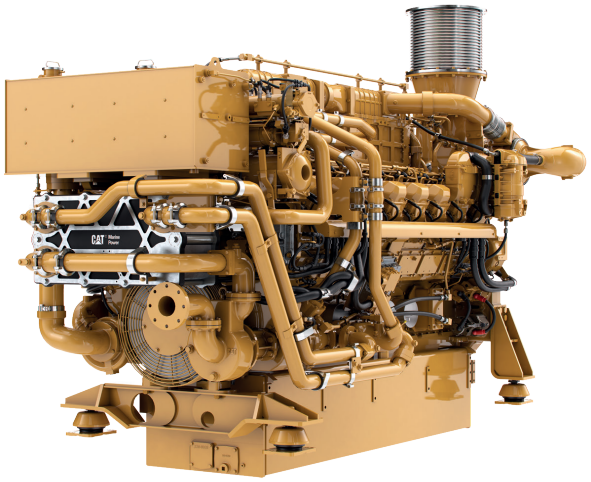
3516E

MARINE AUXILIARY/DIESEL ELECTRIC PROPULSION ENGINE

1825 ekW (1921 bkW) @ 1800 rpm



3516E Marine Auxiliary/Diesel Electric Propulsion Engine
U.S. EPA Tier 4 Final / IMO III

ENGINE SPECIFICATIONS

Configurations
Vee 16, 4-stroke-cycle diesel

Emissions
U.S. EPA Tier 4 Final certified
IMO III emissions certified (SCR required)
IMO II-III switchable

Rated Engine Speed
1800 rpm

Bore x Stroke
170 mm x 215 mm
6.69 in x 8.46 in

Displacement
78 Liter / 4765 cu in

Aspiration
Turbocharged-aftercooled aspiration

Governor
Electronic (A5 ECM)

Refill Capacity
Lube Oil System w/ oil filter change: 799 L (211 gal)/1000 hrs pan

Oil Change Interval
1000 hrs

Cooling
Heat exchanger or keel cooled

Flywheel Housing
SAE No. 00 with SAE No. 00 flywheel (183 teeth)

Rotation
Counterclockwise from flywheel end

FEATURES AND BENEFITS

- Utilizes SCR Technology to enable U.S. EPA Tier 4 Final / IMO III emission regulations compliance while lowering operational costs
- Utilizes closed loop air assisted DEF dosing control strategy that delivers:
  - Highest efficiency mixing and control to lower operational costs
  - Extends emissions useful life
  - Ensures compliance
  - Flexible to urea quality
- Advanced engine combustion design process utilizing optimum configurations and cylinder geometry for maximum engine efficiency
- Enhanced control of fuel injection optimized through crank timing and the latest A5 ECM technology
- Optimal fuel injector nozzle geometry and electronic injection control for improved fuel delivery
- Strengthened cylinder heads and valves for increased durability and peak cylinder pressure capability resulting in higher engine duty cycle capability
- Industry-leading warranty coverage for factory packaged components
- Global dealer network for service in any location

STANDARD ENGINE EQUIPMENT

- Corrosion-resistant aftercooler core
- Dual A5 engine control modules with electronic unit injection and low pressure fuel system
- Dual turbochargers with water-cooled bearings and heat shields
- Vibration damper and guard
- Meets SOLAS regulations
- Duplex Fuel and Oil Filtration
- Auxiliary fresh water pump
- Gear Driven, centrifugal jacket water pump with 40% more capacity

OPTIONAL ATTACHMENTS

- Plate-type heat exchanger with integrated SCAC and JW Water expansion tanks
- Special appearance packages with chrome covers
- Marine society certifications
- Power take-off
- Certified marine alarm and protection safety system
- Standard instrument panel with color touchscreen display
- Mounting rails and trunnion mount options
- Engine mounted fuel cooler (SCAC Water Cooled)
- Sea water pump with 25% more capacity for cooling auxiliary vessel equipment
- Closed crank case ventilation
- Optional air shutoff available

RATING DEFINITION AND CONDITIONS

Typical applications: For vessels operating with generator sets that provide power to the propulsion systems. All ratings are Prime Ratings according to ISO 8528-1 for unlimited usage per year at a load factor of ≤ 70%. 10% overload capability is required for a maximum of 1 hour out of every 12 and a maximum of 25 hours total per year.

