

Allison Transmission Bundled Report

Application	116-A353470-1
Iteration	1
Date	April 4, 2025 12:15:01
Units Of Measure	SI

The vehicle performance calculated by iSCAAN is an estimate for the specified vehicle and power train operating at standard engine conditions per SAE J1995 at 91 m (300 feet) altitude of 100 kPa barometric pressure and 25°C (77°F) inlet air temperature. Engine performance is significantly affected as operating altitude increases, therefore, Allison Transmission, Inc. does not represent and hereby disclaims that, under all conditions, the actual vehicle will achieve the simulated performance.

Application Profile

Application Name	Titan HET Z75 - Mercedes 480kW 3100Nm - 4900
Owner	Andreas Wolf @ DGS Mainz
SCAAN Analysis Type	Standard Vehicle Run
Optional Analysis Type	
Classification	Standard
Review Status	Not Submitted

Mission

End User	Unknown
Selected Vocation	Heavy Haul — Equipment Hauler with Escort or Permit — Tractor Trailer (22-10-20)

Platform

Vehicle Manufacturer	Titan (Europe/ME/SA)
Vehicle Model	Z75
Vehicle Configuration	Hauler 6x6
Engine Rating	Mercedes Benz OM 473 -- 480kW@1600rpm 3100Nm@1300rpm Stufe 3a -- without SEM/LRTP (116-L032702-E, Rev A)
Transmission	4900 SP Retarder (1-L014454-T, Rev F)
Transmission Rating	4900 SP Retarder Specialty/Military - Diesel Allison 6th Generation Controls without SEM/LRTP (1-L017757-R, Rev G)
Vehicle Parameters	Standard
Torque Converter	TC571H (1-L014461-TC, Rev A) - Unacceptable
Transmission Retarder	4000 Series High Capacity (1-L004745-TR, Rev E)
LRTP Status	

Allison Transmission Input Summary

Mission

End User	Unknown
Selected Vocation	Heavy Haul — Equipment Hauler with Escort or Permit — Tractor Trailer (22-10-20)

Platform

Vehicle Manufacturer	Titan (Europe/ME/SA)
Vehicle Model	Z75
Vehicle Configuration	Hauler 6x6
User Expected Engine Load	0%

Platform - Area and Weight

Frontal Area	14.000 m²
Height / Width	4.000 m / 3.500 m
Standard Wind Resistance Coefficient	0.800 (no Deflector)
User Defined Wind Resistance Coefficient	0.800 (no Deflector)
Gross Combined Weight	145000 kg (with Trailer)
Weight On Drive Wheels	78000 kg (53.79%)

Platform - Tires

Number Of Tires	6 (High Flotation (Terra))
Selected Tire	
Tire Revolutions	208 revs/km
Tire Rolling Radius	0.767 m
Standard Surface	Smooth Concrete (SC Factor = 1.00)
Selected Surface	Smooth Concrete (SC Factor = 1.00)
Standard On-Road Traction Limit Coefficient	0.700
Standard Off-Road Traction Limit Coefficient	0.000
User Defined On-Road Traction Limit Coefficient	0.700
User Defined Off-Road Traction Limit Coefficient	0.000
Tire/Wheel Inertia (estimated)	1038.2511 kg-m²

Accessory Losses (Power @ Governed Speed)

Accessory	Standard Loss (kW)	User Defined Loss (kW)
Fan (Clutch Fan)	43.2	43.2
Alternator / Generator	2.4	2.4
Air Compressor	2.7	2.7
Steering Pump	2.7	2.7
Air Conditioning	0.0	0.0
Implement Drive	0.0	0.0

Engine

Number of Power Packs	1
Engine Rating	Mercedes Benz OM 473 -- 480kW@1600rpm 3100Nm@1300rpm Stufe 3a -- without SEM/LRTP (116-L032702-E, Rev A)
Engine Controls Type	Electronic
Evaluate at Altitude	No
Certifications	
Displacement	15.60 l
Peak Torque	3100.0 N-m
Peak Torque Speed	1300 rpm
Peak Power	476.0 kW
Peak Power Speed	1700 rpm
Governed Power	431.8 kW
Governed Speed	1900 rpm
Number Of Curves	1
Engine Curve Reference	100 07 315
Cruise Velocity @ Speed	0.0 km/h @ 0 rpm
Engine Retarder	
Engine Inertia (estimated)	2.2446 kg-m²
Engine Idle Speed	650 rpm

