

**PERFORMANCE DATA [SDN00908]****APRIL 14, 2021**For Help Desk Phone Numbers [Click here](#)

Perf No: EM0402

Change Level: 03

[General](#)[Heat Rejection](#)[Sound](#)[Emissions](#)[Regulatory](#)[Cross Reference](#)[Supplementary Data](#)[Perf Param Ref](#)[View PDF](#)

<b>SALES MODEL:</b>	C32	<b>COMBUSTION:</b>	DIRECT INJECTION
<b>BRAND:</b>	CAT	<b>ENGINE SPEED (RPM):</b>	1,800
<b>ENGINE POWER (BHP):</b>	660	<b>PEAK TORQUE SPEED (RPM):</b>	1,300
<b>PEAK TORQUE (FT-LB):</b>	2,449.4	<b>TORQUE RISE (%):</b>	27
<b>COMPRESSION RATIO:</b>	16.5	<b>ASPIRATION:</b>	TA
<b>RATING LEVEL:</b>	A RATING (UNRESTRICTED CONTINUOUS)	<b>AFTERCOOLER TYPE:</b>	SCAC
<b>PUMP QUANTITY:</b>	1	<b>AFTERCOOLER CIRCUIT TYPE:</b>	JW+OC, AC
<b>FUEL TYPE:</b>	DIESEL	<b>AFTERCOOLER TEMP (F):</b>	126
<b>MANIFOLD TYPE:</b>	WET	<b>JACKET WATER TEMP (F):</b>	185
<b>ELECTRONICS TYPE:</b>	ADEM4	<b>TURBO CONFIGURATION:</b>	PARALLEL
<b>IGNITION TYPE:</b>	CI	<b>TURBO QUANTITY:</b>	2
<b>INJECTOR TYPE:</b>	EUI	<b>TURBOCHARGER MODEL:</b>	S410W021-1.04
<b>REF EXH STACK DIAMETER (IN):</b>	10	<b>CERTIFICATION YEAR:</b>	2007
<b>MAX OPERATING ALTITUDE (FT):</b>	984	<b>PISTON SPD @ RATED ENG SPD (FT/MIN):</b>	1,913.4

INDUSTRY	SUB INDUSTRY	APPLICATION
MARINE	DREDGE	MARINE PROPULSION
MARINE	FERRY	MARINE PROPULSION
MARINE	OFFSHORE	MARINE PROPULSION
MARINE	GENERAL CARGO	MARINE PROPULSION
MARINE	TUG & SALVAGE	MARINE PROPULSION
MARINE	FISHING	MARINE PROPULSION
MARINE	INLAND WATERWAY	MARINE PROPULSION

**General Performance Data** [Top](#)**MAXIMUM LIMIT**

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
1,800	660	1,925	148	0.343	31.9	32.2	136.3	776.6	31.9	555.7
1,700	660	2,038	157	0.340	31.6	31.5	136.0	803.2	29.5	585.2
1,600	660	2,166	167	0.339	31.6	31.1	135.1	834.2	27.4	613.1
1,500	660	2,310	178	0.339	31.6	30.5	132.3	872.9	25.5	642.7
1,400	637	2,390	184	0.344	30.9	29.4	134.2	911.5	22.9	680.9
1,300	603	2,438	188	0.352	30.0	28.1	133.8	964.3	20.4	728.5
1,200	512	2,242	173	0.353	25.5	21.7	131.5	939.8	15.1	733.7
1,100	429	2,049	158	0.348	21.1	15.5	128.6	899.5	10.5	711.8
1,000	422	2,219	171	0.340	20.2	12.9	127.8	928.5	8.1	732.8
900	329	1,917	148	0.336	15.6	8.5	122.2	844.0	5.3	665.3
800	306	2,007	155	0.336	14.5	7.3	116.7	851.1	4.2	659.5
700	248	1,861	143	0.337	11.8	5.5	110.5	787.8	3.2	605.5
600	188	1,643	127	0.340	9.0	4.2	105.5	694.8	2.7	540.2

