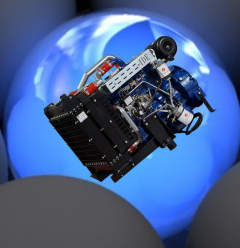


# INTER<sup>®</sup>

EXCELLENT ENGINE



# BII

BII SERIES

# INTER ENGINE



## GLOBAL



## FACILITIES



## About INTER

**INTER DIESEL ENGINE** was first established in USA in 1927 as an independent engine manufacturer.

Right now, they manufacture high quality diesel engines from 2 cylinders to 20 cylinders, in the factories that are in Brazil, Argentina, India and China. They manufacture with their original design.

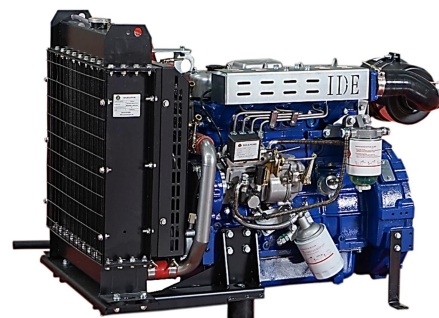
Apart from their own factories, in order to serve and meet the customer needs in other areas, they have their offices and distributors in Germany, UK, Spain, Italy, Turkey and South Africa. These distributors and offices deals with sales, after sales services and spare part supply.

**INTER DIESEL ENGINE** produces diesel engines from 7.5 kW to 3000kW to be used in agricultural equipment's, trucks, buses, tractors, construction equipment, generators, boats and ships.

They export to more than 100 countries and have 45 distributors, 160 dealers and more than 200 after sales service. With this service network, Inter Diesel Engine increases its global market share every day.

## FEATURES AND BENEFITS

- Excellent Design
- High and Dependable Technology
- Heavy Duty
- Durability
- Low Noise
- Low Exhaust Emission
- Low Operating Cost
- World Class Product Support
- Flexible Application
- Direct Injection
- Tier II / Tier III / Tier IV Emission Regulations
- Low Fuel Consumption
- Low Oil Consumption
- Tropical Radiator
- Easy Service & Maintenance
- Mechanical / Electronic Governor
- Compact Design
- Noise Optimized Engine Design



## Diesel Engine and Genset Rating Classifications

*The below ratings represent the engine performance capabilities to conditions specified in TS ISO 8528/1, 8528-4, 8528-5, 8528-8, BS5000, ISO 3046/1:1986, NEMA MG-1.22.1, BS 5514/1.*

### STAND BY POWER RATING (ESP):

ESP is applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Stand By Power rating. This rating should be applied where reliable utility power is available. A Stand By rated engine should be sized for a maximum of an 70% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Stand By Power rating. Stand By ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

### PRIME POWER RATING (PRP):

Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

#### UNLIMITED TIME RUNNING PRIME POWER (ULTP):

PRP (Prime Power) is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

#### LIMITED TIME RUNNING PRIME POWER (LTP):

LTP (Limited Time Prime Power) is available for a limited number of hours in a nonvariable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

#### CONTINUOUS POWER RATING (COP):

COP is the power that the engine can continue to use under the prescribed speed and the specified environment condition in the normal maintenance period stipulated in the manufacturing plant. And Continuous Power is applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

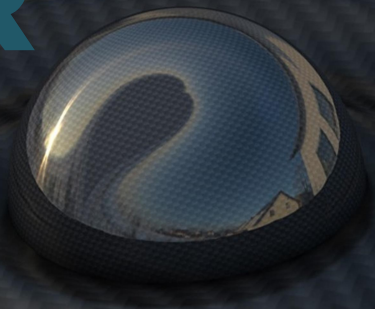
# M20D

2,27 Liter, In Line Type 4 Cylinder

**G Drive Engine**

# INTER<sup>®</sup>

## EXCELLENT ENGINE



# M20D

## TECHNICAL DATA SHEETS

### Diesel Engine Main Technical Parameters

<b>General</b>		
Number of Cylinders		4
Configuration		Vertical, In Line
Aspiration		Naturally
Combustion System		Direct Injection
Compression Ratio		19.1:1
Bore	mm	85
Stroke	mm	100
Displacement	L	2,27
Governing Type		Mechanic
Governing Class		G2
Rotation		Counterclockwise
Firing Order		1-3-4-2
Emission		Tier II
<b>Moments of Rotation Inertia</b>		
Engine	kg • m <sup>2</sup>	0,44
Flywheel	kg • m <sup>2</sup>	2,55
<b>Performance Rating</b>		
Speed Droop	%	≤3
Steady State Speed Band	%	≤0,5
<b>Test Conditions</b>		
Ambient Temperature	%	25
Atmospheric Pressure	kPa	100
Relative Humidity	RH (%)	30
Max. Operating Intake Resistance	kPa	5
Exhaust Backpressure Limit	kPa	5
Fuel Temperature (Fuel Inlet Pump)	°C	38 ± 2
<b>Filters</b>		
Air Filter		Dry Type, Replaceable
Fuel Filter		With Water Separator
Oil Filter		Element Type, Particulate Trap
<b>Flywheel Housing and Flex Coupling</b>		
Flywheel Housing	SAE (J620)	4
Flex Coupling Disc	Inch (")	7,5
<b>Overall Dimensions</b>		
Length *	mm	1087
Width	mm	597
Height	mm	749
Dry Weight	Kg	275

