


<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

## Important

This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with  are considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.

## General

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

Number of cylinders			6
Displacement, total	liters		12,78
		in <sup>3</sup>	780
Firing order			1-5-3-6-2-4
Bore	mm		131
	in		5,16
Stroke	mm		158
	in		6,22
Compression ratio			17,8:1
Wet weight	Engine only (Estimated) (excl after treatment comp.)	kg	1325
		lb	2921
	Power pac	kg	1790
		lb	3946

Performance				rpm	1200	1500	1800	1900
IFN Power	345 kW	without fan		kW	299	345	345	345
				hp	407	469	469	469
		with fan ratio 1:1,07 890 mm		kW	291	333	325	321
				hp	396	453	442	437
Torque at:		IFN Power		Nm	2380	2196	1830	1734
				lbf ft	1755	1620	1350	1279
Max torque at engine speed		rpm	1200 rpm	Nm	2380			
				lbf ft	1755			
Power tolerance				%	±2			
Mean piston speed				m/s	6,3	7,9	9,5	10,0
				ft/sec	20,7	25,9	31,1	32,8
Effective mean pressure at:		IFN Power		MPa	2,34	2,16	1,80	1,71
				psi	339	313	261	247
Max combustion pressure at:		IFN Power		MPa	16,7	16,9	15,6	15
				psi	2422	2451	2262	2175
Total mass moment of inertia, J (mR <sup>2</sup> ) (not including flywheel)				kgm <sup>2</sup>	1,143			
				lbft <sup>2</sup>	27,1			
Friction Power				kW	21	31	45	51
				hp	29	42	61	69
<b>Derating see Technical Diagrams</b>								

<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

<b>Engine brake performance (only engines with VCB)</b>		<b>rpm</b>	<b>1200</b>	<b>1500</b>	<b>1900</b>	<b>2200</b>
Brake power:	without fan	kW	70	128	240	283
		hp	95	174	326	385
Brake torque:	without fan	Nm	557	815	1206	1228
		lbf ft	411	601	890	906
Engine speed range for VCB activation:		rpm	1000-2200			
Min engine speed with VCB still active:		rpm	900			
Min oil temperature for VCB activation:		°C	55			

**Cold start performance**

*Cold start limit temperature	without starting aid	°C	-15		
		°F	5		
	with manifold heater 3 kW	°C	-25		
		°F	-13		
with manifold heater 3 kW and block heater	°C	-30			
	°F	-22			
*Specify oil and fuel quality	T>-15°C Oil VDS3 or VDS4 15W/40 T<-15°C Oil VDS3 or VDS4 5W/40				
Heater type	Make	Power kW	Engaged hours (-30°C)	Cooling water temp engine block	
Self circulating	Volvo 21578298	2	12	-1°C 30°F	

\* See also general section in the sales guide

**Lubrication system**

Lubricating oil consumption (average)		Vol%	0,02		
Oil system capacity including filters		liter US gal	Plastic sump 36 / Aluminium sump 52 Plastic sump 9,51 / Aluminium sump 13,74		
Plastic Oil pan capacity:	Max	liter US gal	30 7,93		
	Min	liter US gal	19 5,02		
Aluminium Oil pan capacity:	Max	liter US gal	46 12,15		
	Min	liter US gal	36 9,51		
Oil change intervals/specifications	VDS3	h	1000		
	VDS4	h	1000		
Engine angularity limits:	front up	°	Plastic sump 11 / Aluminium sump 35		
	front down	°	Plastic sump 11 / Aluminium sump 35		
	side tilt	°	Plastic sump 11 / Aluminium sump 35		
Oil pressure at rated speed		kPa psi	300 - 650 44 - 94		

**Lubrication system**




Lubrication oil temperature in sump:	max	°C	130		
		°F	266		
Oil filter filtration efficiency (in accordance with ISO 4548-12)	99%	μ	38		
	50%	μ	14		

<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

**Fuel system**

System supply flow at max. Speed	liter/h US gal/h	130 34,3	
Fuel supply line max. restriction (measured at fuel inlet connection)	kPa psi	30 4,4	
Fuel supply line max. pressure, during engine stand still (measured at fuel inlet connection)	kPa psi	16,5 2,4	
Fuel supply line min. pressure, during engine stand still (measured at fuel inlet connection)	kPa psi	-125 -18,1	
System return flow at max. Speed	liter/h US gal/h	30,0 7,9	
Fuel return line max. restriction (measured at fuel return connection)	kPa psi	20 2,9	
Max. allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	60 140	
Prefilter / Water separator micron size	μ	10	
Fuel filter filtration efficiency	96%	μ	6
	75%	μ	4
Governor type/make, standard	Volvo/EMS2.3		
Specific UREA consumption in Nonroad Transient Cycle (NRTC)	Vol%	4,9	
Fuel to conform to	Fuel equal to or better than EN590:2009 or ASTM D975-09 and Max sulphur 15ppm		