**MAXIMUM LIMIT**

ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
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ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,800	660	33	249.8	1,799.5	3,488.1	7,799.4	8,025.5	1,689.1	1,568.9
1,700	660	32	246.4	1,694.9	3,374.9	7,318.5	7,543.2	1,588.1	1,470.1
1,600	660	32	242.0	1,604.0	3,266.4	6,888.5	7,112.5	1,497.1	1,380.9
1,500	660	31	238.7	1,511.3	3,162.7	6,468.8	6,692.5	1,410.6	1,294.8
1,400	637	30	234.3	1,396.0	3,011.5	5,948.7	6,167.6	1,298.2	1,186.4
1,300	603	29	230.4	1,276.0	2,863.7	5,417.5	5,630.0	1,185.0	1,077.6
1,200	512	22	201.6	1,056.0	2,380.4	4,462.2	4,643.2	980.7	888.8
1,100	429	16	171.4	857.0	1,892.7	3,601.3	3,750.8	794.4	718.7
1,000	422	13	158.8	730.4	1,633.3	3,055.3	3,198.9	673.4	603.4
900	329	9	134.0	590.7	1,244.1	2,457.9	2,568.5	543.7	489.8
800	306	7	127.2	506.9	1,068.0	2,101.7	2,204.5	469.2	420.1
700	248	6	116.5	427.9	853.4	1,773.0	1,856.6	393.9	353.8
600	188	4	110.4	363.3	674.6	1,511.3	1,575.0	331.7	300.0

**PROP DEMAND CURVE P**

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
1,800	660	1,925	148	0.343	31.9	32.2	136.3	776.6	31.9	555.7
1,700	556	1,717	132	0.346	27.1	26.3	134.4	753.6	25.1	557.2
1,600	463	1,521	117	0.348	22.8	20.5	132.4	728.6	19.1	554.3
1,500	382	1,337	103	0.350	18.8	15.6	130.3	697.0	14.4	543.2
1,400	310	1,165	90	0.355	15.5	11.6	128.2	660.1	10.9	520.6
1,300	249	1,004	77	0.368	12.9	8.9	125.6	623.6	8.5	502.5
1,200	195	856	66	0.372	10.3	6.3	121.9	560.1	6.4	460.3
1,100	151	719	55	0.374	7.9	4.3	118.1	496.9	4.6	414.6
1,000	113	594	46	0.379	6.0	2.8	114.8	435.9	3.3	368.8
900	82.5	481	37	0.394	4.6	1.8	110.9	380.6	2.4	326.9
800	57.9	380	29	0.417	3.4	1.2	107.0	331.2	1.8	289.2
700	38.8	291	22	0.455	2.5	0.7	103.0	288.7	1.3	256.4
600	24.4	214	16	0.520	1.8	0.4	99.3	254.0	1.0	229.1

**PROP DEMAND CURVE P**

ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,800	660	33	249.8	1,799.5	3,488.1	7,799.4	8,025.5	1,689.1	1,568.9
1,700	556	27	223.2	1,574.2	3,022.3	6,749.4	6,942.1	1,461.3	1,358.3
1,600	463	21	196.5	1,348.0	2,562.5	5,742.8	5,904.3	1,242.5	1,154.9
1,500	382	16	171.2	1,150.7	2,144.9	4,866.4	5,000.1	1,051.6	979.1
1,400	310	12	150.3	988.1	1,793.3	4,160.1	4,270.2	899.4	839.6
1,300	249	9	134.4	865.5	1,535.7	3,627.0	3,718.3	784.8	734.2
1,200	195	7	119.8	752.2	1,278.6	3,143.5	3,216.2	683.3	641.8
1,100	151	5	108.3	652.8	1,047.9	2,724.3	2,780.5	589.3	556.1
1,000	113	3	99.9	568.2	855.7	2,369.8	2,412.5	507.8	481.6
900	82.5	2	94.0	499.8	711.8	2,082.1	2,114.4	444.9	424.0
800	57.9	1	89.6	439.3	593.2	1,828.1	1,852.2	389.4	373.0
700	38.8	1	86.5	383.4	493.3	1,594.0	1,611.6	338.7	325.8
600	24.4	1	84.5	329.9	408.2	1,371.6	1,384.3	291.4	281.2

**MAXIMUM POWER CURVE M**

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
1,800	660	1,925	148	0.343	31.9	32.2	136.3	776.6	31.9	555.7
1,700	660	2,038	157	0.340	31.6	31.5	136.0	803.2	29.5	585.2

