

# DIESEL ENGINE

## HEAT EXCHANGER & RADIATOR TYPE

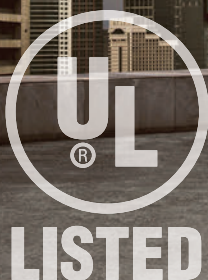
A fire pump has to start immediately based on demand; NAFFCO brand diesel engines have a reputation for consistent starts and lowest operation and maintenance costs. The NAFFCO brand diesel engines are UL listed as per the requirements stated in NFPA 20 and are designed and manufactured according to UL 1247 standards.

These engines go through stringent quality checks and are run tested for their performance ratings at the factory prior to dispatch, only those engine that pass through our rigorous quality checks will be supplied to our valuable customers

### FEATURES

- Easy maintenance
- Highly reliable and advanced diesel engines
- Durable and long lasting
- Rugged Construction built for heavy-duty purpose.
- Reduced noise emission levels to avoid additional acoustic enclosures
- Precise and accurate instrument control with LCD screen for monitoring the performance and health of the diesel engine
- Cooling system designed as per NFPA 20 for optimal heat transfer in order to maintain the diesel engine in optimum conditions.
- Conforms to UL 1247 standards
- Best economic fuel consumption rate.
- A very effective and efficient air intake system