**Intake and exhaust system**

		rpm	1200	1500	1800	1900
Charge air consumption at: (+25°C and 100kPa)	IFN Power	m³/min cfm	20,0 706	25,0 883	26 918	27 954
 <b>See front page for important information</b>		kPa psi	6 0,9			
Max allowable air intake restriction including piping						
Heat rejection to exhaust at:	IFN Power	kW BTU/min	201 11431	250 14217	270 15355	278 15810
Exhaust gas temperature after turbine at:	IFN Power	°C °F	445 833	455 851	465 869	491 916
 <b>See front page for important information</b>						
Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 125 mm		kPa psi	13 1,9	17 2,5	18 2,6	19 2,8
 <b>See front page for important information</b>						
Max allowable temperature drop between turbine and SCR muffler inlet.		Δ°C Δ°F	10 18	10 18	10 18	10 18
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)		kPa psi	9 1,3	10 1,5	10 1,5	11 1,6
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power	m³/min cfm	47,0 1660	56,0 1978	59 2084	61 2154

<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

<b>Cooling system</b>		<b>rpm</b>	<b>1200</b>	<b>1500</b>	<b>1800</b>	<b>1900</b>
Heat rejection radiation from engine at:	IFN Power	kW	7,6	8,1	8,4	8,7
		BTU/min	432	461	478	495
Heat rejection to coolant at:	IFN Power	kW	124	143	155	161
		BTU/min	7052	8132	8815	9156
Coolant		Yellow Volvo Coolant Solution (VCS)				
Radiator cooling system type		Closed circuit				
Standard radiator core area		m <sup>2</sup>	0,8			
		foot <sup>2</sup>	8,61			
Fan diameter	890 mm	mm	890			
		in	35,04			
Fan power consumption	890 mm	kW	4,0	6,0	10,0	12,0
		hp	5	8	14	16
Fan drive ratio	fan Ø890		1:0,84 ccw			
Coolant capacity:	engine	liter	20			
		US gal	5,3			
	std. 0,8m <sup>2</sup> radiator with hoses	liter	24			
		US gal	6,3			
Coolant pump		drive/ratio	belt/1,41:1 cw			
Coolant flow with standard system		l/s	3,7	4,7	5,7	6
		US gal/s	1,0	1,2	1,5	1,6
Minimum coolant flow		l/s	3,2	4,2	5,5	5,5
		US gal/s	0,8	1,1	1,5	1,5
Maximum outer circuit restriction incl. piping		kPa	65,0			
		psi	9,4			
Thermostat:	start to open	°C	82			
		°F	180			
	fully open	°C	92			
		°F	198			
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	100			
		psi	14,5			
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	70			
		psi	10,2			
Standard pressure cap setting		kPa	75			
		psi	10,9			
Maximum top tank temperature		°C	107			
		°F	225			
Recommended Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still are functioning		liter	2			
		US gal	0,5			

<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

<b>Charge air cooler system</b>		<b>rpm</b>	<b>1200</b>	<b>1500</b>	<b>1800</b>	<b>1900</b>
Heat rejection to charge air cooler	IFN Power	kW	54	63	64	61
		BTU/min	3071	3583	3640	3469
Charge air mass flow	IFN Power	kg/s	0,41	0,5	0,52	0,52
Charge air inlet temp. (Charge air temp after turbo compressor)	IFN Power	°C	175	177	172	166
		°F	347	351	342	331
 <b>See front page for important information</b> Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)		°C	45	50	50	50
		°F	113	122	122	122
 <b>See front page for important information</b> Maximum pressure drop over charge air cooler incl. piping		kPa	12			
		psi	1,74			
Charge air pressure (After charge air cooler)		kPa	209	207	179	166
		psi	30,31	30,02	25,96	24,08
Standard charge air cooler core area		m <sup>2</sup>	0,8			
		foot <sup>2</sup>	8,61			

**Cooling performance: 0.8 m<sup>2</sup> radiator and pull 890 fan**

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm.

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m <sup>3</sup> /s	ft <sup>3</sup> /s	Pa	psi
1900	345	58	136	6,4	226,0	247	0,036
0,84	469	60	140	6,9	243,7	125	0,018
		62	144	7,3	257,8	0	

**Cooling performance: 0.8 m<sup>2</sup> radiator and push 890 fan**

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm.