Engine Curve - Standard Losses - Combined Low & High Curves (AC On Where Applicable)

Speed (rpm)	Gross Power (kW)	Gross Torque (N-m)	Net Power Fan On (kW)	Net Torque Fan On (N-m)	Net Power Fan Off (kW)	Net Torque Fan Off (N-m)	Point Identification
800	210.3	2510.0	202.4	2416.2	205.6	2454.7	
900	264.8	2810.0	255.3	2709.2	259.9	2757.9	
1000	314.2	3000.0	302.7	2890.3	309.0	2950.4	
1100	351.3	3050.0	337.5	2929.7	345.9	3002.5	
1200	387.0	3080.0	370.4	2947.6	381.3	3034.2	
1300	422.0	3100.0	402.1	2954.0	416.0	3055.7	Peak Torque
1400	445.0	3035.0	421.4	2874.0	438.6	2991.9	
1500	463.4	2950.0	435.5	2772.7	456.8	2908.0	
1600	480.0	2865.0	447.4	2670.0	473.2	2823.9	
1700	476.0	2673.8	437.9	2459.8	468.8	2633.6	Peak Power
1800	460.0	2440.4	415.8	2206.0	452.6	2400.9	
1900	431.8	2170.0	380.8	1914.1	424.0	2131.2	Governed
2030	0.0	0.0	-60.8	-285.9	-8.1	-38.0	No Load Governed

Engine Curve - User Defined Losses - Combined Low & High Curves (AC On Where Applicable)

Speed (rpm)	Gross Power (kW)	Gross Torque (N-m)	Net Power Fan On (kW)	Net Torque Fan On (N-m)	Net Power Fan Off (kW)	Net Torque Fan Off (N-m)	Point Identification
800	210.3	2510.0	202.4	2416.2	205.6	2454.7	
900	264.8	2810.0	255.3	2709.2	259.9	2757.9	
1000	314.2	3000.0	302.7	2890.3	309.0	2950.4	
1100	351.3	3050.0	337.5	2929.7	345.9	3002.5	
1200	387.0	3080.0	370.4	2947.6	381.3	3034.2	
1300	422.0	3100.0	402.1	2954.0	416.0	3055.7	Peak Torque
1400	445.0	3035.0	421.4	2874.0	438.6	2991.9	
1500	463.4	2950.0	435.5	2772.7	456.8	2908.0	
1600	480.0	2865.0	447.4	2670.0	473.2	2823.9	
1700	476.0	2673.8	437.9	2459.8	468.8	2633.6	Peak Power
1800	460.0	2440.4	415.8	2206.0	452.6	2400.9	
1900	431.8	2170.0	380.8	1914.1	424.0	2131.2	Governed
2030	0.0	0.0	-60.8	-285.9	-8.1	-38.0	No Load Governed

Transmission

Transmission Manufacturer	Allison Transmission
Transmission Family	4000 Series (1-L001323-TF, Rev U)
Transmission	4900 SP Retarder (1-L014454-T, Rev F)
Transmission Rating	4900 SP Retarder Specialty/Military - Diesel Allison 6th Generation Controls without SEM/LRTP (1-L017757-R, Rev G)
Torque Converter	TC571H (1-L014461-TC, Rev A) - Unacceptable
Transmission Retarder	4000 Series High Capacity (1-L004745-TR, Rev E)

Controls

Controls Release	Production Calibration (PC) for 4000 Series (1-L007292-CR, Rev E)
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Controls - Primary Gears (Shift Schedule)

DynActive	No
Speed Profile	Performance
Shift Speed & Strategy	1900 rpm S1 Performance
Equivalent DynActive Bias	0
Primary Mode: Gears	Low = 1, Start = 2, High = 7 (1-2-7)

Driveline

Transmission Output Torque Limit	No
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Driveline - Components

