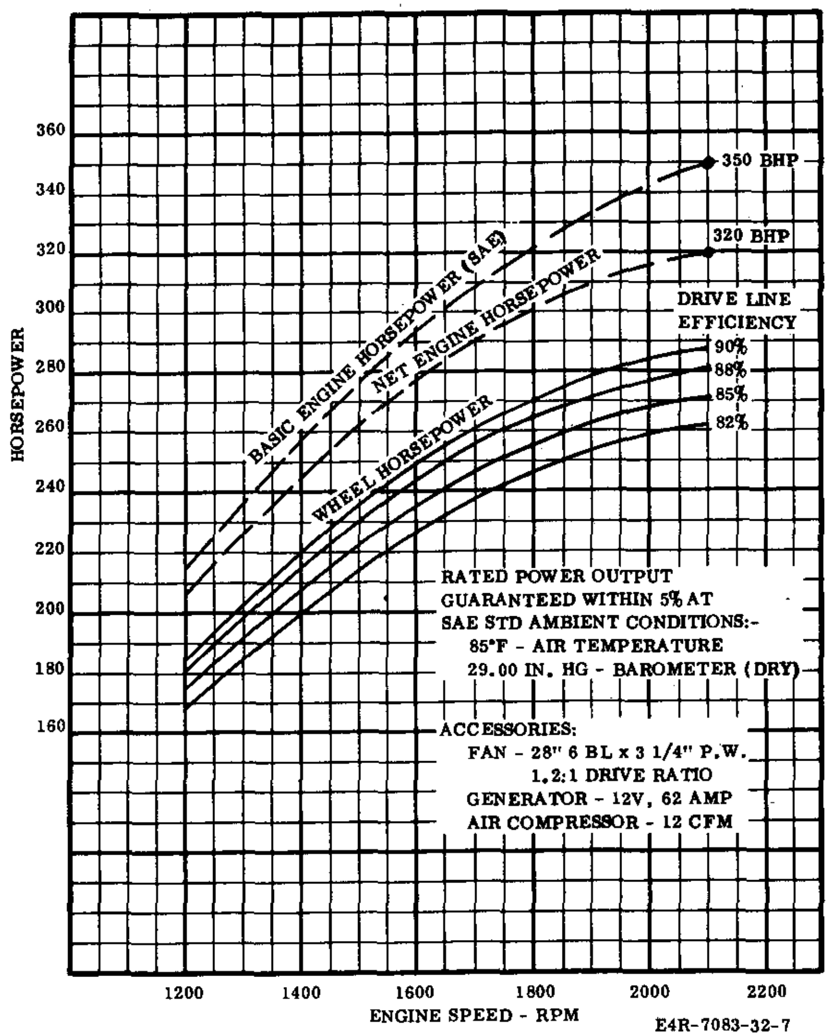
8V-71T — AUTOMOTIVE
N75 INJECTORS

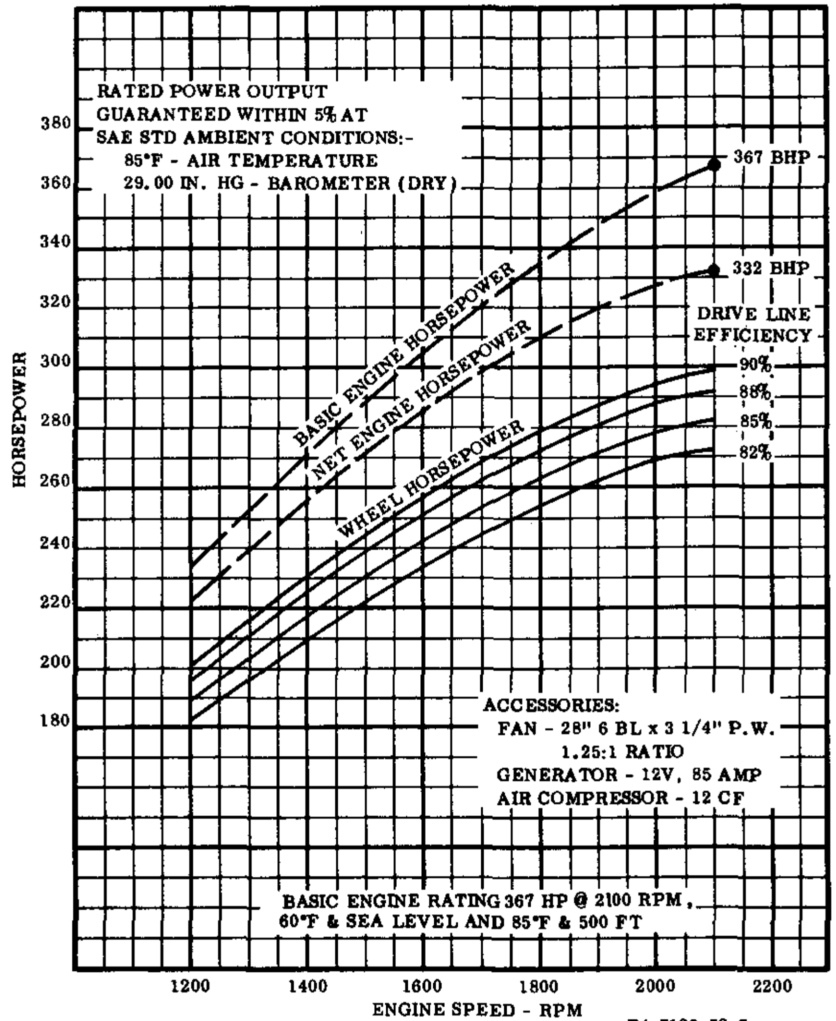


ENGINEERING-TECHNICAL DATA DEPT.

E4R-7083-32-7
Rev. 3-13-72

FIGURE 26

12V-71 ENGINE — AUTOMOTIVE
71C5 INJECTORS

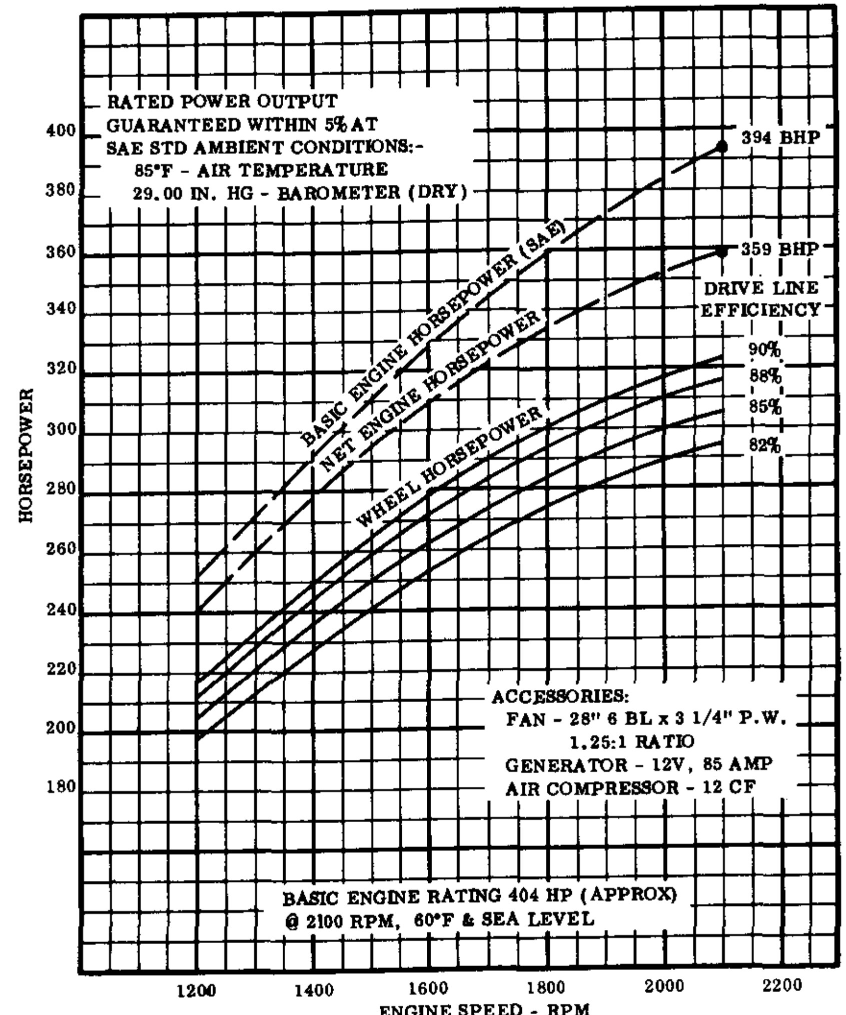


E4-7123-52-7
Rev. 2-16-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 27

12V-71 ENGINE — AUTOMOTIVE
C55 INJECTORS

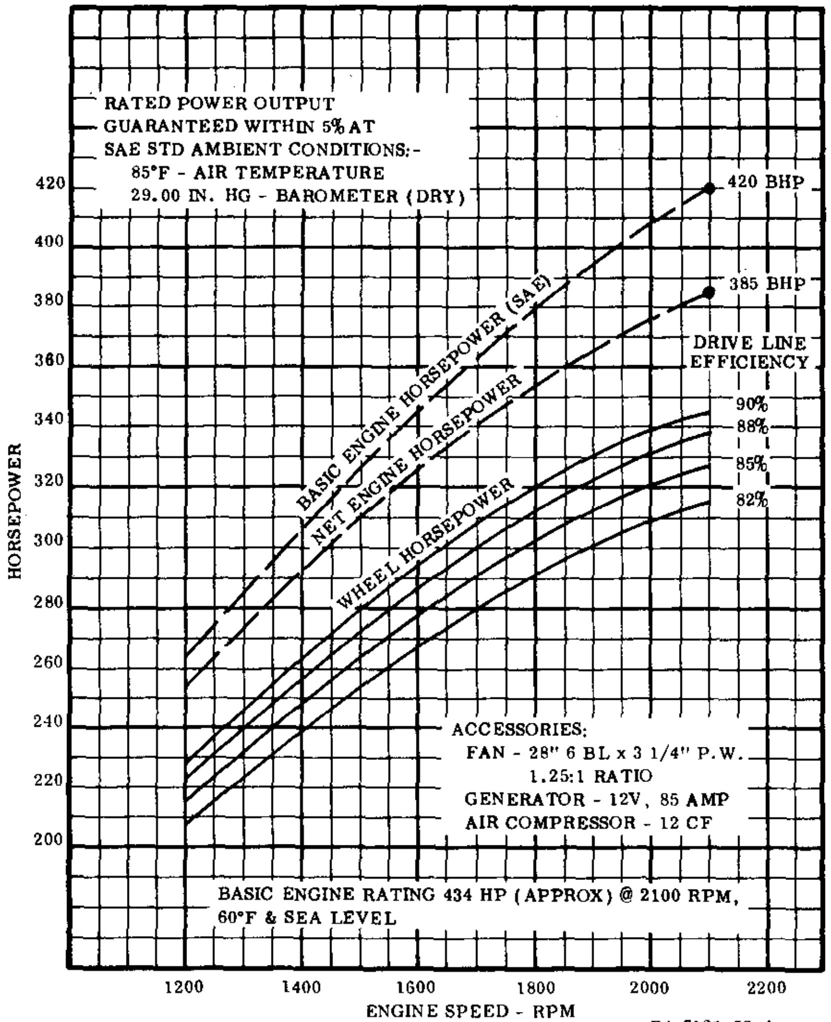


E4-7123-52-5
Rev. 2-16-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 28

12V-71 ENGINE — AUTOMOTIVE
C60 INJECTORS

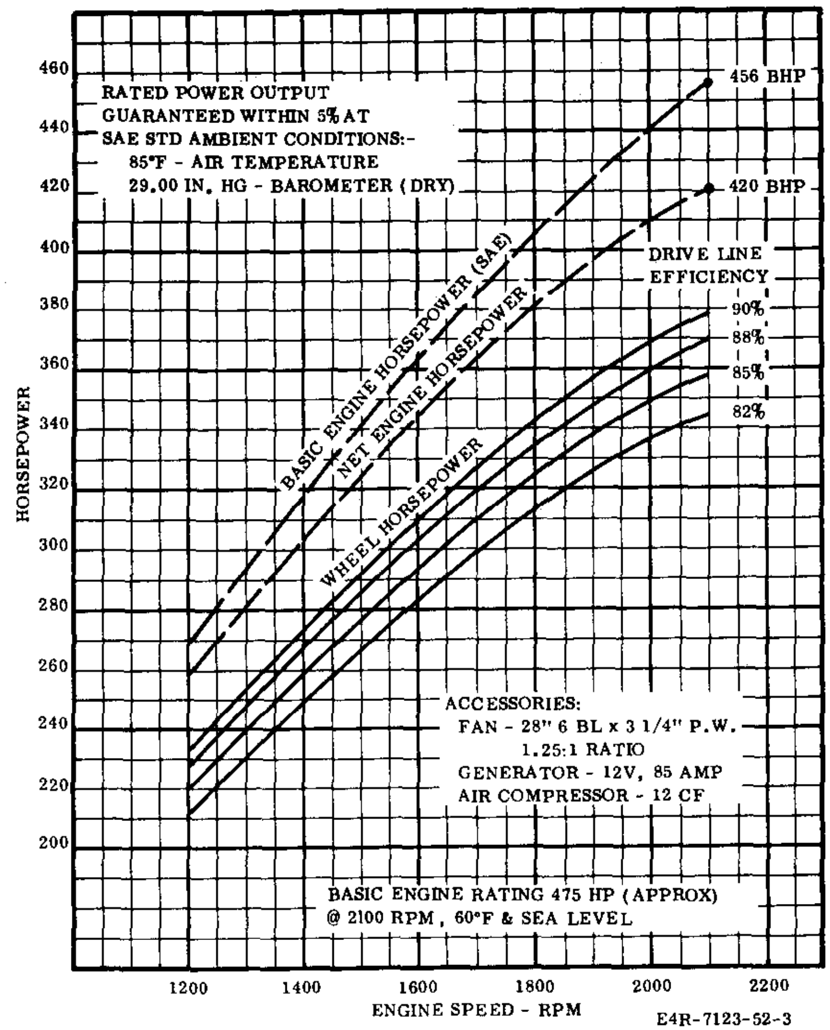


E4-7123-52-4
Rev. 2-16-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 29

12V-71 ENGINE — AUTOMOTIVE
ADVANCE CAMSHAFT TIMING
C65 INJECTORS



E4R-7123-52-3
Rev. 3-13-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 30

ROLLING RESISTANCE

The rolling resistance, or the portion of demand wheel horsepower needed to overcome this resistance is dependent on gross load (GVW or GCW), vehicle velocity (MPH), road surface condition, and tire construction and inflation pressure. The formula for determining the rolling resistance is:

On Zero Grade: $$RR = \frac{GW \times MPH\ (6.75 + 0.074\ MPH)}{375{,}000}$$

On Hill: $$RR = \frac{GCW \times MPH\ [\%\ Grade + .1\ (6.75 + .074\ MPH)]}{37{,}500}$$

Where: RR = Rolling Resistance HP

GCW = Gross Weight (lbs.)

MPH = Vehicle Velocity in Miles Per Hour

The above formula assumes a class 1 road surface and fabric cord tires inflated to the manufacturer's recommended pressure.

Correction factors for other than class 1 road surface are shown on the correction factor work sheet which will be discussed later. Variations in rolling resistance due to tire construction have yet to be fully evaluated; however, the metallic cord tire appears to substantially reduce the rolling resistance of a vehicle.

An examination of the rolling resistance formula indicates that gross loads and vehicle speed are the two major factors effecting rolling resistance. A 10% increase in vehicle speed from 54.55 MPH to 60 MPH with a gross load of 70,000 lbs. would increase the rolling resistance 14%. Or a 10% increase in gross load from 70,000 to 77,000 lbs. increases the rolling resistance by 12.5%. The increase in gross load would be primarily the result of increased pay load which could be as much as a 15% payload increase for a 12.5% increase in rolling resistance.

AIR RESISTANCE

As the vehicle moves along the highway, it displaces a volume of air equal to that of the vehicle. The rate of displacement, or air to vehicle velocity, and aerodynamic configurations of the vehicle determine the air resistance factor.

Increasing the vehicle velocity relative to the air or increasing the frontal area will increase the air resistance of the vehicle. The formula for determining the air resistance (AR) is:

$$AR = \frac{KAM^3}{375}$$

Where: AR = Air Resistance HP (in still air)
K = Drag Coefficient (.00182)
A = Frontal Area (Height less ¾ ft. X width in feet)
M = Velocity (MPH)

It can be seen from the above formula that an increase in the frontal area (A) will affect the air resistance in direct proportion, i.e., a 10% increase in effective frontal area will increase the air resistance by 10%. However, a change in velocity (Vehicle speed) increases the air resistance by a cube factor. This is shown graphically in Fig. 31. An empty trailer (8′ x 13′) has a demand wheel horsepower of 103 at 60 MPH, 132 at 65 and 166 at 70. An increase of 61% in power demand at 70 MPH compared to 103 at 60 MPH.

To summarize the effects of both wind and rolling resistance, the following points should be remembered:

1. Increasing either frontal area, MPH or gross load results in increasing power requirements.
2. Increasing vehicle speed (MPH) will result in the greatest increase in power requirements.
3. Increasing gross load only imposes the least increasing demands and is the most economical way to improve operating economies per ton mile of payload.

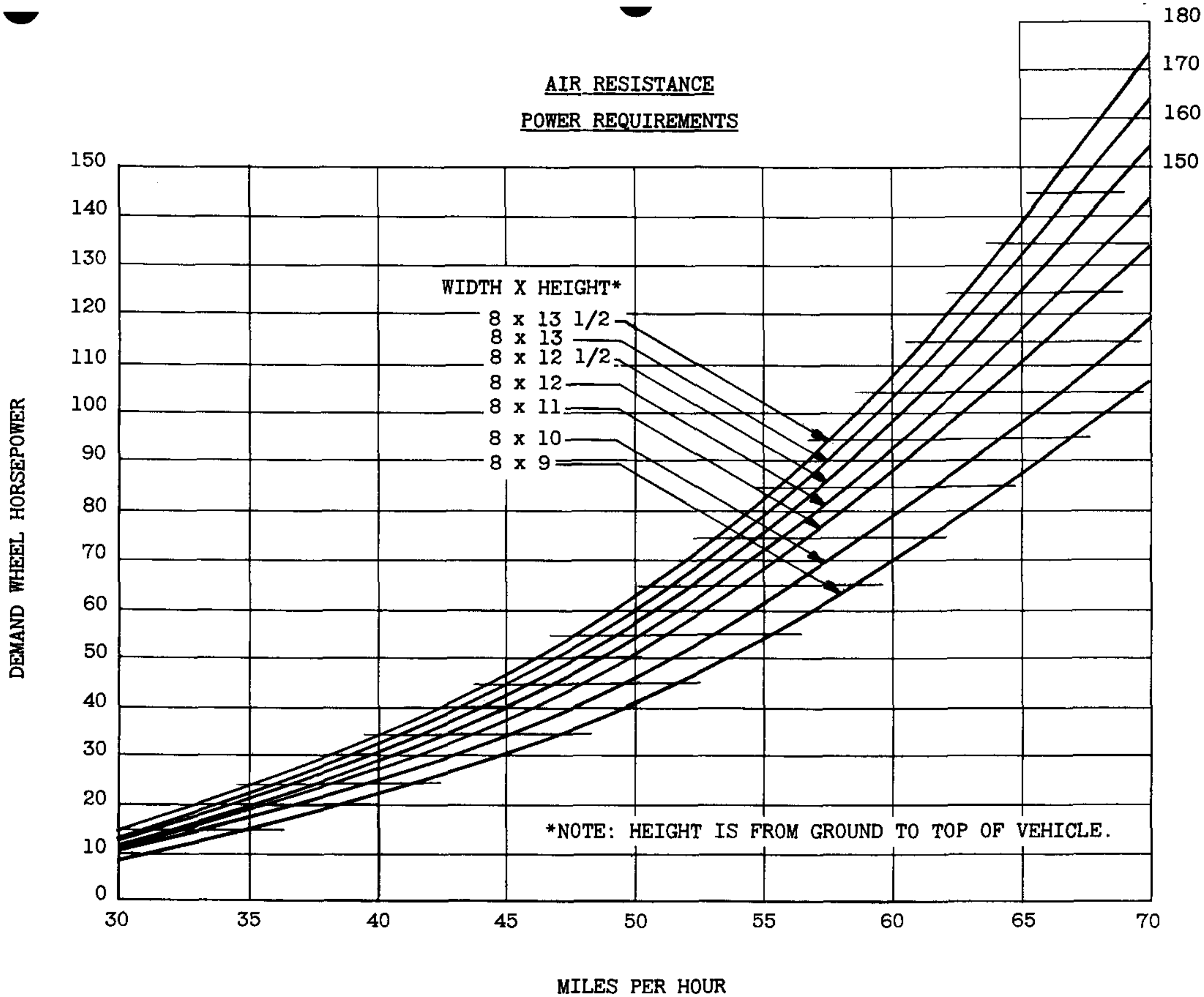


FIGURE 31
AIR RESISTANCE HORSEPOWER CHART

GRADE RESISTANCE & GRADEABILITY

The grade resistance is the force resulting from the weight of the vehicle acting on the grade. Assuming the road surface to remain constant, the grade resistance may be considered as increased rolling resistance. Wheel horsepower in excess of that required to overcome the rolling resistance and the air resistance will be available for acceleration or gradeability. The measure of gradeability is the grade in percent (feet of vertical rise per 100 feet of horizontal distance) that the vehicle can negotiate at a sustained road speed.

FIRST GEAR GRADEABILITY — or the ability of the vehicle to start from a dead stop on a given grade — is also an important factor in the overall gradeability of the vehicle. A highway vehicle will seldom operate on a grade in excess of 10%; however, to start the load in motion on a 10% grade requires more power than sustained motion on the same grade. The amount of added power to start the load may be expressed as additional gradeability. Experience has shown that an additional 5% in gradeability over and above the steepest expected starting grade is sufficient to start the vehicle. Petroleum and similar bulk commodity haulers should have a minimum of 15% first gear gradeability; however, the general freight operation can normally operate satisfactorily with between 12 to 15% first gear gradeability.

The power requirements for a 15% grade is shown on all of the V.P.R. curves for determination of first gear gradeability. If the plot of available wheel horsepower in first gear falls to the left of the 15% grade line on the V.P.R. curve or slightly to the right in the case of a general freight operation, first gear gradeability can be considered to be satisfactory. The available wheel horsepower in first gear as plotted on the V.P.R. curve represents minimum first gear gradeability. While this method is a generalization, it has been proven through experience to give satisfactory results.

Those who wish to determine maximum first gear gradeability may compute it by using the formula shown below:

$$\text{Maximum Gradeability \%} = \frac{\text{AWHP X 37500}}{\text{GW X MPH}}$$

Where:

AWHP = Available wheel horsepower at peak torque RPM from the wheel horsepower curve.

GW = Gross weight (GVW or GCW)

MPH = Road speed at peak torque RPM from the shift pattern.

USING THE TRUCK PERFORMANCE WORK SHEET

The truck performance work sheet is used in conjunction with the vehicle shift pattern and the engine wheel horsepower curves to aid in transposing the available wheel horsepower data to the V.P.R. curve. The work sheet (Fig. 32) is arranged in a sequence of seven steps and will become self-explanatory after being used a few times. For clarity, the meaning and purpose of each line is defined below:

LINE 1 Gross weight is the combined weight of the vehicle and its payload. It may be defined as GVW or GCW depending on the configuration of the vehicle. Where there is a large variation in loads, use the highest average payload plus the vehicle weight. Performance with maximum GCW should be determined for the vehicle as specified for the highest average GCW: thus this performance will be known. If it is not acceptable, a higher average GCW can be considered for determining the specification.

LINE 2 Desired road speed is the highest expected cruising speed on a level highway.

LINE 3 Width and height of truck or tractor trailer combination. **Do not** subtract ground clearance from height — this has already been allowed for in the data used in computing the demand wheel horsepower.

LINE 4 From the proper vehicle power requirement curve based on the specified gross load and frontal area, read the demand wheel horsepower at zero percent grade and the desired road speed. Write this figure on Line 4.

LINE 5 Refer to the drive line efficiency chart on the work sheet and use the efficiency figure that corresponds with the vehicle's driveline or with the anticipated driveline of a new vehicle.

LINE 6 From the wheel horsepower curves select an engine which develops the required WHP (Line 4). Be sure to use WHP for the correct driveline.

NOTE: The figure on Line 6 should equal or exceed the figure on Line 4.

LINE 7 From the shift pattern determine the average engine RPM at the low point of the shifts. From the wheel horsepower curve determine the WHP available at this RPM and enter this figure on Line 7.

NOTE: If the shift point (the bottom of the sawtooth) varies more than 150 RPM, the WHP for each shift point should be determined.

A shift pattern in terms of available wheel horsepower may now be drawn on the V.P.R. curve showing vehicle gradeability in each gear.

EXAMPLE:

Assume we have been asked to determine the correct engine to power a tractor hauling 70,000 maximum GCW and 64,000 average GCW with an 8 ft. wide by 13 ft. high trailer. Desired road speed 50-55 MPH. The customer has requested a 10 speed transmission (10th gear direct) and tandem drive axles with 10.00 x 20 tires. With the above information, we can pick out the correct power requirement curves, 70,000 lbs. GCW and 8 ft. by 13 ft. frontal area.

TRUCK PERFORMANCE WORK SHEET

1. Gross Weight (GCW or GVW) ____________
2. Desired Road Speed ____________
3. Truck or Tractor/Trailer: Width:________Ft; Height________Ft. ____________
   Note: Height measured from ground up.
4. Demand Wheel Horsepower on Level Road ____________
   (from appropriate curve for Items 1, 2 & 3)
5. Driveline Efficiency ____________
   (see Driveline Eff. Charts)
6. Wheel Horsepower Available with__________________Engine
   @__________________RPM and__________________Injectors ____________
7. Wheel Horsepower Available at the Average Shift Point ____________

NOTE: *Do Not* write or mark on your master V.P.R. Curves. Make a copy of the appropriate curve for plotting the available wheel horsepower.