\* From front end of radiator to rear end of air filter

### Diesel Engine Matching Parameters

<b>50 Hz @ 1500 r/min</b>		<b>Stand By</b>	<b>Prime</b>
Gross Engine Power	kW	17,5	15,9
Net Engine Power	kW	15,5	14,4
Fan Power Consumption (Belt Pulley Driven)	kW	1,5	1,5
Other Power Loss	kW	0,5	0,5
Mean Effective Pressure	MPa	0,62	0,56
Intake Air Flow	m <sup>3</sup> / min	1,25	1,25
Exhaust Temperature Limit	°C	300	300
Exhaust Flow	m <sup>3</sup> / min	1,30	1,15
Boost Pressure Ratio		2,90	2,70
Mean Piston Speed	m / s	5,0	5,0
Cooling Fan Air Flow	m <sup>3</sup> / min	46,6	46,6
Typical Generator Output Power	kVA	17	15
<b>Heat Rejection</b>			
Energy in Fuel (Heat of Combustion)	kW	51,9	45,2
Gross Heat to Power	kW	17,5	15,9
Energy to Coolant and Lubricating Oil	kW	16,6	14,4
Heat Dissipation Capacity*	kW	-	-
Energy to Exhaust	kW	14,1	11,9
Heat to Radiation	kW	3,7	3,0

\*Intake Intercooled System

### Cooling System

Radiator Type	50°C	Tropical
Total Coolant Capacity	L	13
Max. Perm. Coolant Outlet Temperature	°C	103
Max. Perm. Flow Resis. (Cool. System And Piping)	bar	0,5
Max. Temperature of Coolant Warning	°C	95
Max. Temperature of Coolant Shutdown	°C	98
Thermostat Operation Temperature - Initial Open	°C	68
Thermostat Operation Temperature - Full Open	°C	72
Delivery of Coolant Pump	m <sup>3</sup> / h	1,60
Min. Pressure Before Coolant Pump	bar	0,15
Radiator Face Area	m <sup>2</sup>	0,21
Rows	Row	2
Matrix Density	Per / Inch	15,5
Material		Aluminum
Width of Matrix	mm	438
Height of Matrix	mm	480
Pressure Cap Setting	kPa	90
Estimated Cooling Air Flow Reserve	kPa	0,125
Engine Pre Heater Tube (with Circulation Pump)	W	1500

### Lubrication System

Total System	L	8
Minimum Oil Level	L	7
Nominal Motor Operating Temperature	°C	40
Lubricating Oil Pressure (Rated Speed)	bar	5
Relief Valve Opens	kPa	352
Oil / Fuel Consumption Ratio	%	≤0,3
Normal Oil Temperature	°C	110

### Electrical System

Voltage	V	12
Starter	kW	3,2
Alternator Output Amperes	A	25
Alternator Output Voltage	V	14
Batteries Capacity	Ah	55

### Fan

Diameter	mm	410
Drive Ratio		1,61:1
Number of Blades		7
Material		Plastic
Type		Blowing

### 60 Hz @ 1800 r/min

		<b>Stand By</b>	<b>Prime</b>
Gross Engine Power	kW	21,0	19,1
Net Engine Power	kW	18,7	17,3
Fan Power Consumption (Belt Pulley Driven)	kW	1,8	1,8
Other Power Loss	kW	0,5	0,5
Mean Effective Pressure	MPa	0,62	0,56
Intake Air Flow	m <sup>3</sup> / min	1,50	1,50
Exhaust Temperature Limit	°C	360	360
Exhaust Flow	m <sup>3</sup> / min	1,57	1,38
Boost Pressure Ratio		3,50	3,20
Mean Piston Speed	m / s	6,0	6,0
Cooling Fan Air Flow	m <sup>3</sup> / min	55,9	55,9
Typical Generator Output Power	kVA	20	18

### Heat Rejection

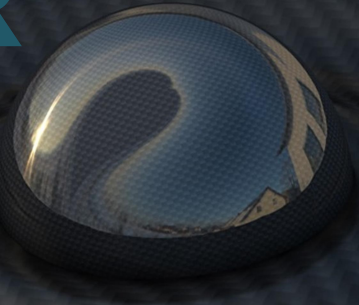
Energy in Fuel (Heat of Combustion)	kW	61,4	52,1
Gross Heat to Power	kW	21,0	17,3
Energy to Coolant and Lubricating Oil	kW	19,9	17,3
Heat Dissipation Capacity*	kW	-	-
Energy to Exhaust	kW	16,9	14,3
Heat to Radiation	kW	3,5	3,2