Component	Description	Ratio	Standard Efficiency (%)	User Defined Efficiency (%)
Propshaft -- One Piece -- Two Joint (1-L003521-DL)	Single	1.000	98.60	98.60
Axle -- Off Hwy Single Red -- 6x6 (1-L003573-DL)	Single	12.700	88.40	88.40
Aux Gearing -- Transfer Case -- Two Speed (1-L003523-DL)	Low	2.040	97.00	97.00
Aux Gearing -- Transfer Case -- Two Speed (1-L003523-DL)	High	1.030	97.00	97.00

Driveline - Overall Driveline Ratio

Description	Ratio	Standard Efficiency (%)	User Defined Efficiency (%)	N over V Ratio (rpm/kph)
High	13.081	84.55	84.55	45.229
Low	25.908	84.55	84.55	89.581

Allison Transmission Ratings and Guidelines Check

Note

This SCAAN information is subject to the SCAAN Disclaimer set forth elsewhere.
Results indicate the vehicle operating conditions at steady state (acceleration = 0).
The exclamation symbol indicates that Wheel Slip may occur.

Converter Rating And Guideline Checks

!		Section Score - XXX	
C01	✓	Transmission / Converter Compatibility	
Overall Status		OK: Acceptable	
C02	✓	Engine / Converter Compatibility	
Overall Status		OK: Acceptable	
C04	!	Engine Speed at Converter Stall	
Overall Status		Reference	
Actual		1642 rpm	
C05	✓	Minimum Engine Speed	
Overall Status		OK: Acceptable	
Rating/Recommendation		1400 rpm (Min)	
Actual		1595 rpm	
Notes		Net peak torque speed (1300 rpm) + allowable variation (100 rpm).	
C10	✓	Torque Converter Input Torque	
Overall Status		OK: Acceptable	
Rating/Recommendation		3200.0 N-m (Max)	
Actual		3100.0 N-m	
C07	!	Turbine Torque at Converter Stall	
Overall Status		XXX: Not Acceptable - rating or usage violation	
Rating/Recommendation		4101.0 N-m (Max)	
Actual		4136.3 N-m	
C08	✓	Converter Speed Ratio at Engine Governed Speed	
Overall Status		OK: Acceptable	
Rating/Recommendation		0.800 (Min)	
Actual		0.857	
C03	!	Converter Stall Torque Ratio	
Overall Status		Reference	
Actual		1.620	

Transmission Rating And Guideline Checks

! Section Score - XX		
T01	!	Transmission / Vocation Compatibility
Overall Status	XX: Questionable - may not be acceptable	
T02	✓	Transmission / Engine Compatibility
Overall Status	OK: Acceptable	
T17	✓	Transmission Permitted in End User/Chassis Mfg Locations
Overall Status	OK: Acceptable	
T15	✓	Transmission Input Power (Gross)
Overall Status	OK: Acceptable	
Rating/Recommendation	597.0 kW (Max)	
Actual	480.0 kW	
T14	✓	Transmission Input Torque (Gross)
Overall Status	OK: Acceptable	
Rating/Recommendation	3200.0 N-m (Max)	
Actual	3100.0 N-m	
T03	✓	Transmission Input Speed
Overall Status	OK: Acceptable	
Rating/Recommendation	1700 rpm / 2300 rpm	
Actual	1900 rpm	
T04	📖	Transmission Output Speed
Overall Status	Reference	
Actual	2973 rpm	
Notes	Check made in Range 7L at 1900 rpm Engine Governed Speed.	

Vehicle Rating And Guideline Checks - Standard

! Section Score - C		
V22	📖	2nd Range Converter Stall Gradeability
Overall Status	Reference	
Actual	28.32 %	
V47	📖	2nd Range 80% Converter Efficiency Gradeability
Overall Status	Reference	
Actual	16.113	
V16	✓	Gradeability Required at Governed Speed
Overall Status	OK: Acceptable	
Rating/Recommendation	8.00 % (Min)	
Actual	26.80 %	
Notes	Check is in Lockup Mode.	
V17	📖	Maximum Geared Vehicle Speed at Engine Governed Speed
Overall Status	Reference	
Actual	65.7 km/h	
Notes	Check is in 7L Lockup.	
V18	!	Maximum Speed on 0.5% Grade
Overall Status	C: Consider - manufacturer to assess	
Rating/Recommendation	104.6 km/h (Min)	
Actual	41.3 km/h	
Notes	At 1372.8 rpm Engine Speed, Range 6L.	
V45	📖	Heat Generated in 2nd Range 80% Converter Efficiency
Overall Status	Reference	
Actual	97.19 kW	
Notes	At 1778.8 rpm Engine Speed.	