DRIVE LINE EFFICIENCY CHART
(TRANSMISSION IN DIRECT)

TRANSMISSION	DRIVING AXLES	EFFICIENCY
4, 5, or 6 Speed	Single	.90
9, 10, 12, or 16 Speed	Single	.88
4, 5, or 6 Speed	Dual	.85
9, 10, 12, or 16 Speed	Dual	.82

NOTE: Reduce the efficiency by 2% if top gear is overdrive.

FIGURE 32

The Demand Wheel Horsepower is read off the vehicle power requirement curve where the 0% grade curve crosses 55 MPH – 190 DWHP.

With a tandem drive axle and a 10 speed transmission, the work sheet indicates a driveline efficiency of .82. What engine will give 190 WHP with an 82% efficiency drive line? An 8V-71N with N-55 injectors will produce 202 WHP at 2100 RPM and for better fuel economy consideration should be given to the same engine at 1950 RPM, 194 WHP. (Figure 21)

Lines 1 through 6 on the "Truck Engine Performance Work Sheet" should now be complete. To complete line 7, a shift pattern will be required.

We have assumed an engine speed of 2100 RPM with the possbiility of operating at 1950 RPM. To select the axle ratios at the two different engine speeds, refer to the "Geared Road Speed Curve" (Fig. 33). From the curve, we find that for 55 MPH at 2100 RPM the 4.56:1 ratio gives 54.8 MPH vehicle speed. At 1950 RPM, there are two choices of available ratios, a 4.33:1 or 4.11:1. The lower

GEARED ROAD SPEED CURVE
10.00 X 20 OR 11.00 X 22.5 TIRES
(504 REV/MILE)

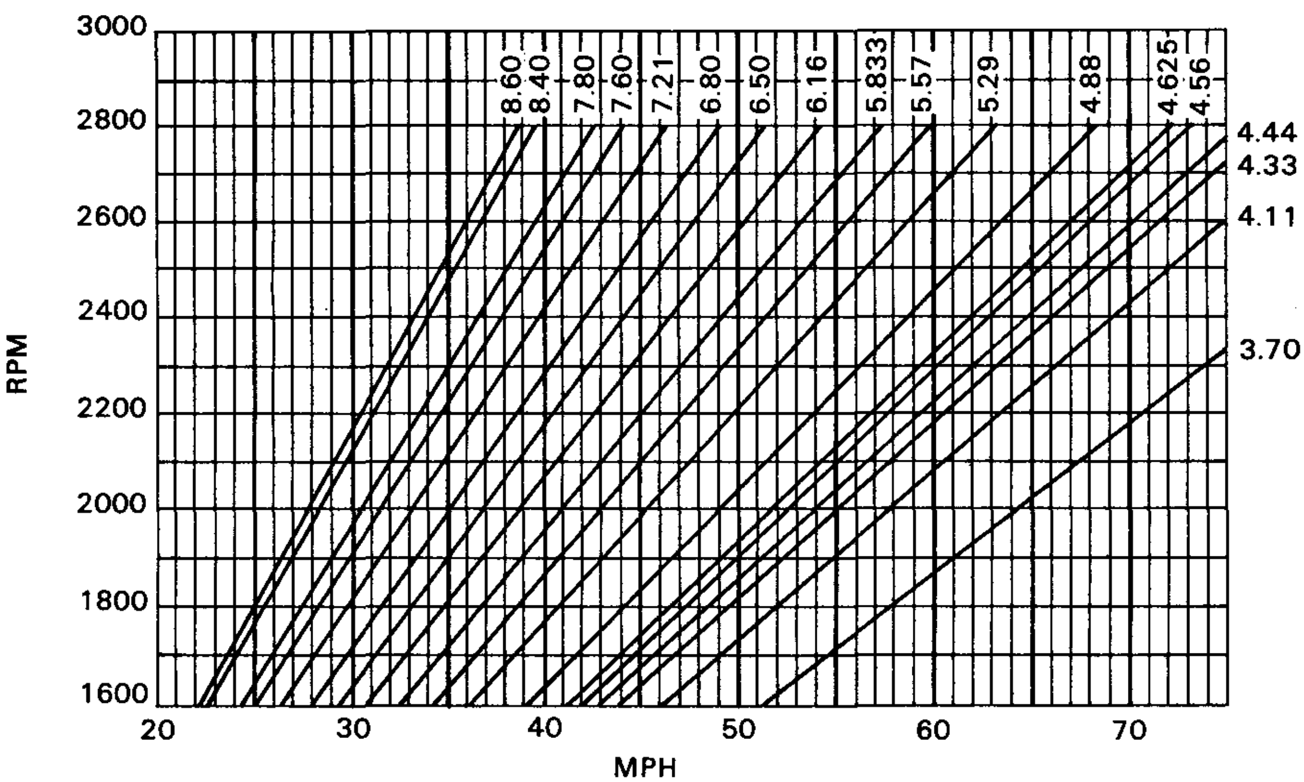


FIGURE 33
GEARED ROAD SPEED CURVE

numerical ratio (4.11:1) could further increase economy but will limit vehicle speed to 55 MPH due to available power. The 4.33:1 ratio will allow maximum power output at 1950 RPM while reducing the vehicle speed to 53.6 MPH. Having selected the two axle ratios (4.11 and 4.33), the shift patterns can be plotted for reference. The RPM at the low point of the shift (bottom of the sawtooth) will determine the WHP available at the split point. With the 4.11 ratio axle, this is 165 WHP at 1525 RPM and with the 4.33 ratio it is 166 WHP at 1550 RPM. At 2100 RPM it is 202 WHP and 174 WHP at the split point (1650 RPM).

This is sufficient information to plot the complete vehicle performance curve for both 2100 RPM and 1950 RPM.

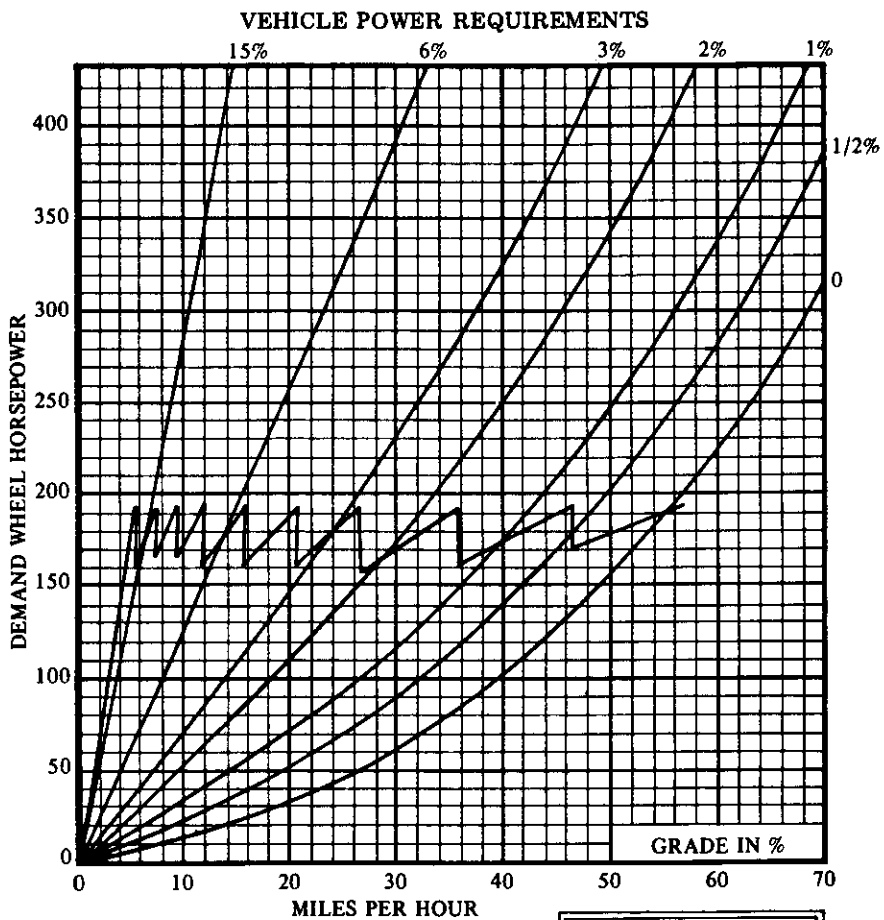
	FIGURE 34	FIGURE 35	FIGURE 36
Gov. Engine RPM	1950 RPM	1950 RPM	2100 RPM
WHP Available	194 WHP	194 WHP	202 WHP
Low Point of Shift RPM	1550 RPM	1525 RPM	1650 RPM
WHP Available	166 WHP	165 WHP	174 WHP
Axle Ratio	4.33	4.11	4.11

The vehicle performance will be plotted one at a time on the Vehicle Power Requirement curves, Figures 34, 35 and 36.

1. Draw a horizontal line through the 194 WHP point from zero to 70 MPH, and another horizontal line at the 166 WHP point from zero to 70 MPH.
2. From the shift pattern plot the equivalent MPH points for 1950 RPM on the 194 WHP line.
3. Draw vertical lines through the MPH points joining the 194 WHP line to the 166 WHP line. (Do not draw a vertical line at the highest MPH point).
4. Draw a line from the 0 MPH and 0 WHP to the first MPH point on the 194 WHP line. This represents minimum 1st gear gradeability. Join the remaining points in a sawtooth manner as shown on the example. NOTE: Unlike the construction of a regular shift pattern, the available wheel horsepower plot is drawn by connecting, with a straight line, the power developed at the shift point and at governed speed in the next higher gear. The extension of this line will not pass through the zero MPH and zero RPM point except for 1st gear. The final plot will be similar to the shift pattern except it is in terms of WHP available in any gear. This same procedure was used with respective data for Figures 35 and 36.

From Figure 34 it can be seen the vehicle would have ample power for 70,000 GCW at 53.6 MPH which is the maximum geared speed. With less than 70,000 GCW the speed would not be much more as the engine would be on the governor. Figure 35 (4.11 axle and 1950 RPM) shows the road speed would be 55 MPH for 70,000 GCW as the engine has 190 WHP at 1900 RPM to match the 190 WDHP. With less than 70,000 GCW the road speed would be 56.5 MPH as the governed engine speed is 1950 RPM. Increasing the governed engine speed to 2100 RPM would give better gradeability in the lower gears but the same 55 MPH with 70,000 GCW as shown in Figure 36. With 64,000 GCW and less the vehicle speed would be greater as the maximum governed speed equates to 60.8 MPH.

Thus the 4.11 axle ratio may be more economical if the frequency of maximum GCW is minimal and the average load is a more important consideration.



VEHICLE ______

ENGINE 8V-71

GOV. R.P.M. 1950 INJ. C-55

TRANS. 10 SPEED

AUX. TRANS. NONE

REAR AXLE 4.11

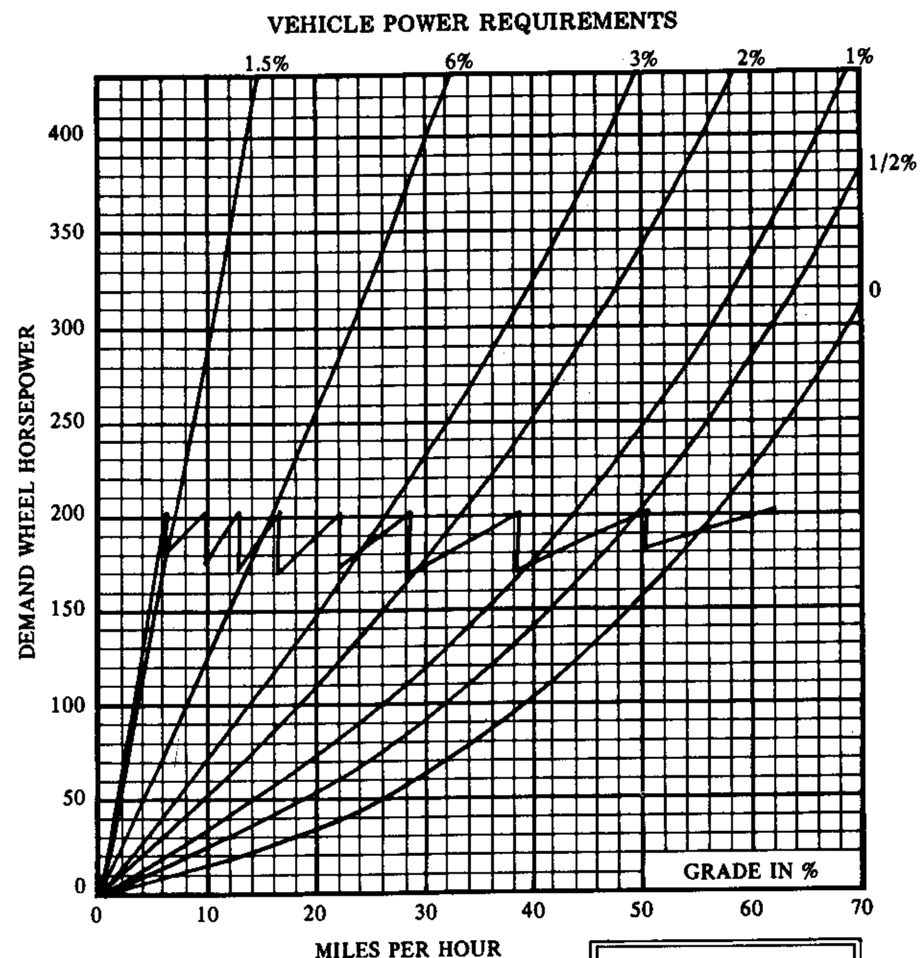
TIRE SIZE 10:00 x 20

TIRE REVS/MILE 504

G.C.W. 70,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ______

FIGURE 34



VEHICLE ______

ENGINE 8V-71

GOV. R.P.M. 2100 INJ. C-55

TRANS. 10 SPEED

AUX. TRANS. NONE

REAR AXLE 4.11:1

TIRE SIZE 10:00 x 20

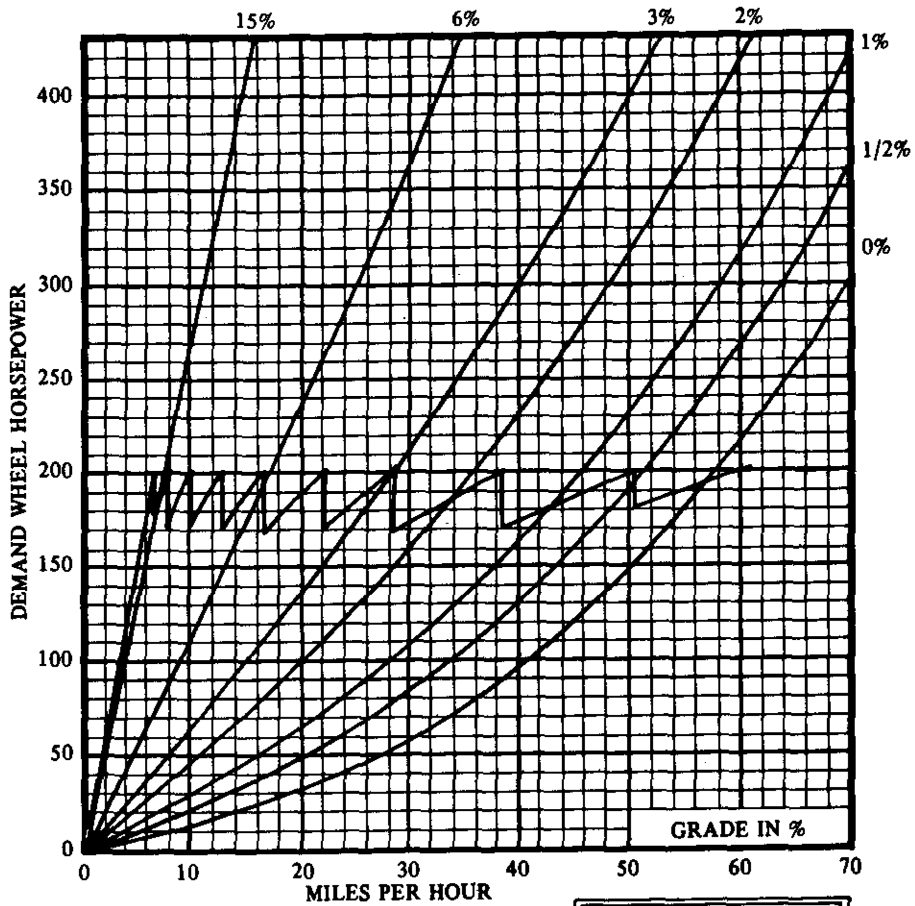
TIRE REVS/MILE 504

G.C.W. 70,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ______

FIGURE 35

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE 8V-71

GOV. R.P.M. 2100 INJ. C-55

TRANS. 10 SPEED

AUX. TRANS. NONE

REAR AXLE 4.11:1

TIRE SIZE 10:00 x 20

TIRE REVS/MILE 504

G.C.W.	70,000 LBS.
HEIGHT	13 FT.
WIDTH	8 FT.

REMARKS ____________

FIGURE 36

ALTITUDE AND ROAD SURFACE CORRECTION

As a vehicle is operated at higher altitudes, the less dense air results in loss of engine power. Also the rarefied air reduces the air resistance and the power required to move the vehicle. If air resistance made up the total power requirement, the vehicle would become more efficient the higher it climbed, since the reduction in air resistance is greater than the loss in engine power. The vehicle does not become more efficient with increasing altitude because the total power requirement also includes the rolling resistance which is not effected by altitude. The combined effect is a vehicle performance loss as the altitude increases because the loss in engine power is greater than the reduction in total vehicle power requirements.

Correction factors have been determined for various altitudes which are applied to the wheel horsepower curves for the various engines. The correction factors were established using the mean air resistance power requirements for normal highway operation and the degree of engine power loss due to altitude. The wheel horsepower curves are based on 500 feet altitude and may be used with sufficient accuracy to predict vehicle performance for altitudes up to 2500 feet. Beyond 2500 feet, multiply the available wheel horsepower by the applicable correction factor shown on the correction factor Work Sheet.

ROAD SURFACE CORRECTION

Since the amount of wheel horsepower required to overcome rolling resistance varies as the surface conditions change, it is sometimes necessary to correct for this change. A rough or tacky road surface offers more resistance than does smooth concrete. The V.P.R. curves are based on a smooth concrete road surface which has a road factor of 1.0. If other road surfaces are encountered, the wheel horsepower to overcome the rolling resistance will be increased resulting in increased vehicle power requirements. A correction factor work sheet has been provided (Fig. 37) to cover this and other common variations in Vehicle Power Requirements.

Correction Factor Work Sheet

I Road Surface Correction

Road Surface	Road Factor
Worn Concrete, Brick, Cold Black Top	1.2
Hot Black Top	1.5
Hard Packed Natural Soil	1.5-2.0
Packed Gravel	2.0
Loose Gravel	7.5
Sand	12.0

Use the following form in conjunction with the truck performance work sheet only when other than good concrete road surface is involved (good concrete has a factor of 1.0).

From V.P.R. Curve (or Line 4 of Work Sheet)	________	DWHP
Subtract Air Res. HP (from Curve, Fig. 33)	________	ARHP
Rolling Resistance HP = DWHP-ARHP	________	RRHP
Corr. RRHP = RRHP X corr. factor	________	CRRHP
Add ARHP (air resist. HP)	________	ARHP
Corr. DWHP = CRRHP + ARHP	________	CDWHP

Note: For Zero grade only.

II Wind Resistance Correction

From V.P.R. Curve (or Line 4 of Work Sheet)	________	DWHP
Subtract Air Res. HP (from Curve, Fig. 27)	________	ARHP
Rolling Resistance HP = DWHP-ARHP	________	RRHP
Add Air Resist. HP @ Effective Air Speed (Curve, Fig. 27)	________	EARHP
Corr. DWHP = RRHP + EARHP	________	CDWHP

III Altitude Correction

Multiply the available wheel horsepower by the applicable correction factor.

Altitude	N.A. Corr. Factor	Turbo Corr. Factor
4000 ft.	.96	–
6000 ft.	.93	.99
8000 ft.	.89	.98
10000 ft.	.85	.97

FIGURE 37

CORRECTION FACTOR WORK SHEET

WIND RESISTANCE

The air resistance horsepower will be affected by the ambient winds because the effective air speed is different from the vehicle speed, except when the wind direction is 90 degrees to the direction of the vehicle travel. The effective air speed may be greater or less than the vehicle speed depending on wind direction. A head wind and a tail wind will result in the maximum and minimum in effective air speed since the result is the sum or difference of the vehicle speed and the wind velocity. A quartering wind will produce an angle of yaw which changes the air resistance coefficient of the vehicle. The result is increased or decreased air resistance, again depending on wind direction and velocity to motion of the vehicle.

The solution of problems involving yaw from a quartering wind is rather complicated and is seldom used for the average highway truck application. Generally the effects of head or tail winds only are considered. The power required, from the appropriate V.P.R. curve, may be corrected for head or tail winds by determining the vehicle rolling resistance and add to this the air resistance at the effective air speed. This is accomplished by using the V.P.R. curve and the air resistance curve (Fig. 31).

The rolling resistance is determined by subtracting the air resistance for the given vehicle configuration at the specific road speed from the total resistance as shown on the V.P.R. curve. Air resistance at the effective air speed added to the rolling resistance will give the total resistance which includes the effect of the specific wind condition. A step by step procedure is shown on the correction factor work sheet.

PROGRESSIVE SHIFTING

Progressive shifting is a method of accelerating a vehicle or driving procedure which uses only the power required to do the job. It is apparent from any of the V.P.R. curves that the power requirements at low vehicle speeds are considerably less than that available from the engine. Thus, it is not necessary to run the engine up to governed speed in the lower gears to achieve acceptable vehicle performance. With the progressive shifting method, the vehicle is started and accelerated in 1st. gear until engine speed is approximately 200 to 300 RPM above idle speed. At this point, the shift to second gear is made and the vehicle accelerated until the engine speed is 400 to 500 RPM above idle speed. The shifts to 3rd., 4th. and so on, at a progressively higher engine speed. This sequence is followed until the vehicle speed is approximately 35 to 40 MPH. From this point upward in vehicle speed, the engine should be accelerated to or nearly to governed speed before up shifting to the next gear. During this process, the throttle is depressed gently, particularly when the engine is operating below the torque peak. Fig. 38 shows the comparison of the progressive shift pattern and the shift pattern resulting from going to governed speed in each gear before up-shifting.

This method is simple and effective and will reduce driveline shock loading, improve tire life and can improve fuel consumption. Another benefit, and perhaps the most important, is that of public acceptance by reducing engine and vehicle noise particularly in heavily populated areas. Many drivers realize after a discussion of this driving method that they have instinctively driven this way for many years. The method is, in effect, the same as that followed when driving a passenger car with a manual transmission and also the sequence an automatic transmission will follow unless the driver overrules it by full throttle operation during acceleration. The aim is to put the vehicle in motion as smoothly as possible without undue wear and tear on the drive train.

