

Technical data TAD1643VE

General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel

Number of cylinders			6
Displacement, total		liters	16.12
		in ³	984
Firing order			1-5-3-6-2-4
Bore		mm	144
		in	5.67
Stroke		mm	165
		in	6.50
Compression ratio			17,5:1
Dry weight	Engine only, excluding cooling system	kg	1440
		lb	3175
	Power pac	kg	1840
		lb	4057
Wet weight	Engine only, excluding cooling system	kg	1510
		lb	3329
	Power pac	kg	2000
		lb	4409

Performance		r/min	1200	1500	1800	1850	
IFN Power	565 kW	without fan	kW	410	513	565	565
			hp	557	697	768	768
		with fan	kW	404	502	546	543
		890 mm	hp	549	683	742	738
Torque at:	IFN Power 565 kW		Nm	3257	3263	2997	2916
			lbf ft	2395	2399	2211	2151
Max torque at engine speed	rpm 1300		Nm	3261			
			lbf ft	2398			
Mean piston speed			m/s	6.6	8.3	9.9	10.2
			ft/sec	21.7	27.1	32.5	33.4

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Performance		r/min	1200	1500	1800	1850
Effective mean pressure at:	IFN Power 565 kW	Mpa psi	2.54 369	2.55 369	2.34 339	2.27 330
Max combustion pressure at:	IFN Power 565 kW	Mpa psi	18 2610	17.5 2538	17.1 2480	16.7 2422
Total mass moment of inertia, J (mR ²) With our standar flywheel		kgm ² lbf ²	4.1 97.3			
Degree of irregularity at:	IFN Power 565 kW		1:23	1:38	1:48	1:80
Friction Power		kW hp	27 37	41 56	58 79	65 88

Derating

The engine may be operated up to 1680 m altitude without derating.
For operation at higher altitudes the power will be derated according to the graph below.
There is no derating for ambient temperature or humidity.

Cold start performance

		r/min	1500	1800	
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	6.5	8.4
		5	s	6.7	8.7
		-15*	s	7.3	9.8
Time from start to stay within 0.8% of no load speed at ambient temperature:	°C	20	s	5.6	7.5
		5	s	6.2	8.2
		-15*	s	6.7	9.2

* With manifold heater kW engaged, lubrication oil 10W/30, block heater and MK1 fuel.

Usage of manifold heater:	Time preheating, minutes	Time postheating, minutes		
	0.5	1.7		
Ambient temp. °C	Block heater type and Make	Power kW	Engaged hours	Cooling water temp engine block, °C
-15	External Volvo	2	12	17

Lubrication system

Lubrication system		r/min	1200	1500	1800	1850
Lubricating oil consumption at max rpm at:	IFN Power 565 kW	liter/h	0.10			
		US gal/h	0.026			
Oil system capacity including filters		liter	48			
		US gal	12.68			
Oil sump capacity:	Max	liter	42			
		US gal	11.10			
	Min	liter	32			
		US gal	8.45			
Oil change intervals/specifications	VDS-2	h	600			
	VDS, ACEA, E3	h	400			
	ACEA E2, API CF, CF-4, CG-4	h	200			

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Lubrication system

Engine angularity limits:	front up	°	30
	front down	°	30
	side tilt	°	30
Oil pressure at rated speed		kPa	300 -- 650
		psi	44 -- 94
Lubrication oil temperature in sump:	max	°C	130
		°F	266
Oil filter micron size		mm	0,040