Allison Transmission
Vehicle Performance Summary

Note

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Full Throttle, Automatic Upshifts (Gradeability)

Engine Fan	Air Conditioning	Engine Power	Vehicle Parameters	Axle Ratio	Auxiliary Gearing Ratio
On	Off	Standard Power Curve	Standard	12.700	2.040

Gradeability	Percent Grade	Vehicle Speed (km/h)	Gear Range	Match Point
Stall Gradeability	28.3	0.0	2C	Stall
Launch Gradeability	26.3	0.0	2C	
Low Speed Gradeability	16.1	4.0	2C	80 Percent
Maximum Speed on Grade	0.0	33.7	7L	Road Load
	0.3	33.5	7L	
	0.5	33.3	7L	
	1.0	31.4	7L	
	2.0	25.0	6L	
	3.0	19.3	5L	
	4.0	16.1	5L	
	5.0	13.7	4L	
	6.0	12.1	4L	
	7.0	10.4	3L	
	8.0	9.6	3L	
	9.0	8.4	3L	
	10.0	5.6	3C	

Full Throttle, Automatic Upshifts (Gradeability)

Engine Fan	Air Conditioning	Engine Power	Vehicle Parameters	Axle Ratio	Auxiliary Gearing Ratio
On	Off	Standard Power Curve	Standard	12.700	1.030

Gradeability	Percent Grade	Vehicle Speed (km/h)	Gear Range	Match Point
Stall Gradeability	13.1	0.0	2C	Stall
Launch Gradeability	11.1	0.0	2C	
Low Speed Gradeability	7.3	7.8	2C	80 Percent
Maximum Speed on Grade	0.0	51.8	6L	Road Load
	0.3	47.1	6L	
	0.5	39.8	5L	
	1.0	35.2	5L	
	2.0	25.5	4L	
	3.0	19.7	3L	
	4.0	11.9	3C	
	5.0	9.0	2C	
	6.0	9.0	2C	
	7.0	8.1	2C	
	8.0	7.1	2C	
	9.0	6.2	2C	
	10.0	5.2	2C	

Full Throttle, Automatic Upshifts (Acceleration)

Engine Fan	Air Conditioning	Engine Power	Vehicle Parameters	Axle Ratio	Auxiliary Gearing Ratio
On	Off	Standard Power Curve	Standard	12.700	2.040

Speed (km/h)	Time (sec)	Distance (m)
0 - 20 km/h	9.8	35
0 - 30 km/h	25.5	147
0 - 40 km/h	Not Possible	Not Possible
0 - 60 km/h	Not Possible	Not Possible
0 - 80 km/h	Not Possible	Not Possible
0 - 100 km/h	Not Possible	Not Possible

Full Throttle, Automatic Upshifts (Acceleration)

Engine Fan	Air Conditioning	Engine Power	Vehicle Parameters	Axle Ratio	Auxiliary Gearing Ratio
On	Off	Standard Power Curve	Standard	12.700	1.030

Speed (km/h)	Time (sec)	Distance (m)
0 - 20 km/h	11.4	40
0 - 30 km/h	27.0	151
0 - 40 km/h	60.4	482
0 - 60 km/h	Not Possible	Not Possible
0 - 80 km/h	Not Possible	Not Possible
0 - 100 km/h	Not Possible	Not Possible

Allison Transmission
Vehicle Full Throttle Performance

Note

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Results indicate the vehicle operating conditions at steady state (acceleration = 0).
The exclamation symbol indicates that Wheel Slip may occur.