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
1,600	660	2,166	167	0.339	31.6	31.1	135.1	834.2	27.4	613.1
1,500	660	2,310	178	0.339	31.6	30.5	132.3	872.9	25.5	642.7
1,400	637	2,390	184	0.344	30.9	29.4	134.2	911.5	22.9	680.9
1,300	603	2,438	188	0.352	30.0	28.1	133.8	964.3	20.4	728.5
1,200	512	2,242	173	0.353	25.5	21.7	131.5	939.8	15.1	733.7
1,100	429	2,049	158	0.348	21.1	15.5	128.6	899.5	10.5	711.8
1,000	422	2,219	171	0.340	20.2	12.9	127.8	928.5	8.1	732.8
900	329	1,917	148	0.336	15.6	8.5	122.2	844.0	5.3	665.3
800	306	2,007	155	0.336	14.5	7.3	116.7	851.1	4.2	659.5
700	248	1,861	143	0.337	11.8	5.5	110.5	787.8	3.2	605.5
600	188	1,643	127	0.340	9.0	4.2	105.5	694.8	2.7	540.2

**MAXIMUM POWER CURVE M**

ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,800	660	33	249.8	1,799.5	3,488.1	7,799.4	8,025.5	1,689.1	1,568.9
1,700	660	32	246.4	1,694.9	3,374.9	7,318.5	7,543.2	1,588.1	1,470.1
1,600	660	32	242.0	1,604.0	3,266.4	6,888.5	7,112.5	1,497.1	1,380.9
1,500	660	31	238.7	1,511.3	3,162.7	6,468.8	6,692.5	1,410.6	1,294.8
1,400	637	30	234.3	1,396.0	3,011.5	5,948.7	6,167.6	1,298.2	1,186.4
1,300	603	29	230.4	1,276.0	2,863.7	5,417.5	5,630.0	1,185.0	1,077.6
1,200	512	22	201.6	1,056.0	2,380.4	4,462.2	4,643.2	980.7	888.8
1,100	429	16	171.4	857.0	1,892.7	3,601.3	3,750.8	794.4	718.7
1,000	422	13	158.8	730.4	1,633.3	3,055.3	3,198.9	673.4	603.4
900	329	9	134.0	590.7	1,244.1	2,457.9	2,568.5	543.7	489.8
800	306	7	127.2	506.9	1,068.0	2,101.7	2,204.5	469.2	420.1
700	248	6	116.5	427.9	853.4	1,773.0	1,856.6	393.9	353.8
600	188	4	110.4	363.3	674.6	1,511.3	1,575.0	331.7	300.0

**Heat Rejection Data [Top](#)**

**MAXIMUM LIMIT**

ENGINE SPEED	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
RPM	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
1,800	660	18,486	1,308	22,512	6,783	3,692	3,547	27,980	69,310	73,833
1,700	660	18,448	1,308	22,305	7,317	3,664	3,236	27,980	68,788	73,276
1,600	660	18,512	1,308	22,378	7,748	3,656	2,950	27,980	68,648	73,127
1,500	660	18,681	1,308	22,393	8,144	3,656	2,755	27,980	68,637	73,116
1,400	637	18,611	1,308	22,176	8,525	3,575	2,385	27,013	67,113	71,492
1,300	603	18,487	1,308	21,937	8,954	3,471	2,096	25,591	65,166	69,419
1,200	512	16,372	1,308	18,458	7,499	2,956	1,253	21,724	55,494	59,115
1,100	429	14,056	1,308	14,655	5,709	2,442	617	18,198	45,844	48,835
1,000	422	14,092	1,308	13,159	5,187	2,343	380	17,914	43,982	46,852
900	329	10,872	1,308	9,857	3,405	1,804	117	13,933	33,877	36,087
800	306	9,883	1,308	9,294	2,878	1,677	88	12,966	31,485	33,539
700	248	7,845	1,308	7,567	1,990	1,364	43	10,521	25,613	27,284
600	188	6,078	1,308	5,445	1,246	1,041	30	7,962	19,547	20,822