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m <sup>3</sup> /s	ft <sup>3</sup> /s	Pa	psi
1900	345	58	136	6,3	222,5	265	0,038
0,84	469	59	138	6,5	229,5	195	0,028
		61	142	7	247,2	0	

<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

**Engine management system**

Functionality	Alternatives			Default setting
Governor mode	Droop	Isochronous		Isochronous
Governor droop	10	127	Nm/rpm	
Governor response	Adjustable PI constants			
Idle speed	600	900	rpm	700
Preheating function	Ignition	Request	Request + temp	If preheat is available, preheat will be active at ignition on if temp low or demanded by driver.
Ignition of stop engine	Yes	No		No

Engine sensors and switch settings		Engine protection action				
Parameter	Unit	Warning setting (Yellow)	Alarm setting (Red)	Default	Optional (Module or conversion kit)	
Oil temp	°C	125	130	Derate	Shut down.	
Oil pressure	Low idle	kPa	80	55,0	Shut down	Shut down.
	Rated speed	kPa	300	275	Shut down	Shut down.
Oil level		Low level	N/A	Fault code only	Fault code only	
Piston cooling pressure >1000 rpm	kPa	Not available on this engine				
Coolant temp	°C	105	107	Derate	Shut down.	
Coolant level		N/A	Low level	Derate	Shut down.	
Fuel feed pressure	Low idle	kPa	See Fuel pressure limits	N/A	Fault code only	
	Rated speed			N/A	Fault code only	
Water in fuel		Alarm when closed	N/A	Fault code only	Fault code only	
EGR temp	°C	N/A	N/A	N/A	N/A	
Air filter pressure drop	kPa	5	N/A	Fault code only	Fault code only	
Altitude, above sea	m	N/A	N/A	Automatic derating, see section derating	Automatic derating, see section derating	
Crank case pressure		N/A	Alarm at	Shut down	Shut down.	
Charge air temp	°C	120	125	Derate	Shut down.	
Charge air pressure	kPa	See Charge air pressure limits		Derate	Shut down.	
SCR temp	°C	N/A	N/A	Automatic derating	Automatic derating	
Engine overspeed	rpm	2400	N/A	Fault code only	Fault code only	

Derate parameters	Derated 0% to engine protection map	Derated 100% to engine protection map	Forced idle after 5 sec	Forced shut down after 0 sec
Oil temp	130°C	132°C	N/A	N/A
Coolant temp	107°C	108°C	N/A	N/A
Charge air temp	125°C	126°C	N/A	N/A
EGR temp	N/A	N/A	N/A	N/A
Low oil pressure	See Oil pressure limits		N/A	At alarm
Charge air pressure	See Charge air pressure limits		N/A	N/A

<b>VOLVO PENTA</b> TAD1373VE	Document No	Issue Index
	<b>22323791</b>	<b>09</b>

**Electrical system**

Voltage and type				24V		
Alternator:	output	A		110/150		
	tacho output	Hz/alternator rev.		6		
	drive ratio			5,25		
Starter motor:	type			105P70 / (105P70 ISS för start/stop)		
	output	kW	hp	7 9,5		
Number of teeth on:	flywheel			153		
	starter motor			12		
Inlet manifold heater (at 20 V)		kW	3			
Power relay for the manifold heater		A	1			
<b>Conditions:</b>	<b>Temperature</b>	°C		<b>25</b>	<b>0</b>	<b>-15</b>
(4 mΩ main circuit resistance@	<b>Battery</b>	<b>Ah / CCA</b>		<b>140 / 800</b>	<b>140 / 800</b>	<b>145 / 1050</b>
Crank speed		rpm		171	118	98
Crank current		A		290	400	480
Starter input power during crank		kW		6,2	7,5	7,7
Battery power during crank		kW		6,5	8,1	8,5
Min battery		Ah / CCA		120 / 700	140 / 800	145 / 1050

**Power take off**

	rpm	1200	1500	1800	1900	
Front end in line with crank shaft max:*	Nm	2300	2140	1560	1620	
(with a total added mass moment of inertia, J (mR2) ≤ 0,05 kgm²)	lbf ft	1696	1578	1151	1195	
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW	42	53	62	68
		hp	57	72	84	92
	max down	kW	36	44	52	60
		hp	49	60	71	82
	max right	kW	42	53	62	68
		hp	57	72	84	92
Timing gear at servo pump PTO max:*	Nm	100				
	lbf ft	74				
Speed ratio direction of rotation viewed from flywheel side		1,75:1/ccw				
Continuous torque on timing gear at rear PTO : *, **	Nm	650 / 1000				
DIN 5462 spline	lbf ft	479 / 739				
Continuous torque on timing gear at rear PTO : *	Nm	600				
SAE B spline	lbf ft	442				
Speed ratio direction of rotation viewed from flywheel side, for all rear PTO,s		1,26:1/ccw				
Continuous torque . Timing gear at compressor PTO max:*	Nm	300				
PTO SAE B	lbf ft	221				
Speed ratio direction of rotation viewed from flywheel side		1,31:1/ccw				
Max allowed bending moment in flywheel housing	Nm	15000				
	lbf ft	11063				
Max. rear main bearing load	N	4000				
	lbf	899,2				

\* **Maximum allowed torque at individual PTO´s.**

**If more than one PTO output is used simultaneously, calculations needs to be performed to determine maximum available torque, depending on application inertia.**

\*\* Standard 650, option 1000 Nm

**VOLVO PENTA**  
TAD1373VE

Document No

**22323791**

Issue Index

**09**