\*Intake Intercooled System



# INTER<sup>®</sup>

EXCELLENT ENGINE



# M20D

POWER RANGE

FUEL CONSUMPTION

OIL GRADES

DIMENSION

DIAGRAMS

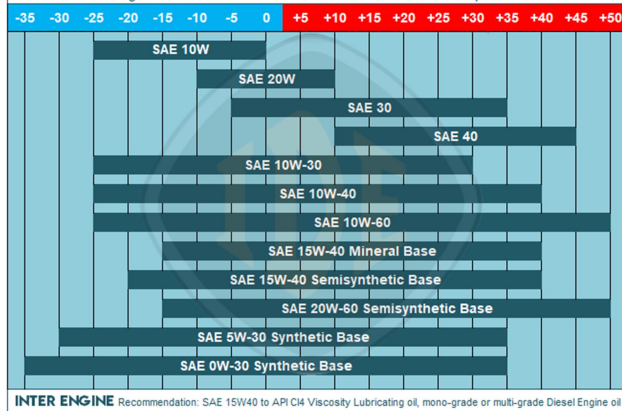
## INTER Diesel Engine Power Ratings

Engine Model	M20D		Engine Family	ID11	Engine Series	BII	
Speed rpm	Type of Operation	Typical Generator Output (Net)		Engine Power			
				Gross		Net	
		kVA	kWe	kWm	Hp	kWm	Hp
1500	Stand By (Maximum)	16,5	13,2	17,5	23,5	15,5	20,8
	Prime	15,3	12,2	15,9	21,3	14,4	19,3
1800	Stand By (Maximum)	19,9	15,9	21,0	28,2	18,7	25,1
	Prime	18,4	14,7	19,1	25,6	17,3	23,2

Generator powers are typical and are based on an average alternator efficiency and a power factor (Cos. Q) of 0.8

## SAE GRADES

For Engine Oils Recommended in Relation with the Outside Temperature °C



INTER ENGINE Recommendation: SAE 15W40 to API C4 Viscosity Lubricating oil, mono-grade or multi-grade Diesel Engine oil

## Fuel Consumption

Percent of Prime power	50Hz - 1500 rpm	60Hz - 1800 rpm
	l/hr	l/hr
110%	4,15	4,98
100%	3,77	4,53
75%	2,90	3,48
50%	2,07	2,49

Note: At calorific value 42700 kJ/kg + 5 %, density 0.860 kg/dm<sup>3</sup>, temperature 280 K.

Fuel specification: BS 2869: Part 2 1998 Class A2 or (DIN EN 590) ASTM D975 D2 Diesel. The fuel must be clean and without water

## INTER ENGINES MAIN AND BIGGEST PARTNERS

INTER<sup>®</sup>  
ENGINE GROUP



North America  
Business Unit

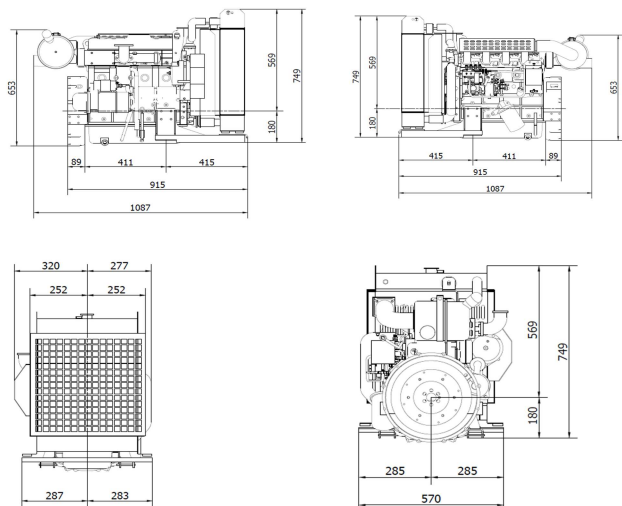


Mercosur  
Business Unit



Global  
Business Unit

## Diesel Engine Appearance and Installation Dimension Diagram



INTER<sup>®</sup>  
ENGINE GROUP

www.interengines.com  
www.interdieselengine.com

DESIGNED BY INTERNATIONAL GROUP / USA - GERMANY - UK - SPAIN - TURKEY - BRASIL - INDIA - PRC

INTERNATIONAL GROUP RESERVES THE RIGHT TO CHANGE THE CATALOGUES, PRODUCTS, MODELS AND TECHNICAL SPECIFICATIONS

English 01-2021 © 2021 Inter Diesel Engine