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REPORT ON TEST IN ACCORDANCE WITH OECD TEST CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

AGRICULTURAL TRACTOR VOLVO BM VALMET 2105

Manufactured by: Volvo BM AB, Eskilstuna, Sweden

Test No. 7022

Agricultural tractor Volvo BM Valmet 2105



This bulletin is based on engineering tests in accordance with the OECD Tractor Code.
It does not contain an evaluation of the performance of the tractor on practical farm work.

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* All specified dimensions refer to the tyre sizes 16.9 R 28, load index 136 A8, at front, 20.8 R 38, load index 153 A8, at rear and the track width 1840 mm at front and 1920 mm at rear.

Tractor manufacturer's name and address:	Volvo BM AB, Eskilstuna, Sweden by order of Scantrac AB, Eskilstuna, Sweden and Valmet AB, Jyväskylä, Finland
Submitted for test by:	Scantrac AB, 631 80 Eskilstuna, Sweden
Selected for test by:	Scantrac AB with the agreement of the testing institute
Place of running in:	Scantrac AB, Eskilstuna, Sweden
Duration of running in:	100 hours

Specification of tractor

Tractor

Make	Volvo BM
Trade name	Volvo BM Valmet[1]
Model	2105
Type	four wheel driven, unit construction
Serial No.	20017
First serial No.	20001

Engine

Make	Volvo
Model	TD 60 K
Type	turbo-charged, intercooled 4-stroke, direct injection, diesel engine, water cooled
Serial No.	82705
Cylinder Number	6
Disposition	vertical, in-line
Bore/Stroke	98.4/120.0 mm
Capacity	5.480 dm^3
Compression ratio	16:1
Arrangement of valves	overhead
Cylinder liners	wet, replaceable, centrifugally cast iron liners

Supercharging

Make	Garret/A i Research
Model	TO 4B/4 – 7/0.84 D
Type	exhaust type turbo-supercharger
Pressure	100 kPa

Fuel system

Type of fuel feed	mechanical, piston type fuel feed pump, Bosch FP/K 22 MW 18
Make and type of fuel filters	2 filters, Bosch replaceable cartridge filter conected in parallel
Fuel tank capacity	210 dm^3
Make, model and type of injection pump	Bosch PES 6 MW 100/320 RS 1004 in-line type
Serial No.	0.403.446.148

[1] From January 1st, 1986 the trade name is changed to Valmet

Manufacturer's production setting of injection pump	96–98 mm^3 per stroke at 700 rev/min of the pump at full injection rate
Flow rate injection timing	20° before T.D.C.
Make, type and model of injectors	Bosch, multihole DLLA 150 P 24
Manufaturer's production setting	27 MPa

Governor

Make	Bosch
Type	mechanical, incorporated in fuel injection pump
Model	RQV 300-1150 MW54
Range of engine speed	governed range of engine speed 550+50 to 2500+–50 rev/min
Rated engine speed	2300 rev/min

Air cleaner

Make and model	Mann -20325/2 Hummel CF1000 (safety cartridge)
Type of cleaner	dry paper air cleaner including replaceable paper element
Location	behind the engine
Maintenance indicator	electric (warning lamp)

Exhaust silencer spark arrester

Make and model	Volvo BM, Reverse Flush 260/152 V 650
Type	expansion chamber type
Location	vertical through bonnet on left hand side, debouch 3.40 m above ground

Lubrication system

Type of feed pump	forced feed from gear type pump with metal strainer in oil sump
Make and type of filter	full flow oil filter with replaceable paper element
Oil capacity	15 dm^3
Changing period	200 h (oil and filter)
Recommended oil	see end of chapter "Specification"

Cooling system

Type	water cooled, impeller assisted by centrifugal pump, 580 mm dia 6-blade belt driven fan
Coolant capacity	26 dm^3
Means for temperature control	thermostat
Pressure	50 kPa

Starting system

Make	Bosch
Model and type	JD 12V4. Electrical, solenoid starter motor, 3 kW
Cold starting aids	electromagnetically controlled for max. fuel injection. Starting element in induction manifold
Safety device	starter interlock, gear in neutral position and clutch pedal released

Electrical system

Voltage	12 V
Generator	
Make	Bosch
Type	Alternator
Power	1260 W
Battery	2 accumulators in parallel
Capacity	140 Ah at 20 h rating

Transmission

Clutch (only for travelling)	
Make	Automotive Products Ltd
Type	dry, single acting, mounted on engine flywheel operating primary shaft of gear box
Model	15" AS, coil spring loaded
Number of plates	one, rigid with carametalix buttons
Diameter of disc	350 mm
Method of operation	foot pedal, mechanically with servo by overcentre spring

Gearbox

Make	Volvo BM
Type, arrangement	mecanical, sliding gear, constant mesh. Main gearbox operated by hand lever with 4 forward speeds and 1 reverse speed combined with one hand lever operated high–low transfer gearbox. Power shift hydraulically operated by electro-switch
No. of speeds	totally 16 forward and 4 reverse
Options	one certain markets 14th and 16th speeds are blocked due to localspeed regulations

