

Allison Transmission
Bundled Report

Application	116-A353464-1
Iteration	1
Date	April 4, 2025 11:26:49
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 - Cummins X15 447kW 2779Nm - 4900SP
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	Cummins X 15 -- 447kW@2100rpm 2779Nm@1400rpm EU Stufe 3a FR11842 -- without SEM/LRTP (116-L032701-E, Rev B)
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) - Recommended
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)	29.1	29.1
Alternator / Generator	2.2	2.2
Air Compressor	2.2	2.2
Steering Pump	2.2	2.2
Air Conditioning	0.0	0.0
Implement Drive	0.0	0.0

Engine

Number of Power Packs	1
Engine Rating	Cummins X 15 -- 447kW@2100rpm 2779Nm@1400rpm EU Stufe 3a FR11842 -- without SEM/LRTP (116-L032701-E, Rev B)
Engine Controls Type	Electronic
Evaluate at Altitude	No
Certifications	
Displacement	14.90 l
Peak Torque	2779.0 N-m
Peak Torque Speed	1400 rpm
Peak Power	446.9 kW
Peak Power Speed	2100 rpm
Governed Power	446.9 kW
Governed Speed	2100 rpm
Number Of Curves	1
Engine Curve Reference	FR11847
Cruise Velocity @ Speed	0.0 km/h @ 0 rpm
Engine Retarder	
Engine Inertia (estimated)	1.8370 kg-m²
Engine Idle Speed	700 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
700	96.9	1322.0	92.1	1256.4	93.2	1271.1	
800	130.6	1559.0	125.1	1492.8	126.7	1512.0	
900	178.9	1898.0	172.4	1829.6	174.7	1853.9	
1000	234.3	2237.0	226.7	2165.3	229.9	2195.3	
1100	281.6	2445.0	272.9	2369.0	277.1	2405.2	
1200	332.3	2644.0	322.0	2562.7	327.5	2605.9	
1300	371.0	2725.0	359.1	2637.5	366.0	2688.2	
1400	407.4	2779.0	393.6	2684.6	402.2	2743.4	Peak Torque
1500	421.0	2680.0	404.9	2577.9	415.5	2645.4	
1600	432.5	2581.0	413.9	2470.5	426.8	2547.3	
1700	442.0	2483.0	420.7	2363.4	436.2	2450.1	
1800	449.6	2385.0	425.2	2255.6	443.5	2352.8	
1900	454.8	2286.0	427.0	2146.2	448.6	2254.4	
2000	452.4	2160.0	420.8	2009.0	445.9	2129.0	
2100	446.9	2032.0	411.1	1869.2	440.1	2001.5	Peak Governed
2230	0.0	0.0	-41.8	-179.0	-7.0	-29.9	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
700	96.9	1322.0	92.1	1256.4	93.2	1271.1	
800	130.6	1559.0	125.1	1492.8	126.7	1512.0	
900	178.9	1898.0	172.4	1829.6	174.7	1853.9	
1000	234.3	2237.0	226.7	2165.3	229.9	2195.3	
1100	281.6	2445.0	272.9	2369.0	277.1	2405.2	
1200	332.3	2644.0	322.0	2562.7	327.5	2605.9	
1300	371.0	2725.0	359.1	2637.5	366.0	2688.2	
1400	407.4	2779.0	393.6	2684.6	402.2	2743.4	Peak Torque
1500	421.0	2680.0	404.9	2577.9	415.5	2645.4	
1600	432.5	2581.0	413.9	2470.5	426.8	2547.3	
1700	442.0	2483.0	420.7	2363.4	436.2	2450.1	
1800	449.6	2385.0	425.2	2255.6	443.5	2352.8	
1900	454.8	2286.0	427.0	2146.2	448.6	2254.4	
2000	452.4	2160.0	420.8	2009.0	445.9	2129.0	
2100	446.9	2032.0	411.1	1869.2	440.1	2001.5	Peak Governed
2230	0.0	0.0	-41.8	-179.0	-7.0	-29.9	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) - Recommended
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	2100 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