**Sound Data [Top](#)**

**EXHAUST: Sound Power (1/3 Octave Frequencies)**

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ENGINE SPEED	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,800	660	123.5	103.9	105.5	105.1	105.1	101.5	95.1	103.6	110.6	105.7	108.0
1,700	660	123.4	100.2	109.5	104.6	106.7	101.3	96.7	103.7	110.8	105.9	107.4
1,600	660	123.5	99.8	108.3	107.7	106.4	99.8	96.7	102.9	110.8	106.5	107.7
1,500	660	123.7	103.3	105.2	106.5	105.5	102.8	97.0	102.4	111.0	107.3	107.5
1,400	637	123.7	108.4	102.3	104.8	104.8	106.6	96.7	101.9	111.2	107.6	106.8
1,300	603	123.5	109.5	99.7	102.7	106.2	107.4	96.1	100.9	111.2	108.1	106.0
1,200	512	122.6	110.5	97.6	100.1	107.7	105.1	94.1	100.3	110.6	108.2	104.8
1,100	429	121.7	111.8	97.1	98.9	106.4	101.1	92.0	99.6	109.8	107.8	104.1
1,000	422	121.5	112.5	98.3	98.5	100.6	98.4	90.9	98.4	109.7	108.4	103.8
900	329	119.9	111.1	98.2	99.0	94.2	90.5	87.1	96.7	109.0	106.7	103.5

**EXHAUST: Sound Power (1/3 Octave Frequencies)**

ENGINE SPEED	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,800	660	109.7	109.8	113.0	116.0	113.5	114.6	111.9	110.5	110.2	107.8	107.2
1,700	660	108.9	109.0	112.7	115.9	113.1	114.6	111.9	110.2	110.0	107.9	106.3
1,600	660	108.9	108.8	113.1	114.6	114.0	115.3	112.1	110.0	110.3	107.8	105.8
1,500	660	108.9	108.5	113.2	115.3	114.1	115.3	112.8	110.3	110.5	108.2	105.8
1,400	637	108.7	108.1	112.7	116.1	113.6	115.2	113.1	110.4	110.4	108.3	105.7
1,300	603	109.0	107.5	111.9	116.1	113.3	114.9	113.0	110.3	109.9	108.5	104.7
1,200	512	108.7	106.2	110.7	115.3	111.9	114.2	111.7	109.1	108.4	107.8	101.9
1,100	429	108.2	105.2	109.7	114.2	110.4	113.2	110.2	107.4	107.4	106.2	99.6
1,000	422	108.9	105.0	109.4	113.8	110.1	112.9	110.4	107.4	107.9	106.3	100.6
900	329	108.1	104.0	108.2	112.5	108.3	111.3	107.9	104.9	107.1	102.9	98.5

**MECHANICAL: Sound Power (1/3 Octave Frequencies)**

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,800	660	119.2	81.9	91.6	93.6	97.7	92.7	94.5	99.8	103.3	104.6	106.0
1,700	660	119.7	75.8	88.2	94.4	91.0	91.8	95.1	100.6	103.2	104.1	105.5
1,600	660	118.8	77.2	88.5	90.8	91.4	93.9	94.2	101.4	103.2	104.2	104.8
1,500	660	118.4	78.0	86.0	88.8	90.1	92.5	92.4	100.2	102.5	103.4	105.0
1,400	637	117.8	78.3	83.3	86.9	88.3	89.8	90.5	98.5	101.7	102.7	105.6
1,300	603	117.4	78.1	79.7	85.2	87.6	88.8	89.5	97.7	101.3	102.1	105.1
1,200	512	115.9	78.1	76.3	82.4	86.0	86.7	88.4	96.4	100.4	101.0	103.8
1,100	429	114.4	78.1	75.6	81.0	84.5	84.8	87.4	95.6	99.4	100.4	102.8
1,000	422	114.0	77.9	77.3	82.4	84.4	84.8	87.1	96.2	99.3	100.8	102.2
900	329	112.7	73.3	78.5	81.9	81.7	83.7	85.9	94.4	97.7	100.0	100.5

**MECHANICAL: Sound Power (1/3 Octave Frequencies)**

ENGINE SPEED	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,800	660	109.0	109.1	108.0	107.1	105.9	104.6	102.7	100.9	103.6	114.5	106.2
1,700	660	107.7	108.1	107.7	106.8	105.7	104.4	102.8	100.8	105.6	115.7	103.2
1,600	660	108.7	109.8	108.0	107.5	105.6	104.5	103.6	102.4	105.8	112.7	102.0
1,500	660	108.2	108.5	107.8	107.0	105.5	104.4	103.4	101.7	104.8	111.8	100.7
1,400	637	106.6	107.5	107.1	106.3	105.0	103.9	102.8	100.8	105.3	111.1	99.3
1,300	603	106.5	106.5	106.9	106.5	104.3	103.6	102.3	100.9	108.5	107.8	97.5
1,200	512	106.7	105.2	106.6	106.1	103.1	103.1	101.1	101.7	109.0	99.7	95.1
1,100	429	105.5	104.7	105.9	105.3	102.1	102.3	100.6	102.6	102.6	94.7	93.2
1,000	422	104.9	104.9	105.8	104.7	102.1	102.1	101.2	104.0	98.7	94.2	93.0
900	329	103.6	104.6	105.1	103.7	101.4	101.4	102.1	100.9	90.3	92.6	89.3