Rear axle and final drive

Make	Volvo BM
Type	bull gear axle with axle tubes mounted to a centre housing, containing differential crownwheel and pinion and spur gear final drives mounted to the gear box
Differential lock	mechanical, dog clutch between rear axle halves. Electrohydraulically operated ram engages and disengages the dog clutch

Front axle and final drive

Make and model	ZF, APL 355
Type	mechanical, driven from bottom of gearbx by drop-down gearbox and two gears and a universal joint shaft. Axle with crown wheel and pinion and planetary final drives in wheel hubs
Differential lock	limited slip, self-locking differential, automatic engagement and disengagement
Model	ZF DZ

Transmission oils-capacity

Gearbox and rear axle	95 dm^3
Change period	1600 h
Power shift	
with servo system	15 dm^3
Change period	800 h
Type of oil filter	full-flow replaceable paper element
Filter change period	800 h
Front axle	8 dm^3
Final drives	2×0,75 dm^3
Change period	1600 h
Recommended oils	see end of chapter "Specifications"

Total ratio and speeds

Gear				Number of engine revolutions for one revolution of driving wheels	Nominal travelling speed at rated engine speed*	
No.	Position				km/h	m/s
Forward	Gear	Group	Power-shift			
1	1	Low	low	256.09	2.9	0.80
2	1	L	high	199.01	3.8	1.06
3	2	L	l	170.47	4.4	1.22
4	2	L	h	132.48	5.7	1.58
5	3	L	l	113.97	6.6	1.83
6	4	L	l	93.86	8.0	2.22
7	3	L	h	88.57	8.5	2.36
8	1	High	l	79.82	9.4	2.61
9	4	L	h	72.94	10.3	2.86
10	1	H	h	62.03	12.1	3.36
11	2	H	l	53.13	14.2	3.94
12	2	H	h	41.29	18.2	5.05
13	3	H	l	35.52	21.2	5.88
14**	4	H	l	29.26	25.7	7.14
15	3	H	h	27.61	27.3	7.58
16**	4	H	h	22.73	33.1	9.19
Reverse						
1	R	L	l	208.58	3.6	1.00
2	R	L	h	162.09	4.6	1.28
3	R	H	l	65.01	11.6	3.22
4	R	H	h	50.52	14.9	4.14

* Tyre size: Rear 20.8 R 38. Radius index 868 mm (dynamic)
** Blocked on markets with max. allowed speed 30 km/h.

Power take-off

Make	Volvo BM
Location	at rear of tractor. 2 shafts.
Type of drive	independent and ground dependent p.t.o. selected by hand lever. Electro-hydraulically operated dry multi disc clutch engaged and disengaged by switch.
Dimensions	according to ISO 500

Proportional engine speed p.t.o.

Lower shaft	height above ground	631 mm
6 splines/.35 mm)		
540 rev/min	distance from the median plane of the tractor	50 mm to the left
	distance behind rear axle	605 mm
	p.t.o. speed at rated engine speed	601 rev/min
	engine speed at standard p.t.o. speed	2067 rev/min
	ratio:	3.8281
	power restriction	48 kW
	direction of rotation (viewed facing driving end)	clockwise
Upper shaft	height above ground	745 mm
21 splines/35 mm	distance from the median plane	
1000 rev/min	of the tractor	0 mm
	distance behind rear axle	554 mm
	p.t.o. speed at rated engine speed	1127 rev/min
	engine speed at standard p.t.o. speed	2042 rev/min
	ratio:	2.0417
	direction of rotation (viewed facing driving end)	clockwise

Proportional ground speed p.t.o.

Travelling distance for one revolution of power take-off shaft:
- 540 rev/min shaft: 0.3271 m
- 1000 rev/min shaft: 0.1745 m

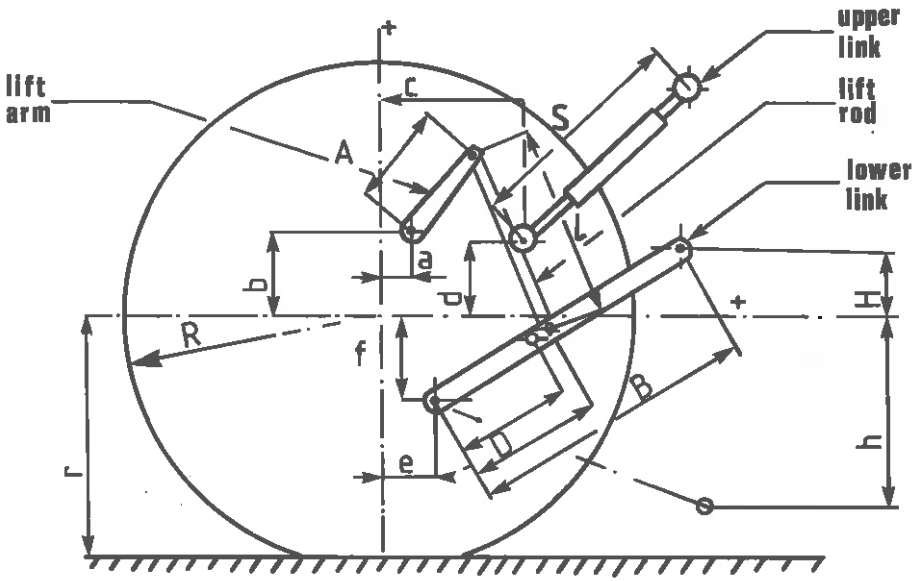
Number of power take-off shaft revolution for one revolution of rear wheels:
- 540 rev/min shaft: 16.672
- 1000 rev/min shaft: 31.261

