

Allison Transmission
Bundled Report

Application	116-A353467-1
Iteration	1
Date	April 4, 2025 12:03:35
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 red. 2500Nm - 4700
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 - red. 2500Nm -- without SEM/LRTP (116-L032706-E, Rev B)
Transmission	4700 INTL Retarder (1-L007442-T, Rev E)
Transmission Rating	4700 INTL Retarder Heavy Equipment Transport (HET) - Diesel Allison 6th Generation Controls without SEM/LRTP (1-L024294-R, Rev A)
Vehicle Parameters	Standard
Torque Converter	TC571 (1-L001261-TC, Rev D) - 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)	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 - red. 2500Nm -- without SEM/LRTP (116-L032706-E, Rev B)
Engine Controls Type	Electronic
Evaluate at Altitude	No
Certifications	
Displacement	14.90 l
Peak Torque	2500.0 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	314.2	2500.0	303.9	2418.7	309.4	2461.8	
1300	340.3	2500.0	328.4	2412.5	335.3	2463.2	
1400	366.5	2500.0	352.7	2405.6	361.3	2464.4	Peak Torque
1500	392.7	2500.0	376.7	2397.9	387.3	2465.4	
1600	418.9	2500.0	400.4	2389.5	413.2	2466.3	
1700	442.0	2483.0	420.7	2363.4	436.2	2450.1	
1800	446.9	2370.9	422.5	2241.5	440.8	2338.7	
1900	446.9	2246.1	419.1	2106.3	440.6	2214.5	
2000	446.9	2133.8	415.3	1982.8	440.4	2102.8	
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	314.2	2500.0	303.9	2418.7	309.4	2461.8	
1300	340.3	2500.0	328.4	2412.5	335.3	2463.2	
1400	366.5	2500.0	352.7	2405.6	361.3	2464.4	Peak Torque
1500	392.7	2500.0	376.7	2397.9	387.3	2465.4	
1600	418.9	2500.0	400.4	2389.5	413.2	2466.3	
1700	442.0	2483.0	420.7	2363.4	436.2	2450.1	
1800	446.9	2370.9	422.5	2241.5	440.8	2338.7	
1900	446.9	2246.1	419.1	2106.3	440.6	2214.5	
2000	446.9	2133.8	415.3	1982.8	440.4	2102.8	
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	4700 INTL Retarder (1-L007442-T, Rev E)
Transmission Rating	4700 INTL Retarder Heavy Equipment Transport (HET) - Diesel Allison 6th Generation Controls without SEM/LRTP (1-L024294-R, Rev A)
Torque Converter	TC571 (1-L001261-TC, Rev D) - 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	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 - 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		1579 rpm	
C05	✓	Minimum Engine Speed	
Overall Status		OK: Acceptable	
Rating/Recommendation		1300 rpm (Min)	
Actual		1509 rpm	
Notes		Net peak torque speed (1200 rpm) + allowable variation (100 rpm).	
C07	!	Turbine Torque at Converter Stall	
Overall Status		XXX: Not Acceptable - rating or usage violation	
Rating/Recommendation		3525.0 N-m (Max)	
Actual		3828.1 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 - OK		
T01		Transmission / Vocation Compatibility
Overall Status		OK: 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		447.0 kW (Max)
Actual		446.9 kW
T14		Transmission Input Torque (Gross)
Overall Status		OK: Acceptable
Rating/Recommendation		2508.0 N-m (Max)
Actual		2500.0 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		25.93 %
V47		2nd Range 80% Converter Efficiency Gradeability
Overall Status		Reference
Actual		16.154
V16		Gradeability Required at Governed Speed
Overall Status		OK: Acceptable
Rating/Recommendation		8.00 % (Min)
Actual		25.97 %
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		42.1 km/h
Notes		At 1902.4 rpm Engine Speed, Range 5L.
V45		Heat Generated in 2nd Range 80% Converter Efficiency
Overall Status		Reference
Actual		97.56 kW
Notes		At 1780.6 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	25.9	0.0	2C	Stall
Launch Gradeability	23.9	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	31.8	7L	
	2.0	22.6	5L	
	3.0	18.3	5L	
	4.0	15.4	4L	
	5.0	13.0	4L	
	6.0	11.4	3L	
	7.0	10.0	3L	
	8.0	7.3	3C	
	9.0	6.2	3C	
	10.0	5.0	2C	