Ratings are based on SAE J3046 and J1349 standard conditions of 100 kPa (29.61 in Hg) and 25°C (77°F). These ratings also apply at ISO8665, ISO3046-1:2002E, DIN6271-3, and BS5514 standard conditions of 100 kPa (29.61 in Hg), 27°C (81°F), and 60% relative humidity.

Fuel rates are based on fuel oil of 35° API [16°C (60°F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29°C (85°F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Marine Auxiliary Engines are mainly used as generator set engines; however, they can be used for electrically driven pumps, winches, conveyors, thrusters, when it is specified. Engines can be radiator cooled or heat exchanger/keel cooled.

CAT®

TECHNICAL DATA

3516E Auxiliary / Diesel Electric Propulsion Engine

CONSTANT SPEED FUEL & DEF CONSUMPTION (1800 RPM) 60 Hz

	Brake Specific Fuel Consumption					DEF Consumption 32.5 % Concentration		DEF Consumption 40 % Concentration	
% Power	ekW	bhp	lb/bhp-hr	bkW	g/bkW-hr	Gal/hr	Liters/hr	Gal/hr	Liters/hr
100	1825	2576	0.334	1921	199.0	7.5	28.3	5.7	21.4
90	1643	2317	0.336	1728	200.5	6.7	25.2	5.0	19.0
80	1460	2058	0.339	1535	202.5	5.7	21.7	4.3	16.4
70	1278	1801	0.343	1343	204.8	5.0	19.0	3.8	14.3
60	1095	1546	0.349	1153	208.2	4.4	16.7	3.3	12.6
50	913	1291	0.358	963	213.6	3.9	14.6	2.9	11.0
40	730	1039	0.374	775	223.1	3.1	11.7	2.3	8.7
30	548	787	0.401	587	239.2	2.3	8.7	1.7	6.6

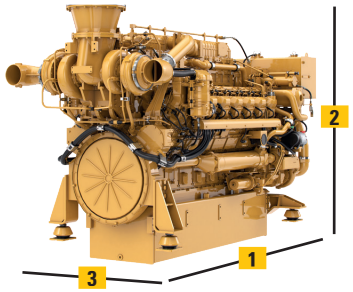
- ISO 3046/1 fluid consumption tolerance of -0/+5%
- Reference 32.5% DEF density of 1.0895 kg/L
- Reference 40% DEF density of 1.1120 kg/L

Consult your local Cat® dealer to create a customized engine TCO (Total Cost of Ownership) analysis specific to your vessel as well as for IMO II optimized performance data.

DIMENSIONS & WEIGHT

	Length (1)	Height (2)	Width (3)	Engine dry weight
min.	146.6 in/3724 mm	90.9 in/2309 mm	72.8 in/1850 mm	22,060 lb/10,006 kg
max.			87.9 in/2230 mm	

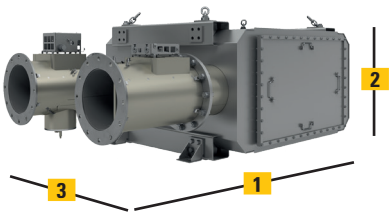
Note: Do not use these dimensions for installation design.
See general dimension drawings for detail - Drawing 5139209 (LH)/ 5139210 (RH)



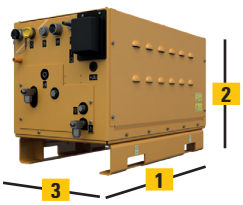
CLEAN EMISSIONS MODULE (CEM)

Dimensions & Weight				
Model	Length (1)	Height (2)	Width (3)	Weight
16 Brick Z-Flow	3678.8 mm 144.83 in	1003.3 mm 39.50 in	1769.9 mm 69.67 in	1399 kg 3084.3 lb
16 Brick U-Flow	2945.4 mm 115.96 in	1003.2 mm 39.50 in	1769.7 mm 69.67 in	1390 kg 3064.43 lb
Dosing Cabinet	948.6 mm 37.35 in	534.5 mm 21.05 in	477.3 mm 18.79 in	---

Clean Emissions Module (CEM)
Available in U-flow configurations (shown) and Z-flow configurations.



Dosing Cabinet



The 3516E engine requires Selective Catalyst Reduction (SCR) technology.
The easy-to-install Cat® SCR System is an exhaust gas aftertreatment solution compliant with U.S. EPA Tier 4 Final / IMO III emission standards.