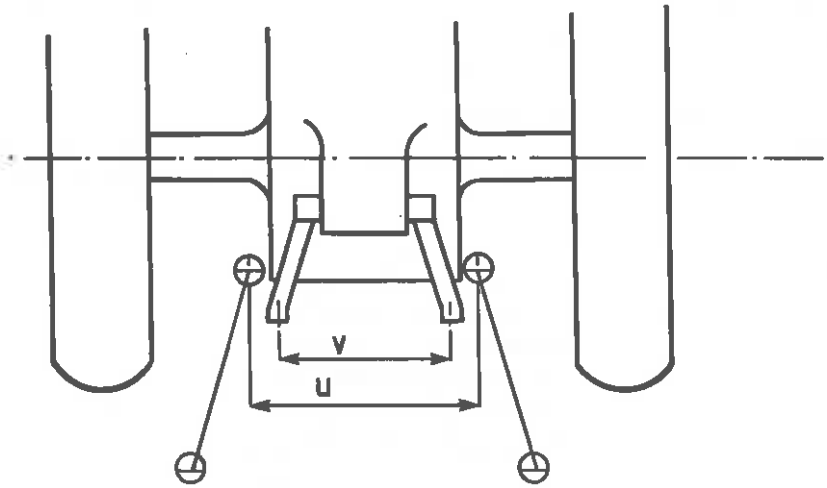
Direction of rotation with forward gear engaged: clockwise

Power lift

Make/model	Volvo BM/Terra trol MII
Type	three cylinders, single acting. Gear type pump driven from the engine by gear
Working pressure	17.0–17.8 MPa. Oil supplied from separate tank situated on the right hand side
Safety valve	not fitted
Oil capacity	74 dm^3
Changing period	800 h
Filter	full flow replaceable, paper element filter
Changing period	400 h
Implement linkage	category 2 according to ISO 730 with lower link sensing. Adaptor to category 3. Draught-, position- and mixed control. 2 operating levers Hydraulic linkage lock for transport operated manually by separate valve
External tappings	2 double acting, and 1 single acting situated on top of rear axle housing. Oil capacity availably for external use 43 dm^3
Recommended oil	See end of chapter "Specification"

Dimensions of linkage geometry, mm





Dimensions of the implement linkage

			mm
Rear tyres (size 20.8 R 38) loaded radius index		(R)	840
Front tyres (size 16.9 R 28) loaded radius index		(r)	660
Length of lift arms		(A)	277
Length of lower links		(B)	895
Distance of lift arm pivot point	horizontally	(a)	−262
from rear wheel centre line	vertically	(b)	473
wheel centre line			
Horizontal distance between the 2 lower link points		(u)	560
Horizontal distance between the 2 lift arm end points		(v)	622
Length of upper link		(S)	from: 630 to: 870
Distance of upper link	horizontally	(c)	410
pivot point from	vertically	(d)	213, 293
wheel centre line			
Distance of lower link	horizontally	(e)	225
pivot point from rear	vertically	(f)	243
wheel centre line			
Distance of lower link pivot point to lift rod pivot points on lower links		(D)	443,522
Length of lift rods		(l)	from: 682 to: 822
Height of lower hitch points:			
– in low position		(h)	from: 390 to: 760
– in high position		(H)	from: 0 to: 260
relative to the rear wheel centre line, situated 840 mm above the ground level			
Height of lower hitch points when locked in transport position			from: 840 to: 1095 above ground

Drawbar

Swinging drawbar.
Height above ground 360 mm.
Vertical distance relative to p.t.o.
258 mm (540 rev/min) and
370 mm (1000 rev/min below.
Horizontal distance from rear axle 954/1004 mm.
Horizontal distance relative to p.t.o.
349/399 mm (540 rev/min) and
400/450 mm (1000 rev/min) behind.
Lateral adjustment 280 mm from centre position.
Pivot position relative to rear wheel centre 304/354 mm behind.
Diameter drawbar pin hole: 33 mm.
Permissible vertical load 7.8/6.8 kN.

Hitch

Pick-up hitch	Height above ground 447 mm. Horizontal distance from rear axle 694 mm. Vertical distance relative to p.t.o. 180 mm (540 rev/min) and 292 mm (1000 rev/min) below. Horizontal distance relative to p.t.o. 89 mm (540 rev/min) and 140 mm (1000 rev/min) behind. Diameter hitch pin hole: 50 mm. Permissible vertical load 30 kN.

Steering

Make and model	Danfoss/Orbitrol OSPC 160 LS
Type	Hydrostatic power assisted with load sensing valve. Gear type pump integrated with hydraulic pump. Single cylinder acting on right and left steering arm. Adjustable steering columninclination. Working pressure 12.5 MPa. Oil capacity, changing period, filter changing period: see power lift.
Recommended oil	See end of chapter "Specification".

