuel on page 6

### Engine Oil Capacity

Capacity with filter change ..... 11.6 U.S. quarts (11 litres)  
 Type of Lubricant ..... Case IH Engine Oil, see Engine Lubrication on page 5

### Engine Cooling System

Capacity ..... 5 U.S. gallons (18.9 litres)  
 Type of coolant ..... Use a mixture of 55% ethylene glycol and 45% water.  
 If lowest ambient temperature will be below -34°F (1.11°C) adjust the mixture.

### Hydraulic Reservoir

Tank capacity ..... 21.9 U.S. gallons (83 litres)  
 System capacity ..... 41.4 U.S. gallons (157 litres)  
 Type of fluid ..... See Hydraulic Oil Chart on page 4

### Swing Gearbox

Capacity ..... 1.8 U.S. quarts (1.7 litres)  
 Type of lubricant ..... Case IH 135H EP Gear Lube

### Swing Ring Gear

Capacity ..... 22 pounds (10 kg)  
 Type of lubricant ..... Case No. 2 Lithium Grease

### Turntable Bearing

Capacity ..... As required  
 Type of lubricant ..... Case No. 2 Lithium Grease

### Final Drives

Capacity ..... 2.8 U.S. quarts (2.5 litres)  
 Type of lubricant ..... Case IH 135H EP Gear Lube

### Track Roller

Capacity ..... 5.3 ounces (160 cc)  
 Type of lubricant ..... Shell Rimula Oil No. 30 or equivalent to API Class CD, SAE 30

### Carrier Roller

Capacity ..... 3.6 ounces (110 cc)  
 Type of lubricant ..... Shell Rimula Oil No. 30 or equivalent to API Class CD, SAE 30

### Idler Wheel

Capacity ..... 4.6 ounces (140 cc)  
 Type of lubricant ..... Shell Rimula Oil No. 30 or equivalent to API Class CD, SAE 30

### Track Adjustment Cylinder

Capacity ..... As required  
 Type of lubricant ..... Case No. 2 Lithium Grease

### Grease Fitting

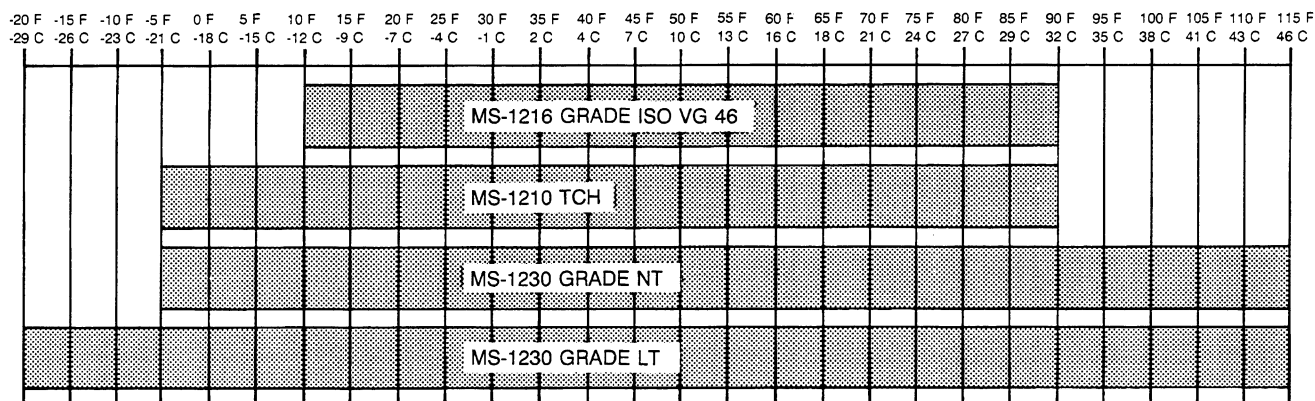
Type of lubricant ..... Case No. 2 Lithium Grease

### Batteries

Capacity ..... As required  
 Type of lubricant ..... Use drinking or distilled water

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**NOTE:** Case specification MS-1210 TCH Fluid is used in place of ISO VG 32 (-5° to +65°F) and ISO VG 46 (+10° to +90°F).

Case specifications MS-1230 Grade NT or Grade LT is used in place of ISO VG 32 (-5° to +65°F), ISO VG 46 (+10° to +90°F), ISO VG 100 (+30° to 115°F), and MS-1210 TCH.

## ENGINE LUBRICATION

### Engine Oil Selection

Case No. 1 Engine Oil is recommended for use in your Case Engine. Case Engine Oil will lubricate your engine correctly under all operating conditions.