Full Throttle, Automatic Upshifts (2C-3C-3L-4L-5L-6L-7L)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	2.040	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
2C	0.0	1642	0	410.19	387.44	0.0	28.32	443.52		
2C	1.6	1595	144	373.37	350.62	166.9	25.44	249.46		
2C	3.0	1681	265	306.70	283.94	252.2	20.38	141.37	70 Percent	
2C	3.2	1705	288	291.96	269.20	261.0	19.28	128.14		
2C	4.0	1779	355	248.96	226.20	273.7	16.11	96.75	80 Percent	
2C	4.5	1837	406	217.15	194.39	273.3	13.80	79.71		
3C	4.5	1639	406	182.18	159.42	229.3	11.28	172.50		
3C	4.8	1653	433	177.34	154.58	237.8	10.94	161.10		
3C	6.4	1731	577	150.57	127.80	269.3	9.02	112.57		
3C	7.5	1788	668	133.19	110.41	275.8	7.79	92.21		
3L	7.5	1273	668	156.63	133.85	324.4	9.46	9.98		
3L	8.0	1374	721	153.49	130.70	343.1	9.23	10.62		
3L	9.7	1649	865	135.66	112.86	363.9	7.96	12.34		
3L	10.7	1824	957	112.30	89.49	333.2	6.31	13.35		
4L	10.7	1368	957	115.62	92.81	343.0	6.54	9.40		
4L	11.3	1442	1009	112.78	89.97	352.9	6.34	9.93		
4L	12.9	1648	1154	101.99	79.15	364.7	5.57	11.38		
4L	14.3	1825	1277	84.24	61.39	333.5	4.32	12.67		
5L	14.3	1277	1277	82.60	59.75	327.0	4.21	8.08		
5L	14.5	1298	1298	82.62	59.76	332.4	4.21	8.28		
5L	16.1	1442	1442	78.99	56.11	353.1	3.95	9.65		
5L	17.7	1586	1586	74.63	51.73	367.0	3.64	11.63		
5L	19.3	1730	1730	65.89	42.96	353.5	3.02	13.11		
5L	20.4	1825	1825	58.68	35.73	332.0	2.51	14.38		
6L	20.4	1345	1825	59.06	36.11	334.2	2.54	15.54		
6L	20.9	1382	1875	58.41	35.45	339.5	2.49	16.29		
6L	22.5	1488	2019	56.14	33.14	351.4	2.33	18.24		
6L	24.1	1594	2163	53.77	30.73	360.6	2.16	20.19		
6L	25.7	1700	2307	49.15	26.07	351.6	1.83	21.99		
6L	27.4	1807	2451	43.39	20.27	329.8	1.43	23.45		
6L	27.6	1825	2476	42.27	19.15	324.5	1.35	23.34		
7L	27.6	1582	2476	46.28	23.15	355.3	1.63	25.06		
7L	29.0	1659	2596	43.66	20.50	351.3	1.44	26.27		
7L	30.6	1751	2740	39.69	16.48	337.1	1.16	27.96		
7L	32.2	1843	2884	35.09	11.83	313.8	0.83	29.75		
7L	33.2	1900	2973	32.01	8.72	295.1	0.61	31.81	Governed	
7L	33.8	1935	3028	21.27	-2.04	199.7	-0.14	31.75		
7L	35.0	2004	3136	0.00	-23.36	0.0	-1.64	31.61		

Full Throttle, Manual Hold (7.6269 Ratio) (1C-1L)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	2.040	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
1C!	0.0	1642	0	881.94	859.19	0.0	75.83	443.52		
1C!	1.4	1681	122	657.69	634.94	248.9	49.90	145.28	70 Percent	
1C!	1.6	1731	144	591.13	568.38	264.3	43.61	118.45		
1C	1.8	1779	163	533.09	510.34	269.8	38.45	101.47	80 Percent	
1C	2.0	1813	177	492.86	470.11	270.4	35.03	91.36		
1L!	2.0	1350	177	606.34	583.59	332.7	45.01	18.22		
1L	2.8	1900	249	390.82	368.06	301.8	26.80	23.85	Governed	
1L	2.9	2012	264	-15.56	-38.32	-12.7	-2.70	17.29		