Brakes

Service brake

Make	Brembo
Model	2328 N
Type	rear-wheel braked by dry caliper brake, disc diameter 350 mm, one disc mounted on each differential shaft. Organic lining material
Method of operating	hydraulically and servoassisted by vacuum, one pedal with hand operated selector valve with automatic return for steering brake
Trailer braking take-off	hydraulic operated by the service brake pedal

Parking brake

Type	dry caliper brake mounted to the same disc as the service brake, organic lining material
Method of operating	mechanically operated by hand lever and with linkage separated from service brake

Wheels

Steering and driving wheels	two at front. Type: Pneumatic, radial tyres 16.9 R 28, load index 136 A8. Maximum permissible load on each tyre 23.5 kN at 160 kPa pressure. Track width 1670, 1720, 1840, 1880, 1910, 1960, 2080, 2120 mm, changed by reversing wheel disc and rim.

Driving wheels	two at rear type: Pneumatic, radial tyres 20.8 R 38, load index 153 A8. Maximum permissible load on each tyre 38.3 kN at 160 kPa pressure. Track width 1820, 1920, 2020, 2120 mm, changed by reversing wheel disc and rim.
Wheelbase	2845 mm

Seat

Make and model	Bostrom Viking 303
Type	torsion bar suspension, adjustable to driver's mass. Damping by hydraulic shock absorber. Range of adjustment 130 mm horizontally 60 mm vertically

Protective cab

OECD approval number	CSD 0194/3-a(C); CSS 034/1-a(C)
Trade name	Volvo BM 2650 H
Manufacturer's name and address	Volvo BM AB, Hallsberg, Sweden

Overall dimensions

	Length, m	Width, m	Height, m	
			exhaust silenser	cab
With ballast	4.81	2.44	3.40	3.10
Without ballast	4.72	2.44	3.40	3.10

Minimum ground clearance 315 mm to underside of drawbar frame.

Lighting The lighting system is in accordance with the national Swedish regulations for road traffic

	Height above ground of centre mm	Size mm	Distance from outside edge of tractor to centre mm
Head lights	1365	145+90*	1040
Side lights	1890	65+65*	455
Rear lights	1750	100+90*	375
Reflectors			
lower	670	70	645
upper	1420	70	160

* Rectangular

Repairs during test

The relief valve in the power lift has been replaced.

Conditions During test

Masses	Tractor without driver but with tanks full		
Without ballast	Part of mass on front wheels		2200 kg
	Part of mass on rear wheels		4195 kg
	Total mass		6395 kg
With ballast	Part of mass on front wheels		3010 kg
	Part of mass on rear wheels		5565 kg
	Total mass		8575 kg
Ballast	Front: Frame and front weights	total	385 kg
	Rear: Weights	total	640 kg
	Liquid front	total	345 kg
	Liquid rear	total	810 kg
Track setting	Front: 1840 mm Rear: 1920 mm		

Fuel and lubricants used in tests

Fuel

Diesel fuel to Swedish Standard SS 155432.
Density at 15°C 0.840 g/cm^3.
Viscosity at 20°C 3.2 mm^2/s (cSt)
Cetane number 49.

Oils	**Recommended**	**Used during test**
Engine oil		
Type:	API CD	Agrol Turbo Kombi
Viscosity:	SAE 10W/30	7.0 mm^2/s(cSt) at 100°
Transmission oils		
Type:	Transmission, hypoid oil API GL 5	Transmission oil API GL 5
Viscosity:	SAE 90	SAE 90
Front axle		
Type:	Transmission, hypoid oil API GL 5	Transmission, hypoid API GL 5
Viscosity:	SAE 90	SAE 90
Power shift with servosystem		
Type:	Transmission oil HTF C 3	Transmission oil HTF C 3
Viscosity:	SAE 10W/20	SAE 10W/20
Steering oil		
Type:	Hydraulic oil or engine oil API CD	Transmission oil HTF C 3
Viscosity:	SAE 10W/30	SAE 10W/20
Hydraulic fluid		
Type:	Hydraulic oil or engine oil API CD	Transmission oil HTF C 3
Viscosity:	SAE 10W/30	SAE 10W/30
Type of grease:	Universal	
Number of grease points:		24

Compulsory tests

1. Main power take-off performance

Date and location of tests: 1985-04-29, Ultuna, Uppsala, Sweden
Type of dynamometer: Eddy current, make Zöllner

