Agricultural Tractor Tire Loadings, Torque Factors, and Inflation Pressures — SAE J709c

SAE STANDARD

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SOCIETY OF AUTOMOTIVE ENGINEERS, INC.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

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AGRICULTURAL TRACTOR TIRE LOADINGS, TORQUE FACTORS, AND INFLATION PRESSURES - SAE J709c

SAE Standard

Report of Tractor Technical Committee approved May 1959 and last revised May 1975.

1. PURPOSE - This SAE Standard establishes loadings, torque factor, and inflation pressure relationships for tire sizes and ply ratings currently used on agricultural tractors. Primary purpose of this recommendation is for use with SAE J708.

The performance of the tractor is materially effected by tire loadings, tire torque transmitting ability, and inflation pressure; therefore, it becomes desirable to publish this information.

2. GENERAL PRINCIPLES

2.1 All agricultural tractor tire loads shown in Tables 1, 2, and 3, are expressed in pounds.

2.2 All agricultural tractor tire inflation pressures shown in Tables 1, 2, and 3 are expressed in pounds per square inch gage, at approximately the prevailing atmospheric temperature at time of test and do not include any inflation pressure buildup due to vehicle operation.

2.3 Tire inflation pressures shall be recorded with the valve at the bottom position.

2.4 The maximum individual tire loading shall not exceed the tire load versus inflation pressure for its respective ply rating shown in Tables 1, 2 and 3. The minimum tire inflation pressure shall not be less than that shown in Tables 1, 2 and 3 for the respective tire size.

2.5 The torque transmitting ability of the drive tire is equal to the product of its torque factor, rated load, and loaded radius. Torque factor is an empirical relationship between the tire section height and tire outside diameter.

2.6 Ply Rating is used to identify a given tire with its maximum recommended load. It is an index of tire strength and does not necessarily represent the number of actual plies in the tire.

2.7 If the tire used is not recorded in Tables 1, 2 and 3, its load and inflation should be in accordance with the latest standards or experimental practices of The Tire and Rim Association, Inc.

TABLE 1—AGRICULTURAL DRIVE WHEEL TRACTOR TIRES
TIRES USED AS SINGLES

MAXIMUM SPEED - 20 mph

TIRE SIZE	PLY RATING	Tire Load Limits At Various Cold Inflation Pressures 12	14	16	18	20	22	24	26		TORQUE FACTOR
8.3-24	4	970	1060	1150	1230	1310	1380(4)				.94
9.5-16	4	910	1000	1080	1150	1230(4)					.86
9.5-24	4	1210	1330	1430	1540	1630(4)					.92
11.2-24	4	1470	1600	1740	1860(4)						.90
11.2-28	4	1560	1710	1850	1980(4)						.92
12.4-24	4,6,8	1760	1920	2080(4)	2230	2370	2510	2640(6)	2760	3120@32(8)	.89
12.4-28	4	1880	2050	2220(4)							.91
13.6-24	4		2270(4)								.87
13.6-28	4,6		2420(4)	2620	2810	2980	3160(6)				.89
13.6-38	4,6		2810(4)	3040	3250	3460	3660(6)				.94
13.9-36	6		2730	2960	3170	3370(6)					.94
14.9-24	6		2700	2920	3130	3330(6)					.86
14.9-26	6,8		2790	3020	3230	3440(6)	3640	3830	4010(8)		.87
14.9-28	6		2880	3120	3340	3550(6)					.88
14.9-30	6		2980	3220	3450	3670(6)					.89
15.5-38	6,8		3160	3410	3660	3890(6)	4110	4330	4540(8)		.94
16.0-24	6,8			3540	3800(6)	4040	4270	4490(8)			.84
16.9-26	6,8			3660	3920(6)	4170	4410	4640(8)			.86
16.9-28	6,8			3780	4050(6)	4310	4560	4790(8)			.87
16.9-30	6			3900	4180(6)						.88
16.9-34	6			4140	4440(6)						.90
16.9-38	6,8			4380	4700(6)	5000	5280	5560(8)			.91
18.4-16.1	6			2810(6)							.79
18.4-26	6,10,8			4390(6)	4700	5000(8)	5290	5560	5830(10)		.85
18.4-28	6			4530(6)							.86
18.4-30	6,8,10			4680(6)	5010	5330(8)	5630	5930	6210(10)		.87
18.4-38	6,8,10,12			5250(6)	5630	5990(8)	6330	6660	6980(10)	7880@32(12)	.90
20.8-34	8			6010	6440(8)						.87
20.8-38	8,10			6360	6820(8)	7250	7670(10)				.89
23.1-26	8			6280(8)	6730	7160(10)					.82
23.1-30	8			6700							.84
23.1-34	8			7110(8)							.86
24.5-32	10				8180	8700(10					.84
17.50-24	6			3390(6)							.86
28L-26	10				7800(10)						.82