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	12.0	0.0	2C	Stall
Launch Gradeability	10.0	0.0	2C	
Low Speed Gradeability	7.3	7.8	2C	80 Percent
Maximum Speed on Grade	0.0	49.3	6L	Road Load
	0.3	44.4	5L	
	0.5	40.3	5L	
	1.0	31.3	4L	
	2.0	23.5	3L	
	3.0	15.5	3C	
	4.0	10.8	3C	
	5.0	9.9	2C	
	6.0	9.6	2C	
	7.0	8.2	2C	
	8.0	6.9	2C	
	9.0	5.4	2C	
	10.0	3.6	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	10.7	39
0 - 30 km/h	28.1	163
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	12.7	45
0 - 30 km/h	29.1	161
0 - 40 km/h	70.6	572
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	1579	0	379.62	356.87	0.0	25.93	395.46		
2C	1.6	1511	144	331.37	308.61	148.1	22.23	204.16		
2C	2.9	1640	259	291.70	268.94	234.0	19.26	131.83	70 Percent	
2C	3.2	1685	288	280.78	258.03	251.0	18.45	120.71		
2C	4.0	1781	355	249.53	226.77	274.6	16.15	97.36	80 Percent	
2C	4.8	1891	433	213.82	191.05	286.8	13.56	80.24		
2C	5.0	1911	447	207.79	185.03	287.7	13.12	78.40	85 Percent	
2C	5.0	1915	449	206.78	184.01	287.8	13.05	78.09		
3C	5.0	1619	449	162.11	139.35	225.7	9.85	137.30		
3C	6.4	1721	577	147.46	124.69	263.7	8.80	109.27		
3C	8.0	1833	721	127.03	104.25	283.9	7.35	85.57		
3C	8.2	1846	738	124.72	101.94	285.4	7.19	83.43		
3L	8.2	1407	738	127.04	104.25	290.7	7.35	10.50		
3L	9.7	1649	865	125.38	102.58	336.3	7.23	12.60		
3L	11.3	1924	1009	109.01	86.20	341.1	6.07	14.69		
3L	11.9	2024	1062	102.38	79.56	337.1	5.60	15.59		
4L	11.9	1518	1062	95.10	72.28	313.1	5.09	10.49		
4L	12.9	1648	1154	94.22	71.39	337.0	5.03	11.71		
4L	14.5	1855	1298	85.59	62.73	344.4	4.42	13.35		
4L	15.8	2025	1417	76.77	53.90	337.3	3.79	15.33		
5L	15.8	1417	1417	66.81	43.93	293.5	3.09	9.64		
5L	16.1	1442	1442	66.73	43.85	298.3	3.09	9.93		
5L	17.7	1586	1586	66.25	43.34	325.8	3.05	11.80		
5L	19.3	1730	1730	64.27	41.34	344.8	2.91	13.47		
5L	20.9	1875	1875	58.85	35.88	342.0	2.52	15.45		
5L	22.5	2019	2019	53.62	30.61	335.6	2.15	17.60		
5L	22.6	2025	2025	53.41	30.41	335.3	2.14	17.65		
6L	22.6	1492	2025	48.06	25.06	301.7	1.76	17.98		
6L	24.1	1594	2163	47.80	24.76	320.5	1.74	19.90		
6L	25.7	1700	2307	47.15	24.07	337.2	1.69	21.92		
6L	27.4	1807	2451	44.34	21.22	337.0	1.49	23.69		
6L	29.0	1913	2596	41.30	18.14	332.4	1.28	25.49		
6L	30.6	2019	2740	38.54	15.32	327.3	1.08	27.35		
6L	30.7	2025	2747	38.40	15.19	327.1	1.07	27.42		
7L	30.7	1755	2747	39.05	15.83	332.5	1.11	28.42		
7L	32.2	1843	2884	36.94	13.68	330.3	0.96	30.41		
7L	33.8	1935	3028	34.66	11.34	325.4	0.80	32.93		
7L	35.4	2027	3172	32.53	9.16	320.0	0.64	35.70		
7L	36.7	2100	3286	30.95	7.54	315.4	0.53	38.08	Governed	
7L	37.0	2119	3317	25.44	2.01	261.6	0.14	38.08		
7L	38.6	2208	3456	0.00	-23.49	0.0	-1.65	37.98		

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	1579	0	816.23	793.48	0.0	67.24	395.46	
1C!	1.3	1640	119	625.48	602.73	230.9	46.80	135.49	70 Percent
1C!	1.6	1721	144	578.89	556.14	258.8	42.50	115.07	
1C	1.8	1781	163	534.31	511.55	270.6	38.56	102.10	80 Percent
1C	2.1	1863	190	476.47	453.71	280.7	33.67	88.41	
1L	2.1	1449	190	496.70	473.95	292.6	35.35	18.42	
1L	3.1	2100	275	380.22	357.47	324.6	25.97	27.20	Governed
1L	3.2	2200	288	45.21	22.45	40.4	1.58	21.38	
1L	3.2	2213	290	-1.17	-23.93	-1.1	-1.68	20.53	

