

Medium & Heavy Duty Diesel

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MACK

GENERAL SPECIFICATIONS							
Engine	Cycle	Displ. Cu. Ins.	Compr. Ratio	Bore	Stroke	Firing Order	Inj. Timing ①
END475	4	475"	16.5:1	4.530"	4.920"	1,5,3,6,2,4	24.0°
ENDT475	4	475"	15.5:1	4.530"	4.920"	1,5,3,6,2,4	25.0°
ENDT673	4	672"	16.11:1	4.875"	6.000"	1,5,3,6,2,4	29.0°
ENDT673C	4	672"	14.99:1	4.875"	6.000"	1,5,3,6,2,4	28.0°
ENDT673E	4	672"	16.11:1	4.875"	6.000"	1,5,3,6,2,4	30.0°
ENDT/B675	4	672"	14.99:1	4.875"	6.000"	1,5,3,6,2,4	29.0°
ENDT/B676	4	672"	14.99:1	4.875"	6.000"	1,5,3,6,2,4	22.0°
END707	4	707"	15.21:1	5.000"	6.000"	1,5,3,6,2,4	30.0°
ENDT/B865	4	866"	15.7:1	5.250"	5.000"	1,5,4,8,6,3,7,2	25.0°
ENDT/B866	4	866"	15.7:1	5.250"	5.000"	1,5,4,8,6,3,7,2	25.0°

① — Unless otherwise noted, all Injection Timing is BTDC.

NORMAL OPERATING SPECIFICATIONS						
Engine	Idle RPM	Max. RPM	Oil Temp.	Oil Press.	Coolant Temp.	Compression Pressure (PSI) @ RPM (Sea Level)
END475	450	2600	.....	75	①170°	490-540@1000
ENDT475	500	2600	.....	75	①170°	430-470@1000
ENDT673	500-575	2280	.....	45-75	①170°	575@1000
ENDT673C	525-575	2280	.....	40-75	①170°	460@1000
ENDT673E	500-575	2280	.....	40-75	①170°	530@1000
ENDT/B675	500-575	2270	.....	40-75	①170°	460-1000
ENDT/B676	525-575	2310	.....	40-94	①170°	460@1000
END707	525-575	2285	.....	45-75	①170°	530@1000
ENDT/B865	600-650	2650	.....	40-95	①170°	②530@1000
ENDT/B866	600-650	2500	.....	40-95	①170°	③540@1000

① — Thermostat open temperature.

② — Prior to engine serial no. T865-7WO-030, 485@1000.

③ — Prior to engine serial no. T866-7WO-515, 485@1000

ROCKER ARMS & VALVE BRIDGES						
Engine	Rocker Shaft O.D.	Rocker Arm I.D.	Rocker Arm Clearance	Bridge Guide O.D.	Bridge I.D.	Bridge Height Above Head
END475	.8654-.8656"	.8661-.8669"	.0005-.0015"	.....	.....	.....
ENDT475	.8654-.8656"	.8661-.8669"	.0005-.0015"	.....	.....	.....
ENDT673	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"	.....	.....	.....
ENDT673C	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"	.....	.....	.....
ENDT673E	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"	.....	.....	.....
ENDT/B675	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"	.....	.....	.....
ENDT/B676	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"	.....	.....	.....
END707	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"	.....	.....	.....
ENDT/B865	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"
ENDT/B866	1.1286-1.1291"	1.1296-1.1301"	.0005-.0015"