Fuel system

		r/min	1200	1500	1800	1850
IFN Power 565 kW Specific fuel consumption at:	25%	g/kWh	218	219	230	238
		lb/hph	0.353	0.355	0.373	0.386
	50%	g/kWh	200	200	207	213
		lb/hph	0.324	0.324	0.336	0.345
	75%	g/kWh	197	192	203	208
		lb/hph	0.320	0.311	0.329	0.337
	100%	g/kWh	190	194	198	200
		lb/hph	0.308	0.314	0.321	0.324
Fuel to conform to			ASTM-D975-No2, DIN 51601, EN 590			
System return flow at max. speed		liter/h	25			
		US gal/h	6.6			
System supply flow at max. speed		liter/h	185			
		US gal/h	48.9			
Fuel supply line max. restriction		kPa	10			
		psi	1.5			
Fuel supply line max. pressure, engine stopped		kPa	0.0			
		psi	0.0			
Fuel return line max. restriction		kPa	20			
		psi	2.9			
Max. allowable inlet fuel temp		°C	60			
		°F	140			
Prefilter / Waterseparator micron size		mm	0,010			
Governor type/make, standard		VOLVO / EMS2				
Injection pump type/make		Delphi E1				

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Intake and exhaust system		Inlet air temp	r/min	1200	1500	1800	1850
Air consumption at 100kPa ambient pres:	IFN Power 565 kW	25°C 77°F	m ³ /min cfm	27 936	40 1413	43 1519	43 1529
Air intake restriction, clean filter(s)			kPa In wc	2.1 8.4			
Max allowable air intake restriction			kPa In wc	5 20.1			
Air filter type			Single stage paper cartridge				
Air filter cleaning efficiency			%	99.85			
Heat rejection to exhaust at:	IFN Power 565 kW		kW BTU/min	294 16719	384 21838	486 27638	495 28150
Exhaust gas temperature after turbine at:	IFN Power 565 kW		°C °F	486 907	438 820	501 934	508 946
Max allowable back pressure in exhaust line			kPa In wc	8.5 34.1	13.0 52.2	13.5 54.2	15.0 60.2
Exhaust gas flow at:	IFN Power 565 kW		m ³ /min cfm	69 2437	90 3178	104 3684	106 3731
Exhaust gas smoke	IFN Power 565 kW		*Bosch	0.2	0.16	0.4	0.45

***N.B!** Bosch units are calculated values. Measured values are acc. to ISO 10054 in FSN units

Cooling system		r/min	1800	1850
Heat rejection radiation from engine at:	IFN Power 565 kW	kW BTU/min	8 455	8.3 472
Heat rejection to coolant at:	IFN Power 565 kW	kW BTU/min	230 13080	236 13421
Coolant	Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type	Closed circuit			

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Cooling system		r/min	1200	1500	1800	1850
Standard radiator core area		m ²	1.32			
		foot ²	14.21			
Standard radiator core thickness		mm	52			
		in	2.05			
Fan diameter	890 mm	mm	890			
		in	35.04			
Fan power consumption	890 mm	kW	5.6	10.8	19.1	22.1
		hp	8	15	26	30
Fan drive ratio	fan Ø890		1,04 : 1			
Coolant capacity:	engine	liter	33			
		US gal	8.7			
	std. 1,32m ² radiator with hoses	liter	60			
		US gal	15.9			
Coolant pump		drive/ratio	belt/1,85:1			
Coolant flow with standard system		l/s	5.4	6.8	8.1	8.5
		US gal/s	1.4	1.8	2.1	2.2
Minimum coolant flow		l/s	5.4	6.8	8.1	8.5
		US gal/s	1.4	1.8	2.1	2.2
Maximum external coolant system restriction incl. piping		kPa	55.0			
		In wc	220.8			
Thermostat:	start to open	°C	86			
		°F	187			
	fully open	°C	96			
		°F	205			
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	100			
		in wc	402			
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	70			
		in wc	281			
Standard pressure cap setting		kPa	75			
		In wc	301			
Maximum top tank temperature		°C	103			
		°F	217			
Draw down capacity		4% of total cooling system capacity				