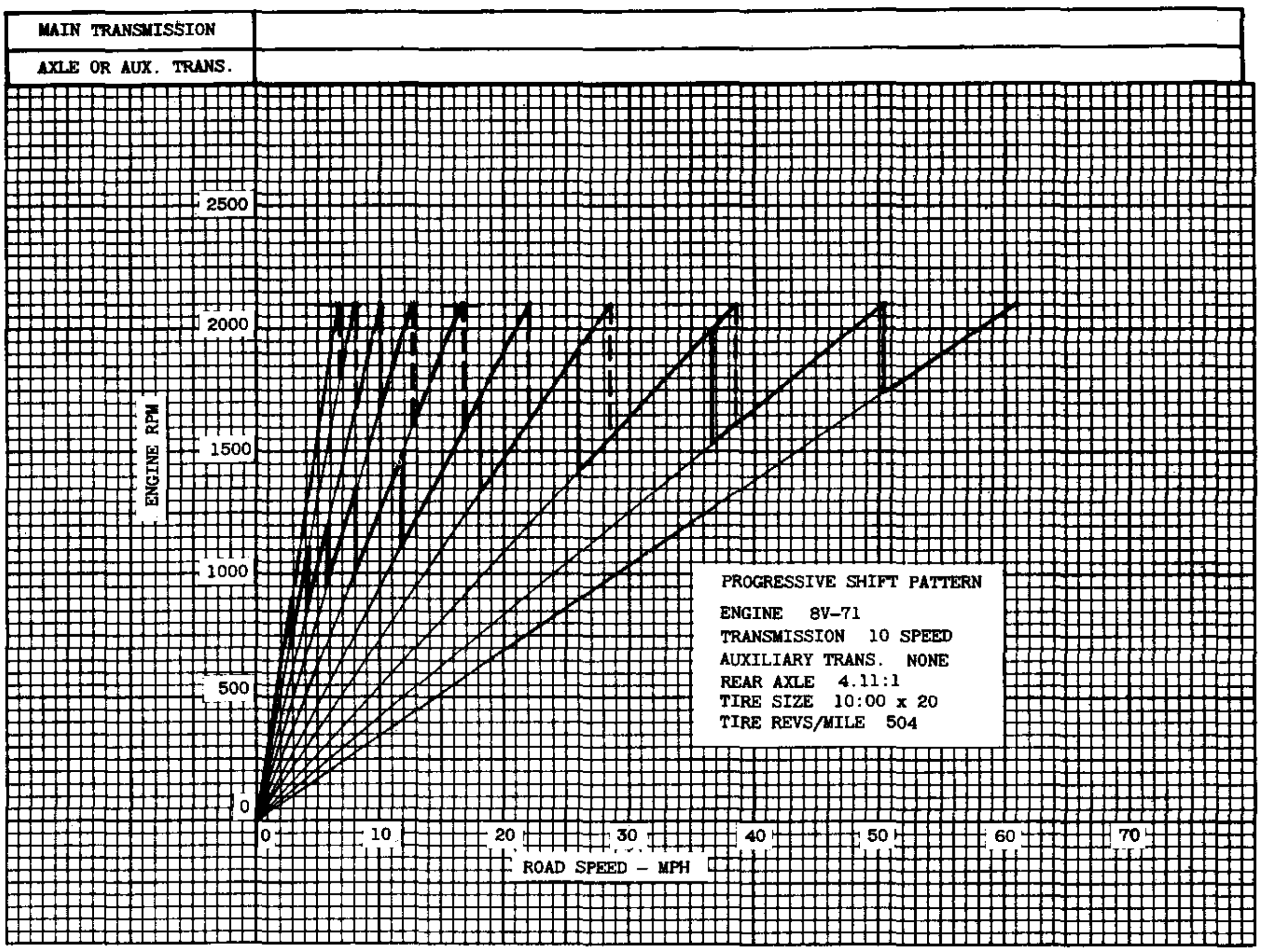


FIGURE 38

PROGRESSIVE SHIFTING vs. GOVERNED-SPEED SHIFTING

FUEL CONSUMPTION AND FUEL CURVES

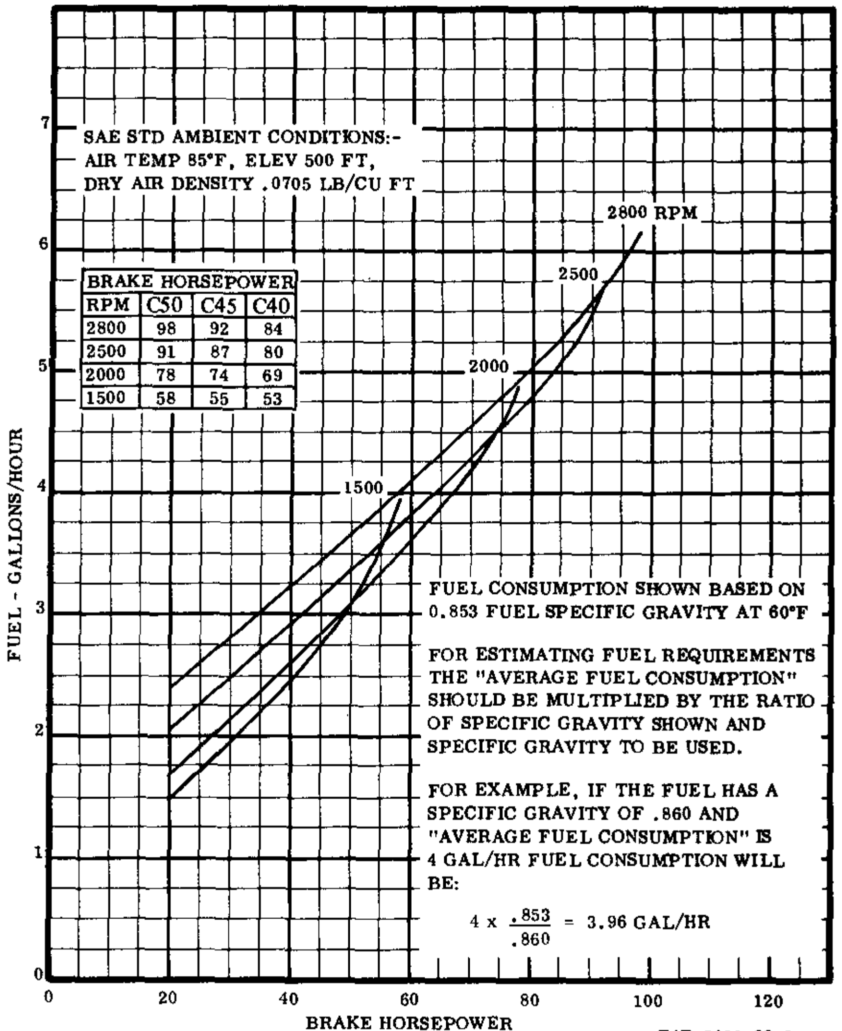
Fuel consumption curves, commonly referred to as "fish hooks" are a plot of specific fuel consumption (pounds of fuel per brake horsepower per hour) vs. power output at various engine speeds. Each curve or hook represents a constant speed (RPM) and varying throttle. A series of average fuel consumption curves have been developed from the characteristic curves (Fig. 39 through 51) by converting the fuel rate from pounds per BHP-hr. to gallons per hour. It is apparent from these curves that at any output (BHP) less than full throttle (the end point of the various curves), the desired horsepower may be developed at several different engine speeds. If 120 BHP is required to operate in a 35 MPH speed zone and the vehicle is powered with an 8V-71N (N-55), it is obvious that sufficient power could be produced at 2100 RPM (See Fig. 46). Also at 1200 to 1400 RPM, more than the required power could be developed. Is there an advantage of operating the engine at the lower speeds under these conditions? The fuel curve (Fig. 46) shows a fuel rate of 7.3 gallons per hour at 2100 RPM for 120 BHP and 6.4 gallons per hour for the same power at 1200 to 1400 RPM. If in the course of a normal truck run, one hour's operation were at 35 MPH in congested or city traffic operating the engine at reduced speed during this time would save nearly a gallon of fuel. While a gallon of fuel may not appear to be significant, it could be considered as an extra 4 or 5 miles per trip (depending on overall average fuel consumption in MPG) for the same quantity of fuel.

In the case of a one way empty operation such as a tanker, the difference in fuel consumption is very significant. If 120 BHP were required for a 50 mile empty return at 50 MPH or one hour's operation at 2100 RPM will result in $\frac{50 \text{ MPH}}{7.3 \text{ gal/hr}} = 6.85 \text{ MPG}$ or

at 1200 to 1400 RPM $\frac{50 \text{ MPH}}{6.4 \text{ gal/hr}} = 7.82 \text{ MPG}$

Overall vehicle road load fuel consumption is affected by many variables and is therefore very difficult to predict. However, it is possible to predict relative differences in fuel consumption as shown in the above examples with reasonable accuracy.

AUTOMOTIVE
3-53 BASIC ENGINE
AVERAGE FUEL CONSUMPTION
ADVANCED CAMSHAFT TIMING



BRAKE HORSEPOWER			
RPM	C50	C45	C40
2800	98	92	84
2500	91	87	80
2000	78	74	69
1500	58	55	53

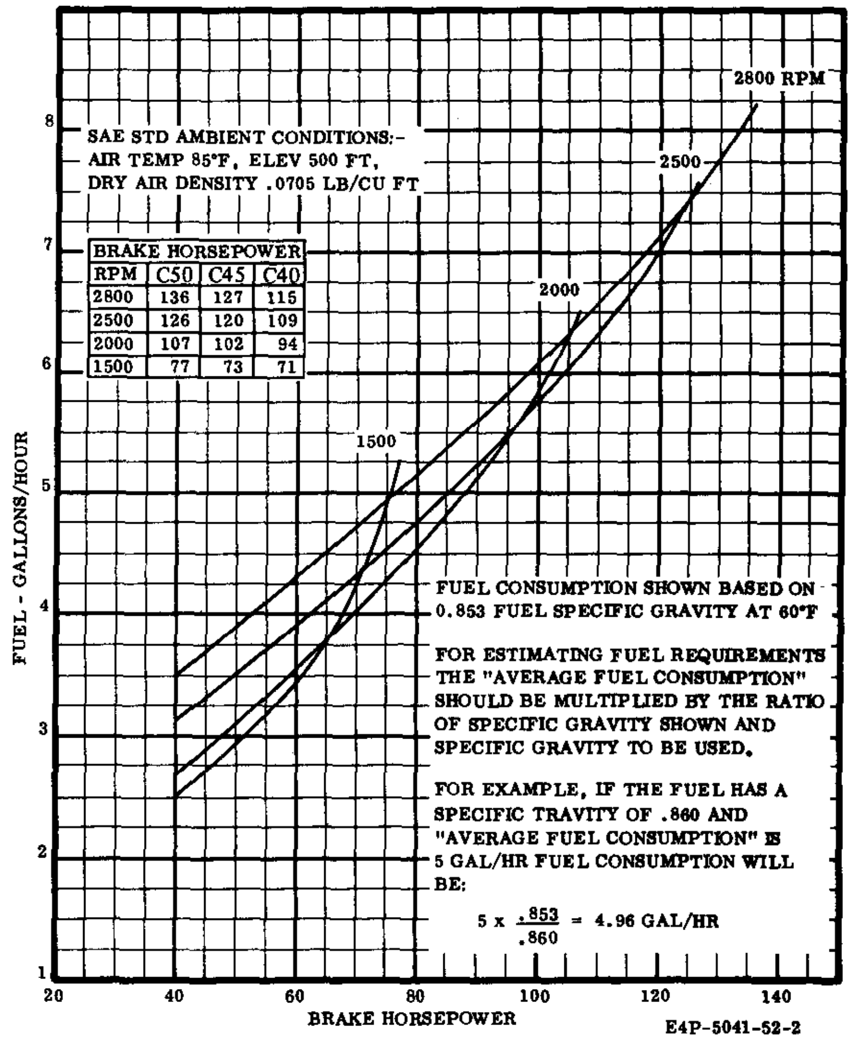
$4 \times \frac{.853}{.860} = 3.96$ GAL/HR

E4P-5031-52-2
6-5-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 39

AUTOMOTIVE
4-53 BASIC ENGINE
AVERAGE FUEL CONSUMPTION
ADVANCED CAMSHAFT TIMING



BRAKE HORSEPOWER			
RPM	C50	C45	C40
2800	136	127	115
2500	126	120	109
2000	107	102	94
1500	77	73	71

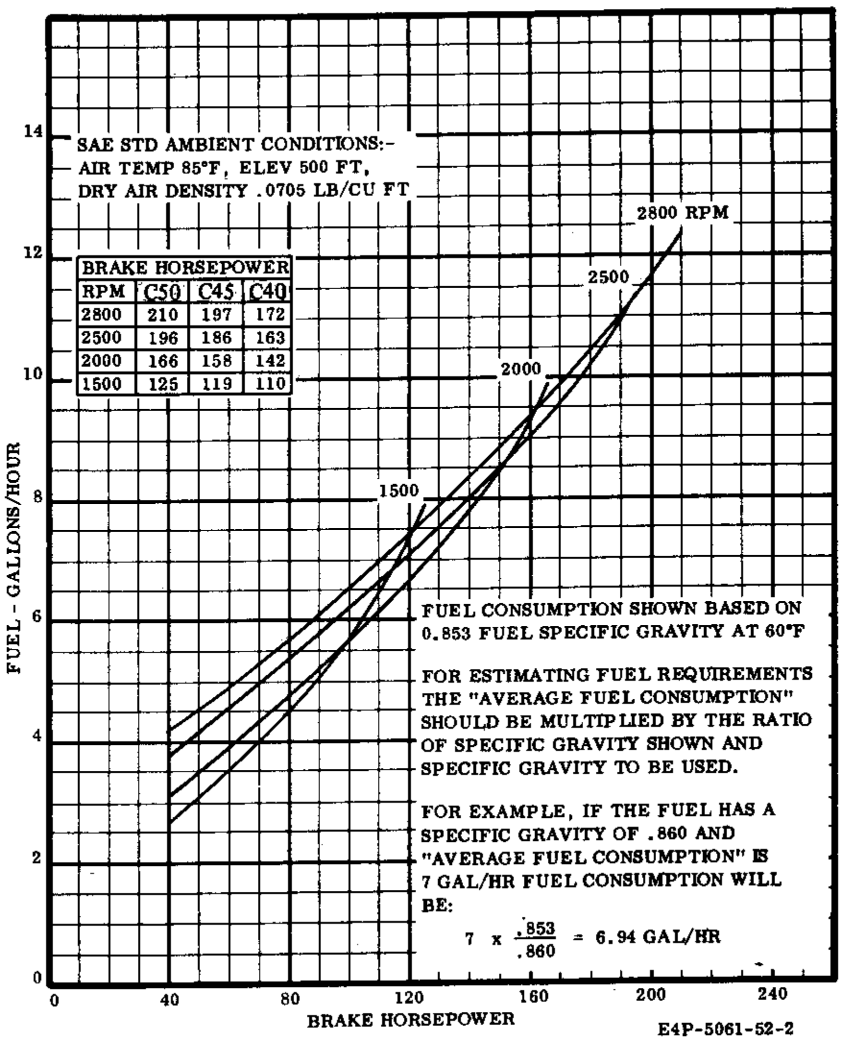
$5 \times \frac{.853}{.860} = 4.96$ GAL/HR

E4P-5041-52-2
6-5-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 40

AUTOMOTIVE
6V-53 BASIC ENGINE
AVERAGE FUEL CONSUMPTION
ADVANCED CAMSHAFT TIMING



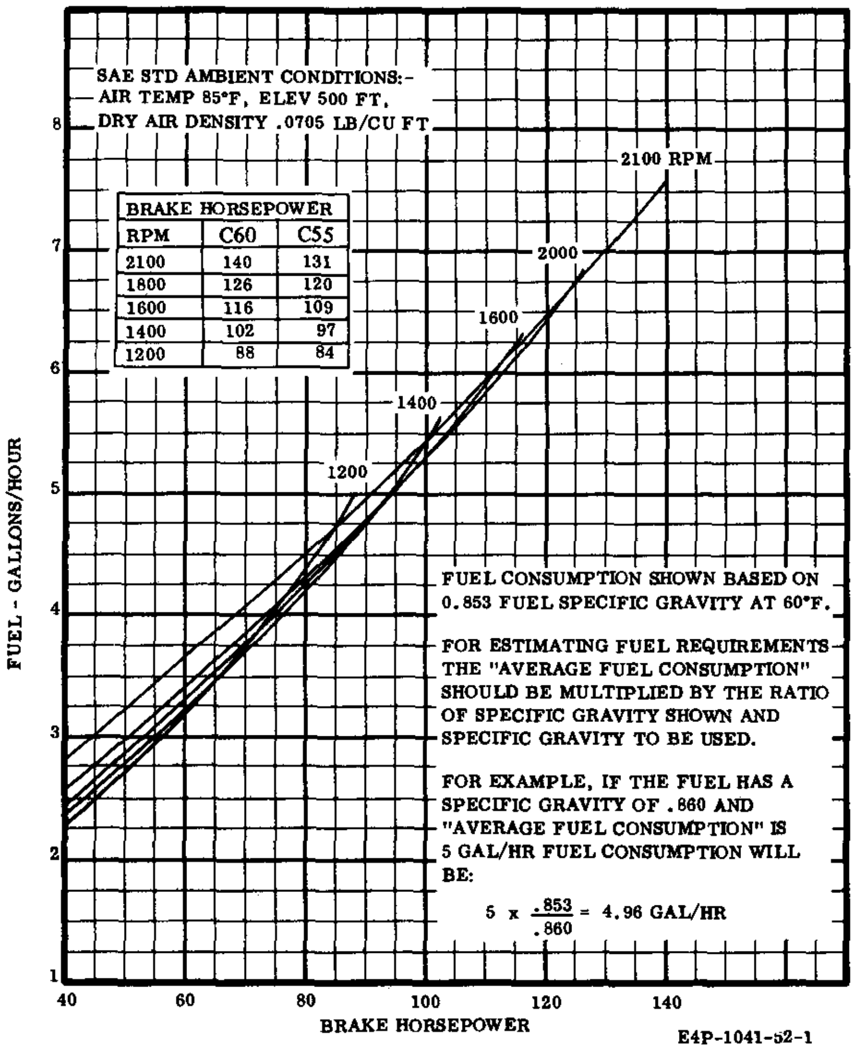
BRAKE HORSEPOWER			
RPM	C50	C45	C40
2800	210	197	172
2500	196	186	163
2000	166	158	142
1500	125	119	110

E4P-5061-52-2
6-5-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 41

4-71 BASIC ENGINE
AVERAGE FUEL CONSUMPTION



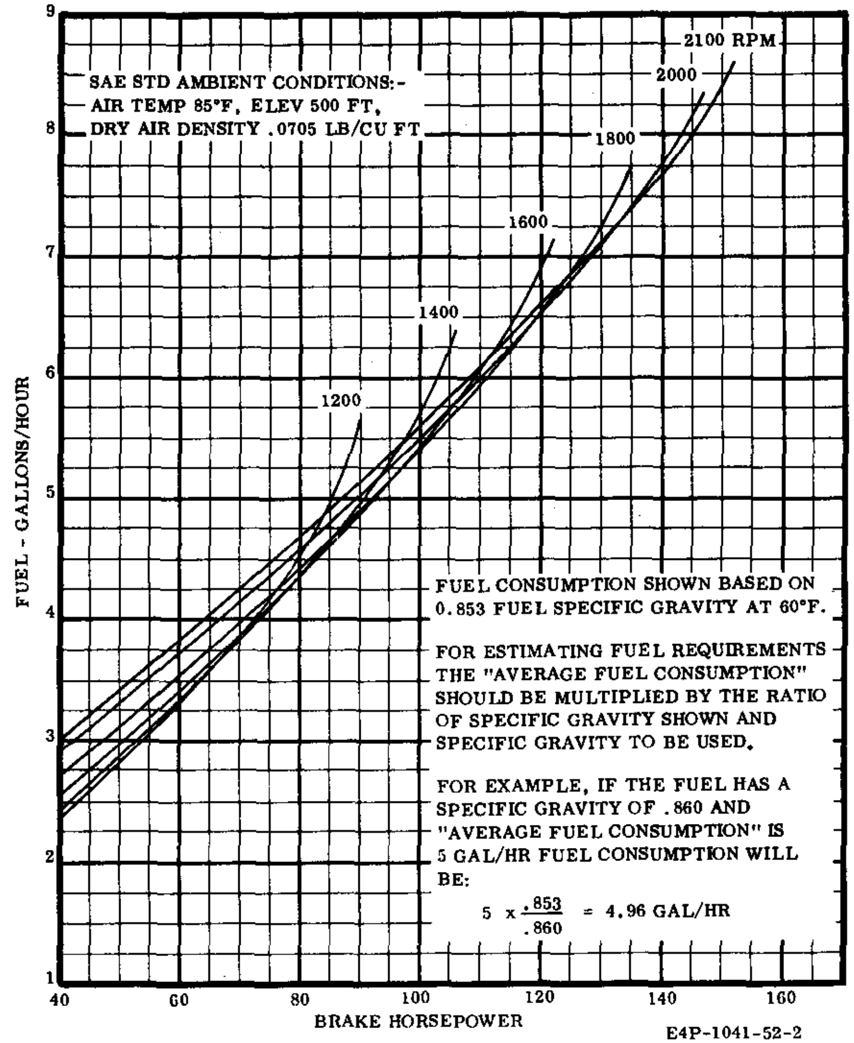
BRAKE HORSEPOWER		
RPM	C60	C55
2100	140	131
1800	126	120
1600	116	109
1400	102	97
1200	88	84