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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 - OK	
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		1603 rpm	
C05		Minimum Engine Speed	
Overall Status		OK: Acceptable	
Rating/Recommendation		1500 rpm (Min)	
Actual		1551 rpm	
Notes		Net peak torque speed (1400 rpm) + allowable variation (100 rpm).	
C10		Torque Converter Input Torque	
Overall Status		OK: Acceptable	
Rating/Recommendation		3200.0 N-m (Max)	
Actual		2779.0 N-m	
C07		Turbine Torque at Converter Stall	
Overall Status		OK: Acceptable	
Rating/Recommendation		4101.0 N-m (Max)	
Actual		3951.4 N-m	
C08		Converter Speed Ratio at Engine Governed Speed	
Overall Status		OK: Acceptable	
Rating/Recommendation		0.800 (Min)	
Actual		0.891	
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	454.8 kW	
T14	✓	Transmission Input Torque (Gross)
Overall Status	OK: Acceptable	
Rating/Recommendation	3200.0 N-m (Max)	
Actual	2779.0 N-m	
T03	✓	Transmission Input Speed
Overall Status	OK: Acceptable	
Rating/Recommendation	1700 rpm / 2300 rpm	
Actual	2100 rpm	
T04	📖	Transmission Output Speed
Overall Status	Reference	
Actual	3286 rpm	
Notes	Check made in Range 7L at 2100 rpm Engine Governed Speed.	