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Charge air cooler system		r/min	1800	1850
Cooling power	IFN Power 565 kW	kW	155	156
		BTU/min	8815	8872
Combustion air inlet temp. (Charge air temp after turbo compressor)	IFN Power 565 kW	°C	239	240
		°F	462	464
Max allowable Comb. Air temp after CAC at 25 degree ambient. (Charge air temp after intercooler)	IFN Power 565 kW	°C	45	45
		°F	113	113
Maximum pressure droop over intercooler, incl. piping		kPa	16	
		psi	2.32	
Boost pressure at rated power 1800rpm.		kPa	230	
		psi	33.36	
Standard intercooler core area		m ²	1.3	
		foot ²	13.99	
Standard intercooler core thickness		mm	68	
		in	2.68	

Cooling performance: 1.31 m² radiator and 890 mm fan

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 40% antifreeze

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	kg/s	lb/s	Pa	psi
1800	565	53.5	128	13.2	29.1	0	0.0
		50	122	11.2	24.8	409	0.059
	768	45	113	9.6	21.1	770	0.112
		40	104	8.0	17.7	1048	0.152

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Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop Switchable during operation	Isochronous
Governor droop	0 - 5%	0
Governor response	Adjustable PID-constants	
Idle speed	550 - 800 rpm	600 rpm
Stop function	Energized to run / stop	Energized to stop
Preheating function	ON/OFF	OFF
Lamp test	ON/OFF	ON

Engine protection		Alarm level		Engine protection	
Parameter	Unit	Setting range	Default setting	Protection at	Protective action
Oil temperature	°C	120 - 130	125	Setting +5	Shut down / off *
Oil pressure	Low idle	kPa	-	Default -30	Shut down / off *
	Rated speed	kPa	-	Default -30	Shut down / off *
Oil level		-	Min level	-	-
Piston cooling pressure >1000 rpm	kPa	-	150	150	Shut down / off *
Coolant temp	°C	95 - 101	98	Setting +5	Shut down / off *
Coolant level		-	On	Low level	Shut down / off *
Fuel feed pressure	Low idle	kPa	-	100	-
	Rated speed		-	300	-
Water in fuel		-	High level	-	-
Crank case pressure	kPa	-	-	-	Shut down
Air filter pressure drop	kPa	-	5.0	-	-
Altitude, above sea	m			-	Automatic derating, see section derating
Charge air temp	°C	-	80	+5	Shut down
Charge air pressurer	kPa	-	290	340	Shut down
Engine speed	rpm	100 - 120% of rated	120% / off *	Alarm level	Shut down / on
Low voltage	V	-	25.5	-	-

*Off means no shutdown , alarm only.

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Electrical system

Voltage and type			24V / Insulated from earth
Alternator:	make		Bosch
	output	Amp	80
	tacho output	Hz/alternator rev.	6
	drive ratio		3,9 : 1
Starter motor:	make		Melco
	type		105P70
	output	kW hp	7 9.5
	Starter motor solenoid:	pull current hold current	Amp Amp
Number of teeth on:	flywheel		153
	starter motor		12
Inrush current at +20°C		Amp	700
Cranking current at +20°C		Amp	280
Crank engine speed at +20°C		rpm	150
Starter motor battery capacity	max	Ah	2x 225
	min at +5°C	Ah	
Inlet manifold heater (at 20 V)		kW	4
Power relay for the manifold heater		Amp	1

Power take off

	r/min	1200	1500	1800	1850	
Front end in line with crank shaft max:	Nm lbf ft	TBD				
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	26 35	33 45	38 52	40 54
	max down	kW hp	60 82	75 102	85 116	90 122
		max right	kW hp	26 35	33 45	38 52
	Timing gear at compressor PTO max:	Nm lbf ft	160 118			
		Speed ratio direction of rotation viewed from flywheel side	1,31:1/ anti-clockwise			
	Timing gear at servo pump PTO max:	Nm lbf ft	100 74			
Max allowed bending moment in flywheel housing		Nm lbf ft	15000 11063			
	Max. rear main bearing load	N lbf	5000 1124.0			