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VALVES & SEATS								
Engine	Head Diameter	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Seat Insert O.D.	Valve Clearance
END475 Int.	2.170"	30°	29½°	.047-.059"	.....	.0060"	.....	.012"Hot .014"Cold
Exh.	1.854"	30°	29½°	.047-.059"	.....	.0060"	.....	.016"Hot .018"Cold
ENDT475 Int.	2.170"	30°	29½°	.047-.059"	.....	.0060"	.....	.012"Hot .014"Cold
Exh.	1.854"	30°	29½°	.047-.059"	.....	.0060"	.....	.026"Hot .028"Cold
ENDT673 Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0030-.0050"	2.4405-2.4415"	.014"Hot .016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.0855-2.0865"	.022"Hot .024"Cold
ENDT673C Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0030-.0050"	2.4405-2.4415"	.014"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.0855-2.0865"	.022"Hot .024"Cold
ENDT673E Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0030-.0050"	2.4405-2.4415"	.014"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.0855-2.0865"	.022"Hot .024"Cold
ENDT/B675 Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0030-.0050"	2.4405-2.4415"	.014"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.0855-2.0865"	.022"Hot .024"Cold
ENDT/B676 Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0020-.0040"	2.4405-2.4415"	.014"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.0855-2.0865"	.022"Hot .024"Cold
END707 Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0020-.0040"	2.4405-2.4415"	.014"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0020-.0040"	2.0855-2.0865"	.022"Hot .024"Cold
ENDT/B865 Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0020-.0040"	2.4370-2.4380"	.015"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.1760-2.1770"	.024"Hot .026"Cold
ENDT/B866 Int.	2.050"	30°	30°	.063-.094"	.4965-.4975"	.0020-.0040"	2.4370-2.4380"	.015"Hot ①.016"Cold
Exh.	1.690"	30°	30°	.063-.094"	.4955-.4965"	.0030-.0050"	2.1760-2.1770"	.024"Hot .026"Cold

① — Set valve clearance COLD STATIC ONLY on all B&C model engines which are equipped with Dynatard Engine Brake.

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CAMSHAFT			
Engine	Journal Diam.	Clearance	Lobe Lift
END475			
No.1	2.6825"	.0020-.0030"	.004-.010"
No.2	2.6800"	.0015-.0030"	.004-.010"
No.3	2.6750"	.0015-.0030"	.004-.010"
No.4	2.3600"	.0015-.0030"	.004-.010"
ENDT475			
No.1	2.6825"	.0020-.0030"	.004-.010"
No.2	2.6800"	.0015-.0030"	.004-.010"
No.3	2.6750"	.0015-.0030"	.004-.010"
No.4	2.3600"	.0015-.0030"	.004-.010"
ENDT673			
No.1-6	2.4390-2.4400"	.0015-.0045"	.008-.014"
No.7	2.2510-2.2520"	.0015-.0045"	.008-.014"
ENDT673C			
No.1-6	2.4390-2.4400"	.0015-.0045"	.008-.014"
No.7	2.2510-2.2520"	.0015-.0045"	.008-.014"
ENDT673E			
No.1-6	2.4390-2.4400"	.0015-.0045"	.008-.014"
No.7	2.2510-2.2520"	.0015-.0045"	.008-.014"
ENDT/B675			
No.1-6	2.4390-2.4400"	.0015-.0045"	.008-.014"
No.7	2.2510-2.2520"	.0015-.0045"	.008-.014"
ENDT/B676			
No.1-6	2.4390-2.4400"	.0010-.0050"	.008-.014"
No.7	2.2510-2.2520"	.0015-.0030"	.008-.014"
END707			
No.1-6	2.4390-2.4400"	.0020-.0040"	.008-.014"
No.7	2.2510-2.2520"	.0015-.0030"	.008-.014"
ENDT/B865	2.4390-2.4400"	.0010-.0050"	.008-.014"
ENDT/B866	2.4390-2.4400"	.0010-.0050"	.008-.014"

VALVE SPRINGS			
Engine	Free Length	Compressed Length	Lbs. @ Comp. Length
END475			
Inner	2.313"	1.250"	45
Outer	2.594"	1.406"	106
ENDT475			
Inner	2.313"	1.250"	45
Outer	2.594"	1.406"	106
ENDT673			
Inner	3.031"	2.031"	77.2
Outer	3.406"	2.156"	99
ENDT673C			
Inner	3.031"	2.031"	77.2
Outer	3.406"	2.156"	99
ENDT673E			
Inner	3.031"	2.031"	77.2
Outer	3.406"	2.156"	99
ENDT/B675			
Inner	3.031"	2.031"	77.2
Outer	3.406"	2.156"	99
ENDT/B676			
Inner	3.031"	2.031"	77.2
Outer	3.406"	2.156"	99
END707			
Inner	3.031"	2.156"	77.2
Outer	3.406"	2.156"	99
ENDT/B865	3.125"	2.563"	90
ENDT/B866	3.125"	2.563"	90