**“ HEAVY-DUTY, RUGGED CONSTRUCTION & RELIABLE OPERATION ”**

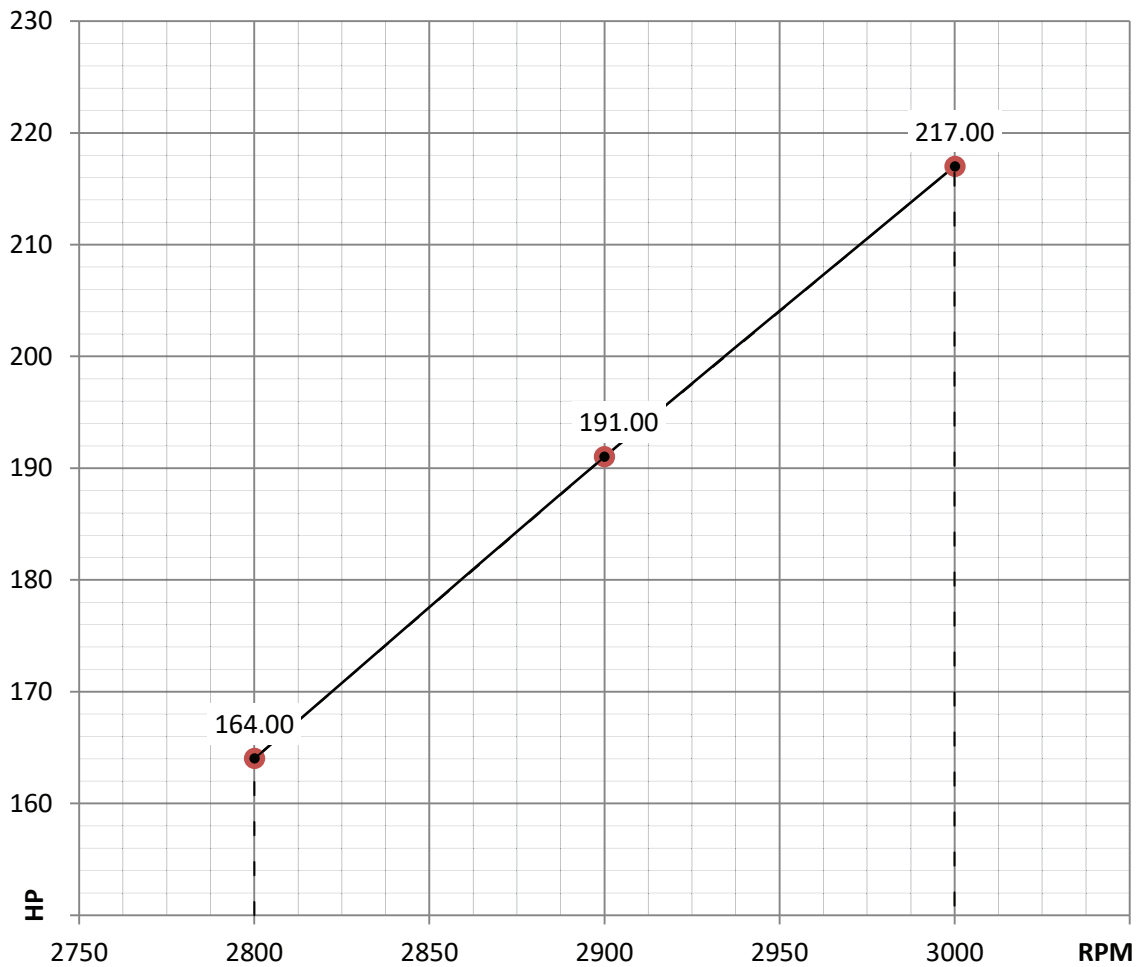


## FD-Hi SERIES PERFORMANCE CURVE

### ENGINE MODEL - FD-190Hi

POWER STANDARD: 164 HP @ 2800 r/min  
191 HP @ 2900 r/min  
217 HP @ 3000 r/min

COMPRESSION RATIO : 17.0:1  
TOTAL DISPLACEMENT : 6.48 L



SYSTEM VOLTAGE

12 v

ASPIRATION

Turbocharged, Aftercooled

Estimated Sound pressure level at 1 meter

dBa

102



# FD-190Hi ENGINE SPECIFICATION

Dimensions (L x W x H) : 1603 x 932 x 1204 mm

Weight : 910 kg



## ENGINE BASIC DATA

<input type="radio"/> Ignition Type	Compression (Diesel)	
<input type="radio"/> Aspiration	Turbocharged, Aftercooled	
<input type="radio"/> Number of Cylinders and its Arrangements	6 Cylinders, In-Line	
<input type="radio"/> Engine Rotation (view from flywheel end)	Counter - Clockwise	
<input type="radio"/> Combustion System	Direct Injection	
<input type="radio"/> Engine Crankcase Vent System	Open	
<input type="radio"/> Bore & Stroke	105 x 125	(mm)
<input type="radio"/> Valves per Cylinder	Intake :1 Exhaust :1	
<input type="radio"/> Firing Order	1-5-3-6-2-4	

## EXHAUST SYSTEM

	2800 RPM	2900 RPM	3000 RPM	
<input type="radio"/> Exhaust Flow	1344.9	1655.2	1894.2	(ft <sup>3</sup> / min)
<input type="radio"/> Exhaust Temperature	440	460	470	(°C)
<input type="radio"/> Max. Allowable Backpressure	4			(kpa)
<input type="radio"/> Exhaust pipe Dia.	5			(in)

## AIR INTAKE SYSTEM

<input type="radio"/> Air Cleaner Type	Dry type, Indoor service only			
<input type="radio"/> Air Intake Restriction Maximum Limit				
<input type="radio"/> Dirty Air Cleaner	2			(kpa)
<input type="radio"/> Clean Air Cleaner	1.0 - 1.25			(kpa)
<input type="radio"/> Engine Air Flow	2800 RPM 547.4	2900 RPM 674.5	3000 RPM 741.6	(ft <sup>3</sup> / min)

## COOLING SYSTEM

	2800 RPM	2900 RPM	3000 RPM	
<input type="radio"/> Engine Radiated Heat	43.6	46.4	62.5	(Btu/sec)
<input type="radio"/> Engine Coolant Flow at Full Load	6			(m <sup>3</sup> /h)
<input type="radio"/> Thermostat Range Start Open	74			(°C)
<input type="radio"/> Thermostat Range Full Open	84			(°C)
<input type="radio"/> Coolant Pressure Cap	0.9			(bar)
<input type="radio"/> Max. Engine Coolant Temperature	95			(°C)
<input type="radio"/> Coolant Specification	50%:50% Ethylene glycol premixed with demineralized water			
<input type="radio"/> Coolant Capacity	18			(L)
<input type="radio"/> Heat Exchanger Cooling Water Inlet Pressure	4.13			(bar)
<input type="radio"/> Heat Exchanger Cooling Water Flow	37			(gal/min)
<input type="radio"/> Raw Water Pressure	0.5 to 2.0			(bar)
<input type="radio"/> Min. Raw Water Temperature	15			(°C)
<input type="radio"/> Raw Water Pipe Size - Inlet	BSP1-1/4"			
<input type="radio"/> Raw Water Pipe Size - Outlet	BSP1-1/2"			