- Proven technology to meet U.S. EPA Tier 4 Final / IMO III emission standards
- IMO II-III switchable calibrations available
- Maintains engine efficiency, durability and reliability
- Easy to install with minimum impact to vessel design
- Compact package from one single source
- Available for new builds and retrofits
- For detailed dimensions and installation requirements, please refer to latest revision of A&I guide LEBM0023.

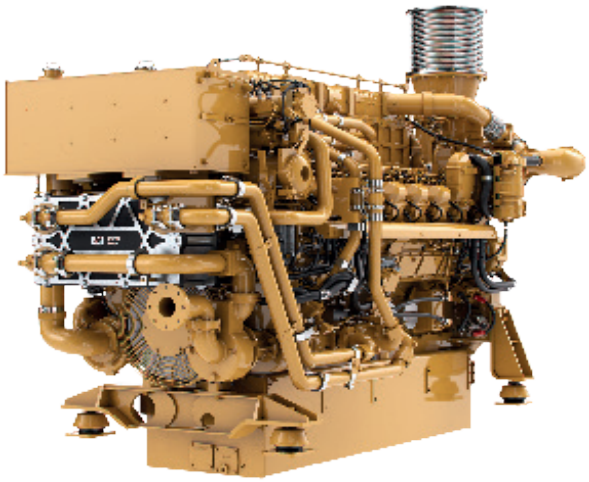
Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

LEHM0260-03

3516E

MARINE AUXILIARY/DIESEL ELECTRIC PROPULSION ENGINE

2000 ekW (2105 bkW) @ 1800 rpm



3516E Marine Auxiliary/Diesel Electric Propulsion Engine
U.S. EPA Tier 4 Final / IMO III

ENGINE SPECIFICATIONS

Configurations
Vee 16, 4-stroke-cycle diesel

Emissions
U.S. EPA Tier 4 Final certified
IMO III emissions certified (SCR required)
IMO II-III switchable

Rated Engine Speed
1800 rpm

Bore x Stroke
170 mm x 215 mm
6.69 in x 8.46 in

Displacement
78 Liter / 4765 cu in

Aspiration
Turbocharged-aftercooled aspiration

Governor
Electronic (A5 ECM)

Refill Capacity
Lube Oil System w/ oil filter change: 799 L (211 gal)/1000 hrs pan

Oil Change Interval
1000 hrs

Cooling
Heat exchanger or keel cooled

Flywheel Housing
SAE No. 00 with SAE No. 00 flywheel (183 teeth)

Rotation
Counterclockwise from flywheel end

FEATURES AND BENEFITS

- Utilizes SCR Technology to enable U.S. EPA Tier 4 Final / IMO III emission regulations compliance while lowering operational costs
- Utilizes closed loop air assisted DEF dosing control strategy that delivers:
  - Highest efficiency mixing and control to lower operational costs
  - Extends emissions useful life
  - Ensures compliance
  - Flexible to urea quality
- Advanced engine combustion design process utilizing optimum configurations and cylinder geometry for maximum engine efficiency
- Enhanced control of fuel injection optimized through crank timing and the latest A5 ECM technology
- Optimal fuel injector nozzle geometry and electronic injection control for improved fuel delivery
- Strengthened cylinder heads and valves for increased durability and peak cylinder pressure capability resulting in higher engine duty cycle capability
- Industry-leading warranty coverage for factory packaged components
- Global dealer network for service in any location

STANDARD ENGINE EQUIPMENT

- Corrosion-resistant aftercooler core
- Dual A5 engine control modules with electronic unit injection and low pressure fuel system
- Dual turbochargers with water-cooled bearings and heat shields
- Vibration damper and guard
- Meets SOLAS regulations
- Duplex Fuel and Oil Filtration
- Auxiliary fresh water pump
- Gear Driven, centrifugal jacket water pump with 40% more capacity

OPTIONAL ATTACHMENTS

- Plate-type heat exchanger with integrated SCAC and JW Water expansion tanks
- Special appearance packages with chrome covers
- Marine society certifications
- Power take-off
- Certified marine alarm and protection safety system
- Standard instrument panel with color touchscreen display
- Mounting rails and trunnion mount options
- Engine mounted fuel cooler (SCAC Water Cooled)
- Sea water pump with 25% more capacity for cooling auxiliary vessel equipment
- Closed crank case ventilation
- Optional air shutoff available

RATING DEFINITION AND CONDITIONS

Typical applications: For vessels operating with generator sets that provide power to the propulsion systems. All ratings are Prime Ratings according to ISO 8528-1 for unlimited usage per year at a load factor of ≤ 70%. 10% overload capability is required for a maximum of 1 hour out of every 12 and a maximum of 25 hours total per year.