CYLINDER LINER & BORE			
Engine	Type	Liner Bore	Liner Protrusion
END475	Dry	4.5270"	.0027-.0040"
ENDT475	Dry	4.5270"	.0027-.0040"
ENDT673	Dry	4.8670-4.8770"	.0035-.0075"
ENDT673C	Dry	4.8670-4.8770"	.0035-.0075"
ENDT673E	Dry	4.8670-4.8770"	.0035-.0075"
ENDT/B675	Dry	4.8670-4.8770"	.0035-.0075"
ENDT/B676	Dry	4.8760-4.8770"	.0035-.0075"
END707	Dry	5.0010-5.0020"	.0035-.0075"
ENDT/B865	Wet	5.2415-5.2425"	.0005-.0045"
ENDT/B866	Wet	5.2415-5.2425"	.0005-.0045"

CONNECTING RODS & BEARINGS			
Engine	Journal Diameter	Bearing Clearance	Sideplay
END475	2.9510"	.0020-.0040"	.008-.010"
ENDT475	2.9510"	.0020-.0040"	.008-.010"
ENDT673	2.9970-2.9980"	.0011-.0036"	.006-.012"
ENDT673C	2.9970-2.9980"	.0011-.0036"	.006-.012"
ENDT673E	2.9970-2.9980"	.0011-.0036"	.006-.012"
ENDT/B675	2.9970-2.9980"	.0011-.0036"	.006-.012"
ENDT/B676	2.9970-2.9980"	.0011-.0039"	.007-.012"
END707	2.9970-2.9980"	.0011-.0031"	.007-.012"
ENDT/B865	3.7470-3.7480"	.0016-.0046"	.007-.0015"
ENDT/B866	3.7470-3.7480"	.0016-.0046"	.007-.015"

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CRANKSHAFT & MAIN BEARINGS						
Engine	Journal Diameter	Bearing Clearance	Crankshaft End Play	Thrust Location	Thrust Washer Thickness	Number of Main Bearings
END475	3.3465"	.0020-.0045"	.002-.010"	No.7	.....	7
ENDT475	3.3465"	.0020-.0045"	.002-.010"	No.7	.....	7
ENDT673①	3.9980-3.9990"	.0020-.0050"	.004-.010"	No.4	.090-.103"	7
ENDT/B675	3.9980-3.9990"	.0020-.0050"	.004-.010"	No.4	.090-.103"	7
ENDT/B676	3.9980-3.9990"	.0020-.0050"	.004-.010"	No.4	.090-.103"	7
END707	3.9980-3.9990"	.0020-.0050"	.004-.010"	No.4	.090-.103"	7
ENDT/B865	3.9980-3.9990"	.0026-.0056"	.004-.010"	No.3	.....	5
ENDT/B866	3.9980-3.9990"	.0026-.0056"	.004-.010"	No.3	.....	5

① — ENDT673 E&C Models have same specifications.