E4P-1041-52-1
Rev. 6-7-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 42

4-71 BASIC ENGINE
AVERAGE FUEL CONSUMPTION
C65 INJECTORS
ADVANCED CAMSHAFT TIMING

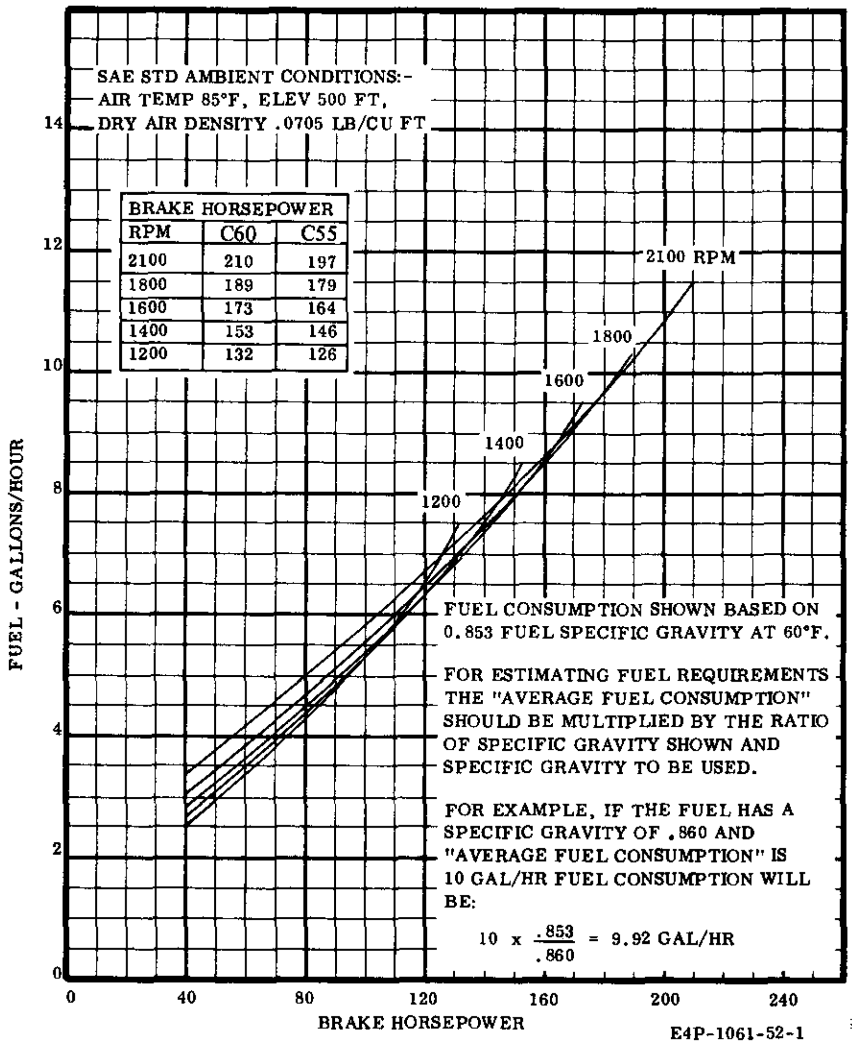


E4P-1041-52-2
6-7-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 43

6-71 AND 6V-71 BASIC ENGINE
AVERAGE FUEL CONSUMPTION

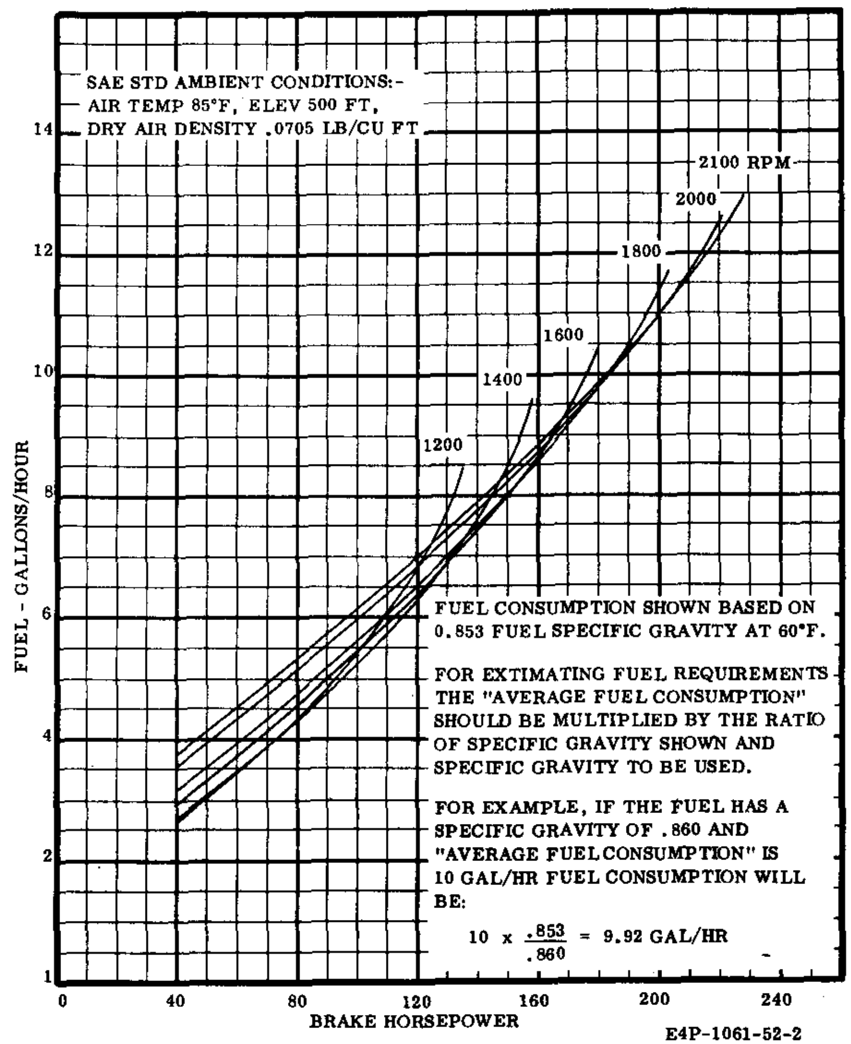


E4P-1061-52-1
Rev. 6-7-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 44

6-71 AND 6V-71 BASIC ENGINE
AVERAGE FUEL CONSUMPTION
C65 INJECTORS
ADVANCED CAMSHAFT TIMING

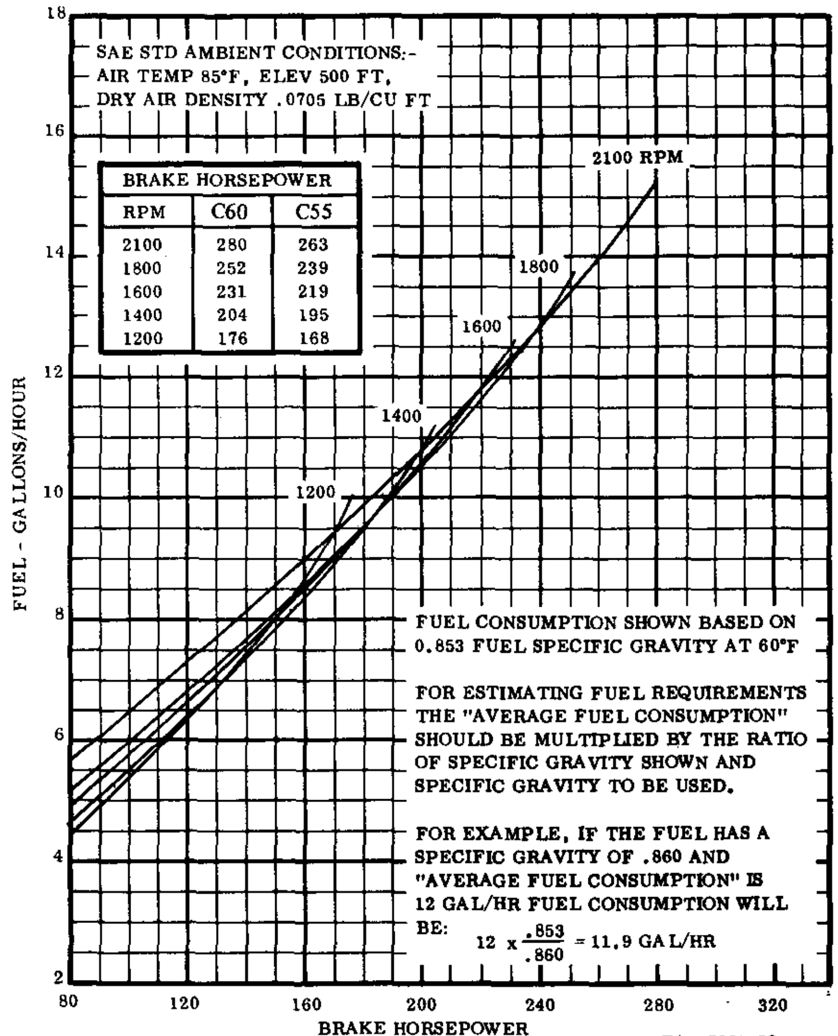


E4P-1061-52-2
6-7-72

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 45

8V-71 BASIC ENGINE
AVERAGE FUEL CONSUMPTION

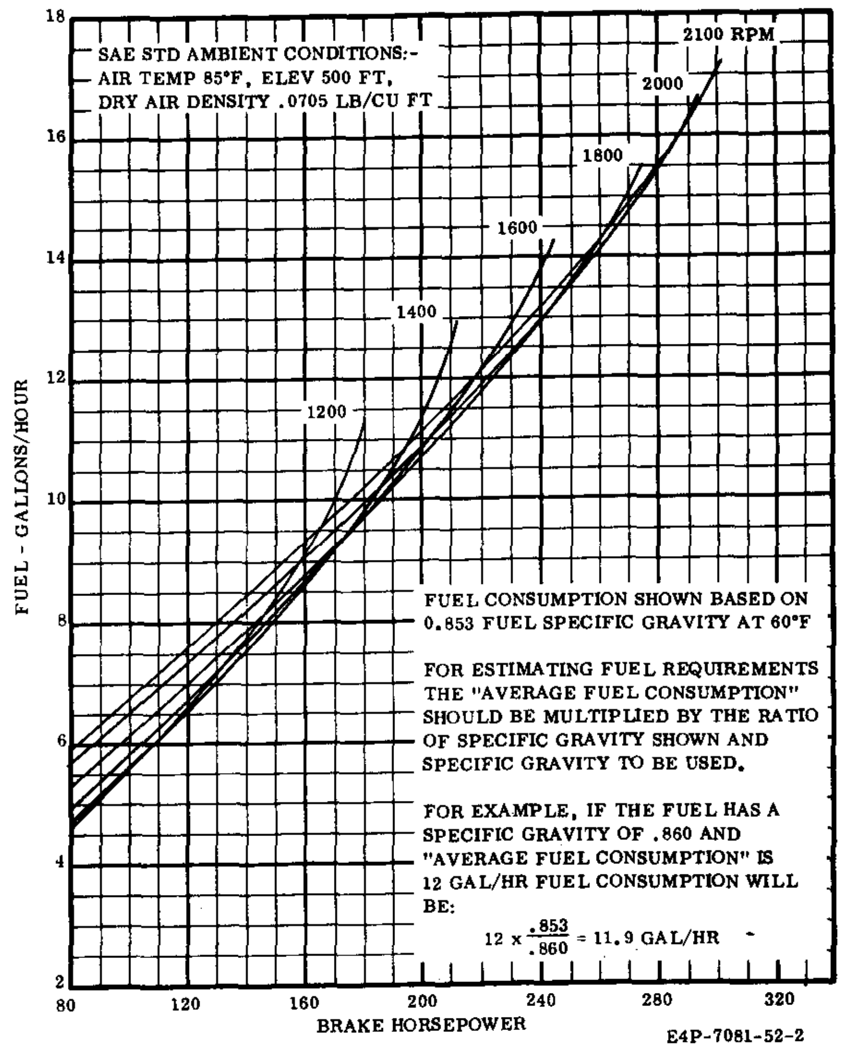


E4P-7081-52-1
Rev. 3-20-70

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 46

8V-71 BASIC ENGINE
AVERAGE FUEL CONSUMPTION
C65 INJECTORS
ADVANCED CAMSHAFT TIMING

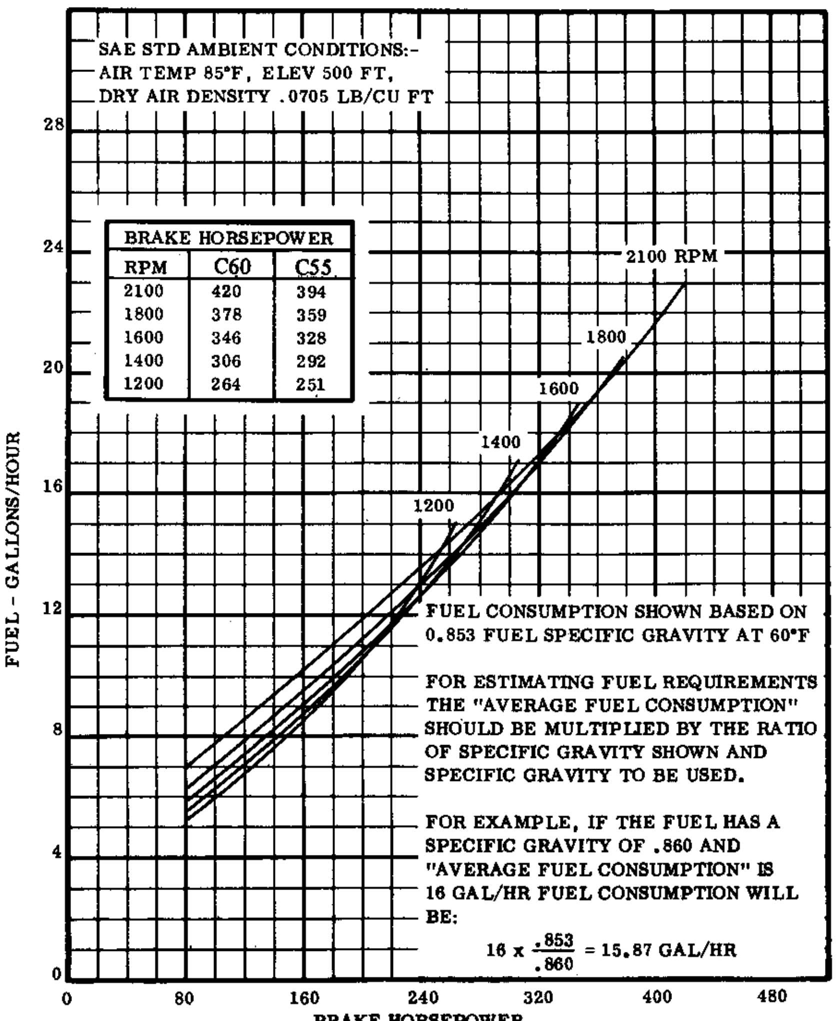


E4P-7081-52-2
3-23-70

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 47

12V-71N BASIC ENGINE
AVERAGE FUEL CONSUMPTION

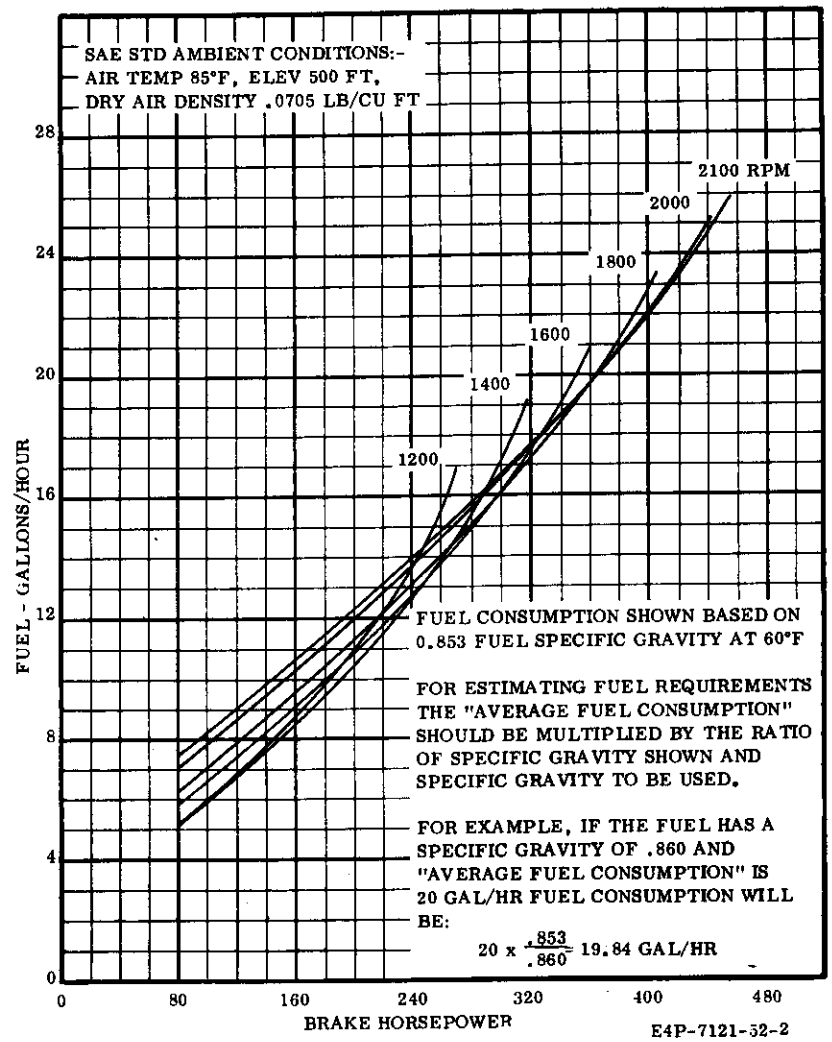


E4P-7121-52-1
Rev. 3-19-70

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 48

12V-71N BASIC ENGINE
AVERAGE FUEL CONSUMPTION
C65 INJECTORS
ADVANCED CAMSHAFT TIMING

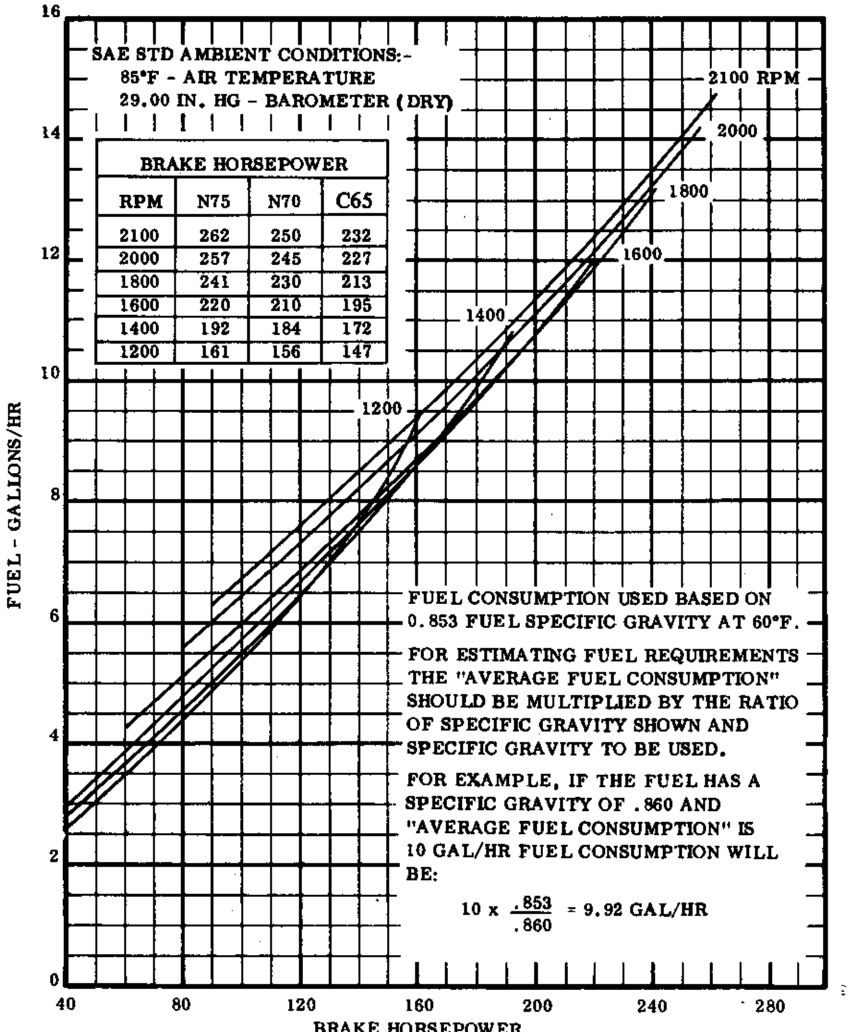


E4P-7121-52-2
3-23-70

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 49

6-71T BASIC ENGINE AVERAGE FUEL CONSUMPTION



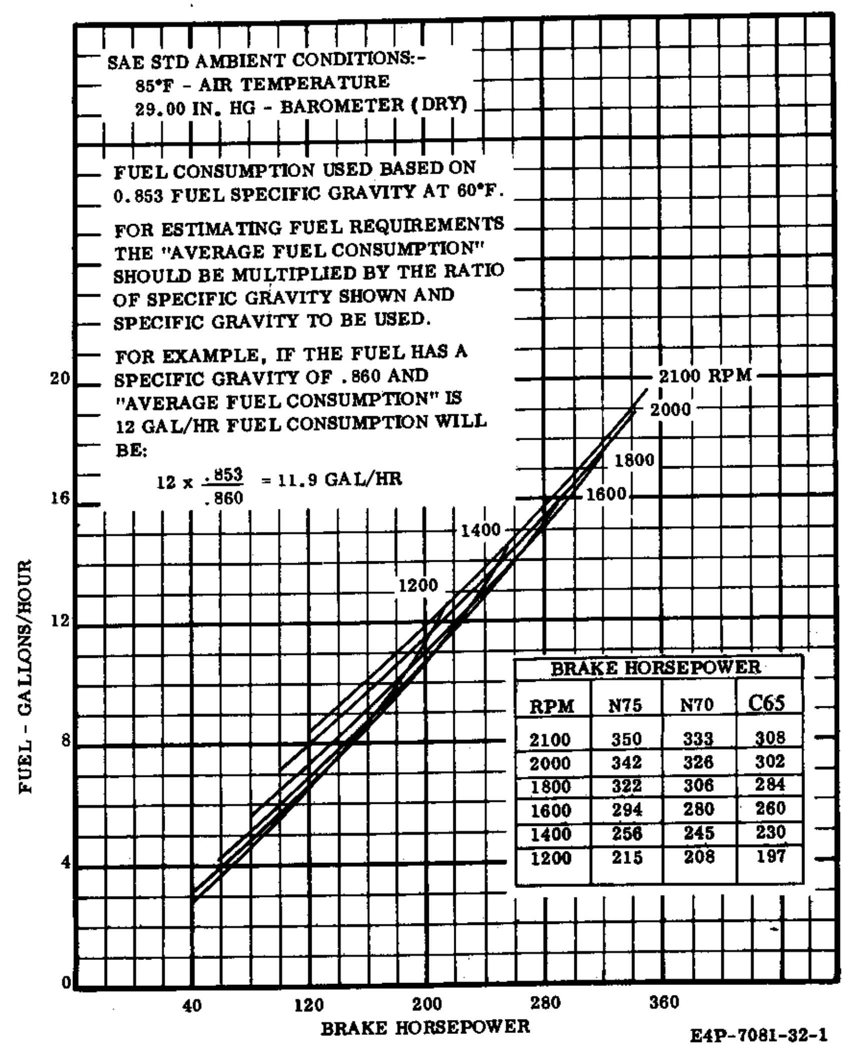
BRAKE HORSEPOWER			
RPM	N75	N70	C65
2100	262	250	232
2000	257	245	227
1800	241	230	213
1600	220	210	195
1400	192	184	172
1200	161	156	147

E4P-1061-32-3
11-4-70

ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 50

8V-71T BASIC ENGINE AVERAGE FUEL CONSUMPTION



BRAKE HORSEPOWER			
RPM	N75	N70	C65
2100	350	333	308
2000	342	326	302
1800	322	306	284
1600	294	280	260
1400	256	245	230
1200	215	208	197

E4P-7081-32-1
Rev. 11-4-70

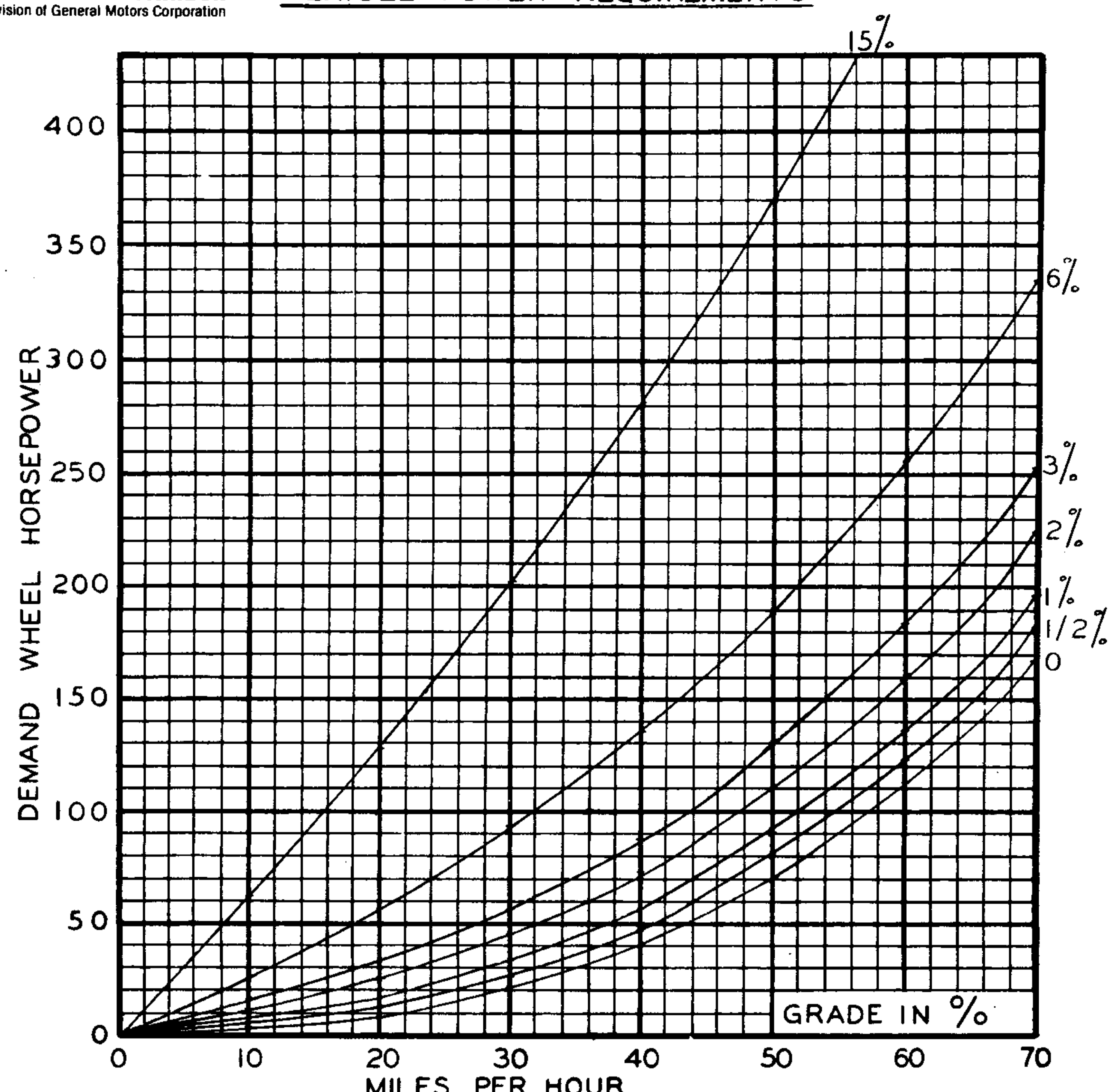
ENGINEERING-TECHNICAL DATA DEPT.

FIGURE 51

[redacted]

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

TIRE REVS/MILE ____________

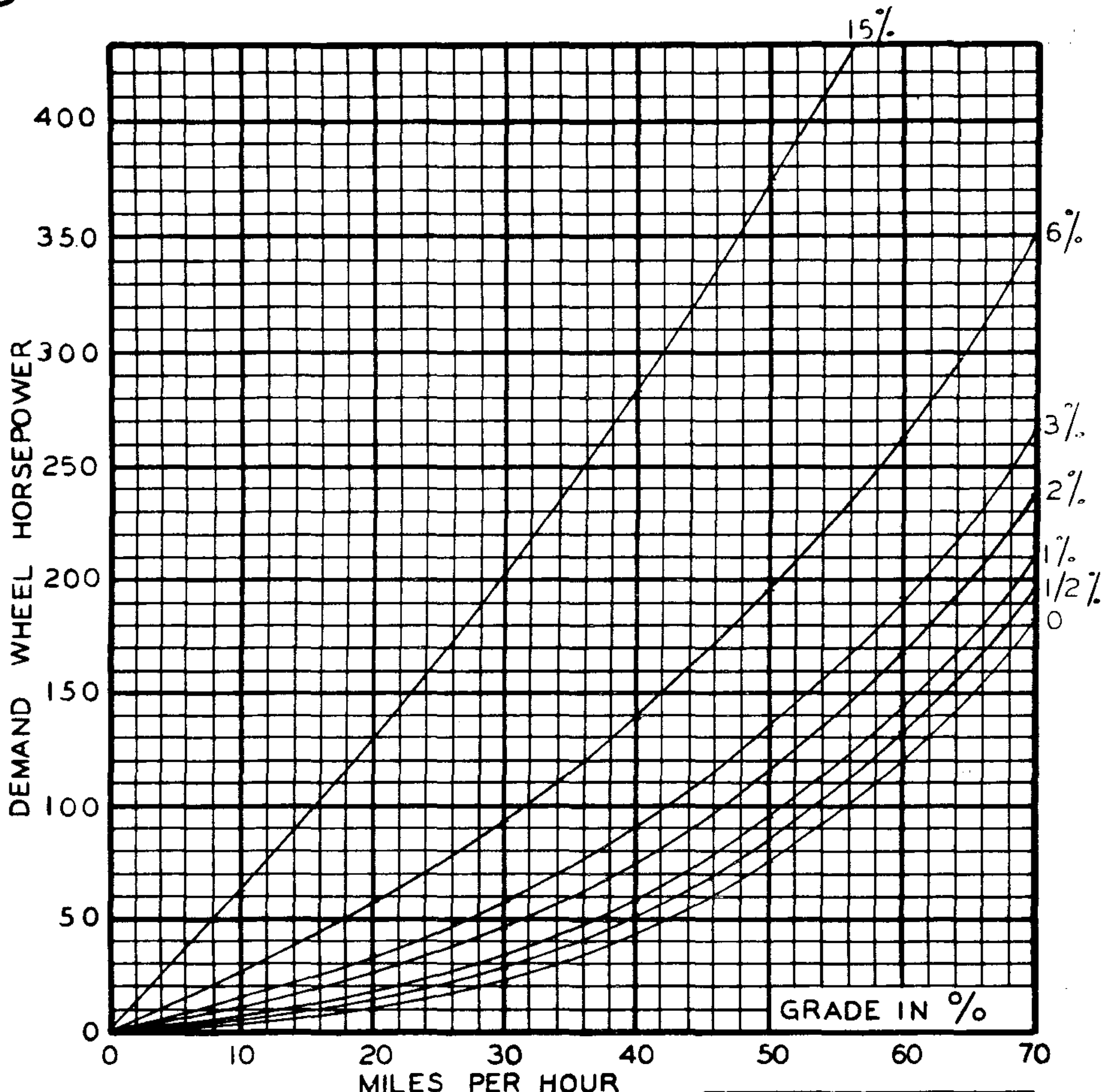
GCW.	15,000 LBS.
HEIGHT	11 FT.
WIDTH	8 FT.

REMARKS ____________

7SA535
R5-0097
1

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 15000	LBS.
HEIGHT 12	FT.
WIDTH 8	FT.

VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

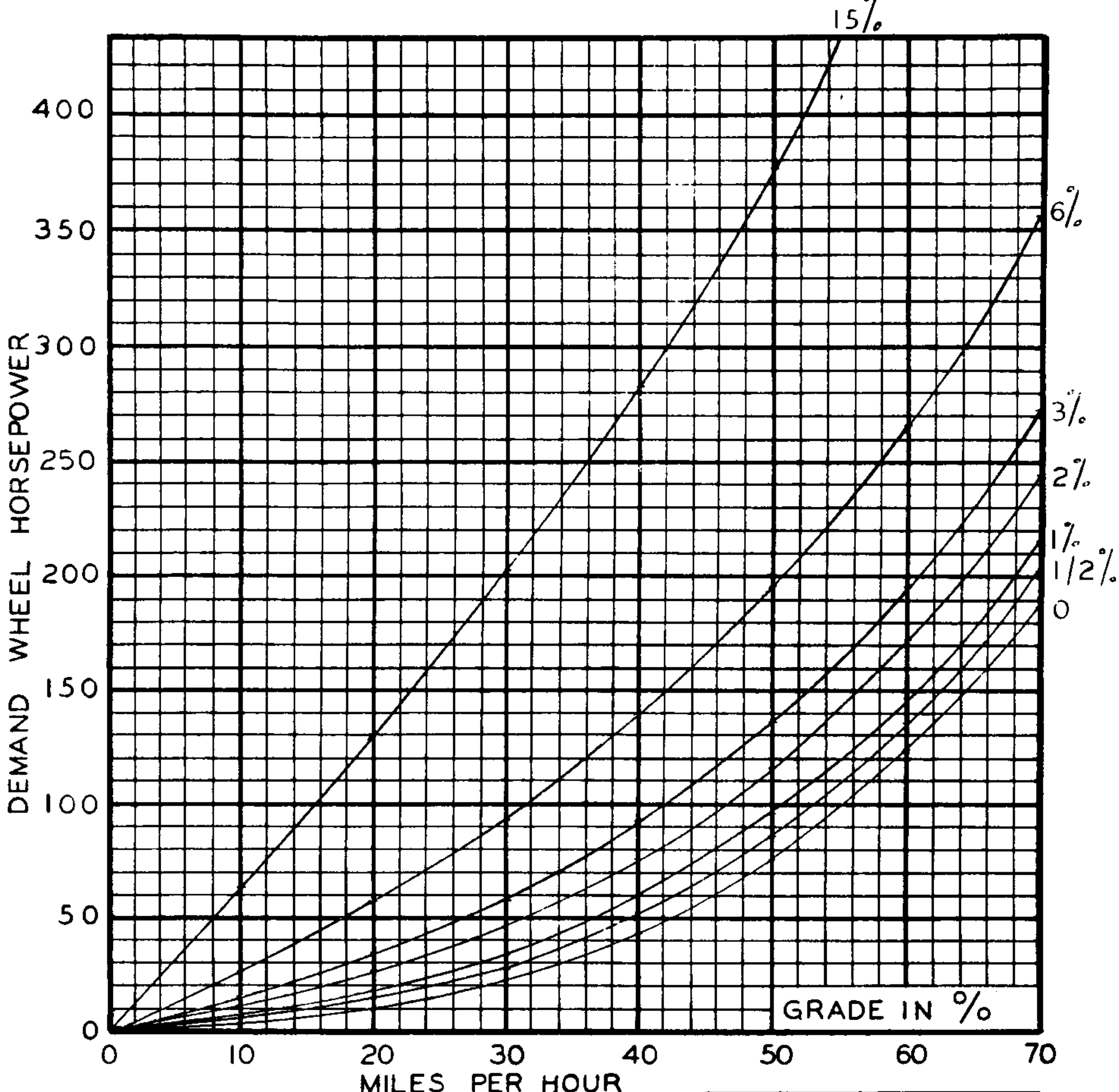
TIRE SIZE ____________________

TIRE REVS/MILE ____________________

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

TIRE REVS/MILE ____________

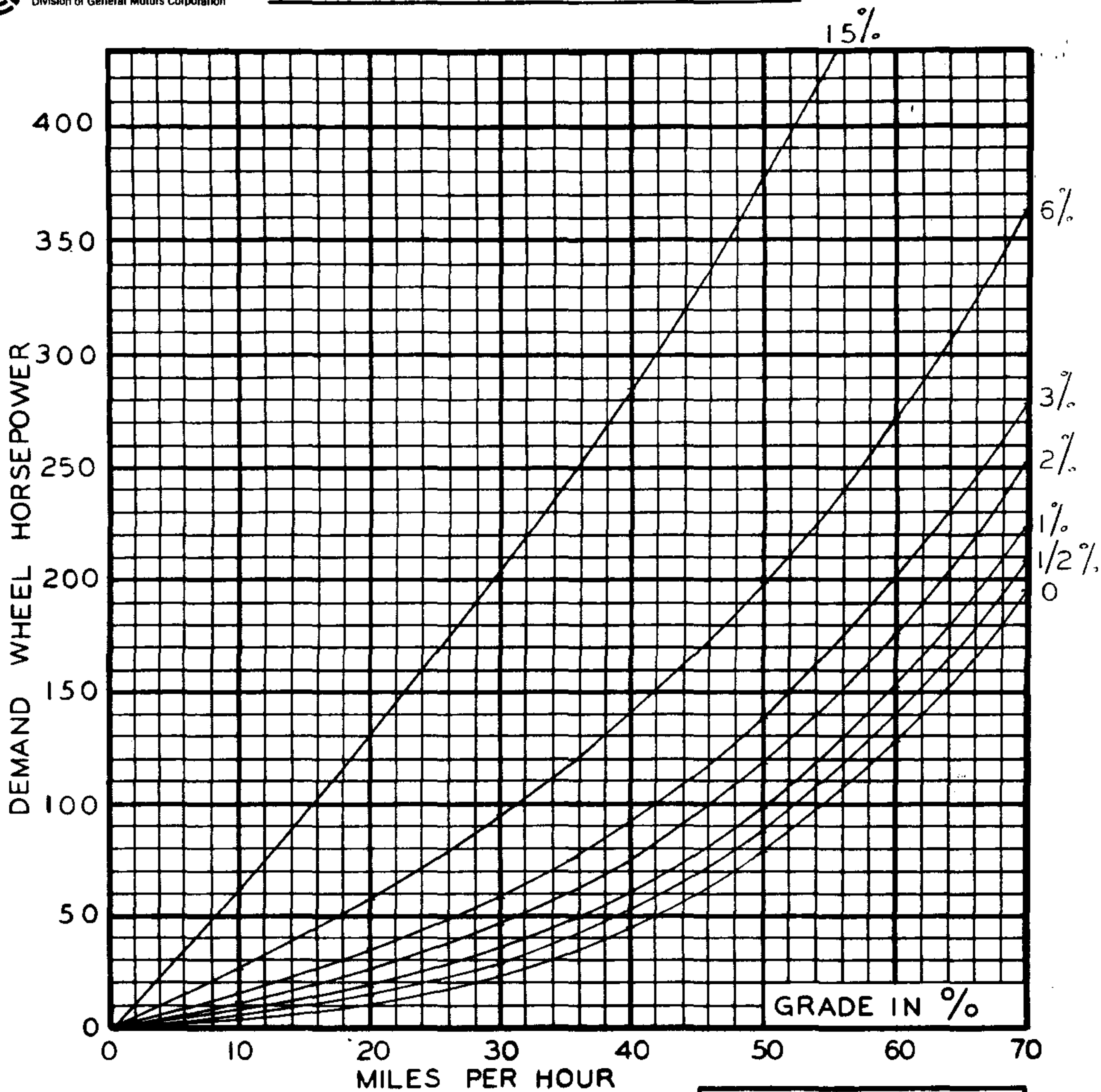
GCW. 15,000 LBS.
HEIGHT 12 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

75A535
R5-0097

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

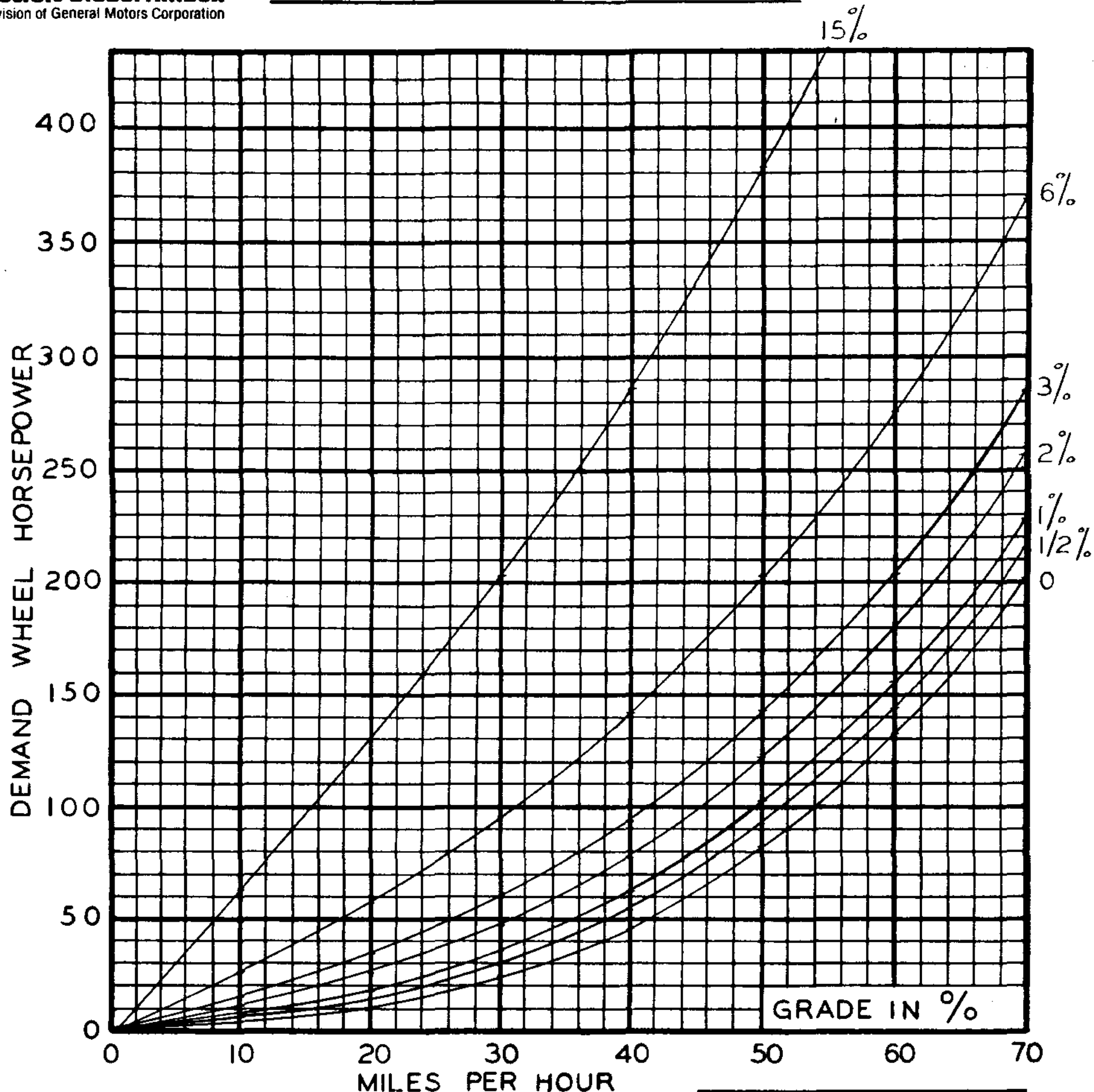
TIRE REVS/MILE ____________

GCW. 15,000	LBS.
HEIGHT 13	FT.
WIDTH 8	FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

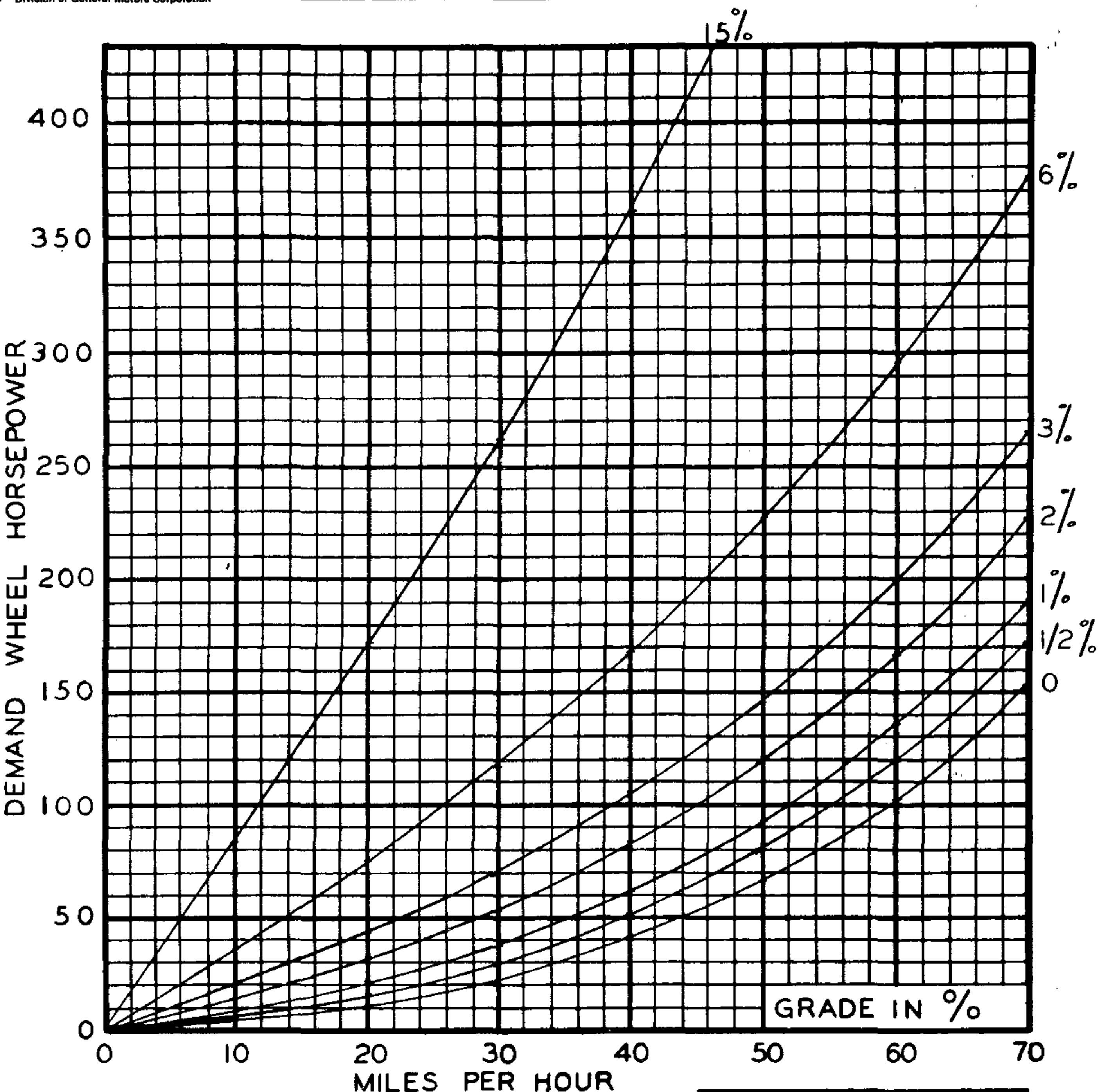
TIRE REVS/MILE ____________

GCW. 15,000 LBS.
HEIGHT 13 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS ____________

REAR AXLE ____________

TIRE SIZE ____________

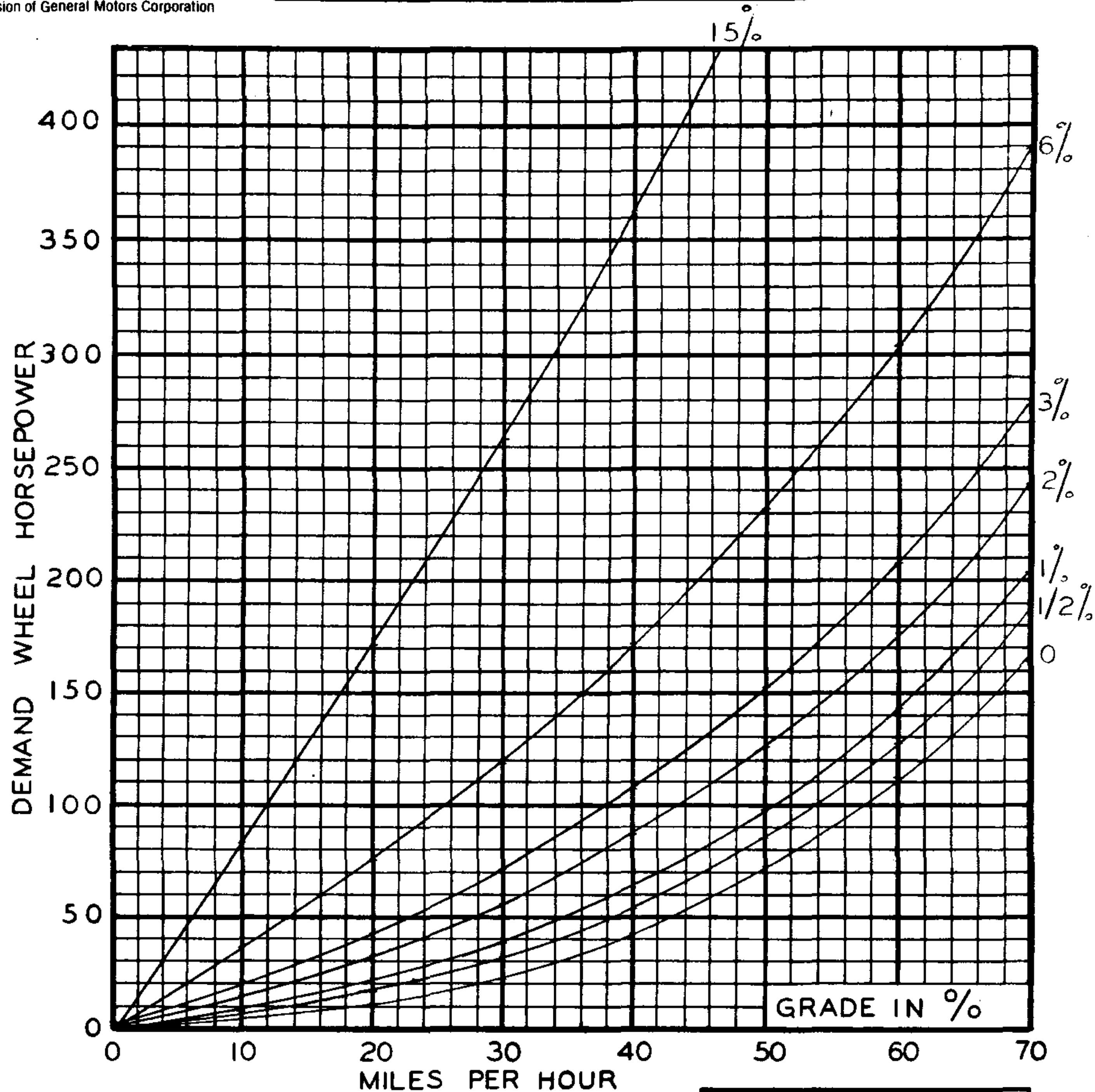
TIRE REVS/MILE ____________

GCW. 20000 LBS.
HEIGHT 9 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	20,000 LBS.
HEIGHT	10 FT.
WIDTH	8 FT.

VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ______ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

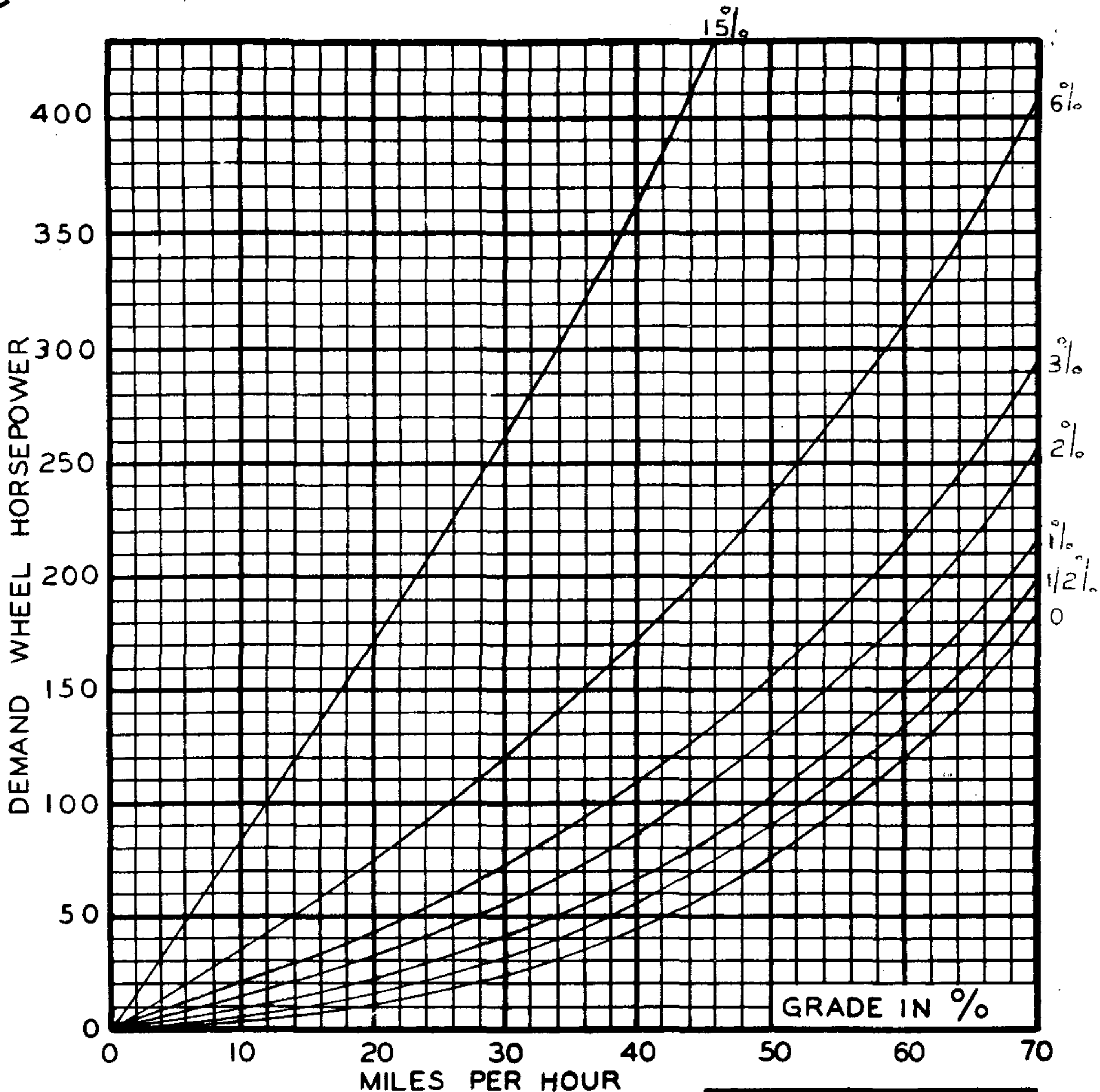
TIRE REVS/MILE ____________________

REMARKS ____________________

7SA535
R5-0097
7

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 20,000 LBS.
HEIGHT 11 FT.
WIDTH 8 FT.

VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

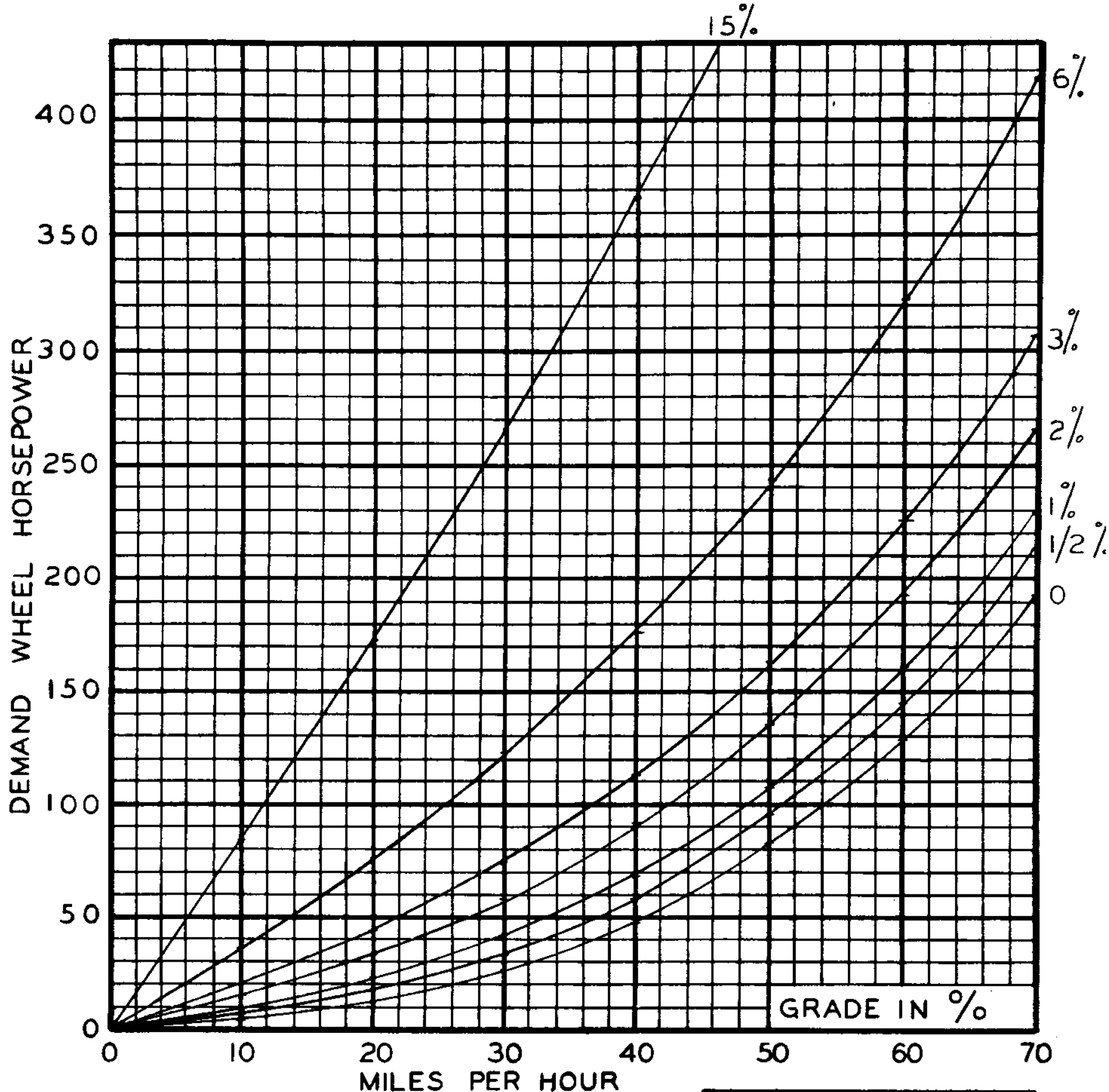
TIRE SIZE ____________

TIRE REVS/MILE ____________

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	20,000 LBS.
HEIGHT	12 FT.
WIDTH	8 FT.