NOTES: 1. Figures in parentheses denote ply rating for which bold face loads and inflations are maximum.

2. When used on tractors with mounted implements or on self-propelled implements (except Combines) and operated at speeds not exceeding 10 MPH, Drive Wheel tire loads may be increased up to 20% with no increase in inflation pressure. Tire loads should include full bins or tanks, all ballast, accessories, etc.

3. When used on tractors or self-propelled implements (except Combines) and operated at speeds not exceeding 5 MPH in service which does not require sustained high torque, Drive Wheel tire loads may be increased up to 30% with inflation pressures increased 4 PSI. Tire loads should include full bins or tanks, all ballast, accesories, etc. Wheel and rim strength must be adequate for maximum load and inflation of a given tire size and ply rating.

4. When used on tractors and operated at speeds not exceeding 15 MPH in service which does not require sustained high torque, drive wheel tire loads may be increased up to 7% with no increase in inflation pressures.

5. For shipping purposes, tire inflation pressures may be increased to 30 PSI. This higher inflation pressure must be reduced to operating inflation BEFORE the tractor is removed from the carrier.

TABLE 2 - AGRICULTURAL AND INDUSTRIAL TRACTOR STEERING WHEEL TIRES

MAXIMUM SPEED - 20 mph

Tire Load Limits At Various Cold Inflation Pressures

TIRE SIZE	PLY RATING	20	24	28	32	36	40	44	48	52	56	60	64
4.00-12SL	4	330	370	400	430	470	490	520	550(4)				
5.00-15SL	4	540	600	660	710	760	810(4)						
5.50-16SL	4	660	740	810	870	940(4)							
6.00-14SL	4,6	680	760	830	900(4)	960	1030	1080	1140(6)				
6.00-16SL	4,6	760	840	920	1000(4)	1070	1140	1200	1260(6)				
6.50-16SL	4,6	850	950	1040	1130(4)	1210	1280	1360(6)					
7.50-16SL	4,6,8	1100	1220	1340(4)	1450	1550	1650(6)	1740	1830	1920(8)			
7.50-18SL	4,6	1190	1330	1450(4)	1570	1680	1790(6)						
7.50-20SL	6	1280	1430	1560	1690	1810	1930(6)						
9.00-10SL	4	1100	1230(4)										
10.00-16SL	6,8	1750	1950	2130(6)	3210	2470	2630(8)						
11.00-16SL	6,8	2070	2300	2520(6)	2720	2920(8)							
					LOW SECTION HEIGHT TIRES								
7.5L-15SL	6,8	1060	1180	1290	1390	1490	1590(6)	1680	1770	1850(8)			
9.5L-15SL	6	1290	1440	1580	1700(6)								
11L-15SL	6	1570	1740	1910(6)									
14L-16.1SL	6	2560	2850(6)										

NOTES: 1. Figures in parentheses denote ply rating for which loads and inflations are maximum.