**Emissions Data** [Top](#)

Units Filter

**RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM**

<b>ENGINE POWER</b>	<b>BHP</b>	<b>660</b>	<b>495</b>	<b>330</b>	<b>165</b>	<b>66.0</b>
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ENGINE POWER PERCENT LOAD		BHP %	660 100	495 75	330 50	165 25	66.0 10
TOTAL NOX (AS NO2)		G/HR	4,140	2,442	2,245	1,446	846
TOTAL CO		G/HR	336	383	395	422	479
TOTAL HC		G/HR	102	85	85	89	109
PART MATTER		G/HR	103.9	99.3	67.2	57.7	55.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,858.5	2,095.7	2,788.1	2,816.0	2,429.5
TOTAL CO	(CORR 5% O2)	MG/NM3	230.9	329.9	485.8	817.9	1,366.3
TOTAL HC	(CORR 5% O2)	MG/NM3	60.8	63.0	90.1	149.3	270.0
PART MATTER	(CORR 5% O2)	MG/NM3	61.6	74.4	73.5	101.8	146.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,392	1,021	1,358	1,372	1,183
TOTAL CO	(CORR 5% O2)	PPM	185	264	389	654	1,093
TOTAL HC	(CORR 5% O2)	PPM	113	118	168	279	504
TOTAL NOX (AS NO2)		G/HP-HR	6.32	4.97	6.83	8.79	12.86
TOTAL CO		G/HP-HR	0.51	0.78	1.20	2.57	7.29
TOTAL HC		G/HP-HR	0.16	0.17	0.26	0.54	1.66
PART MATTER		G/HP-HR	0.16	0.20	0.20	0.35	0.84
TOTAL NOX (AS NO2)		LB/HR	9.13	5.38	4.95	3.19	1.86
TOTAL CO		LB/HR	0.74	0.85	0.87	0.93	1.06
TOTAL HC		LB/HR	0.23	0.19	0.19	0.20	0.24
PART MATTER		LB/HR	0.23	0.22	0.15	0.13	0.12

### RATED SPEED NOMINAL DATA: 1800 RPM

ENGINE POWER PERCENT LOAD		BHP %	660 100	495 75	330 50	165 25	66.0 10
TOTAL NOX (AS NO2)		G/HR	3,422	2,019	1,855	1,195	699
TOTAL CO		G/HR	180	205	211	226	256
TOTAL HC		G/HR	54	45	45	47	58
TOTAL CO2		KG/HR	319	251	173	106	68
PART MATTER		G/HR	53.3	50.9	34.4	29.6	28.3
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,362.4	1,732.0	2,304.2	2,327.3	2,007.9
TOTAL CO	(CORR 5% O2)	MG/NM3	123.5	176.4	259.8	437.4	730.6
TOTAL HC	(CORR 5% O2)	MG/NM3	32.2	33.3	47.7	79.0	142.9
PART MATTER	(CORR 5% O2)	MG/NM3	31.6	38.2	37.7	52.2	74.9
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,151	844	1,122	1,134	978
TOTAL CO	(CORR 5% O2)	PPM	99	141	208	350	584
TOTAL HC	(CORR 5% O2)	PPM	60	62	89	147	267
TOTAL NOX (AS NO2)		G/HP-HR	5.22	4.11	5.65	7.27	10.63
TOTAL CO		G/HP-HR	0.27	0.42	0.64	1.37	3.90
TOTAL HC		G/HP-HR	0.08	0.09	0.14	0.29	0.88
PART MATTER		G/HP-HR	0.08	0.10	0.10	0.18	0.43
TOTAL NOX (AS NO2)		LB/HR	7.54	4.45	4.09	2.63	1.54
TOTAL CO		LB/HR	0.40	0.45	0.47	0.50	0.57
TOTAL HC		LB/HR	0.12	0.10	0.10	0.10	0.13
TOTAL CO2		LB/HR	703	553	382	234	149
PART MATTER		LB/HR	0.12	0.11	0.08	0.07	0.06
OXYGEN IN EXH		%	12.1	13.1	14.4	16.1	17.4
DRY SMOKE OPACITY		%	1.3	2.3	2.6	2.1	2.1
BOSCH SMOKE NUMBER			0.45	0.81	0.93	0.71	0.69