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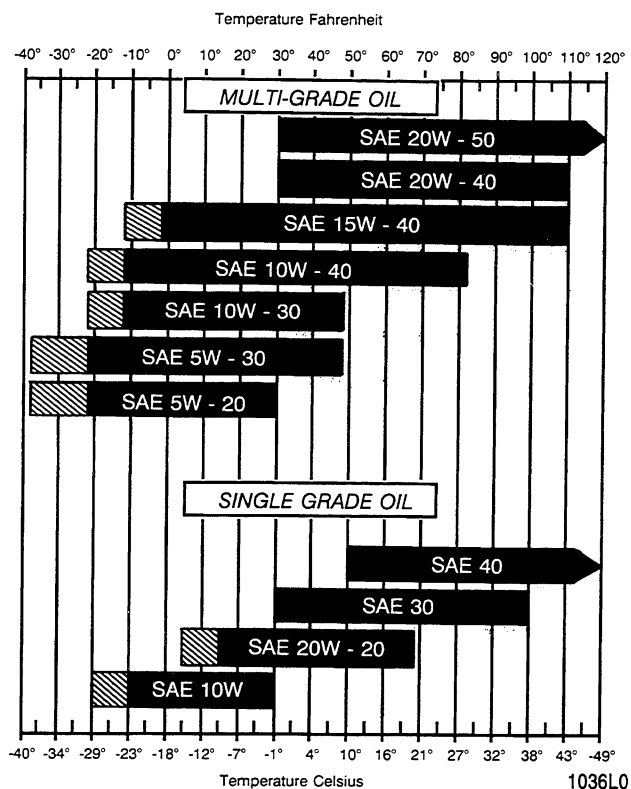
If Case No. 1 Multi-Viscosity or Single Grade Engine Oil is not available, use only oil meeting API engine oil service category CE.



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**NOTE:** Do not put Performance Additives or other oil additive products in the engine crankcase. The oil change intervals given in this manual are according to tests with Case lubricants.

### Oil Viscosity/Temperature Ranges



**NOTE:** Use of an engine oil pan heater or an engine coolant heater is required when operating temperatures are in the crosshatched area.



DIESEL FUEL

Use No. 2 diesel fuel in the engine of this machine. The use of other fuels can cause the loss of engine power and high fuel consumption.

In very cold temperatures, a mixture of No. 1 and No. 2 diesel fuels is temporarily permitted. See the following Note.

**NOTE:** See your fuel dealer for winter fuel requirements in your area. If the temperature of the fuel lowers below the cloud point (wax appearance point), wax crystals in the fuel will cause the engine to lose power or not start.

The diesel fuel in this machine must meet the specifications in the chart below or Specification D975-81 of the American Society for Testing and Materials.

Fuel Storage


If you keep fuel in storage for a period of time, you can get foreign material or water in the fuel storage tank. Many engine problems are caused by water in the fuel.

Keep the fuel storage tank outside and keep the fuel as cool as possible. Remove water from the storage container at regular periods of time.

Fill the fuel tank at the end of the daily operating period to prevent condensation in the fuel tank.

Specifications for Acceptable No. 2 Diesel Fuel

API gravity, minimum .....	34
Flash point, minimum .....	140°F (60°C)
Cloud point (wax appearance point), maximum .....	-5°F (-20°C) See Note above
Pour point, maximum .....	-15°F (-26°C) See Note above
Distillation temperature, 90% point .....	540 to 640°F (282 to 338°C)
Viscosity, at 100°F (38°C)	
Centistokes .....	2.0 to 4.3
Saybolt Seconds Universal .....	32 to 40
Cetane number, minimum .....	43 (45 to 55 for winter or high altitudes)
Water and sediment, by volume, maximum .....	0.05 of 1%
Sulfur, by weight, maximum .....	0.50 of 1%
Copper strip corrosion, maximum .....	No. 2
Ash, by weight, maximum .....	0.01 of 1%



Engine fuel is flammable and can cause a fire or an explosion. Do not fill the fuel tank or service the fuel system near an open flame, welding, burning cigars, cigarettes, etc.

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# Section

# 2001

## ENGINE REMOVAL AND INSTALLATION



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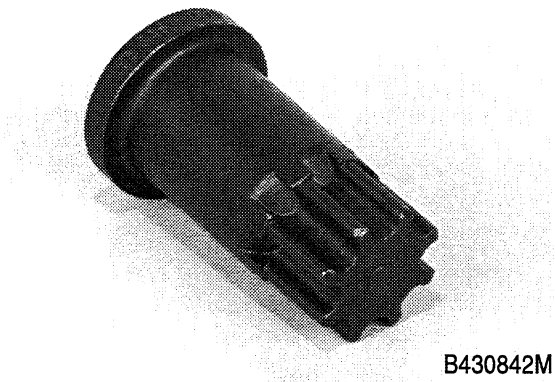
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**NOTE:** The J I Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

# SPECIFICATIONS

Cooling system capacity .....	18.7 U.S. quarts (17.7 litres)
Special torques	
Bolts that hold the engine mounts to the frame .....	195 to 231 pound-feet (264 to 313 Nm)
Cap screws that hold the rear engine mounts to the engine .....	71 to 83 pound-feet (96 to 112 Nm)
Cap screws that hold the front engine mounts to the engine .....	71 to 83 pound-feet (96 to 112 Nm)
Cap screws that hold the fan and the spacer to the engine .....	38 to 45 pound-feet (51 to 61 Nm)
Cap screws that hold the hydraulic pump to the flywheel housing .....	48 to 56 pound-feet (65 to 76 Nm)
Weight of the hydraulic pump .....	201 pounds (91 kg)
Weight of the engine .....	827 pounds (375 kg)

# SPECIAL TOOLS



CAS-1690 Tool used to rotate the flywheel.