PISTONS, PINS, RINGS						
Engine	PISTONS		PINS		RINGS	
	Clearance	Piston Fit	Rod Fit	Rings	End Gap	Side Clearance
END475	.0060"	.0015-.0050"	.0005-.0015"	1	.020-.028"	①
				2	.012-.024"	.0025"
				3	.012-.024"	.0020"
				4	.012-.024"	.0016"
				5	.012-.024"	.0016"
ENDT475	.0060"	.0015-.0050"	.0005-.0015"	1	.020-.028"	①
				2	.012-.024"	.0025"
				3	.012-.024"	.0020"
				4	.012-.024"	.0016"
				5	.012-.024"	.0016"
ENDT673	.0075-.0085"	.0003"	.0011-.0016"	1	.013-.025"	①
				2	.013-.025"	①
				3	.013-.025"	.0020-.0060"
				4	.013-.025"	.0010-.0045"
				5	.013-.025"	.0016"
ENDT673C	.0075-.0085"	.0003"	.0011-.0016"	1	.013-.025"	①
				2	.013-.025"	①
				3	.013-.025"	.0020-.0060"
				4	.013-.025"	.0010-.0045"
				5	.013-.025"	.0016"
ENDT673E	.0075-.0085"	.0003"	.0011-.0016"	1	.013-.025"	①
				2	.013-.025"	①
				3	.013-.025"	.0020-.0060"
				4	.013-.025"	.0010-.0045"
				5	.013-.025"	.0016"
ENDT/B675	.0075-.0085"	.0003"	.0011-.0016"	1	.013-.025"	①
				2	.013-.025"	①
				3	.013-.025"	.0020-.0060"
				4	.013-.025"	.0010-.0045"
				5	.013-.025"	.0016"
ENDT/B676	.0015-.0060"	.0011-.0039"	.0011-.0016"	1	.013-.025"	.0057"
				2	.013-.025"	.0052"
				3	.013-.025"	.0015-.0035"
				4	.013-.025"	①
				5	.013-.025"	①
END707	.0090-.0100"	.0001-.0002"	.0008-.0012"	1	.013-.025"	①
				2	.013-.025"	①
				3	.013-.025"	①
				4	.013-.025"	.0010-.0045"
				5	.013-.025"	.0016"
ENDT/B865	.0080"	.0004-.0007"	.0008-.0055"	1	.020-.030"	.0060"
				2	.020-.030"	.0060"
				3	.016-.026"	.0060"
				4	.018-.028"	.0040-.0050"
				5	.018-.028"	.0040-.0050"

① — Ring should be snug in groove with no visible side play.

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OIL PUMP SPECIFICATIONS

END475, ENDT475

Type	Rotor
Clearance Bushing-to-Inner Rotor Shaft0015-.0025"
Drive Gear-to-Idler Gear Backlash .....	.0020-.0040"
Idler Gear-to-Crankshaft Gear Backlash .....	.0020-.0040"

Type	Gear
Clearance Pump Gear-to-Housing .....	.0020-.0040"

ENDT673, ENDT673C, ENDT673E ENDT/B675

Type	Gear
Clearance Gear-to-Side, Cavity .....	.0035-.0060"
Clearance Gear-to-Cover .....	.0025-.0050"
Pump Gear Backlash .....	.0235-.0295"
Pump Gear-to-Pump Driven Gear Backlash .....	.0072-.0138"
Pump Spring	
Compressed Length @40 lbs.	3.078"
Free Length	3.875"
Pressure Relief Valve Opening	65-100psi

ENDT/B676

Type	Gear
Clearance Gear-to-Side, Cavity .....	.0035-.0060"
Clearance Gear-to-Cover .....	.0025-.0050"
Pump Gear Backlash .....	.0235-.0295"
Pump Gear-to-Pump Driven Gear Backlash .....	.0072-.0138"
Pump Spring	
Compressed Length @40 lbs.	3.078"
Free Length	3.469"
Pressure Relief Valve Opening	65-100psi

END707

Type	Gear
Clearance Gear-to-Housing Side .....	.0025-.0045"
Clearance Gear-to-Housing End .....	.0015-.0020"
Gear Backlash .....	.0270"max
Pump Spring	
Compressed Length @40 lbs.	3.078"
Free Length	3.469"

ENDT/B865, ENDT/B866

Type	Gear
Drive Gear-to-Idler Gear Backlash .....	.0050-.0070"
Clearance Gear-to-Housing Cover .....	.0025-.0050"
Clearance Gear-to-Side, Cavity .....	.0035-.0060"
Pump Gear Backlash .....	.0250-.0290"
Idler Gear-to-Crankshaft Gear Backlash .....	.0032-.0058"
Idler Gear Bushing Bore	1.0015-1.0025"
Idler Gear End Clearance .....	.0015-.0040"
Pump Spring	
Compressed Length @72.75 lbs.	3.085"
Free Length	4.275"
Relief Valve Spring	
Compressed Length @29.7 lbs.	3.875"
Free Length	4.875"

TIGHTENING SPECIFICATIONS

NOTE — Use minimum two steps to torque all nuts and bolts.