Full Throttle, Manual Hold (3.5102 Ratio) (2C-2L)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	2.040	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
2C	0.0	1642	0	410.19	387.44	0.0	28.32	443.52		
2C	1.6	1595	144	373.37	350.62	166.9	25.44	249.46		
2C	3.0	1681	265	306.70	283.94	252.2	20.38	141.37	70 Percent	
2C	3.2	1705	288	291.96	269.20	261.0	19.28	128.14		
2C	3.6	1744	325	268.31	245.55	270.3	17.53	108.39		
2L	3.6	1141	325	285.70	262.94	287.9	18.82	10.42		
2L	4.8	1518	433	266.98	244.22	358.1	17.43	14.22		
2L	6.0	1900	541	183.14	160.37	307.3	11.35	17.33	Governed	
2L	6.4	2009	572	-0.26	-23.03	-0.5	-1.62	14.50		

Full Throttle, Automatic Upshifts (2C-3C-3L-4L-5L-6L-7L)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	1.030	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
2C	0.0	1642	0	207.10	184.35	0.0	13.08	443.52		
2C	1.6	1620	73	197.31	174.56	88.2	12.37	341.23		
2C	3.2	1595	146	188.24	165.49	168.3	11.72	247.83		
2C	4.8	1637	218	169.36	146.59	227.1	10.36	175.26		
2C	5.9	1681	265	154.85	132.08	252.2	9.33	141.37	70 Percent	
2C	6.4	1708	291	146.48	123.71	261.9	8.73	126.43		
2C	7.8	1779	355	125.70	102.92	273.7	7.26	96.75	80 Percent	
2C	8.0	1790	364	122.74	99.96	274.4	7.05	93.62		
2C	9.0	1837	406	109.64	86.85	273.3	6.12	79.71		
3C	9.0	1639	406	91.99	69.19	229.3	4.87	172.50		
3C	9.7	1655	437	89.16	66.36	239.1	4.67	159.36		
3C	11.3	1693	510	82.47	59.65	258.1	4.20	133.39		
3C	12.9	1735	582	75.48	52.65	269.9	3.70	111.01		
3C	14.5	1780	655	68.43	45.58	275.3	3.21	94.57		
3C	14.8	1788	668	67.25	44.39	275.8	3.12	92.21		
3L	14.8	1273	668	79.08	56.23	324.4	3.96	9.98		
3L	16.1	1388	728	77.20	54.32	345.1	3.82	10.80		
3L	17.7	1526	801	73.39	50.49	360.9	3.55	11.78		
3L	19.3	1665	874	67.56	44.63	362.4	3.14	12.50		
3L	20.9	1804	946	58.30	35.33	338.8	2.49	13.69		
3L	21.2	1824	957	56.70	33.73	333.2	2.37	13.35		
4L	21.2	1368	957	58.38	35.40	343.0	2.49	9.40		
4L	22.5	1457	1019	56.65	33.64	354.5	2.37	10.05		
4L	24.1	1561	1092	54.44	31.40	365.0	2.21	10.95		
4L	25.7	1665	1165	50.79	27.71	363.3	1.95	11.55		
4L	27.4	1769	1238	45.67	22.55	347.1	1.59	12.26		
4L	28.2	1825	1277	42.53	19.39	333.5	1.36	12.67		
5L	28.2	1277	1277	41.70	18.56	327.0	1.31	8.08		
5L	29.0	1310	1310	41.59	18.42	334.7	1.30	8.34		
5L	30.6	1383	1383	40.72	17.50	345.8	1.23	9.11		
5L	32.2	1456	1456	39.67	16.40	354.7	1.15	9.82		
5L	33.8	1529	1529	38.56	15.25	362.0	1.07	10.78		
5L	35.4	1602	1602	37.42	14.05	368.0	0.99	11.94		
5L	37.0	1675	1675	35.18	11.75	361.7	0.83	12.51		
5L	38.6	1747	1747	32.64	9.15	350.2	0.64	13.24		
5L	40.2	1820	1820	29.84	6.28	333.4	0.44	14.40		
5L	40.3	1825	1825	29.63	6.07	332.0	0.43	14.38		
6L	40.3	1345	1825	29.82	6.27	334.2	0.44	15.54		
6L	41.8	1395	1893	29.37	5.75	341.4	0.40	16.63		
6L	43.5	1449	1966	28.78	5.10	347.4	0.36	17.38		
6L	45.1	1502	2039	28.18	4.43	352.8	0.31	18.59		
6L	46.7	1556	2111	27.58	3.75	357.5	0.26	19.31		
6L	48.3	1610	2184	26.86	2.96	360.3	0.21	20.32		
6L	49.9	1663	2257	25.65	1.67	355.5	0.12	20.89		
6L	51.5	1717	2330	24.37	0.30	348.6	0.02	21.89		
6L	53.1	1771	2403	22.91	-1.24	338.0	-0.09	22.54		
6L	54.7	1824	2475	21.36	-2.87	324.6	-0.20	23.34		
6L	54.7	1825	2476	21.34	-2.89	324.5	-0.20	23.34		
7L	54.7	1582	2476	23.37	-0.87	355.3	-0.06	25.06		
7L	56.3	1628	2548	22.64	-1.68	354.2	-0.12	25.74		
7L	57.9	1675	2621	21.73	-2.69	349.7	-0.19	26.71		
7L	59.5	1721	2694	20.73	-3.77	342.9	-0.27	27.61		
7L	61.2	1768	2767	19.64	-4.96	333.6	-0.35	28.37		
7L	62.8	1814	2839	18.49	-6.21	322.4	-0.44	29.49		
7L	64.4	1861	2912	17.23	-7.57	308.1	-0.53	30.17		
7L	65.7	1900	2973	16.16	-8.73	295.1	-0.61	31.81	Governed	
7L	66.0	1907	2985	15.01	-9.89	275.2	-0.70	31.80		
7L	67.6	1954	3058	7.80	-17.21	146.4	-1.21	31.71		
7L	69.2	2000	3131	0.58	-24.54	11.2	-1.73	31.62		
7L	69.3	2004	3136	0.00	-25.13	0.0	-1.77	31.61		