VEHICLE ______________

ENGINE ______________

GOV. R.P.M. ______ INJ. ______

TRANS. ______________

AUX. TRANS. ______________

REAR AXLE ______________

TIRE SIZE ______________

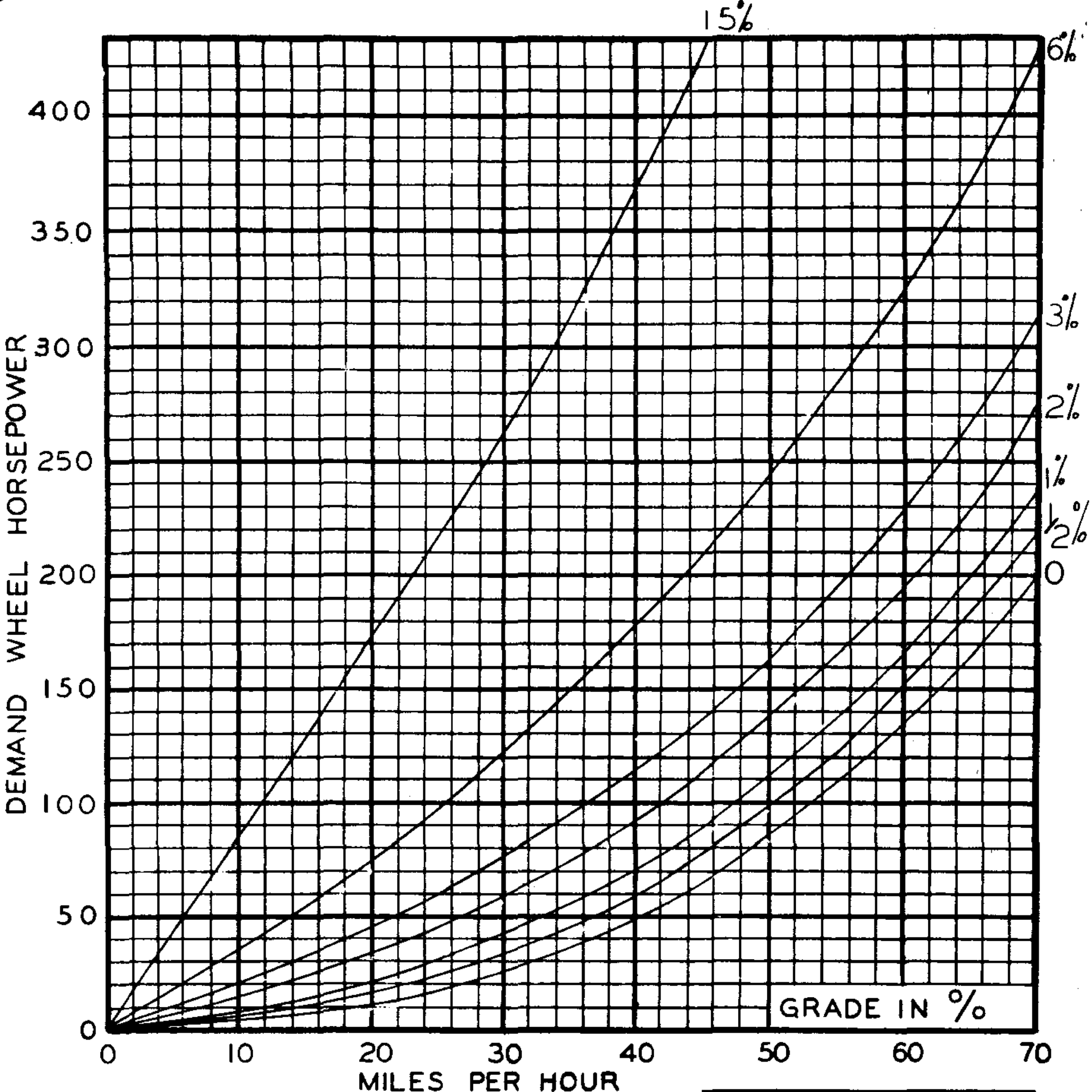
TIRE REVS/MILE ______________

REMARKS ______________

7SA535
R5-0097
a

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

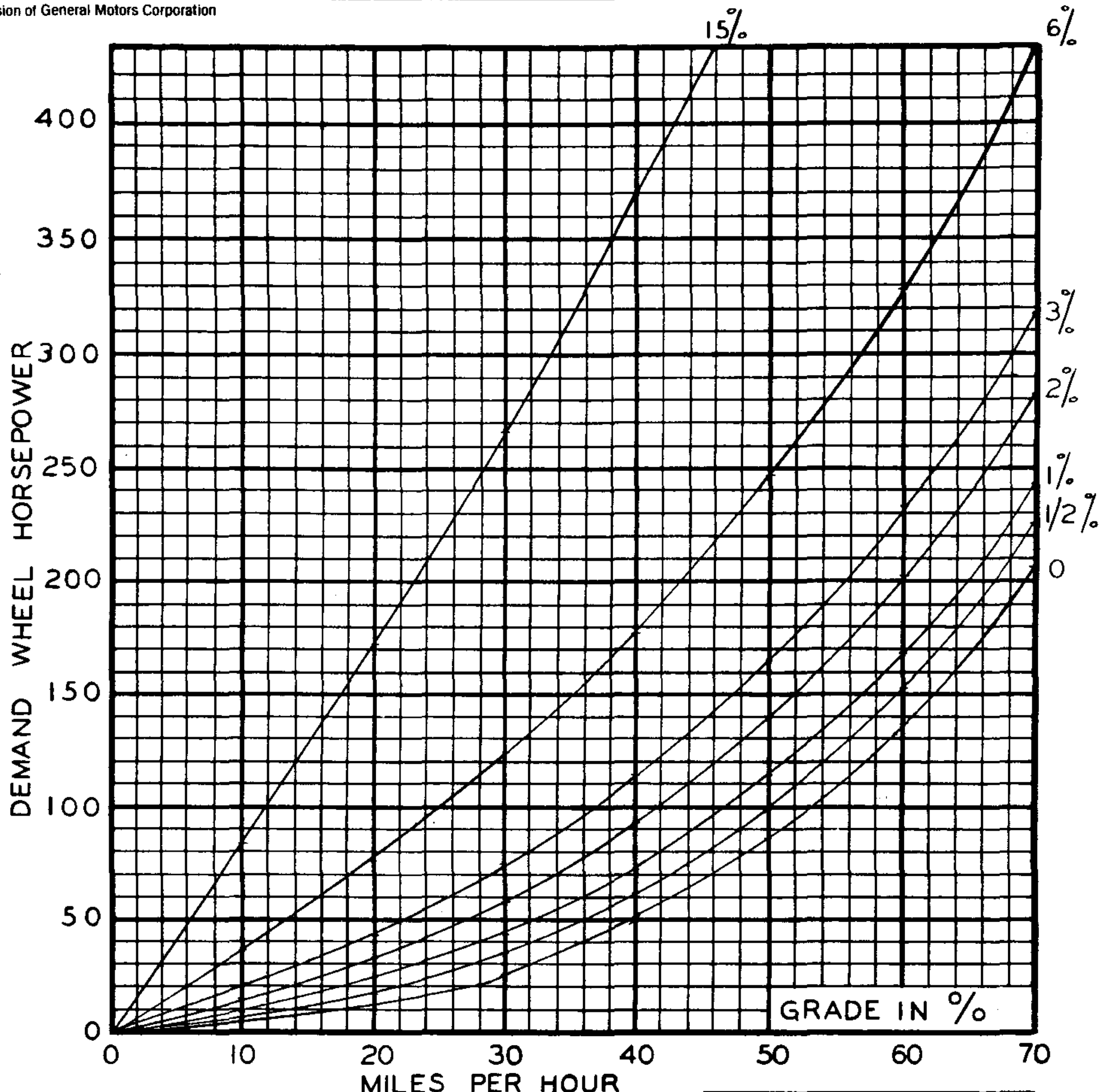
TIRE REVS/MILE ____________

GCW. 20,000 LBS.
HEIGHT 12 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ______

ENGINE ______

GOV. R.P.M. ______ INJ. ______

TRANS. ______

AUX. TRANS. ______

REAR AXLE ______

TIRE SIZE ______

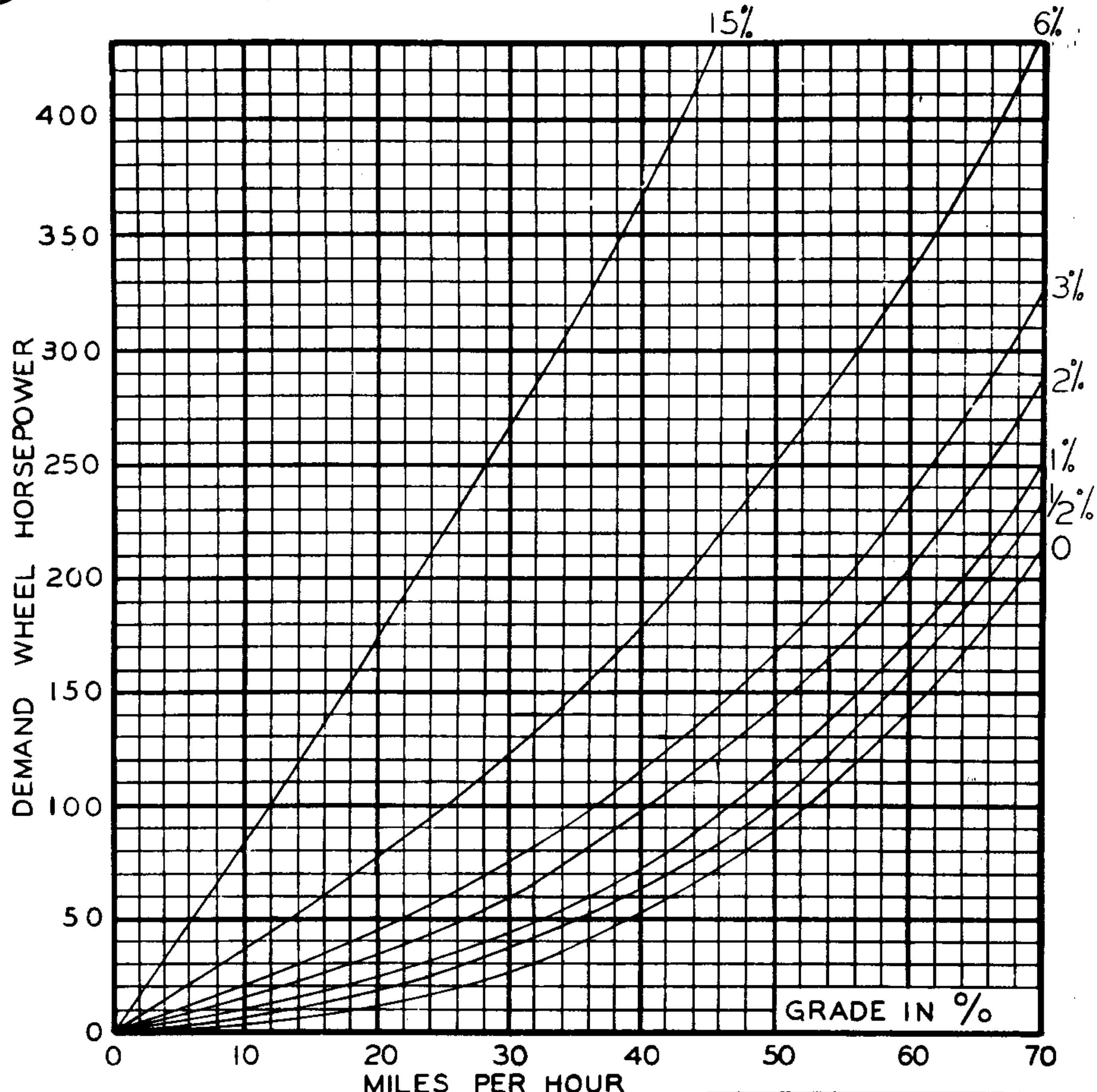
TIRE REVS/MILE ______

GCW.	20,000	LBS.
HEIGHT	13	FT.
WIDTH	8	FT.

REMARKS ______

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 20,000 LBS.
HEIGHT 13½ FT.
WIDTH 8 FT.

VEHICLE ______

ENGINE ______

GOV. R.P.M. ______ INJ. ______

TRANS. ______

AUX. TRANS. ______

REAR AXLE ______

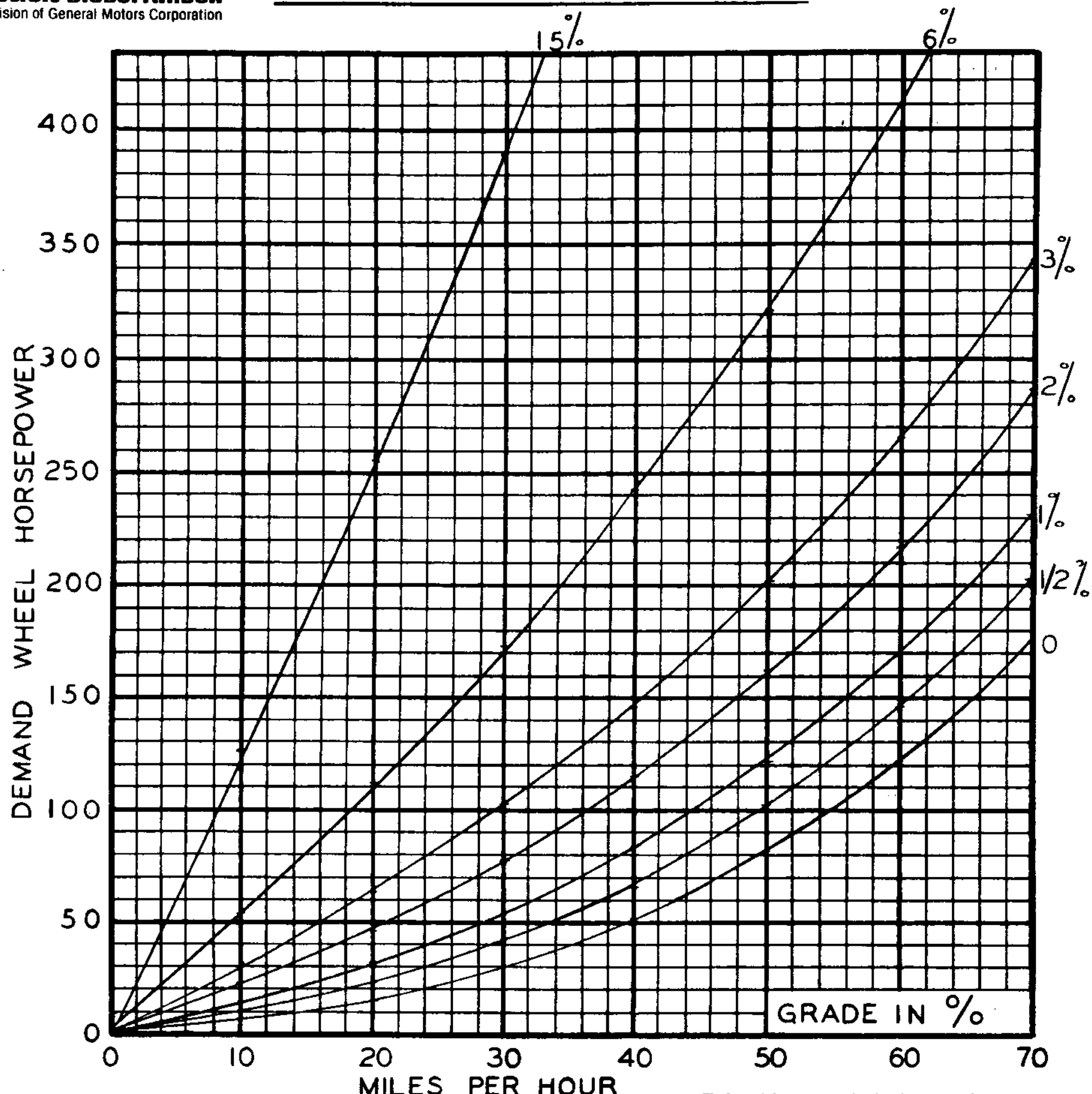
TIRE SIZE ______

TIRE REVS/MILE ______

REMARKS ______

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ______________

ENGINE ______________

GOV. R.P.M. ______ INJ. ______

TRANS. ______________

AUX. TRANS. ______________

REAR AXLE ______________

TIRE SIZE ______________

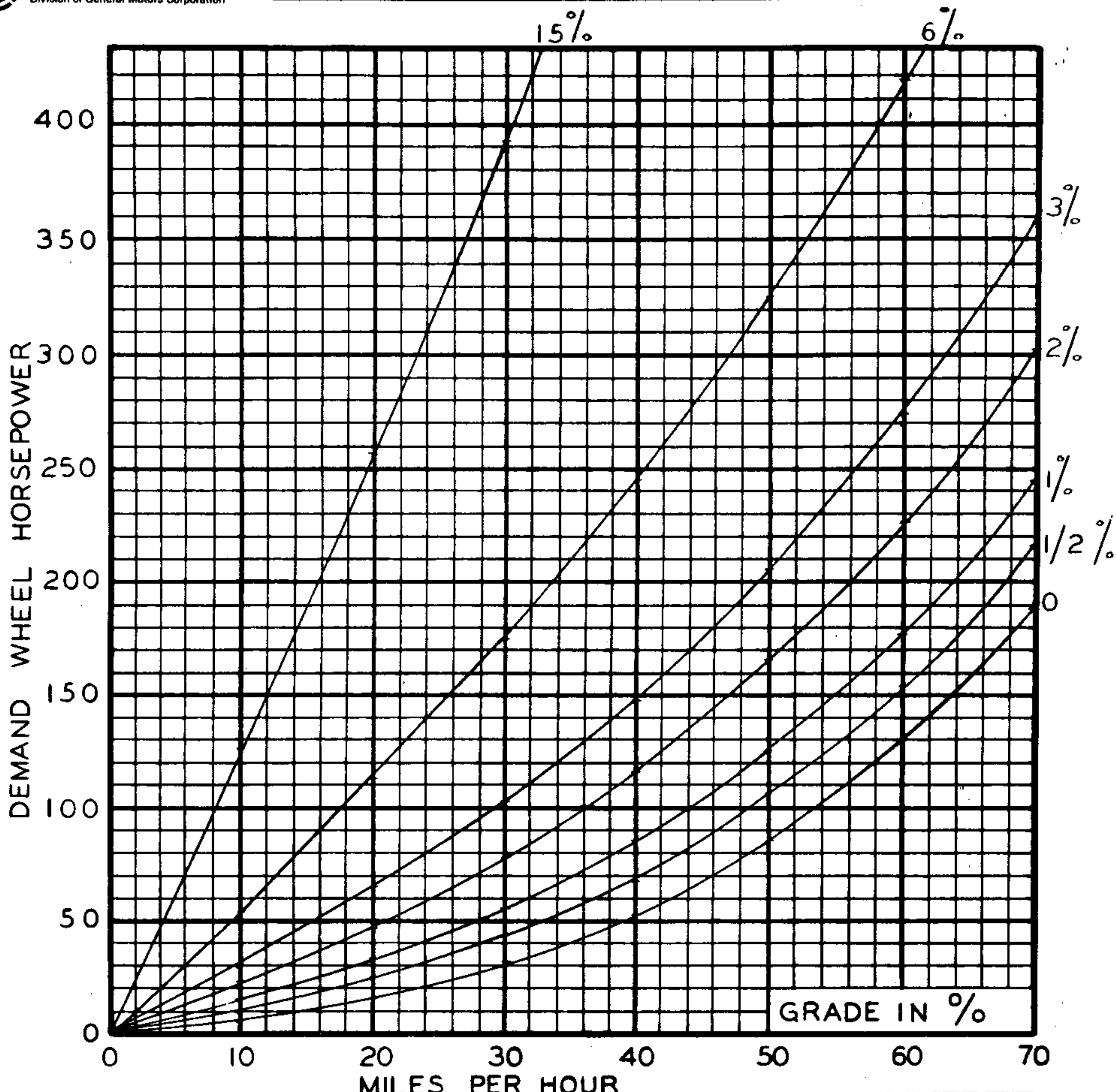
TIRE REVS/MILE ______________

GCW. 30,000 LBS.
HEIGHT 9 FT.
WIDTH 8 FT.

REMARKS ______________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	30,000	LBS.
HEIGHT	10	FT.
WIDTH	8	FT.

VEHICLE ______________________

ENGINE ______________________

GOV. R.P.M ______ INJ. ________

TRANS. ______________________

AUX. TRANS. __________________

REAR AXLE ___________________

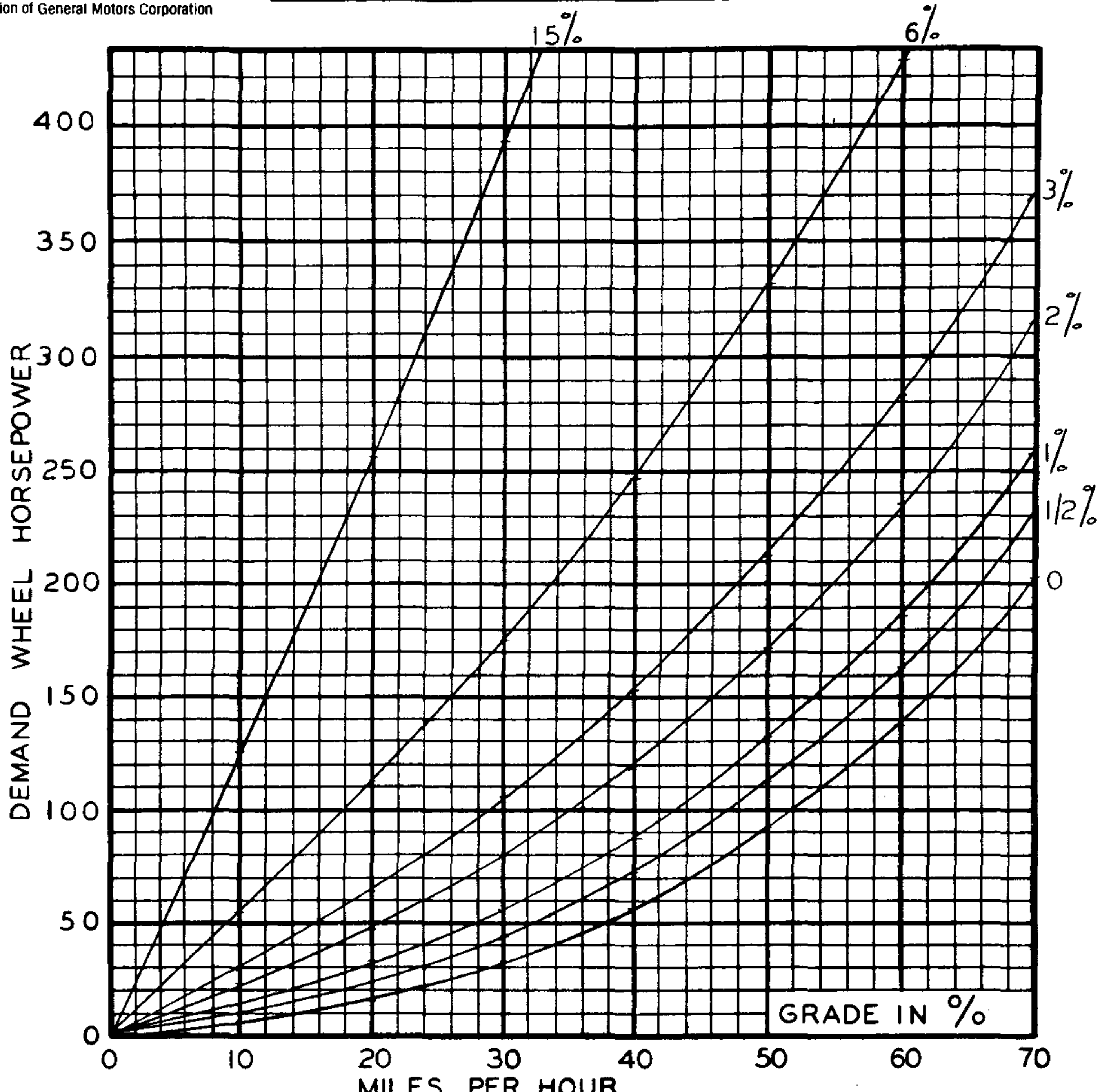
TIRE SIZE ____________________

TIRE REVS/MILE _______________

REMARKS ______________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	30,000 LBS.
HEIGHT	11 FT.
WIDTH	8 FT.

VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

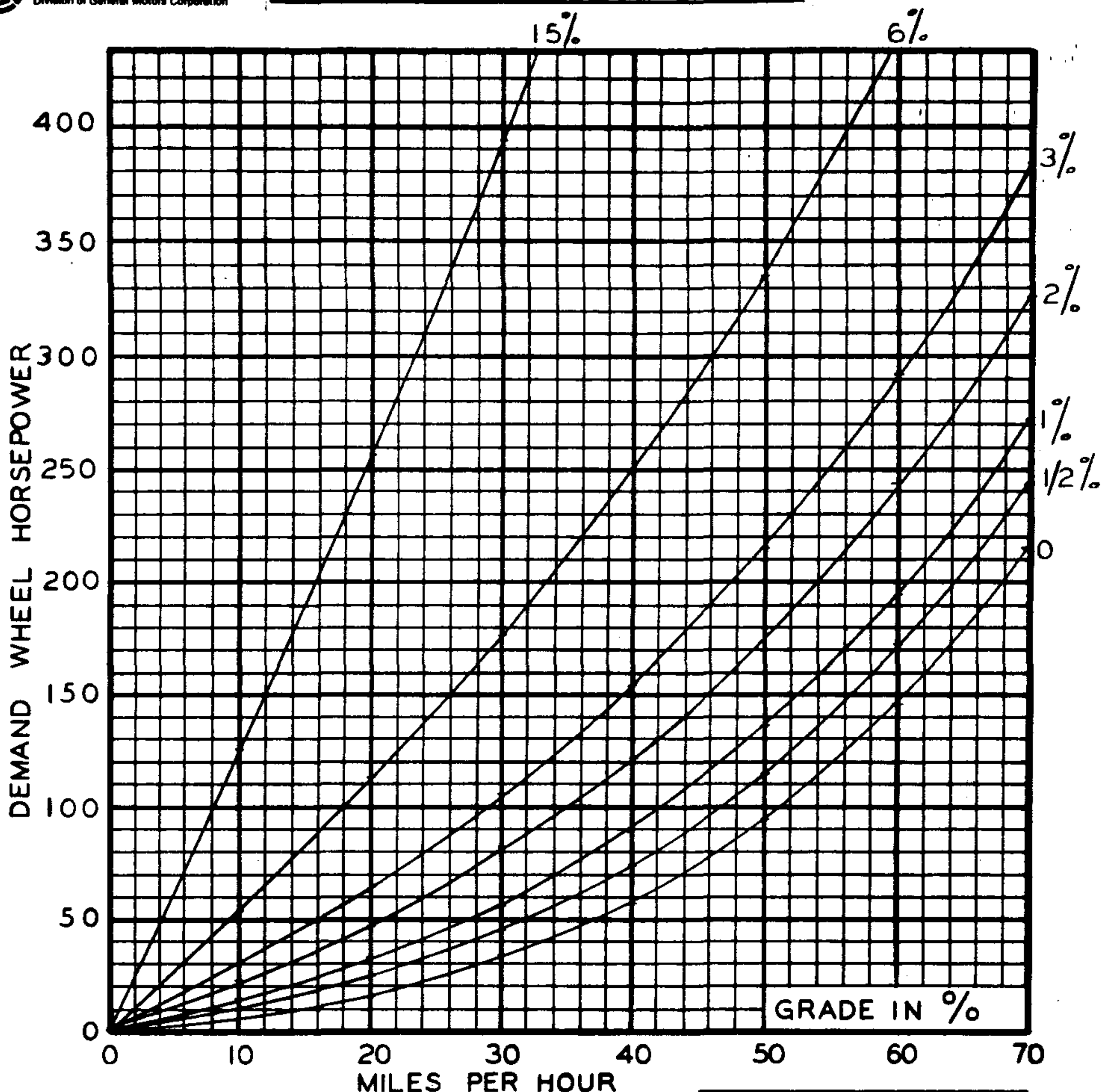
TIRE REVS/MILE ____________

REMARKS ____________

7SA535
R5-0097

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	30,000	LBS.
HEIGHT	12	FT.
WIDTH	8	FT.