Vehicle Rating And Guideline Checks - Standard

! Section Score - C		
V22	📖	2nd Range Converter Stall Gradeability
Overall Status	Reference	
Actual	26.88 %	
V47	📖	2nd Range 80% Converter Efficiency Gradeability
Overall Status	Reference	
Actual	16.224	
V16	✓	Gradeability Required at Governed Speed
Overall Status	OK: Acceptable	
Rating/Recommendation	8.00 % (Min)	
Actual	25.98 %	
Notes	Check is in Lockup Mode.	
V17	📖	Maximum Geared Vehicle Speed at Engine Governed Speed
Overall Status	Reference	
Actual	72.6 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	42.8 km/h	
Notes	At 1934 rpm Engine Speed, Range 5L.	
V45	📖	Heat Generated in 2nd Range 80% Converter Efficiency
Overall Status	Reference	
Actual	97.99 kW	
Notes	At 1783.8 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	26.9	0.0	2C	Stall
Launch Gradeability	24.9	0.0	2C	
Low Speed Gradeability	16.2	4.0	2C	80 Percent
Maximum Speed on Grade	0.0	37.1	7L	Road Load
	0.3	36.9	7L	
	0.5	36.7	7L	
	1.0	32.1	7L	
	2.0	22.9	6L	
	3.0	18.9	5L	
	4.0	15.5	4L	
	5.0	13.3	4L	
	6.0	11.5	3L	
	7.0	10.2	3L	
	8.0	8.8	3L	
	9.0	6.2	3C	
	10.0	5.1	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	12.4	0.0	2C	Stall
Launch Gradeability	10.4	0.0	2C	
Low Speed Gradeability	7.3	7.9	2C	80 Percent
Maximum Speed on Grade	0.0	50.5	6L	Road Load
	0.3	44.7	5L	
	0.5	40.8	5L	
	1.0	31.4	5L	
	2.0	23.5	3L	
	3.0	18.7	3L	
	4.0	11.2	3C	
	5.0	9.9	2C	
	6.0	9.7	2C	
	7.0	8.3	2C	
	8.0	6.9	2C	
	9.0	5.7	2C	
	10.0	4.4	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	10.3	37
0 - 30 km/h	27.1	157
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	12.2	43
0 - 30 km/h	28.2	156
0 - 40 km/h	65.6	528
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	1603	0	391.85	369.10	0.0	26.88	414.28		
2C	1.6	1551	144	350.46	327.71	156.7	23.68	224.33		
2C	2.9	1653	261	296.09	273.33	239.4	19.59	134.46	70 Percent	
2C	3.2	1687	288	282.21	259.46	252.3	18.56	121.48		
2C	4.0	1784	356	250.48	227.72	276.2	16.22	97.84	80 Percent	
2C	4.8	1898	433	217.52	194.76	291.7	13.83	81.96		
2C	5.0	1922	449	210.27	187.51	292.7	13.30	79.46		
3C	5.0	1633	449	166.11	143.35	231.2	10.13	142.72		
3C	6.4	1721	577	147.43	124.66	263.6	8.80	109.89		
3C	8.0	1837	721	128.22	105.44	286.6	7.44	86.91		
3C	8.2	1851	738	126.08	103.30	288.5	7.28	84.95		
3L	8.2	1407	738	141.75	118.97	324.3	8.40	10.74		
3L	9.7	1649	865	127.62	104.83	342.3	7.39	12.40		
3L	11.3	1924	1009	111.01	88.20	347.4	6.21	14.64		
3L	11.9	2024	1062	103.48	80.65	340.7	5.68	15.48		
4L	11.9	1518	1062	101.71	78.89	334.9	5.56	10.47		
4L	12.9	1648	1154	95.92	73.09	343.1	5.15	11.49		
4L	14.5	1855	1298	86.75	63.89	349.0	4.50	13.37		
4L	15.8	2025	1417	77.59	54.72	340.9	3.85	15.21		
5L	15.8	1417	1417	74.30	51.43	326.4	3.62	9.46		
5L	16.1	1442	1442	73.52	50.64	328.6	3.56	9.64		
5L	17.7	1586	1586	68.96	46.05	339.1	3.24	11.63		
5L	19.3	1730	1730	64.41	41.47	345.5	2.92	13.44		
5L	20.9	1875	1875	59.81	36.84	347.6	2.59	15.43		
5L	22.5	2019	2019	54.24	31.24	339.5	2.20	17.45		
5L	22.6	2025	2025	53.98	30.98	338.9	2.18	17.49		
6L	22.6	1492	2025	51.98	28.98	326.3	2.04	18.11		
6L	24.1	1594	2163	49.62	26.58	332.7	1.87	19.91		
6L	25.7	1700	2307	47.15	24.07	337.3	1.69	21.86		
6L	27.4	1807	2451	44.68	21.56	339.6	1.52	23.66		
6L	29.0	1913	2596	42.11	18.94	338.8	1.33	25.45		
6L	30.6	2019	2740	38.99	15.77	331.1	1.11	27.24		
6L	30.7	2025	2747	38.83	15.61	330.7	1.10	27.30		
7L	30.7	1755	2747	39.20	15.98	333.8	1.12	28.40		
7L	32.2	1843	2884	37.40	14.14	334.4	0.99	30.44		
7L	33.8	1935	3028	35.30	11.98	331.4	0.84	32.88		
7L	35.4	2027	3172	32.89	9.52	323.4	0.67	35.58		
7L	36.7	2100	3286	30.96	7.54	315.5	0.53	37.97	Governed	
7L	37.0	2119	3317	25.45	2.02	261.7	0.14	37.96		
7L	38.6	2208	3456	0.00	-23.49	0.0	-1.65	37.85		

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	1603	0	842.52	819.77	0.0	70.56	414.28		
1C!	1.3	1653	120	634.91	612.16	236.2	47.70	138.19	70 Percent	
1C!	1.6	1721	144	578.75	555.99	258.7	42.48	115.69		
1C!	1.8	1784	164	536.34	513.59	272.1	38.73	102.60	80 Percent	
1C	2.1	1869	190	482.78	460.02	284.4	34.19	90.13		
1L!	2.1	1449	190	545.87	523.12	321.5	39.56	18.86		
1L	3.1	2100	275	380.33	357.57	324.7	25.98	27.09	Governed	
1L	3.2	2200	288	45.32	22.57	40.5	1.59	21.25		
1L	3.2	2213	290	-1.15	-23.91	-1.0	-1.68	20.40		

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	1603	0	391.85	369.10	0.0	26.88	414.28		
2C	1.6	1551	144	350.46	327.71	156.7	23.68	224.33		
2C	2.9	1653	261	296.09	273.33	239.4	19.59	134.46	70 Percent	
2C	3.2	1687	288	282.21	259.46	252.3	18.56	121.48		
2C	4.0	1784	356	250.48	227.72	276.2	16.22	97.84	80 Percent	
2C	4.0	1789	359	248.97	226.21	277.1	16.11	96.97		
2L	4.0	1260	359	252.83	230.07	281.4	16.40	11.47		
2L	4.8	1518	433	247.58	224.82	332.0	16.01	13.88		
2L	6.4	2025	577	188.98	166.20	337.9	11.77	18.71		
2L	6.7	2100	598	178.40	155.63	330.9	11.01	19.70	Governed	
2L	7.0	2214	631	-0.03	-22.81	-0.1	-1.60	16.72		