## LUBRICATION SYSTEM

○ Oil Capacity with filter	14.5	(L)
○ Oil Temp	120 - 130	(°C)
○ Normal Operating Oil Pressure Range	2.5 - 10.0	(bar)
○ Oil Pan Capacity - High & Low	High: 11.5L & Low: 9L	
○ Lubrication Oil Specification	15W40 C14	

## FUEL SYSTEM

○ Injection Pump	Inline, Plunger Type		
○ Injection Advance Angle	18±1		(deg.)
○ Minimum Supply line Size	12.7		(mm)
○ Minimum Return line Size	9.5		(mm)
○ Fuel Management Control	Mechanical, ETS		
○ Fuel Consumption	2800 RPM 9.3	2900 RPM 11.04	3000 RPM 12.8 (gal/hr)
○ Max. Governed Speed	+10% over rated speed		
○ Max. Allowable fuel high above fuel pump	5		(m)
○ Governed Speed Rate	≤ 10		(%)

## HEATER SYSTEM

○ Jacket Water Heater	Standard		
● Wattage (Nominal)	2000		(W)
● Voltage - AC, IP	240		(V)

## ELECTRIC SYSTEM

○ System Voltage (Nominal)	12		(V)
○ Starter Motor	3.0		(kW)
○ Recommended Battery Capacity	180		(AH)
○ Cold Cranking Amperes @ -18°C	640		(CCA)
○ Battery Cable Minimum Size	70		(mm <sup>2</sup> )
○ Charging Alternator Output	35		(Amps)
○ Starter Cranking Amps @ 15°C	250 - 350		(Amps)

## PERFORMANCE

○ Power	2800 RPM 164(122)	2900 RPM 191(142)	3000 RPM 217(161)	(HP(kW))
○ Torque	416	468	512	(N.m)



# FD-190Hi ENGINE SERIES

## MATERIAL AND CONSTRUCTION



### Air Cleaner

Type : Dry Type, Indoor Service  
Material : Cellulose Paper

### Crankshaft

Material : 42 Cr M04  
Type : Balance weight attached

### Camshaft

Type of Cam : Cam Ground  
Material : C45 (DIN 17200)  
Location : Inside Crankcase

### Coolant Pump

Type : Centrifugal  
Drive : Belt

### Cooling System Thermostat

Type : Spring Loaded  
Quantity : 1

### Connecting Rods

Type : 45 Angular Split  
Material : 39 Cr5V

### Main Bearings

Type : Bi-Metallic  
Material : Copper - Lead with Overlay Plating

### Piston Pins

Type : Modular  
Material : 17Cr3

### Piston Rings

Top : RIK-20A  
Second : RIK-40  
Third : RIK-40

### Cylinder Head

Type : Integral Type  
Material : Gray CI-Grade FG260

### Cylinder Liners

Type : Wet Liner  
Material : Gray CI-Grade FG150

### Valves

Type : Poppet  
Arrangement : Overhead Valve  
Number per Cylinder : 1 Intake & 1 Exhaust  
Operating Mechanism : Mechanical Rocker Arm Lifter  
Lifter Type : Flat Follower

### Heat Exchanger

Type : Tube & Shell  
Materials, Tube & Shell  
Tubes : Brass  
Shell : Aluminium

### Fuel Injection Pump

Type : Inline Pump  
Drive : Gear Driven

### Lubrication Pump

Pump, Type : Gerotor  
Drive : Gear Drive

### Pistons

Type and Material : Al Alloy - CSA12  
Material : Jet Oil Cooling

### Cooling Loop

Tees, Elbow, Pipe : Stainless Steel  
Ball Valves : Stainless Steel  
Solenoid Valve : Brass  
Pressure Regulator : Stainless Steel  
Strainer : Stainless Steel



Our manufacturing facility for diesel engine has been assessed against ISO 9001 requirements by UL DQS (Underwriters Laboratories Inc) and BSI (British Standard Institutions).

Our Diesel Engine Test facility is capable of conducting the following tests:

- Endurance Test
- Operational Test
- Continuous Running Test
- Rotational Speed Test
- Load Test



For further information please visit:  
[www.fire-driver.com](http://www.fire-driver.com)

**CAT.NO: NF/FD-H/08/22**

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We reserve the right to modify specifications without prior notice