Power	Speed rev/min		Fuel consumption				Specific energy	
kW	Engine	p.t.o.	l/h	kg/h	g/MJ	kg/kWh	MJ/l	kWh/l
Maximum power At 2-hour test								
114.5	2293	1123	33.3	28.0	67.9	0.245	12.36	3.43
Varying loads. The governor hand lever in the position corresponding to maximum power at full load.								
(1) Maximum power								
116.5	2303	1128	33.6	28.2	67.3	0.242	12.49	3.47
(2) 85% of the torque at max. power rated speed								
101.9	2368	1160	30.1	25.3	69.0	0.248	12.18	3.38
(3) 75% of the torque defined in (2)								
77.7	2409	1180	24.8	20.8	74.3	0.268	11.31	3.14
(4) 50% of the torque defined in (2)								
52.6	2442	1196	19.0	16.0	84.5	0.304	9.94	2.76
(5) 25% of the torque defined in (2)								
26.6	2470	1210	13.6	11.4	119.0	0.428	7.06	1.96
(6) Unloaded								
1.9	2495	1222	8.5	7.2	– –	– –	– –	– –
Varying loads. The governor hand lever in the position corresponding to standard p.t.o. speed (1000 rev/min).								
(1) Maximum power								
108.7	2048	1003	30.1	25.3	64.6	0.233	13.00	3.61
(2) 85% of the torque at max. power								
95.1	2107	1032	26.8	22.5	65.7	0.237	12.79	3.55
(3) 75% of the torque defined in (2)								
72.9	2158	1057	21.7	18.2	69.3	0.250	12.12	3.37
(4) 50% of the torque defined in (2)								
49.3	2195	1075	16.4	13.8	77.7	0.280	10.81	3.00
(5) 25% of the torque defined in (2)								
25.1	2232	1093	11.6	9.7	107.5	0.387	7.81	2.17
(6) Unloaded								
1.6	2269	1109	7.0	5.9	– –	– –	– –	– –

Standard specific fuel consumption:	69.0 (0.248)/84.5 (0.304) g/MJ (kg/kWh) 65.7 (0.237)/77.7 (0.280) g/MJ(kg/kWh)		
No load maximum engine speed	2495 rev/min		
Torque at maximum power Corresponding to 2 hour test	477 Nm		
Torque corresponding to maximum power at varying loads	483 Nm		
Maximum torque	536 Nm at 1699 rev/min engine speed		
Mean atmospheric conditions:	Temperature	15	°C
	Pressure	101.0	kPa
	Rel. humidity	49	%
Maximum temperatures:	Coolant	86	°C
	Engine oil	105	°C
	Fuel	19	°C
	Engine air intake	38	°C

2. Drawbar performance

Date of tests: 1985-06-19, 1985-06-24/25/26
Type of track: Tarmac
Height of drawbar above ground

unballasted	460 mm
ballasted	400 mm

Tyre inflation pressure:

unballasted	rear	130 kPa	front	150 kPa
ballasted	rear	150 kPa	front	150 kPa

Results see Table 1.
Engine oil consumption during ten hours duration of test (iii and iv) was 84 g/h. Test (iv) was carried out with additional ballast. Power, speed, slip and fuel consumption do not correspond to test (ii) gear 2 Ll.

Table 1. Drawbar performance

Gear	Power	Draw-bar pull	Speed		Engine speed		Wheel slip	Spec. fuel consumption		Spec. energy		Temperature			
												Coo-lant	Fuel	Engine oil	Transm. oil
	kW	kN	m/s	km/h	rev/s	rev/min	%	g/MJ	kg/kWh	MJ/l	kWh/l	°C	°C	°C	°C
i) Maximum power (unballasted tractor)															
2Ll	56.6	52.1	1.09	3.91	40.1	2404	15.6	104.3	0.376	8.05	2.24	78	43	88	53
2Lh	72.3	52.0	1.39	5.02	39.6	2375	15.2	96.2	0.346	8.73	2.43	78	38	78	50
3Ll	82.0	51.6	1.59	5.72	38.3	2300	14.4	92.8	0.334	9.06	2.52	81	42	86	53
4Li	87.2	43.0	2.03	7.30	38.2	2295	10.0	86.4	0.311	9.72	2.70	81	45	92	58
3Lh	91.4	41.8	2.19	7.87	38.3	2300	8.3	83.2	0.300	10.09	2.80	80	42	91	54
1Hl	91.2	37.3	2.44	8.80	38.3	2300	7.0	83.9	0.302	10.01	2.78	81	42	91	50
4Lh	89.6	33.0	2.72	9.78	38.3	2300	6.2	84.6	0.304	9.93	2.76	80	46	93	57
1Hh	93.0	29.0	3.21	11.55	38.3	2300	5.2	81.3	0.292	10.34	2.87	82	45	92	55
2Hl	91.3	24.0	3.80	13.69	38.3	2300	3.7	83.6	0.301	10.05	2.79	81	45	92	54
ii) Maximum power (ballasted tractor)															
1Ll	49.6	68.1	0.73	2.62	40.3	2418	15.5	114.3	0.412	7.35	2.04	78	30	50	27
1Lh	62.5	67.6	0.92	3.33	39.8	2391	15.8	101.7	0.366	8.26	2.29	81	36	75	36
2Ll	71.9	67.1	1.07	3.86	39.4	2366	15.7	97.7	0.352	8.59	2.39	83	40	80	42
2Lh	85.7	60.4	1.42	5.11	38.3	2298	10.4	88.5	0.319	9.49	2.64	82	40	92	45
3Ll	90.1	53.1	1.70	6.11	38.3	2299	7.9	84.9	0.306	9.89	2.75	82	39	94	45
4Ll	88.3	41.7	2.12	7.62	38.3	2298	5.7	85.9	0.309	9.78	2.72	81	45	91	49
3Lh	90.4	40.3	2.24	8.08	38.2	2294	5.3	83.4	0.300	10.08	2.80	83	42	94	50
1Hl	90.4	36.1	2.51	9.02	38.3	2297	4.5	83.6	0.301	10.04	2.79	82	44	94	51
4Lh	89.4	32.3	2.77	9.96	38.3	2299	4.0	84.6	0.304	9.93	2.76	84	47	94	50
1Hh	91.6	28.0	3.27	11.78	38.3	2300	3.0	82.0	0.295	10.24	2.84	82	46	94	55
2Hl	89.6	23.4	3.82	13.78	38.3	2297	2.8	84.1	0.303	9.99	2.77	82	46	94	54
iii) Five hour test at 75% pull at maximum power															
3Lh	70.6	30.2	2.34	8.41	39.2	2352	3.9	91.9	0.331	9.14	2.54	91	64	108	78
iv) Five hour test corresponding to 15% wheelslip															
2Ll	76.6	68.1	1.12	4.05	39.0	2340	10.4	– –	– –	– –	– –	87	– –	104	63