Ratings are based on SAE J3046 and J1349 standard conditions of 100 kPa (29.61 in Hg) and 25°C (77°F). These ratings also apply at ISO8665, ISO3046-1:2002E, DIN6271-3, and BS5514 standard conditions of 100 kPa (29.61 in Hg), 27°C (81°F), and 60% relative humidity.

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Marine Auxiliary Engines are mainly used as generator set engines; however, they can be used for electrically driven pumps, winches, conveyors, thrusters, when it is specified. Engines can be radiator cooled or heat exchanger/keel cooled.

TECHNICAL DATA

3516E Auxiliary / Diesel Electric Propulsion Engine

CONSTANT SPEED FUEL & DEF CONSUMPTION (1800 RPM, 60 Hz)

	Brake Specific Fuel Consumption					DEF Consumption 32.5 % Concentration		DEF Consumption 40 % Concentration	
% Power	ekW	bhp	lb/bhp-hr	bkW	g/bkW-hr	Gal/hr	Liters/hr	Gal/hr	Liters/hr
100	2000	2823	0.335	2105	199.8	7.8	29.4	5.9	22.2
90	1800	2539	0.334	1893	199.0	7.4	28.2	5.6	21.3
80	1600	2256	0.337	1682	201.0	6.4	24.4	4.8	18.3
70	1400	1974	0.340	1472	203.2	5.5	20.8	4.1	15.7
60	1200	1694	0.345	1263	206.0	4.8	18.0	3.6	13.5
50	1000	1415	0.353	1055	210.6	4.1	15.6	3.1	11.8
40	800	1139	0.367	849	218.8	3.4	12.9	2.6	9.7
30	600	862	0.391	643	233.4	2.5	9.4	1.9	7.2

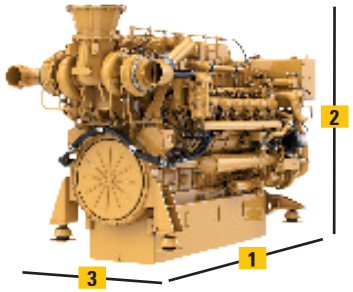
- ISO 3046/1 fluid consumption tolerance of -0/+5%
- Reference 32.5% DEF density of 1.0895 kg/L
- Reference 40% DEF density of 1.1120 kg/L

Consult your local Cat® dealer to create a customized engine TCO (Total Cost of Ownership) analysis specific to your vessel.

DIMENSIONS & WEIGHT

	Length (1)	Height (2)	Width (3)	Engine dry weight
min.	146.6 in/3724 mm	90.9 in/2309 mm	72.8 in/1850 mm	22,060 lb/10,006 kg
max.			87.9 in/2230 mm	

Note: Do not use these dimensions for installation design.
See general dimension drawings for detail - Drawing 5139209 (LH)/ 5139210 (RH)



CLEAN EMISSIONS MODULE (CEM)

Dimensions & Weight				
Model	Length (1)	Height (2)	Width (3)	Weight
16 Brick Z-Flow	3678.8 mm 144.83 in	1003.3 mm 39.50 in	1769.9 mm 69.67 in	1399 kg 3084.3 lb
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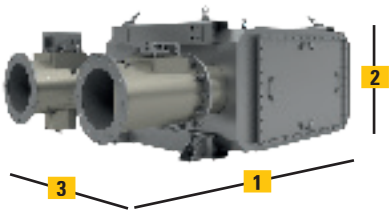
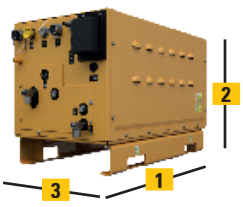
Dosing Cabinet	948.6 mm 37.35 in	534.5 mm 21.05 in	477.3 mm 18.79 in	---

Clean Emissions Module (CEM)
Available in U-flow configurations (shown) and Z-flow configurations.