Full Throttle, Manual Hold (7.6269 Ratio) (1C-1L)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	1.030	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
1C	0.0	1642	0	445.29	422.54	0.0	31.12	443.52		
1C	1.6	1598	73	398.49	375.73	178.1	27.40	236.52		
1C	2.7	1681	122	332.07	309.32	248.9	22.29	145.28	70 Percent	
1C	3.2	1735	146	296.30	273.54	264.9	19.60	116.93		
1C	3.6	1779	163	269.16	246.40	269.8	17.59	101.47	80 Percent	
1C	3.9	1813	177	248.85	226.09	270.4	16.10	91.36		
1L	3.9	1350	177	306.14	283.38	332.7	20.34	18.22		
1L	4.8	1666	218	264.30	241.53	354.5	17.24	21.90		
1L	5.5	1900	249	197.32	174.56	301.8	12.37	23.85	Governed	
1L	5.8	2009	263	-1.09	-23.86	-1.8	-1.68	17.52		

Full Throttle, Manual Hold (3.5102 Ratio) (2C-2L)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	1.030	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
2C	0.0	1642	0	207.10	184.35	0.0	13.08	443.52		
2C	1.6	1620	73	197.31	174.56	88.2	12.37	341.23		
2C	3.2	1595	146	188.24	165.49	168.3	11.72	247.83		
2C	4.8	1637	218	169.36	146.59	227.1	10.36	175.26		
2C	5.9	1681	265	154.85	132.08	252.2	9.33	141.37	70 Percent	
2C	6.4	1708	291	146.48	123.71	261.9	8.73	126.43		
2C	7.2	1744	325	135.47	112.69	270.3	7.95	108.39		
2L	7.2	1141	325	144.25	121.47	287.9	8.57	10.42		
2L	8.0	1278	364	144.91	122.13	323.9	8.62	11.98		
2L	9.7	1533	437	134.02	111.22	359.5	7.85	14.29		
2L	11.3	1789	510	108.59	85.78	339.8	6.04	16.38		
2L	12.0	1900	541	92.47	69.65	307.3	4.90	17.33	Governed	
2L	12.7	2009	572	0.00	-22.83	0.0	-1.61	14.50		