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	1579	0	379.62	356.87	0.0	25.93	395.46	
2C	1.6	1511	144	331.37	308.61	148.1	22.23	204.16	
2C	2.9	1640	259	291.70	268.94	234.0	19.26	131.83	70 Percent
2C	3.2	1685	288	280.78	258.03	251.0	18.45	120.71	
2C	4.0	1781	355	249.53	226.77	274.6	16.15	97.36	80 Percent
2C	4.0	1786	359	247.66	224.90	275.6	16.02	96.29	
2L	4.0	1260	359	233.70	210.94	260.1	15.00	11.02	
2L	4.8	1518	433	231.51	208.75	310.5	14.84	13.80	
2L	6.4	2025	577	186.97	164.20	334.3	11.62	18.82	
2L	6.7	2100	598	178.35	155.57	330.8	11.01	19.81	Governed
2L	7.0	2214	631	-0.04	-22.81	-0.1	-1.60	16.85	

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	1579	0	191.67	168.92	0.0	11.96	395.46		
2C	3.2	1512	146	167.06	144.31	149.4	10.20	202.82		
2C	5.7	1640	259	147.28	124.51	234.0	8.79	131.83		70 Percent
2C	6.4	1689	291	141.19	118.42	252.5	8.36	119.87		
2C	7.8	1781	355	125.99	103.21	274.6	7.28	97.36		80 Percent
2C	9.7	1897	437	107.03	84.23	287.1	5.93	79.65		
2C	9.9	1911	447	104.92	82.12	287.7	5.78	78.40		85 Percent
2C	9.9	1915	449	104.40	81.60	287.8	5.75	78.09		
3C	9.9	1619	449	81.85	59.05	225.7	4.16	137.30		
3C	12.9	1725	582	74.07	51.24	264.9	3.61	107.91		
3C	16.1	1839	728	63.65	40.77	284.6	2.87	84.65		
3C	16.3	1846	738	62.97	40.09	285.4	2.82	83.43		
3L	16.3	1407	738	64.14	41.26	290.7	2.90	10.50		
3L	19.3	1665	874	63.18	40.25	339.0	2.83	12.76		
3L	22.5	1943	1019	54.40	31.40	340.5	2.21	14.77		
3L	23.5	2024	1062	51.69	28.67	337.1	2.02	15.59		
4L	23.5	1518	1062	48.02	24.99	313.1	1.76	10.49		
4L	25.7	1665	1165	47.48	24.40	339.6	1.72	11.87		
4L	29.0	1873	1310	42.70	19.54	343.6	1.37	13.60		
4L	31.3	2025	1417	38.76	15.53	337.3	1.09	15.33		
5L	31.3	1417	1417	33.73	10.49	293.5	0.74	9.64		
5L	32.2	1456	1456	33.67	10.40	301.0	0.73	10.10		
5L	35.4	1602	1602	33.42	10.04	328.6	0.71	12.02		
5L	38.6	1747	1747	32.15	8.66	344.9	0.61	13.65		
5L	41.8	1893	1893	29.35	5.73	341.1	0.40	15.89		
5L	44.8	2025	2025	26.97	3.22	335.3	0.23	17.65		
6L	44.8	1492	2025	24.27	0.52	301.7	0.04	17.98		
6L	45.1	1502	2039	24.25	0.50	303.6	0.04	18.17		
6L	48.3	1610	2184	24.09	0.19	323.1	0.01	20.18		
6L	51.5	1717	2330	23.58	-0.48	337.4	-0.03	22.03		
6L	54.7	1824	2475	22.13	-2.10	336.4	-0.15	23.83		
6L	57.9	1932	2621	20.60	-3.81	331.6	-0.27	25.69		
6L	60.7	2025	2747	19.39	-5.19	327.1	-0.36	27.42		
7L	60.7	1755	2747	19.72	-4.86	332.5	-0.34	28.42		
7L	61.2	1768	2767	19.57	-5.03	332.5	-0.35	28.72		
7L	64.4	1861	2912	18.42	-6.38	329.4	-0.45	30.88		
7L	67.6	1954	3058	17.27	-7.74	324.3	-0.54	33.45		
7L	70.8	2047	3203	16.21	-9.02	318.8	-0.63	36.22		
7L	72.6	2100	3286	15.63	-9.73	315.4	-0.68	38.08		Governed
7L	74.0	2140	3349	9.85	-15.62	202.5	-1.10	38.07		
7L	76.4	2208	3456	0.00	-25.64	0.0	-1.80	37.98		