Dosing Cabinet



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- Proven technology to meet U.S. EPA Tier 4 Final / IMO III emission standards
- IMO II-III switchable calibrations available
- Maintains engine efficiency, durability and reliability
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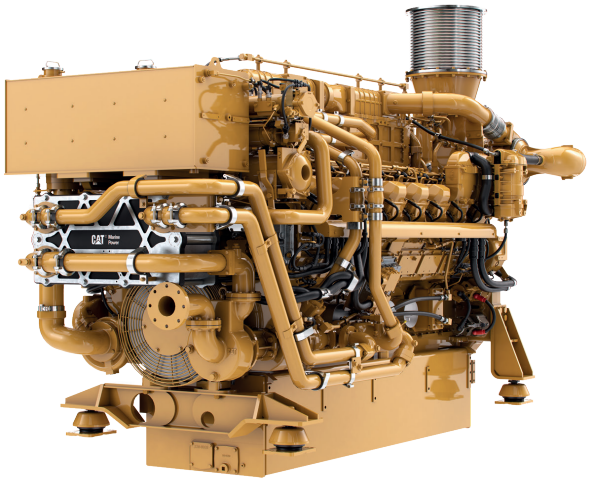
LEHM0259-03

3516E

MARINE AUXILIARY/DIESEL ELECTRIC PROPULSION ENGINE

2250 ekW (2368 bkW) @ 1800 rpm



3516E Marine Auxiliary/Diesel Electric Propulsion Engine
U.S. EPA Tier 4 Final / IMO III

ENGINE SPECIFICATIONS

Configurations
Vee 16, 4-stroke-cycle diesel

Emissions
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IMO III emissions certified (SCR required)
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Rated Engine Speed
1800 rpm

Bore x Stroke
170 mm x 215 mm
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STANDARD ENGINE EQUIPMENT

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- Dual A5 engine control modules with electronic unit injection and low pressure fuel system
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OPTIONAL ATTACHMENTS

- Plate-type heat exchanger with integrated SCAC and JW Water expansion tanks
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90	2025	2856	0.335	2130	200.0	7.8	29.5	5.9	22.3
80	1800	2539	0.334	1893	199.0	7.4	28.2	5.6	21.3
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60	1350	1906	0.341	1421	203.7	5.3	20.1	4.0	15.1
50	1125	1592	0.348	1187	207.5	4.5	17.1	3.4	12.9
40	900	1281	0.358	955	213.8	3.8	14.5	2.9	11.0
30	675	970	0.380	723	226.6	2.9	10.8	2.1	8.1

- ISO 3046/1 fluid consumption tolerance of -0/+5%
- Reference 32.5% DEF density of 1.0895 kg/L
- Reference 40% DEF density of 1.1120 kg/L

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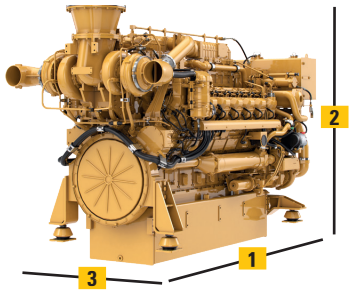
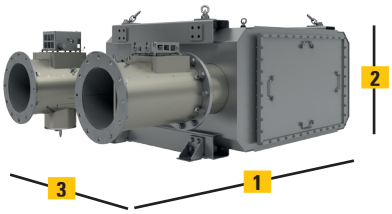


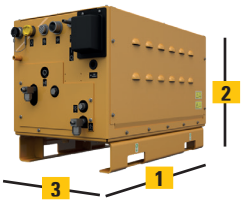
CLEAN EMISSIONS MODULE (CEM)

Dimensions & Weight				
Model	Length (1)	Height (2)	Width (3)	Weight
16 Brick Z-Flow	3678.8 mm 144.83 in	1003.3 mm 39.50 in	1769.9 mm 69.67 in	1399 kg 3084.3 lb
16 Brick U-Flow	2945.4 mm 115.96 in	1003.2 mm 39.50 in	1769.7 mm 69.67 in	1390 kg 3064.43 lb
Dosing Cabinet	948.6 mm 37.35 in	534.5 mm 21.05 in	477.3 mm 18.79 in	---

Clean Emissions Module (CEM)
Available in U-flow configurations (shown) and Z-flow configurations.



Dosing Cabinet



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LEHM0258-03