Full Throttle, Reverse Performance (Standard 4.801 Ratio) (R1C-R1C)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	2.040	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)	Match Point	
R1C!	0.0	1642	0	547.16	524.41	0.0	39.68	443.52		
R1C	1.6	1620	144	465.89	443.14	208.3	32.80	199.15		
R1C	2.2	1681	194	411.77	389.02	247.6	28.44	146.87	70 Percent	
R1C	2.9	1779	259	334.96	312.20	269.3	22.50	102.06	80 Percent	
R1C	3.2	1824	288	301.95	279.20	270.0	20.02	88.09		
R1C	3.6	1870	319	267.73	244.97	265.1	17.49	77.73	85 Percent	
R1C	3.8	1900	339	246.89	224.14	259.5	15.96	73.96	Governed	
R1C	4.7	2010	422	0.00	-22.76	0.0	-1.60	12.35		

Full Throttle, Reverse Performance (Optional 17.120 Ratio - LRTP Required) (R2C-R2C)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	2.040	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)		Match Point
R2C!	0.0	1642	0	1943.19	1920.44	0.0	999.00	443.52		
R2C!	0.6	1681	54	1463.66	1440.91	246.7	999.00	147.85		70 Percent
R2C!	0.8	1779	73	1191.02	1168.27	268.4	144.12	103.02		80 Percent
R2C!	1.0	1870	90	952.36	929.61	264.4	86.39	78.55		85 Percent
R2C!	1.1	1900	95	878.40	855.65	258.8	75.34	74.71		Governed
R2C	1.3	2010	118	-1.00	-23.75	-0.4	-1.67	11.56		

Full Throttle, Reverse Performance (Standard 4.801 Ratio) (R1C-R1C)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	1.030	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)		Match Point
R1C	0.0	1642	0	276.26	253.51	0.0	18.12	443.52		
R1C	1.6	1610	73	260.14	237.39	116.3	16.93	308.94		
R1C	3.2	1622	146	234.52	211.76	209.7	15.06	197.35		
R1C	4.3	1681	194	207.90	185.14	247.6	13.13	146.87		70 Percent
R1C	4.8	1716	218	193.53	170.77	259.6	12.10	127.50		
R1C	5.7	1779	259	169.12	146.35	269.3	10.35	102.06		80 Percent
R1C	6.4	1828	291	150.86	128.08	269.8	9.04	86.86		
R1C	7.1	1870	319	135.18	112.40	265.1	7.93	77.73		85 Percent
R1C	7.5	1900	339	124.66	101.88	259.5	7.18	73.96		Governed
R1C	8.0	1936	364	82.64	59.86	184.7	4.21	44.65		
R1C	9.3	2010	422	0.00	-22.79	0.0	-1.60	12.35		

Full Throttle, Reverse Performance (Optional 17.120 Ratio - LRTP Required) (R2C-R2C)

Engine Fan		Air Conditioning		Engine Power		Vehicle Parameters		Axle Ratio	Auxiliary Gearing Ratio	
On		Off		Standard Power Curve		Standard		12.700	1.030	
Gear Range	Vehicle Speed (km/h)	Engine Speed (rpm)	Output Speed (rpm)	Tractive Effort (kN)	Drawbar Pull (kN)	Wheel Power Available (kW)	Net Grade (%)	Transmission Heat Rejection (kW)		Match Point
R2C!	0.0	1642	0	981.12	958.37	0.0	91.23	443.52		
R2C!	1.2	1681	54	739.01	716.25	246.7	58.31	147.85		70 Percent
R2C!	1.6	1779	73	601.35	578.59	268.4	44.54	103.02		80 Percent
R2C!	1.6	1779	73	600.59	577.84	268.5	44.47	102.84		
R2C	2.0	1870	90	480.85	458.09	264.4	34.03	78.55		85 Percent
R2C	2.1	1900	95	443.51	420.75	258.8	30.98	74.71		Governed
R2C	2.6	2010	118	-0.01	-22.76	0.0	-1.60	11.58		