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	1579	0	412.12	389.36	0.0	28.47	395.46		
1C	2.6	1640	119	315.81	293.05	230.9	21.06	135.49		70 Percent
1C	3.2	1726	146	290.76	268.00	260.0	19.19	113.76		
1C	3.6	1781	163	269.77	247.02	270.6	17.64	102.10		80 Percent
1C	4.2	1863	190	240.57	217.81	280.7	15.50	88.41		
1L	4.2	1449	190	250.79	228.03	292.6	16.25	18.42		
1L	6.1	2100	275	191.97	169.20	324.6	11.98	27.20		Governed
1L	6.4	2214	290	-1.32	-24.09	-2.3	-1.69	20.50		

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	1579	0	191.67	168.92	0.0	11.96	395.46		
2C	3.2	1512	146	167.06	144.31	149.4	10.20	202.82		
2C	5.7	1640	259	147.28	124.51	234.0	8.79	131.83	70 Percent	
2C	6.4	1689	291	141.19	118.42	252.5	8.36	119.87		
2C	7.8	1781	355	125.99	103.21	274.6	7.28	97.36	80 Percent	
2C	7.9	1786	359	125.04	102.26	275.6	7.21	96.29		
2L	7.9	1260	359	118.00	95.21	260.1	6.71	11.02		
2L	9.7	1533	437	116.82	94.02	313.3	6.63	13.96		
2L	12.9	2044	582	93.26	70.42	333.5	4.96	18.95		
2L	13.2	2100	598	90.05	67.21	330.8	4.73	19.81	Governed	
2L	13.9	2214	631	0.00	-22.85	0.0	-1.61	16.85		

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	1579	0	506.39	483.64	0.0	36.17	395.46		
R1C	1.6	1556	144	419.95	397.20	187.7	29.09	167.92		
R1C	2.1	1640	189	391.74	368.98	229.8	26.87	136.87	70 Percent	
R1C	2.9	1781	260	335.71	312.96	270.1	22.56	102.69	80 Percent	
R1C	3.2	1837	288	311.21	288.45	278.2	20.72	92.16		
R1C	3.6	1911	326	280.06	257.30	283.5	18.40	83.38	85 Percent	
R1C	4.3	2100	390	238.74	215.98	288.5	15.37	69.89	Governed	
R1C	4.8	2164	433	105.01	82.25	140.8	5.79	27.54		
R1C	5.2	2214	464	1.62	-21.14	2.3	-1.49	14.68		

Full Throttle, Reverse Performance (Optional 17.120 Ratio - L RTP 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	1579	0	1798.40	1775.65	0.0	999.00	395.46		
R2C!	0.6	1640	53	1392.49	1369.74	229.0	358.71	137.77	70 Percent	
R2C!	0.8	1781	73	1193.71	1170.96	269.3	145.14	103.66	80 Percent	
R2C!	1.0	1911	92	996.17	973.42	282.7	93.91	84.28	85 Percent	
R2C!	1.2	2100	109	849.54	826.79	287.8	71.47	70.67	Governed	
R2C	1.5	2214	130	7.57	-15.18	3.1	-1.07	13.82		

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	1579	0	255.68	232.93	0.0	16.60	395.46	
R1C	3.2	1558	146	211.61	188.85	189.2	13.40	166.72	
R1C	4.2	1640	189	197.79	175.03	229.8	12.40	136.87	70 Percent
R1C	5.7	1781	260	169.50	146.73	270.1	10.37	102.69	80 Percent
R1C	6.4	1843	291	155.93	133.16	278.8	9.41	91.27	
R1C	7.2	1911	326	141.40	118.63	283.5	8.37	83.38	85 Percent
R1C	8.6	2100	390	120.54	97.75	288.5	6.89	69.89	Governed
R1C	9.7	2171	437	46.08	23.28	123.6	1.64	24.91	
R1C	10.3	2214	464	0.82	-21.99	2.3	-1.55	14.68	

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	1579	0	908.02	885.27	0.0	79.55	395.46	
R2C!	1.2	1640	53	703.07	680.32	229.0	54.48	137.77	70 Percent
R2C!	1.6	1781	73	602.71	579.95	269.3	44.67	103.66	80 Percent
R2C	2.0	1911	92	502.97	480.22	282.7	35.88	84.28	85 Percent
R2C	2.4	2100	109	428.94	406.18	287.8	29.81	70.67	Governed
R2C	2.9	2214	130	3.82	-18.93	3.1	-1.33	13.82	