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	1603	0	197.85	175.10	0.0	12.41	414.28		
2C	3.2	1552	146	176.68	153.92	158.0	10.89	222.82		
2C	5.8	1653	261	149.50	126.73	239.4	8.95	134.46	70 Percent	
2C	6.4	1691	291	141.79	119.01	253.5	8.40	120.29		
2C	7.9	1784	356	126.47	103.68	276.2	7.31	97.84	80 Percent	
2C	9.7	1905	437	108.89	86.09	292.1	6.07	81.32		
2C	9.9	1922	449	106.17	83.37	292.7	5.87	79.46		
3C	9.9	1633	449	83.87	61.07	231.2	4.30	142.72		
3C	12.9	1725	582	74.04	51.20	264.8	3.60	108.72		
3C	16.1	1843	728	64.29	41.41	287.4	2.91	86.07		
3C	16.3	1851	738	63.66	40.78	288.5	2.87	84.95		
3L	16.3	1407	738	71.57	48.69	324.3	3.43	10.74		
3L	19.3	1665	874	63.96	41.03	343.1	2.89	12.55		
3L	22.5	1943	1019	55.34	32.34	346.3	2.27	14.71		
3L	23.5	2024	1062	52.24	29.22	340.7	2.06	15.48		
4L	23.5	1518	1062	51.35	28.33	334.9	1.99	10.47		
4L	25.7	1665	1165	48.07	24.99	343.8	1.76	11.65		
4L	29.0	1873	1310	43.38	20.22	349.1	1.42	13.62		
4L	31.3	2025	1417	39.18	15.94	340.9	1.12	15.21		
5L	31.3	1417	1417	37.52	14.28	326.4	1.00	9.46		
5L	32.2	1456	1456	36.89	13.63	329.9	0.96	9.81		
5L	35.4	1602	1602	34.57	11.20	340.0	0.79	11.95		
5L	38.6	1747	1747	32.25	8.76	346.0	0.62	13.62		
5L	41.8	1893	1893	29.90	6.28	347.5	0.44	15.82		
5L	44.8	2025	2025	27.26	3.51	338.9	0.25	17.49		
6L	44.8	1492	2025	26.25	2.50	326.3	0.18	18.11		
6L	45.1	1502	2039	26.13	2.37	327.1	0.17	18.33		
6L	48.3	1610	2184	24.87	0.96	333.5	0.07	20.15		
6L	51.5	1717	2330	23.61	-0.45	337.8	-0.03	22.00		
6L	54.7	1824	2475	22.35	-1.88	339.7	-0.13	23.84		
6L	57.9	1932	2621	20.98	-3.43	337.7	-0.24	25.63		
6L	60.7	2025	2747	19.60	-4.97	330.7	-0.35	27.30		
7L	60.7	1755	2747	19.79	-4.79	333.8	-0.34	28.40		
7L	61.2	1768	2767	19.66	-4.94	334.0	-0.35	28.71		
7L	64.4	1861	2912	18.69	-6.11	334.3	-0.43	30.92		
7L	67.6	1954	3058	17.57	-7.44	330.0	-0.52	33.39		
7L	70.8	2047	3203	16.34	-8.89	321.4	-0.63	36.07		
7L	72.6	2100	3286	15.63	-9.73	315.5	-0.68	37.97	Governed	
7L	74.0	2140	3349	9.85	-15.61	202.6	-1.10	37.95		
7L	76.4	2208	3456	0.00	-25.64	0.0	-1.80	37.85		