END475, ENDT475

Application	Ft. Lbs.
Cylinder Head Nuts ^⓪	140
Main Bearing Cap Nuts	150
Connecting Rod Bearing Cap Bolts	80
Vibration Damper-to-Crankshaft	542
Camshaft Gear Retaining Nut	220
Flywheel Bolts	149

^⓪ — See cylinder head tightening sequence.

ENDT673, ENDT673C, ENDT673E ENDT/B675

Application	Ft. Lbs.
Cylinder Head Nuts ^⓪	175
Main Bearing Cap Bolts	
1 1/16" Bolt	200
5/8" Bolt	150
Connecting Rod Bearing Cap Bolts	150
Vibration Damper-to-Crankshaft	300
Flywheel Bolts	150-175

^⓪ — See cylinder head tightening sequence.

ENDT/B676

Application	Ft. Lbs.
Cylinder Head Nuts ^⓪	175
Main Bearing Cap Bolts	
1 1/16" Bolt	200
5/8" Bolt	150
Connecting Rod Bearing Cap Bolts	150
Vibration Damper-to-Crankshaft	300
Flywheel Bolts	150

^⓪ — See cylinder head tightening sequence.

END707

Application	Ft. Lbs.
Cylinder Head Nuts ^⓪	175
Main Bearing Cap Bolts	200
Connecting Rod Bearing Cap Bolts	150
Vibration Damper-to-Crankshaft	275
Flywheel Bolts	150-175

^⓪ — See cylinder head tightening sequence.

ENDT/B865, ENDT/B866

Application	Ft. Lbs.
Cylinder Head Bolts ^⓪	225
Main Bearing Cap Bolts	350
Connecting Rod Bearing Cap Bolts	150
Vibration Damper-to-Crankshaft	300
Flywheel Bolts	150

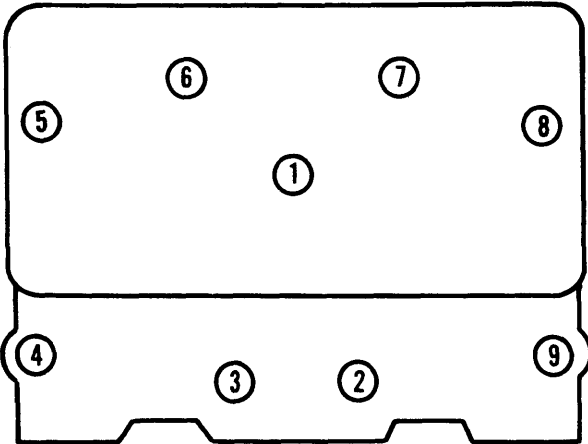
^⓪ — See cylinder tightening sequence.

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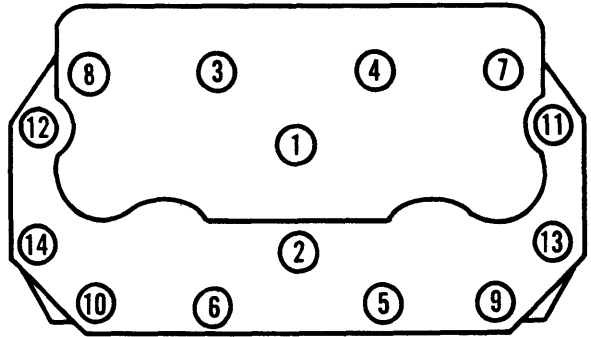
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CYLINDER HEAD TIGHTENING SEQUENCE

END475, ENDT475



ENDT/B865, ENDT/B866



ENDT673, ENDT673C, ENDT673E
ENDT/B675, ENDT/B676
END707