## Regulatory Information [Top](#)

EU STAGE IIIA	2009 - 2019	CYCLE : E2,E3				
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 97/68/EC (AS AMENDED BY EU 2004/26/EC) AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE MARINE REGULATIONS.						
<b>Locality</b> EUROPE	<b>Agency</b> EU	<b>Regulation</b> MARINE COMMERCIAL	<b>Tier/Stage</b> STAGE IIIA	<b>Max Limits - G/BKW - HR</b> CO: 5.0 Nox + HC: 7.2 PM: 0.20		
IMO II	2011 - ----	CYCLE : E2,E3				
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN REGULATION 13 OF REVISED ANNEX VI OF MARPOL 73/78 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THIS ENGINE CONFORMS TO INTERNATIONAL MARINE ORGANIZATION'S (IMO) MARINE COMPRESSION-IGNITION EMISSION REGULATIONS.						

## Cross Reference [Top](#)

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number

## Supplementary Data [Top](#)

Type	Classification	Performance Number
SECONDARY RATED SPEED	1600 RPM	<a href="#">EM0704</a>
CHART	BSFC CONTOUR PLOT	<a href="#">EM1019</a>
CHART	AMBIENT CAPABILITY CHART	<a href="#">EM1170</a>

## Performance Parameter Reference [Top](#)

### Parameters Reference: DM9600 - 12

#### PERFORMANCE DEFINITIONS

### PERFORMANCE DEFINITIONS DM9600

**APPLICATION:** Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

**PERFORMANCE PARAMETER TOLERANCE FACTORS:** Power +/- 3% Torque +/- 3% Exhaust stack temperature +/- 8% Inlet airflow +/- 5% Intake manifold pressure-gage +/- 10% Exhaust flow +/- 6% Specific fuel consumption +/- 3% Fuel rate +/- 5% Specific DEF consumption +/- 3% DEF rate +/- 5% Heat rejection +/- 5% Heat rejection exhaust only +/- 10% Heat rejection CEM only +/- 10% Heat Rejection values based on using treated water.

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

**C280/3600 HEAT REJECTION TOLERANCE FACTORS:** Heat rejection +/- 10% Heat rejection to Atmosphere +/- 50% Heat rejection to Lube Oil +/- 20% Heat rejection to Aftercooler +/- 5%

**TEST CELL TRANSDUCER TOLERANCE FACTORS:** Torque +/- 0.5% Speed +/- 0.2% Fuel flow +/- 1.0% Temperature +/- 2.0 C degrees Intake manifold pressure +/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

**REFERENCE ATMOSPHERIC INLET AIR FOR 3500 ENGINES AND SMALLER** SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.

**FOR 3600 ENGINES** Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

**MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE** Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

**REFERENCE EXHAUST STACK DIAMETER** The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

**REFERENCE FUEL DIESEL** Reference fuel is #2 distillate diesel with a 35API gravity; A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).

**GAS** Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

**ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD** Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

**ALTITUDE CAPABILITY** Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set. Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.

Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

**REGULATIONS AND PRODUCT COMPLIANCE** TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.

Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

**EMISSION CYCLE LIMITS:** Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.

**EMISSIONS DEFINITIONS:** Emissions : DM1176

**EMISSION CYCLE DEFINITIONS**

1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.

2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.

3. For constant-speed auxiliary engines test cycle D2 shall be applied.

4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

**HEAT REJECTION DEFINITIONS:** Diesel Circuit Type and HHV Balance : DM9500

**HIGH DISPLACEMENT (HD) DEFINITIONS:** 3500: EM1500

**RATING DEFINITIONS:** Agriculture : TM6008

Fire Pump : TM6009

Generator Set : TM6035

Generator (Gas) : TM6041

Industrial Diesel : TM6010

Industrial (Gas) : TM6040

Irrigation : TM5749

Locomotive : TM6037

Marine Auxiliary : TM6036

Marine Prop (Except 3600) : TM5747

Marine Prop (3600 only) : TM5748

MSHA : TM6042

Oil Field (Petroleum) : TM6011

Off-Highway Truck : TM6039

On-Highway Truck : TM6038

**SOUND DEFINITIONS:** Sound Power : DM8702

Sound Pressure : TM7080

**Date Released : 07/10/19**