Atmospheric conditions

	Temperature	Relative humidity	Pressure
	°C	%	kPa
Maximum power			
unballasted tractor	20–24	44	101.2
ballasted tractor	22–25	53	100.7
Five hour tests			
at 75% pull at max power	26–31	44	101.1
at max. pull	26–31	42	101.3

3. Turning space and turning circle

Details of wheel equipment: As in specification without ballast

	With brakes		Without brakes	
	Left-hand m	Right-hand m	Left-hand m	Right-hand m
Radius of turning space	4.71 (4.79)	4.64 (4.73)	6.17 (5.67)	6.11 (5.58)
Radius of turning circle	4.44 (4.52)	4.38 (4.46)	5.90 (5.40)	5.84 (5.31)

* figures in brackets indicate two wheel drive

4. Location of centre of gravity

Height above ground	1135 mm
Distance forward from the vertical plane containing the axis at rear wheels	981 mm
Distance from the median plane	2 mm (to the right)

5. Braking

Date of tests: 1985-05-28, 1985-06-27.
Tractor masses during brake tests:

	Front kg	Rear kg	Total kg
Ballasted	3500	7500	11000
Unballasted	2230	4265	6495

Type 0 (ordinary cold service braking device performance) test

Speed before application of brakes:

ballasted tractor	unballasted tractor
29.0 km/h	29.5 km/h

Ballasted	Braking device control force,	N	330*	305	250	190	135
	Mean deceleration,	m/s^2	3.19	3.00	2.50	2.00	1.50
Unballasted	Braking device control force,	N	250*	160	130	100	70
	Mean deceleration,	m/s^2	3.32	3.00	2.50	2.00	1.50

* Locked

Type I (fade) test, ballasted tractor

Braking device control force,	N	260*	240	195	150	105
Mean deceleration	m/s^2	3.18	3.00	2.50	2.00	1.50

* locked

The brakes were heated by: selfpropelled
Comments on deviation and vibration: None

Parking brake device test

		18 per cent slope		12 per cent slope with trailer of 3000 kg	
		Up	Down	Up	Down
Braking device control force	N	294	368	216	275

6. Measurement of external noise level

Date of test: 1985-05-30
Type of sound level meter: Brüel & Kjær 2204
Type of track: Tarmac

Result of tests:

Gear: 3 Hh
Travelling speed before acceleration: 22.1 km/h
Sound level: 88 dB(A)

7. Noise measurement at the driver's ear

Date of test: 1985-06-20
Type of sound level meter: Brüel & Kjær 2204
Type of track: Tarmac
Cab fitted: Yes

Result of tests

Gear	Drawbar pull at which the tractor develops the maximum sound level kN	Measured travelling speed m/s	km/h	Sound level dB(A)	N
4Ll*	37.0		7.7	81	– –
1Ll	52.0		2.6	82	– –
2Ll	44.4		4.2	82	– –
2Lh	52.4		5.0	82	– –
3Ll	44.4		6.2	82	– –
3Lh	35.7		8.2	82.5	– –
1Hl	31.7		9.2	84.5	82
1Hh	28.8		11.7	82	– –
2Hl	24.9		13.7	83	– –
2Hh	18.8		17.9	82.5	– –
4Ll*	light load		8.8	78.5	– –
3Hh	light load		29.8	80	– –

* Gear corresponding to the nominal travelling speed nearest to 7.5 km/h

8. Power lift and hydarulic pump performance

Date of tests: 1985-06-14/17/18

Hydraulic fluid

Type: HTF C3, SAE 10 W/30
Viscosity: Min. 5.7 mm^2/s (cSt) at 100°C
Type of linkage lock for transport: Hydraulic

Power lift

	Height above ground in down position mm	Vertical movement mm	Maximum force exerted through full range kN	Corresponding pressure of hydraulic fluid MPa	Moment about rear axle kNm	Tilt angle of mast* degrees
At the hitch points	203	666	40.2	16.4	44.7	– –
On the frame	129	781	35.7	16.4	61.5	9.5