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	1603	0	425.39	402.64	0.0	29.52	414.28		
1C	2.7	1653	120	320.57	297.81	236.2	21.42	138.19	70 Percent	
1C	3.2	1725	146	290.61	267.86	259.8	19.18	114.57		
1C	3.6	1784	164	270.80	248.04	272.1	17.72	102.60	80 Percent	
1C	4.2	1869	190	243.76	220.99	284.4	15.73	90.13		
1L	4.2	1449	190	275.61	252.85	321.5	18.07	18.86		
1L	6.1	2100	275	192.03	169.26	324.7	11.99	27.09	Governed	
1L	6.4	2214	290	-1.29	-24.06	-2.3	-1.69	20.37		

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	1603	0	197.85	175.10	0.0	12.41	414.28		
2C	3.2	1552	146	176.68	153.92	158.0	10.89	222.82		
2C	5.8	1653	261	149.50	126.73	239.4	8.95	134.46	70 Percent	
2C	6.4	1691	291	141.79	119.01	253.5	8.40	120.29		
2C	7.9	1784	356	126.47	103.68	276.2	7.31	97.84	80 Percent	
2C	7.9	1789	359	125.71	102.92	277.1	7.26	96.97		
2L	7.9	1260	359	127.65	104.87	281.4	7.40	11.47		
2L	9.7	1533	437	124.19	101.40	333.1	7.15	13.94		
2L	12.9	2044	582	94.01	71.18	336.2	5.01	18.81		
2L	13.2	2100	598	90.07	67.24	330.9	4.73	19.70	Governed	
2L	13.9	2214	631	0.00	-22.85	0.0	-1.61	16.72		

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	1603	0	522.70	499.95	0.0	37.56	414.28		
R1C	1.6	1583	144	438.74	415.99	196.1	30.59	180.48		
R1C	2.1	1653	191	397.60	374.85	235.0	27.33	139.63	70 Percent	
R1C	2.9	1784	260	336.98	314.22	271.6	22.66	103.21	80 Percent	
R1C	3.2	1842	288	314.25	291.50	281.0	20.94	93.65		
R1C	3.7	1923	328	283.24	260.48	288.4	18.63	84.53	85 Percent	
R1C	4.3	2100	390	238.81	216.05	288.6	15.37	69.80	Governed	
R1C	4.8	2164	433	105.04	82.27	140.9	5.80	27.43		
R1C	5.2	2214	464	1.65	-21.12	2.4	-1.49	14.55		

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	1603	0	1856.33	1833.58	0.0	999.00	414.28		
R2C!	0.6	1653	53	1413.32	1390.56	234.2	467.92	140.56	70 Percent	
R2C!	0.8	1784	73	1198.19	1175.44	270.8	146.89	104.18	80 Percent	
R2C!	1.0	1923	92	1007.46	984.71	287.6	95.99	85.45	85 Percent	
R2C!	1.2	2100	109	849.78	827.03	287.9	71.50	70.58	Governed	
R2C	1.5	2214	130	7.66	-15.10	3.1	-1.06	13.70		

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	1603	0	263.91	241.16	0.0	17.21	414.28		
R1C	3.2	1585	146	220.92	198.17	197.5	14.07	178.99		
R1C	4.2	1653	191	200.75	177.99	235.0	12.62	139.63	70 Percent	
R1C	5.7	1784	260	170.14	147.37	271.6	10.42	103.21	80 Percent	
R1C	6.4	1847	291	157.56	134.78	281.7	9.52	92.85		
R1C	7.3	1923	328	143.01	120.23	288.4	8.49	84.53	85 Percent	
R1C	8.6	2100	390	120.58	97.79	288.6	6.89	69.80	Governed	
R1C	9.7	2171	437	46.09	23.29	123.6	1.64	24.79		
R1C	10.3	2214	464	0.83	-21.97	2.4	-1.55	14.55		

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	1603	0	937.26	914.51	0.0	83.99	414.28		
R2C!	1.2	1653	53	713.59	690.83	234.2	55.58	140.56	70 Percent	
R2C!	1.6	1784	73	604.97	582.22	270.8	44.88	104.18	80 Percent	
R2C	2.0	1923	92	508.67	485.92	287.6	36.36	85.45	85 Percent	
R2C	2.4	2100	109	429.06	406.30	287.9	29.82	70.58	Governed	
R2C	2.9	2214	130	3.87	-18.89	3.1	-1.33	13.70		