2. For intermittent service only at maximum speeds of 5 MPH, Steering Wheel maximum operating tire loads may be increased up to 50% with no increase in inflation pressures.

3. Steering Wheel tire loads may be increased up to 35% with no increase in inflation, when used on tractors with mounted implements or on self-propelled implements, and operated at speeds not exceeding 10 MPH.

4. Steering Wheel tire loads may be increased up to 15% with no increase in inflation when used on tractors with mounted implements or on self-propelled implements, and operated at speeds not exceeding 15 MPH.

5. Tire loads should include full bins or tanks, all ballast, accessories, etc.

6. Shipping inflation pressures shall not exceed the maximum pressures shown in Table.

TABLE 3 - AGRICULTURAL IMPLEMENT TIRES

MAXIMUM SPEED - 20 mph

Tire Load Limits At Various Cold Inflation Pressures

TIRE SIZE	PLY RATING	20	24	28	32	36	40	44	48	52	56
3.50-12SL	4	370	410	450	490	520	550	580(4)			
4.00- 8SL	4	340	370	410	440	470	500(4)				
4.00-12SL	4	450	500	540	590	630	670(4)				
4.00-18SL	2,4	580(2)	650	710	770	820	880(4)				
5.00-15SL	4	730	810	880	960(4)						
5.50-16SL	4	900	1000	1090	1180(4)						
5.90-15SL	4	850	950	1040	1120(4)						
6.00-16SL	4,6	1020	1140	1240(4)	1340	1440	1530(6)				
6.40-15SL	4,6	960	1060	1160(4)	1260	1350	1430	1420(6)			
6.50-16SL	4,6,8	1150	1280(4)	1400	1520	1630	1730(6)	1830	1930	2020(8)	
6.70-15SL	4,6	1070	1190	1300(4)	1400	1500	1600(6)				
7.50-16SL	4,6,8,10	1480	1650(4)	1810	1950(6)	2090	2230	2350(8)	2480	2590	2710(10)
7.50-18SL	4	1540	1720(4)								
7.50-20SL	4,6	1590	1770(4)	1940	2100(6)						
7.60-15SL	4,6,8	1250	1390(4)	1530	1650	1770(6)	1880	1990	2090(8)		
9.00-16SL	8,10	1960	2180	2380	2580	2760	2930(8)	3100	3260(10)		
9.00-24SL	6,8	2530	2820(6)	3080	3330	3570(8)					
11.25-24SL	8	3300	3680	4020(8)							
11.20-28SL	10	3420	3810	4170	4510	4830(10)					
13.50-16.1SL	8	3500	3900	4270(8)							
8.5L-14SL	6,8	1400	1560	1710	1850(6)	1980	2100	2220(8)			
9.5L-14SL	6,8	1580	1760	1930(6)	2090	2230	2380(8)				
9.5L-15SL	8	1660	1840	2020	2180	2340	2480(8)				
11L-14SL	6	1850	2060(6)								
11L-15SL	6,8,10	1930	2150(6)	2350	2550(8)	2730	2900(10)				
11L-16SL	6,8,10	2010	2240(6)	2450	2650(8)	2840	3020(10)				
12.5L-15SL	6,8	2290	2540(6)	2780	3010(8)						
12.5L-16SL	8	2380	2650	2900	3130(8)						
16.5L-16.1SL	6,8,10	3990(6)	4440(8)	4860	5250(10)						

NOTES: 1. For speeds not exceeding 5 MPH, the above loads may be increased up to 18% with a 4 PSI increase in inflation pressure.

2. For speeds not exceeding 10 MPH, the above loads may be increased up to 12% with 4 PSI increase in inflation pressure.

3. Figures in parentheses denote ply rating for which loads and inflations are maximum.

4. Tire loads should include full bins or tanks, all ballast, accessories, etc.

5. Maximum shipping pressures are the maximum inflation pressures for the tire sizes and ply ratings shown.