Temperatur of hydraulic fluid at start of test 44°C

* Tilt angle of mast from vertical position to uppermost position 4.5°

Lifting heights relative to the horizontal plane including the lower link pivot points.

mm	−507	−394	−300	−200	−100	+−0	+100	+200	+272	+274
Lifting forces at the hitch points										
kN	– –	40.2	– –	44.7	46.0	46.9	46.5	46.9	46.9	– –
Lifting forces at the test frame										
kN	35.7	– –	40.5	41.2	40.7	39.3	38.0	37.3	– –	36.6

Hydraulic pump performance

Tapping point	Double acting external tapping
Opening pressure of the relief valve	14.7 MPa
Sustained pressure with relief valve open	16.4 MPa
Pump delivery rate at rated engine speed:	
at minimum pressure	1.02 l/s (61.0 l/min)
Hydraulic power at:	
90 per cent of relief valve setting	13.9 kW
corresponding delivery rate	0.94 l/s (56.5 l/min)
pressure	14.8 MPa
Maximum hydraulic power:	14.0 kW
corresponding delivery rate	0.93 l/s (56.0 l/min)
pressure	15.0 MPa
Temperature of hydraulic fluid	60–68°C

Table 2. Linkage geometry when connected to the standard frame

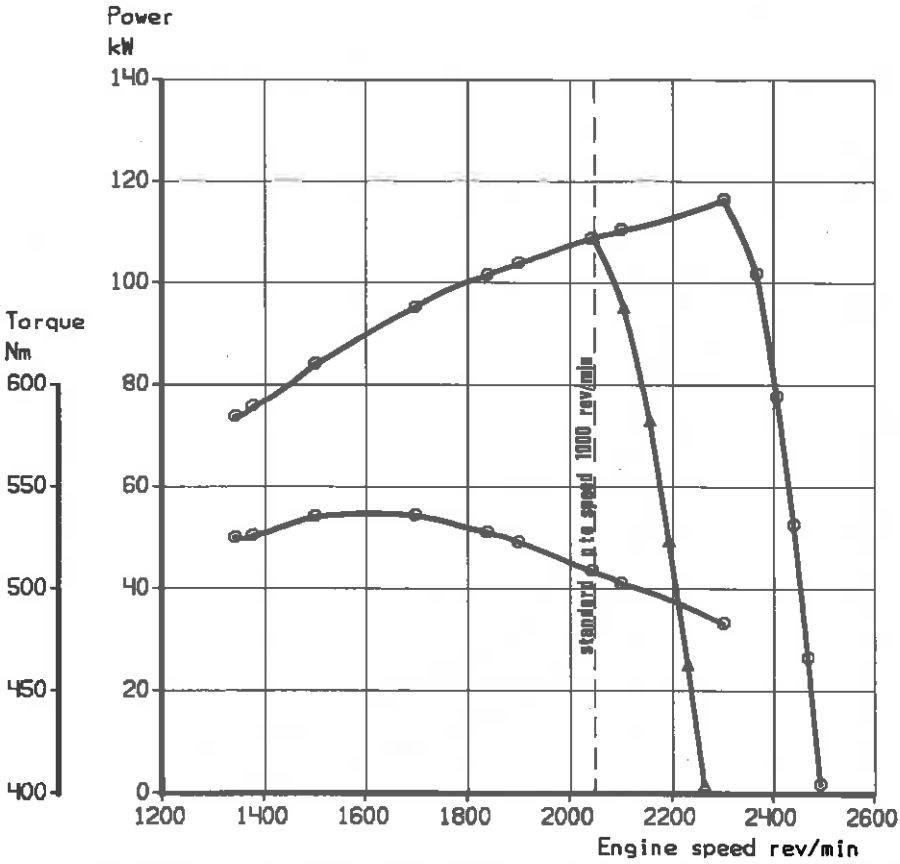
Projected length in side view		
Lower links	895 mm	
Lift arms	277 mm	
Lift rods	810 mm	
Upper link	705 mm	
Distance of lift rod connection point from pivot point of lower link	522 mm	
The following dimensions are given relative to the rear wheel centre line, situated 840 mm above the ground level		
Lower link pivot point	225 mm behind	243 mm below
Upper link pivot point	410 mm behind	213 mm above
Lift arm pivot point	262 mm behind	473 mm above
Maximuim and minimum height of lower link hitch points	29 mm above	637 mm below
Height of lower link hitch points when locked in transport position	29 mm above	—

