

S.No.	Variable factor or characteristics	SI Engine	CI Engine	Remarks
1.	Thermodynamic cycle	Otto cycle	Diesel and Dual Combustion cycle	Otto cycle more efficient at a given compression ratio and heat input
2.	Combustion	Spark-ignition	Compression-ignition	
3.	Governing (speed & load control)	Quantity governing by throttling; almost constant A/F ratio	By rack, quality governing, air constant, fuel charge variable, no throttling, variable A/F ratio	Quality governing more efficient
4.	Compression ratio	6-11, restricted by detonation (average 7-9)	13-22 (average 15-18) Higher CR reduces knocking. Restricted by mechanical and thermal stresses.	CI engine has higher thermal efficiency due to higher CR
5.	Operating pressures (a) Compression pressure (b) Max. pressure (c) Operating speed	7 to 15 bar 45 to 50 bar Max. 10 bar	30 to 50 bar 60 to 70 bar Max 20 bar	CI engine heavily built
6.	(a) Operating speed (b) Piston speed	High speed (2000-6000 rpm) High 16 m/s	Low speed (4000 rpm) medium speed (400-1200), high speed (1200-3500) up to 11 m/s	SI engine small in size for the same horse power
7.	Distribution of fuel	A/F ratio is not optimum in multicylinder engines	Excellent distribution of fuel in multicylinder engines	Better efficiency and balance in the CI engine
8.	Supercharging	Limited by detonation, used only in aircraft engine	Inherently suitable, widely used. Limited by blower power and mechanical and thermal stresses.	

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9.	Exhaust gas temperature	High, due to low thermal efficiency	Low, due to high thermal efficiency	SI exhaust valves subjected to intense heat
10.	Starting	Easy, low cranking effort	Difficult, high cranking effort	CI engine cold weather starting difficult
11.	Weight per unit power	Low (0.5 to 4.5 kg/kW)	High (3.3 to 13.5 kg/kW)	SI engine lower weight engine for the same power
12.	Power per unit displacement	High (30 kW/litre)	Low (15 kW/litre)	SI engine, hence used in small aircrafts, small volume
13.	Acceleration	Not so good, but compensated by acceleration pump	Good	
14.	Reliability	Good, normal troubles in carburettor and ignition system	Good, greater reserve of power, rated by smoke, not max. power, normal trouble in injection and generating systems	
15.	(a) Specific fuel consumption	Full load low, worse at part load and idling	Full load better, part load much better than SI as no throttling	Most important advantage of the CI engine and hence wide application
	(b) Fuel economy	Costly fuel, density low, calorific value slightly higher, less calories per litre	Cheaper fuel, density high, calorific value slightly low, more calories per litre	
	Full load	Medium	Good	
	Part load	Poor	Good	
16.	Fuel safety (fire hazard)	Volatile fuel, more fire hazard	Less volatile, less fire hazard	CI engine safe in marine and other confined installations

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17.	(a) Initial, capital cost	Low	High due to heavy weight and sturdy construction, costly construction, 1.25 - 1.5 times	
	(b) Running cost	High	Low	
18.	Operating life	Less	More due to sturdy construction. Rating lower than maximum power	
19.	Maintenance cost	Minor maintenance similar to CI	Major overall required less frequently	
20.	Noise and vibration	Less	More idle noise major problem	For comfort, passenger cars mostly use SI engines
21.	Odour and smoke	Less objectionable	More objectionable	
22.	Two-stroke operation	Less suitable, fuel loss in scavenging	More suitable, no fuel loss in scavenging	But small 2-stroke SI engines widely used in motor cycles, scooters, mopeds due to simplicity and cheapness.
23.	Applications	Passenger cars, small mobile applications aircrafts. Two stroke engines scooters, motor cycle mopeds due to cheaper and simpler engine.	Buses, trucks, locomotives, stationary generating plants. Heavy duty equipment like tractors, earth moving machinery; ships	Advantages and disadvantages in both types. For long, continuous running CI always preferred due to low running costs.

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24.	Combustion problem	Kneek in unburnt mixture.	Diesel knock caused by long delay. High cetane number, low self-ignition temperature	
25.	Fuel	Petrol high octane number, high self-ignition temperature		
26.	Air-fuel ratio	10 to 17	18 to 100	
27.	Fuel supply method	Cheap; carburettor	Expensive; fuel pump and injector	
28.	Very high power	No	Yes	