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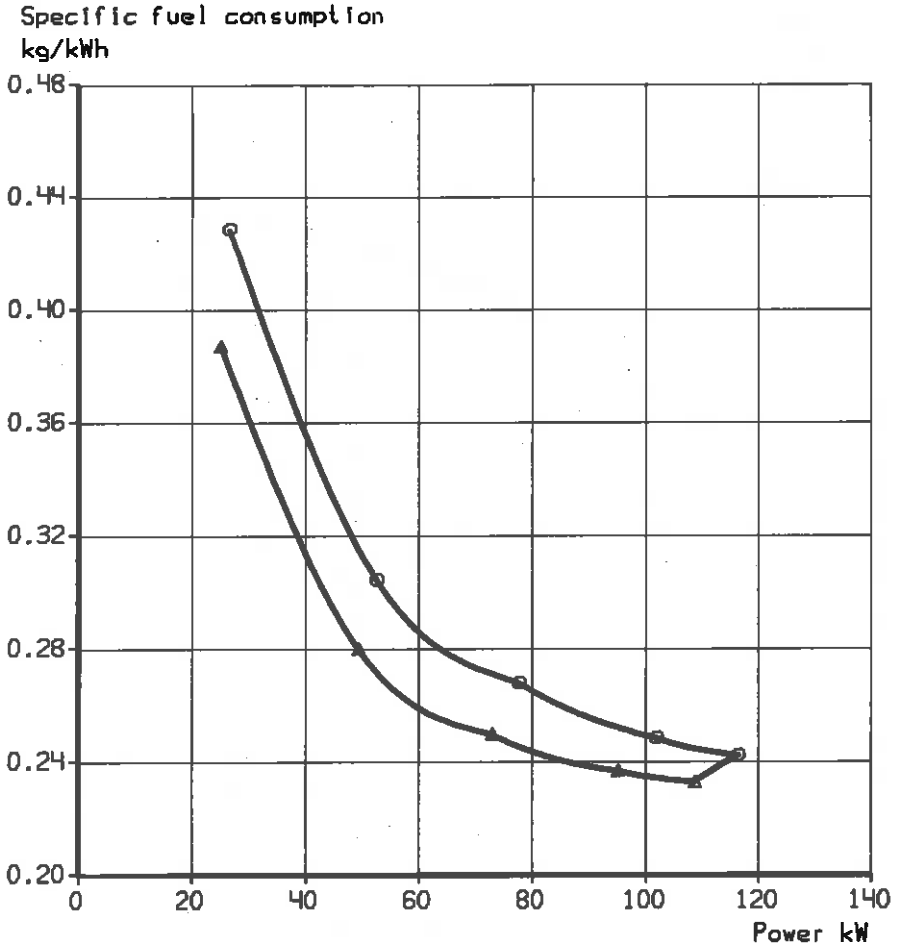
National Machinery Testing Institute

Power take-off test
Volvo BM Valmet 2105

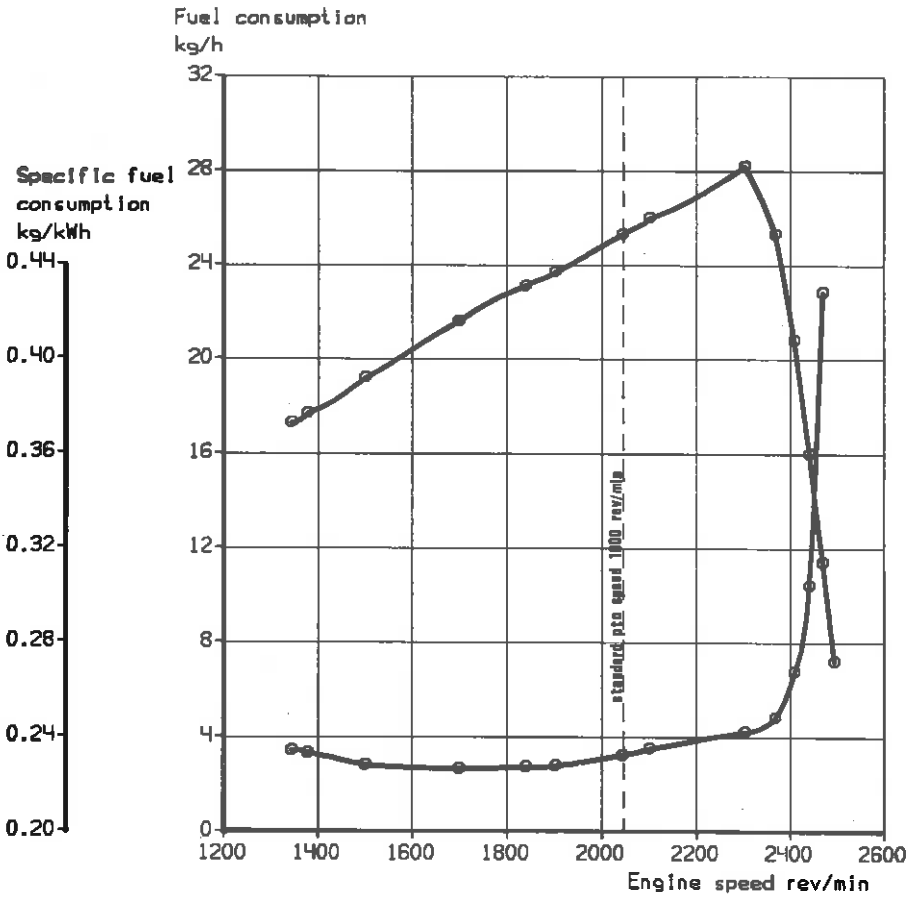
Figure 1



National Machinery Testing Institute	**Power take-off test Volvo BM Valmet 2105**	Figure 2



National Machinery Testing Institute	**Power take-off test Volvo BM Valmet 2105**	Figure 3



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