VEHICLE ______

ENGINE ______

GOV. R.P.M. ______ INJ. ______

TRANS. ______

AUX. TRANS. ______

REAR AXLE ______

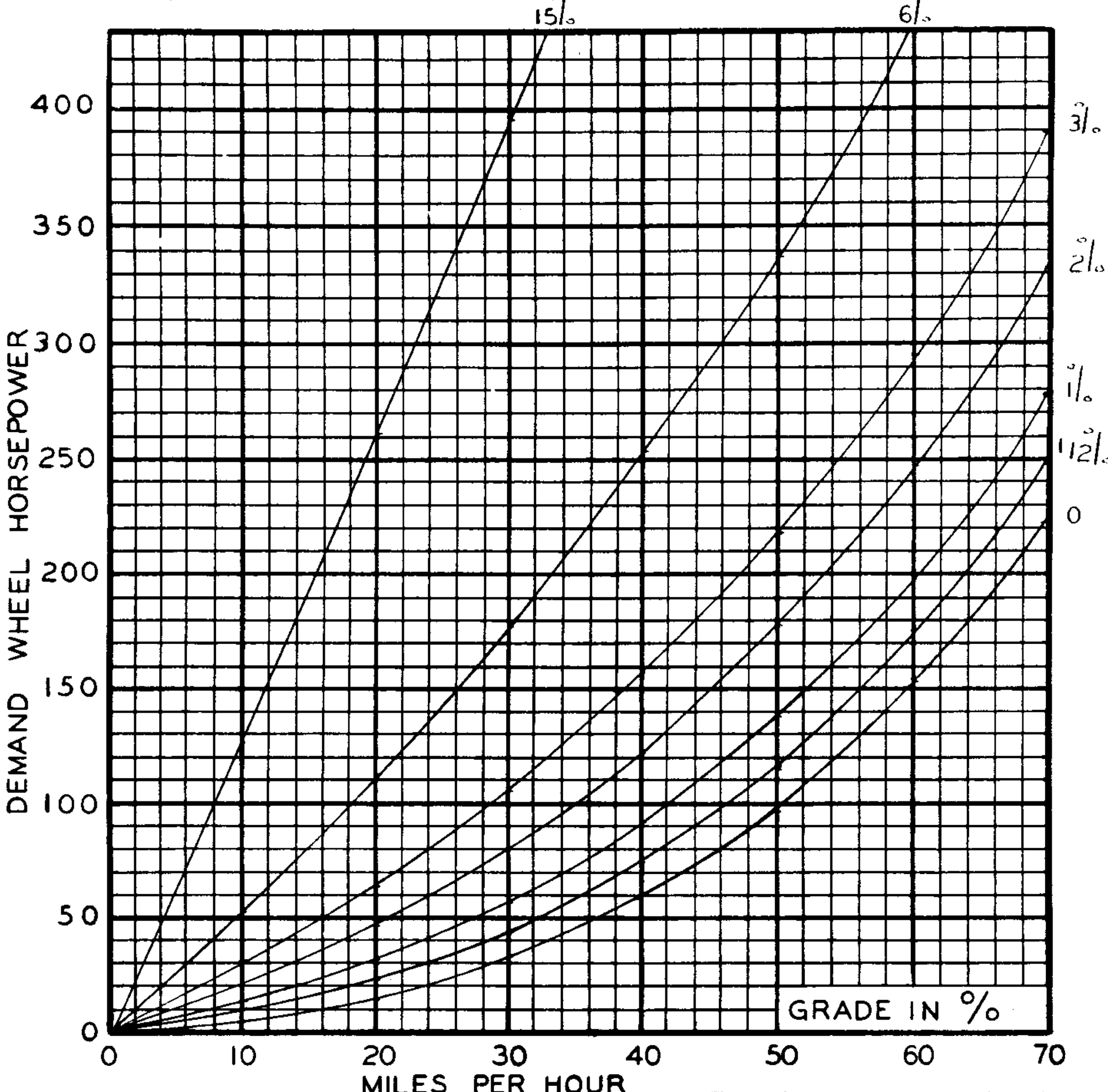
TIRE SIZE ______

TIRE REVS/MILE ______

REMARKS ______

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS ____________

REAR AXLE ____________

TIRE SIZE ____________

TIRE REVS/MILE ____________

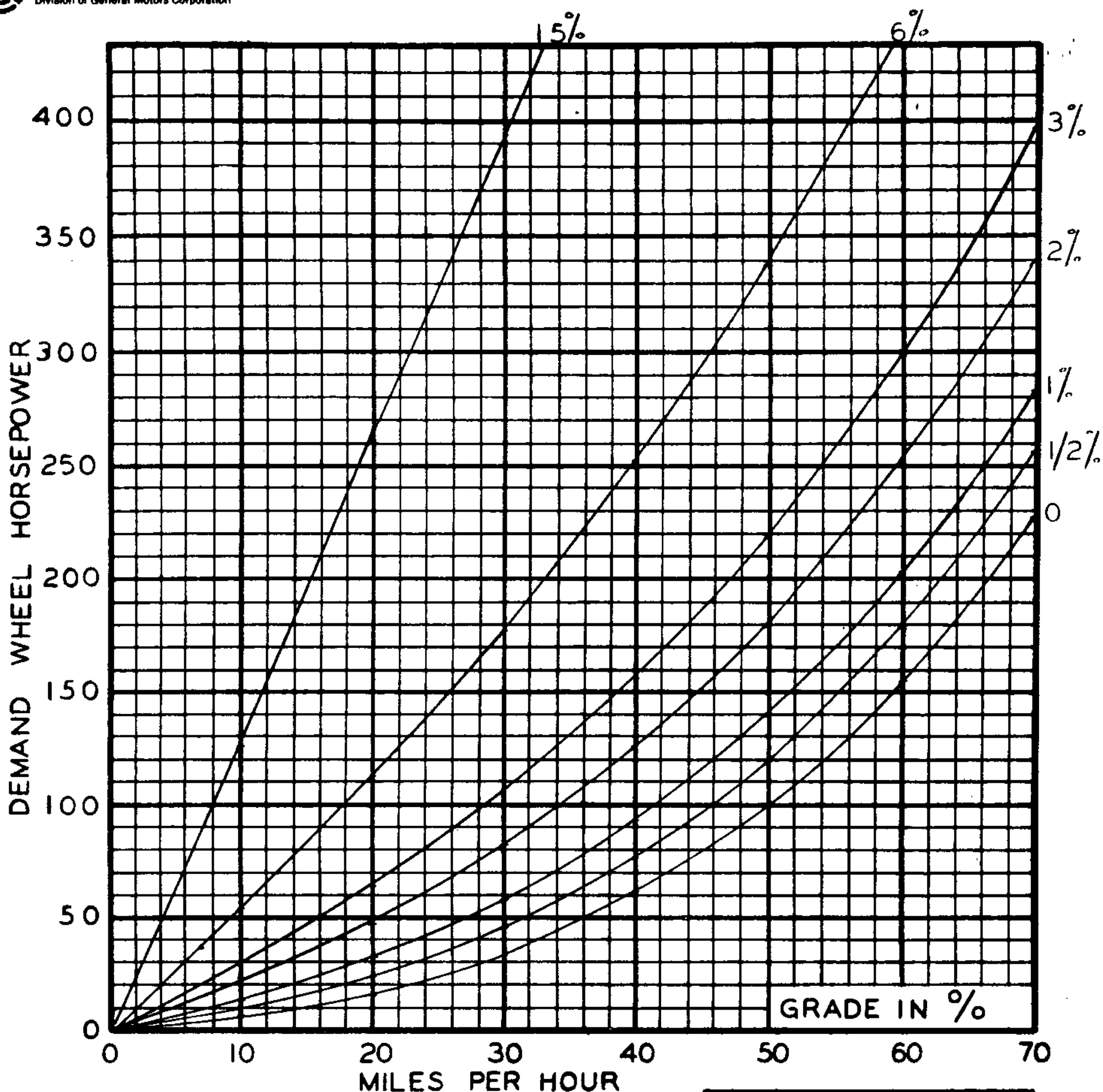
GCW. 30,000 LBS.
HEIGHT 12 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

7SA535
R5-0097
17

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

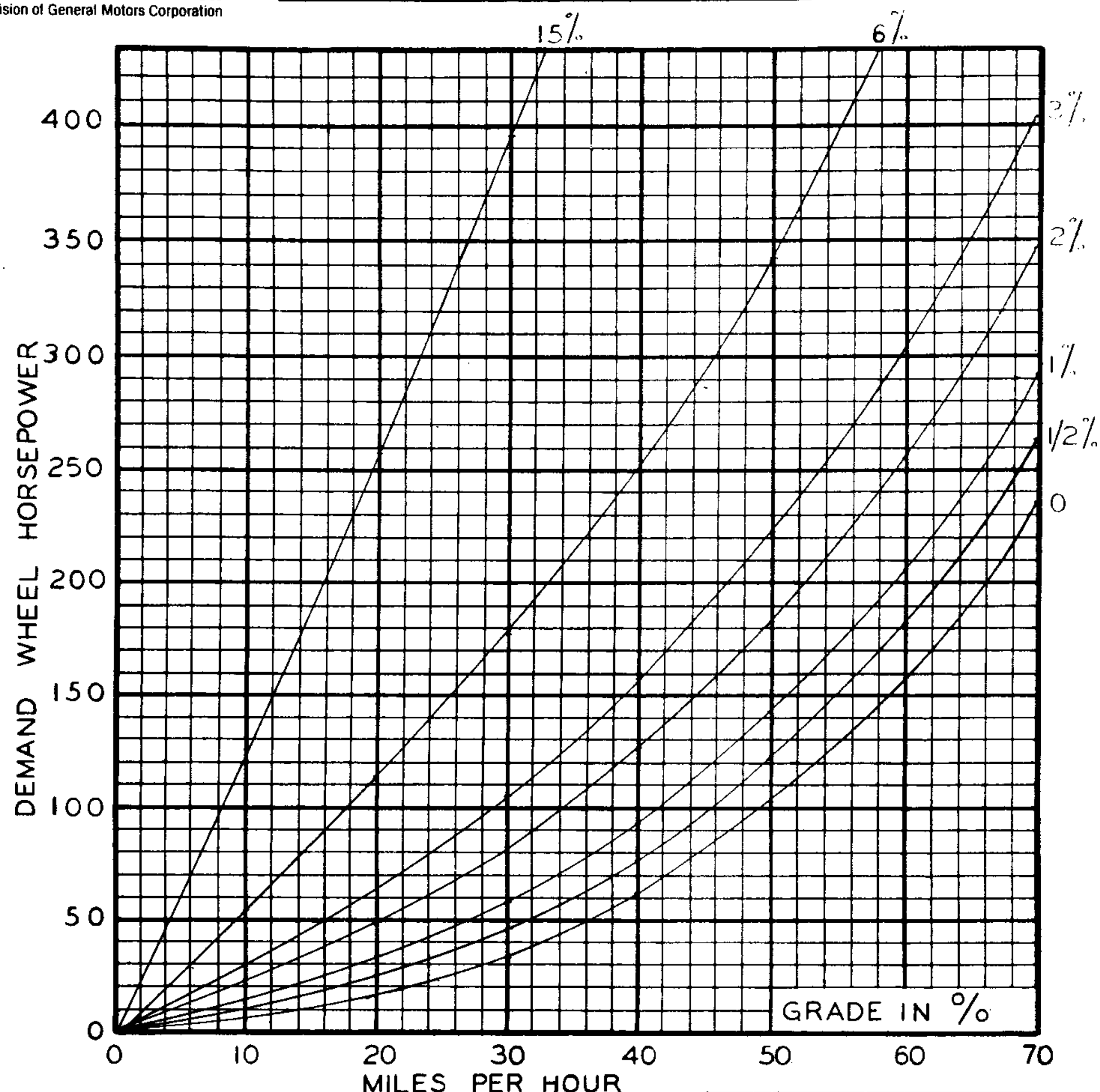
TIRE REVS/MILE ____________

GCW. 30,000	LBS.
HEIGHT 13	FT.
WIDTH 8	FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M.______ INJ.______

TRANS. ____________

AUX. TRANS.____________

REAR AXLE ____________

TIRE SIZE ____________

TIRE REVS/MILE____________

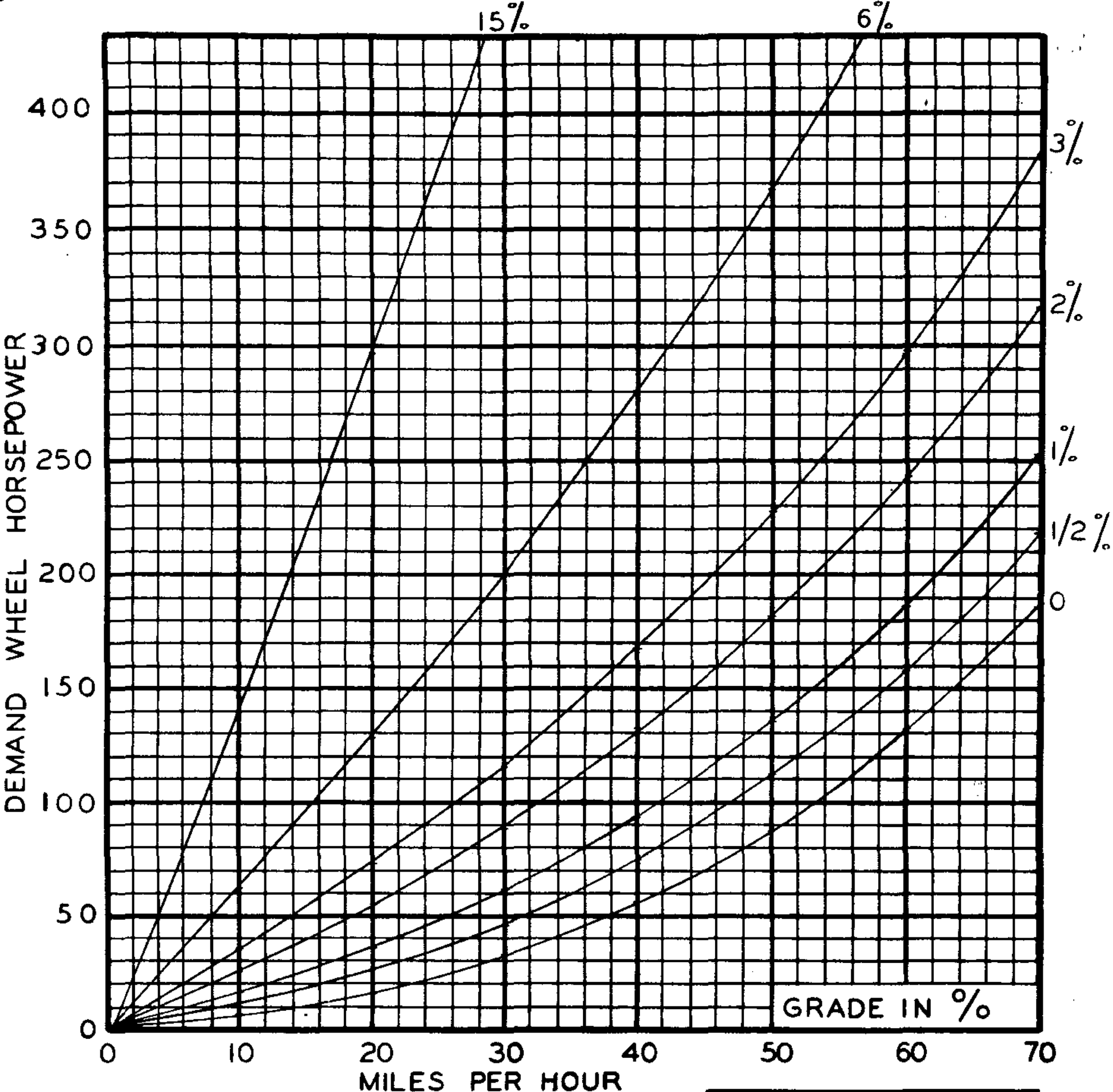
GCW. 30,000 LBS.
HEIGHT 13 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

7SA535
R5-0097
19

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M ______ INJ. ______

TRANS. ____________

AUX. TRANS ____________

REAR AXLE ____________

TIRE SIZE ____________

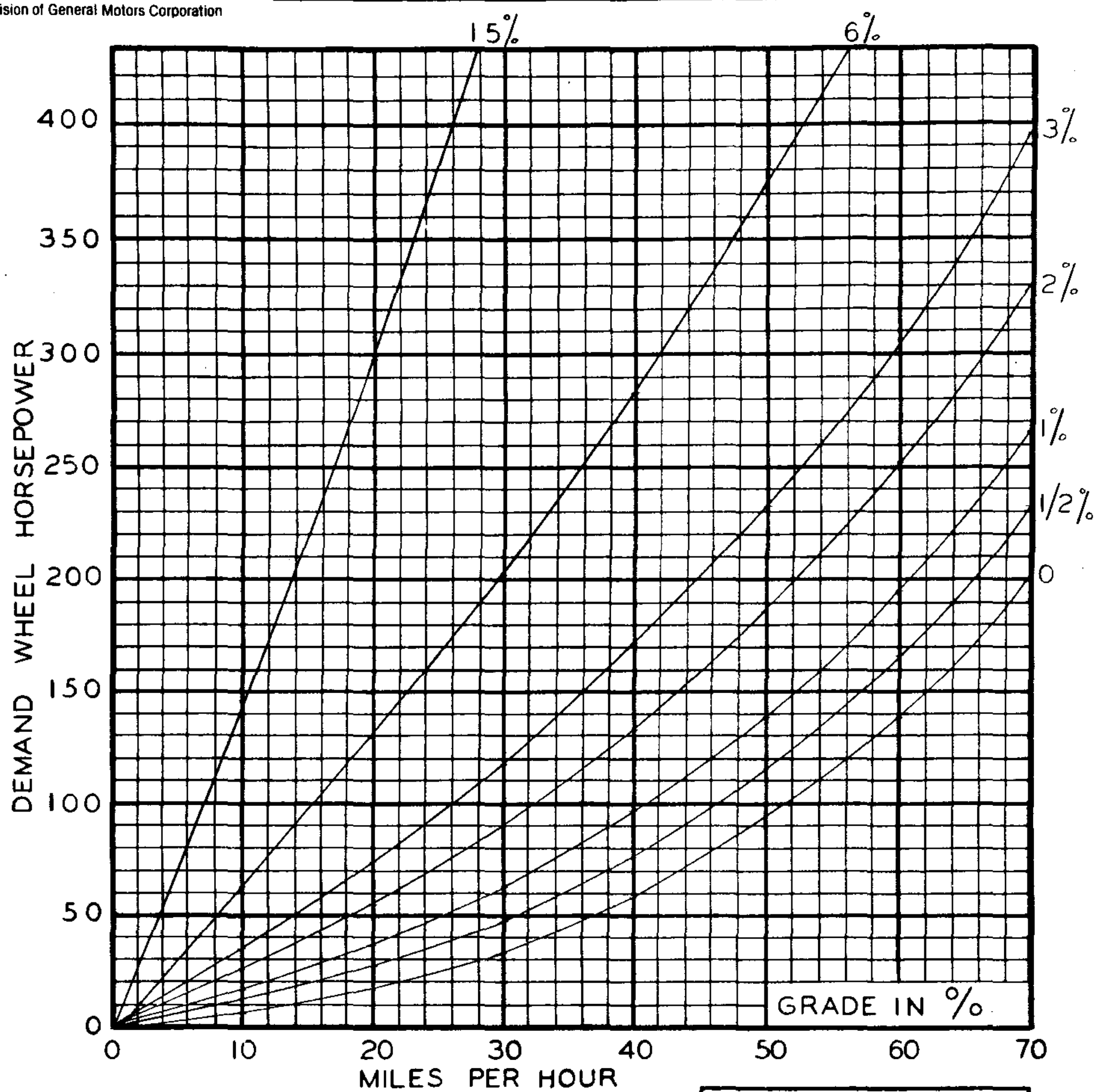
TIRE REVS/MILE ____________

GCW.	35,000	LBS.
HEIGHT	9	FT.
WIDTH	8	FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

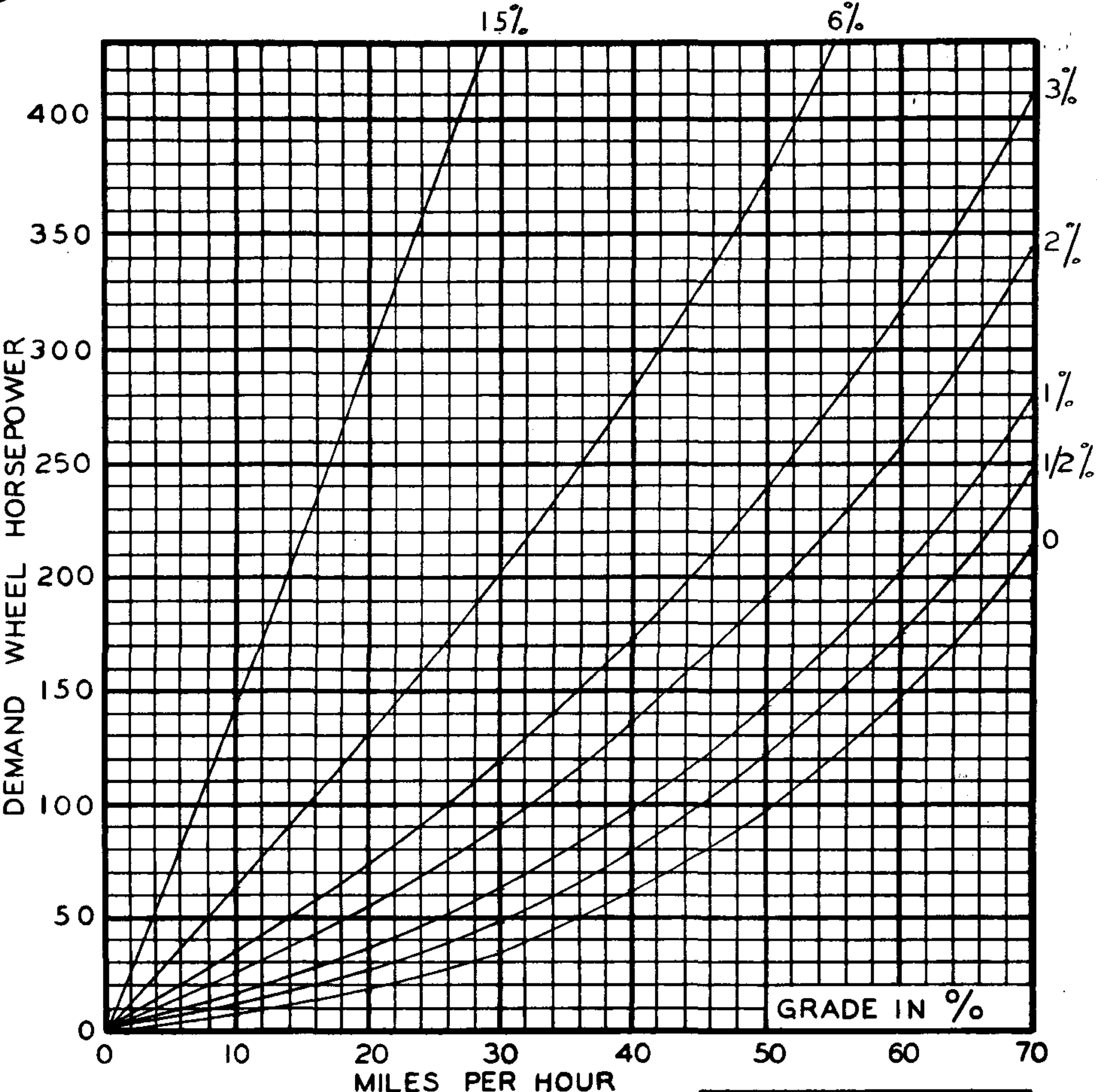
TIRE REVS/MILE ____________

GCW. 35,000 LBS.
HEIGHT 10 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

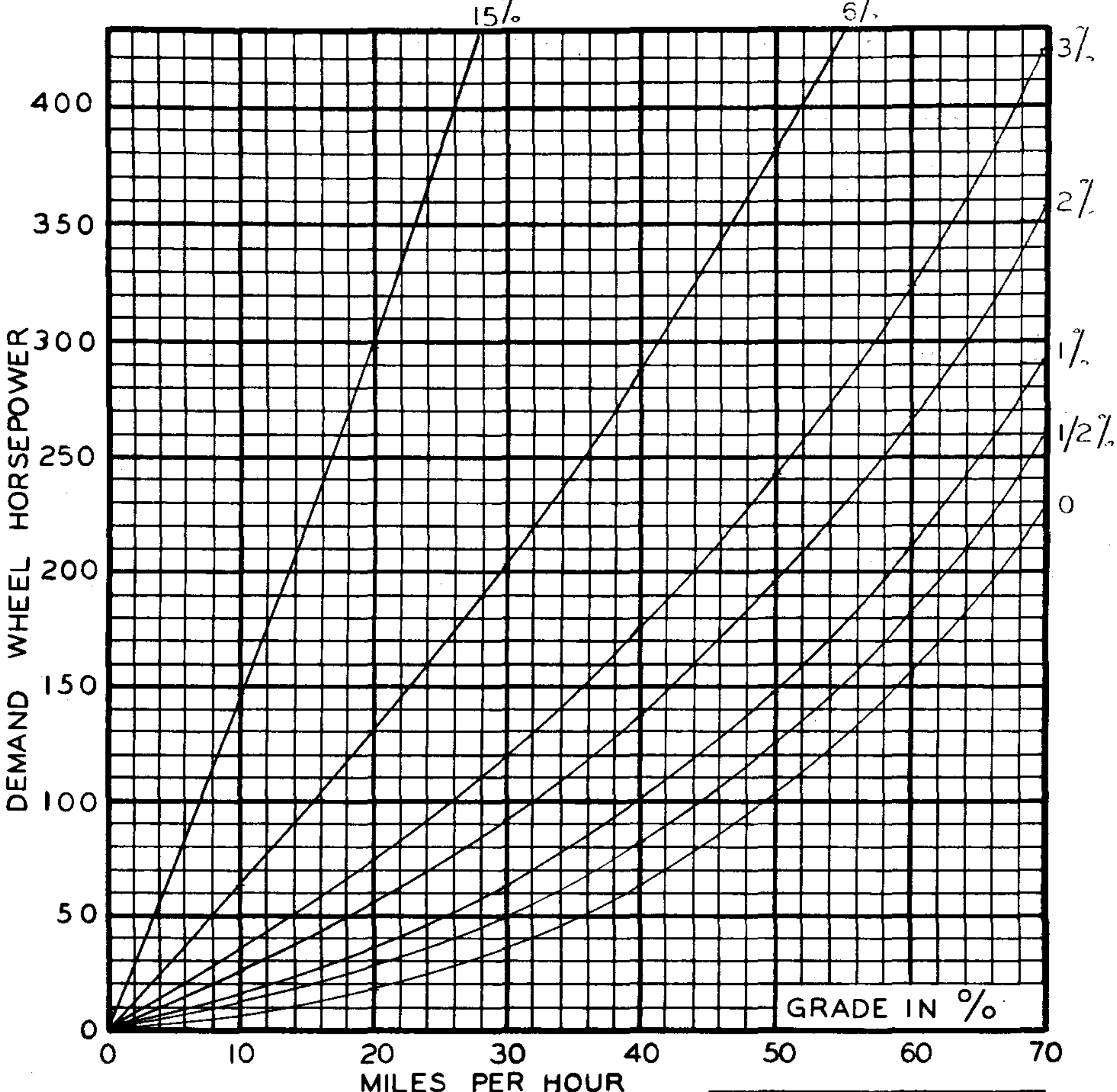
TIRE REVS/MILE ____________

GCW. 35,000	LBS.
HEIGHT 11	FT.
WIDTH 8	FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	35000 LBS.
HEIGHT	12 FT.
WIDTH	8 FT.

VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

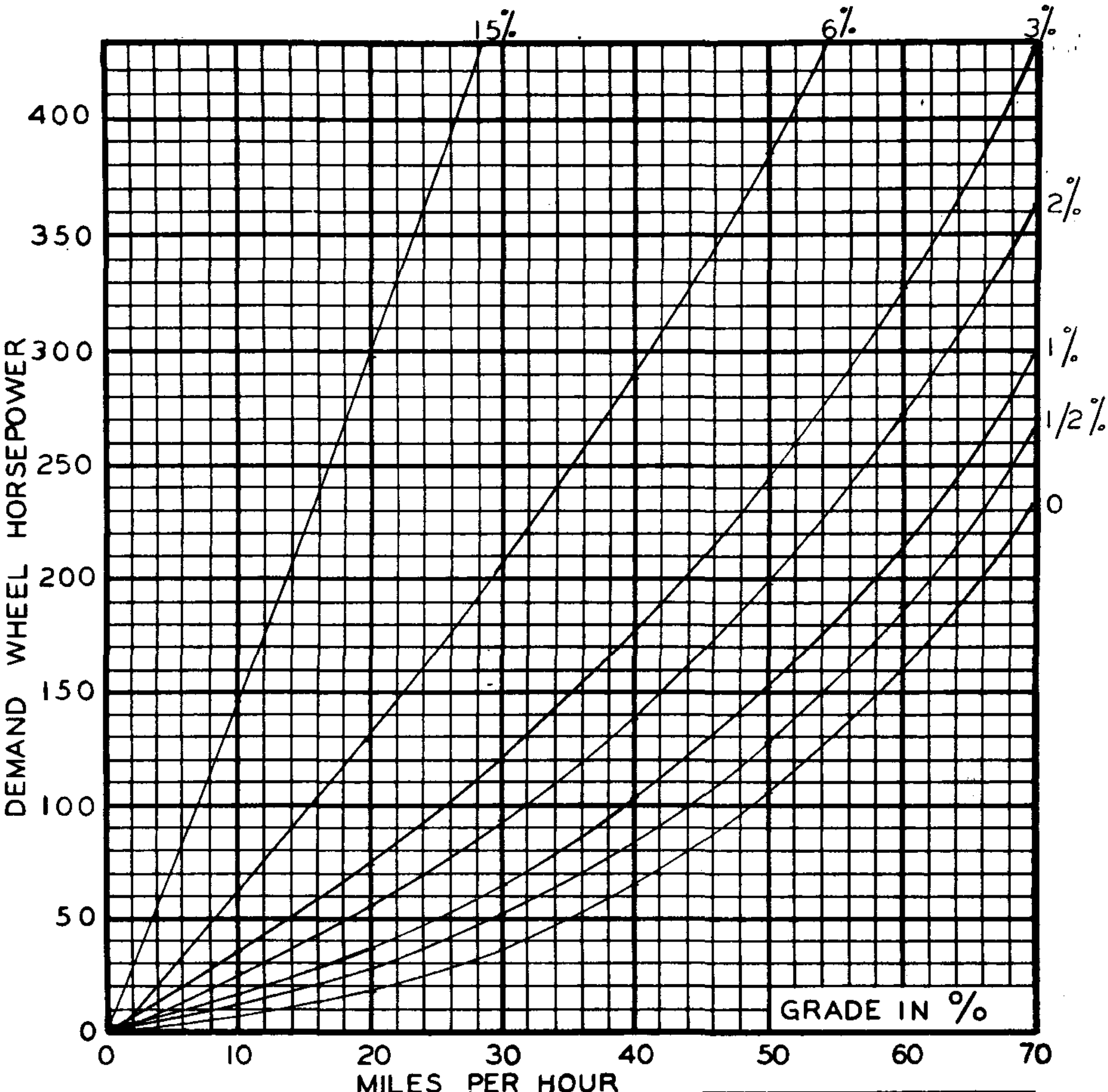
TIRE REVS/MILE ____________

REMARKS ____________

7SA535
R5-0097

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

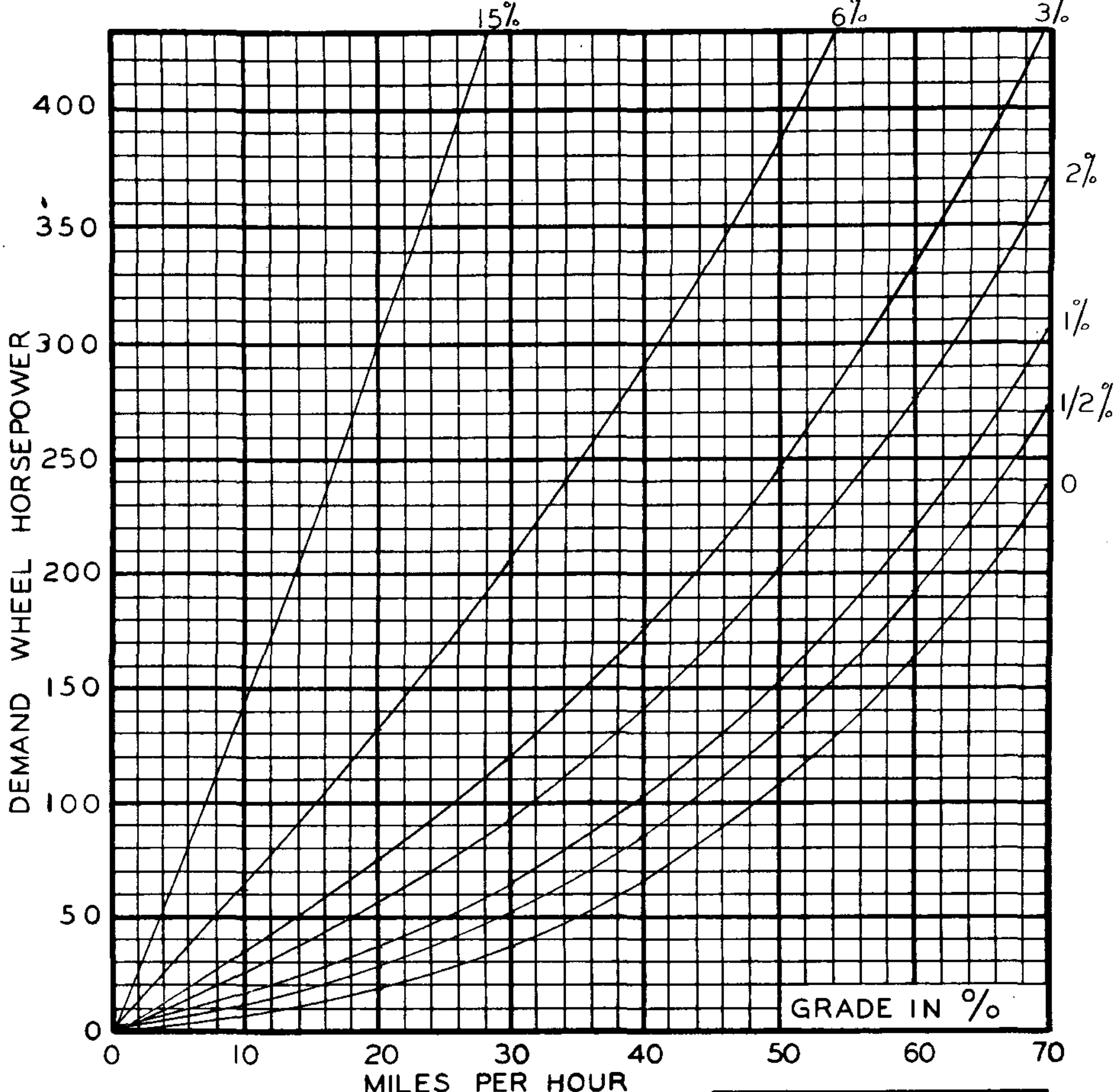
TIRE REVS/MILE ____________

GCW.	35,000	LBS.
HEIGHT	12 1/2	FT.
WIDTH	8	FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ______ INJ. ________

TRANS. ____________________

AUX. TRANS. ________________

REAR AXLE __________________

TIRE SIZE __________________

TIRE REVS/MILE _____________

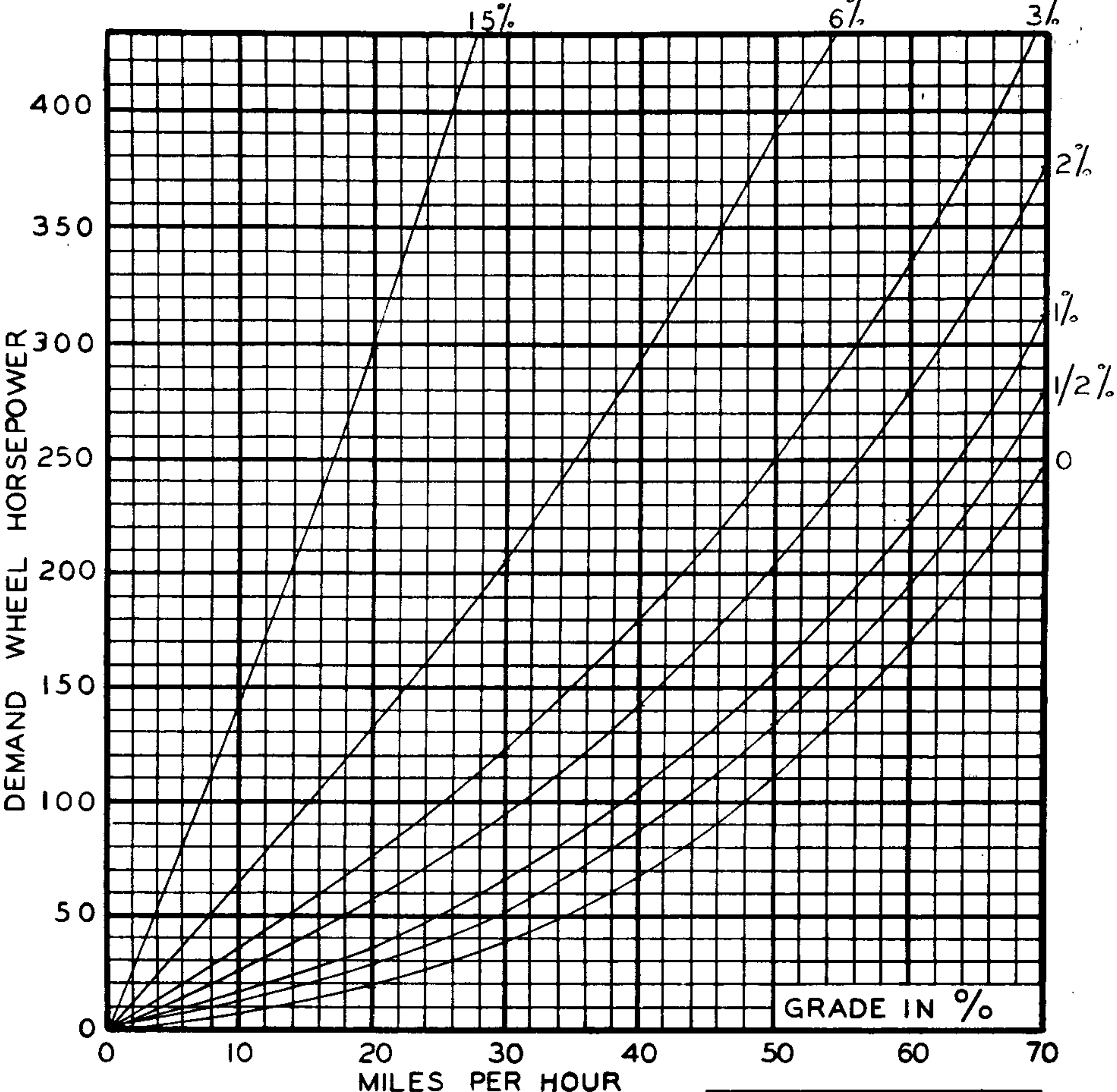
GCW. 35,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ____________________

7SA535
R5-0097
25

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M ______ INJ. ______

TRANS. ____________

AUX. TRANS ____________

REAR AXLE ____________

TIRE SIZE ____________

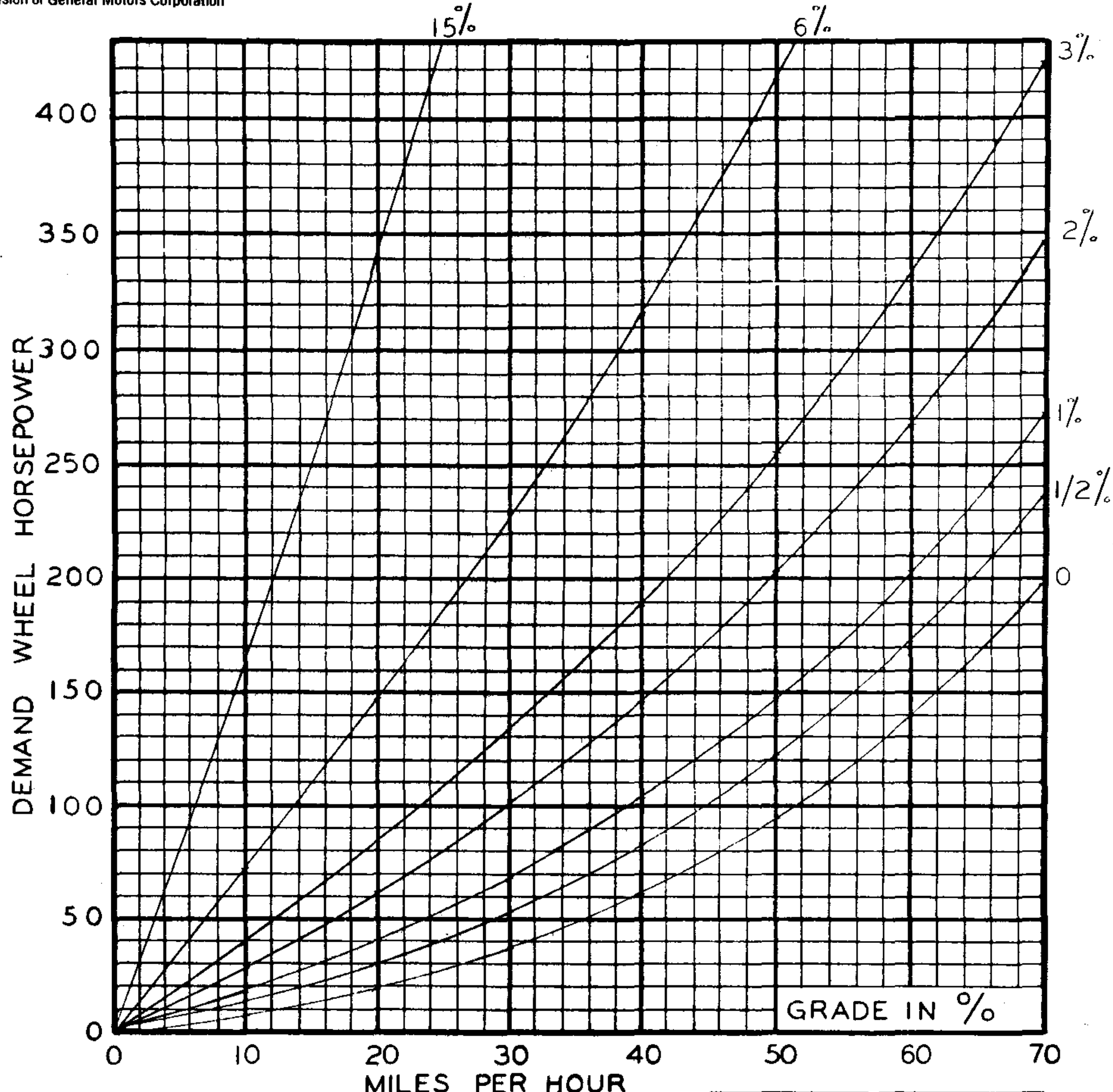
TIRE REVS/MILE ____________

GCW. 35000 LBS.
HEIGHT 13 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ______________

ENGINE ______________

GOV. R.P.M. ______ INJ. ______

TRANS. ______________

AUX. TRANS. ______________

REAR AXLE ______________

TIRE SIZE ______________

TIRE REVS/MILE ______________

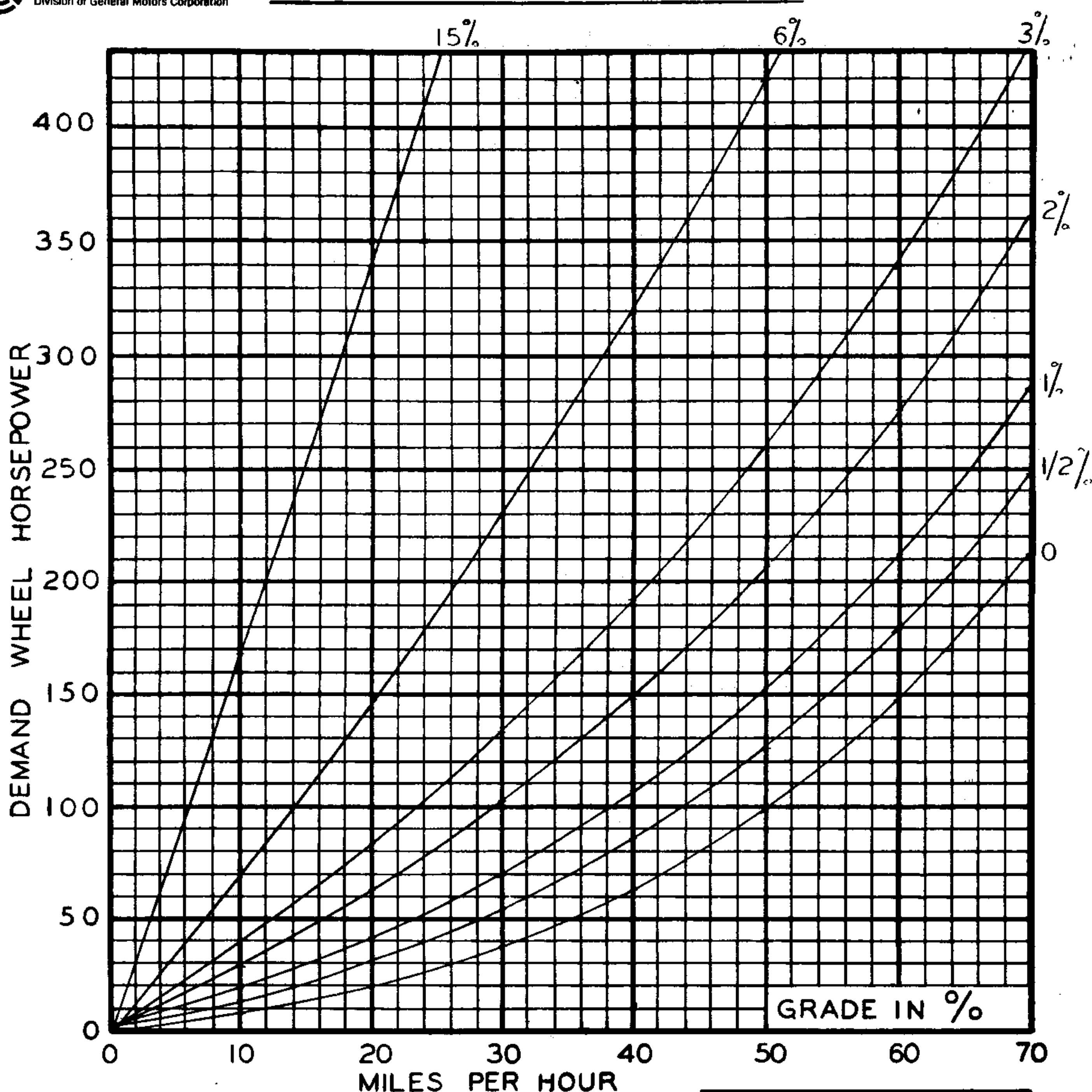
GCW. 40,000	LBS.
HEIGHT 9	FT.
WIDTH 8	FT.

REMARKS ______________

7SA535
R5-0097
27

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 40,000 LBS.
HEIGHT 10 FT.
WIDTH 8 FT.

VEHICLE ____________

ENGINE ____________

GOV. R.P.M ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

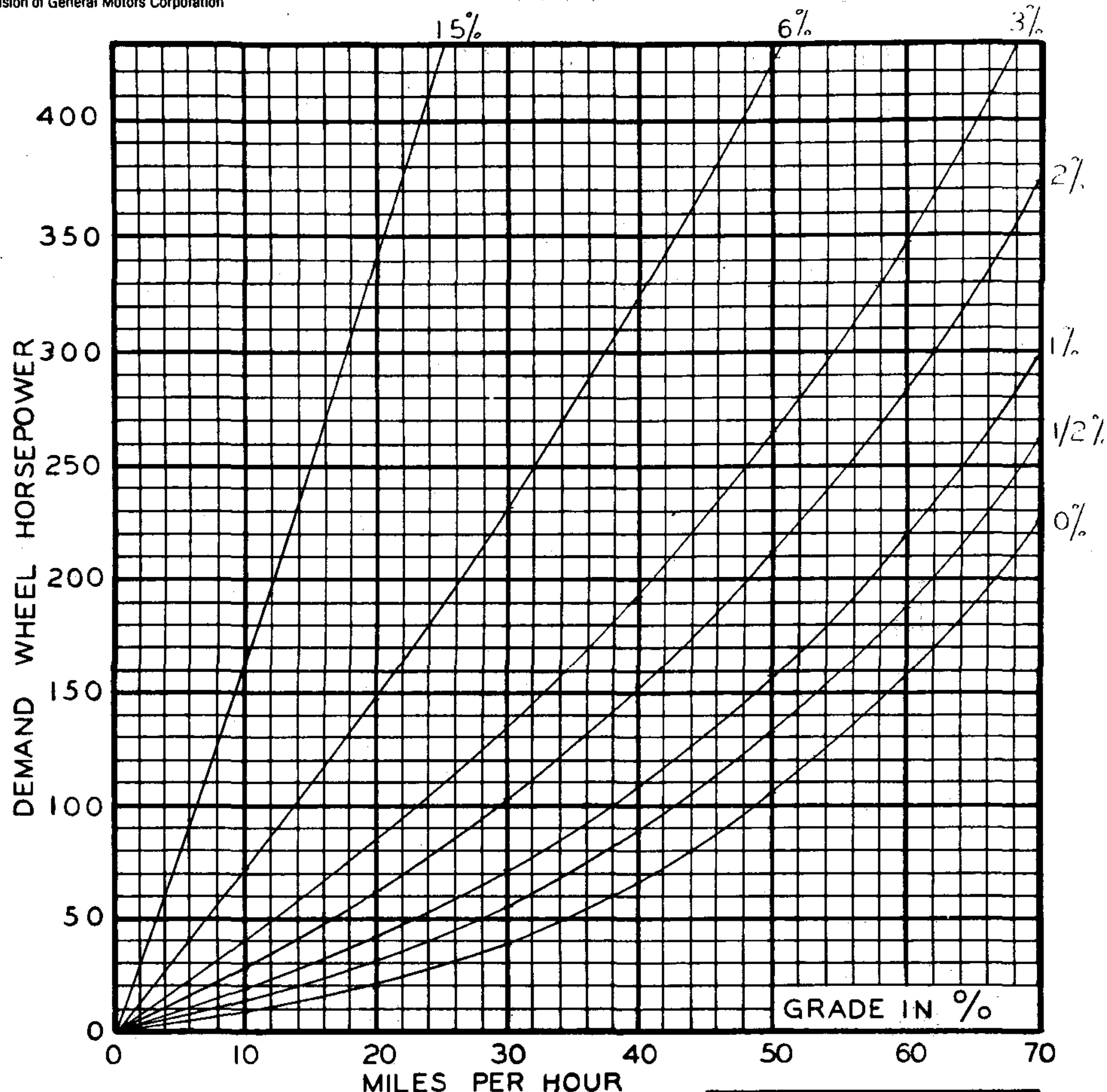
TIRE SIZE ____________

TIRE REVS/MILE ____________

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

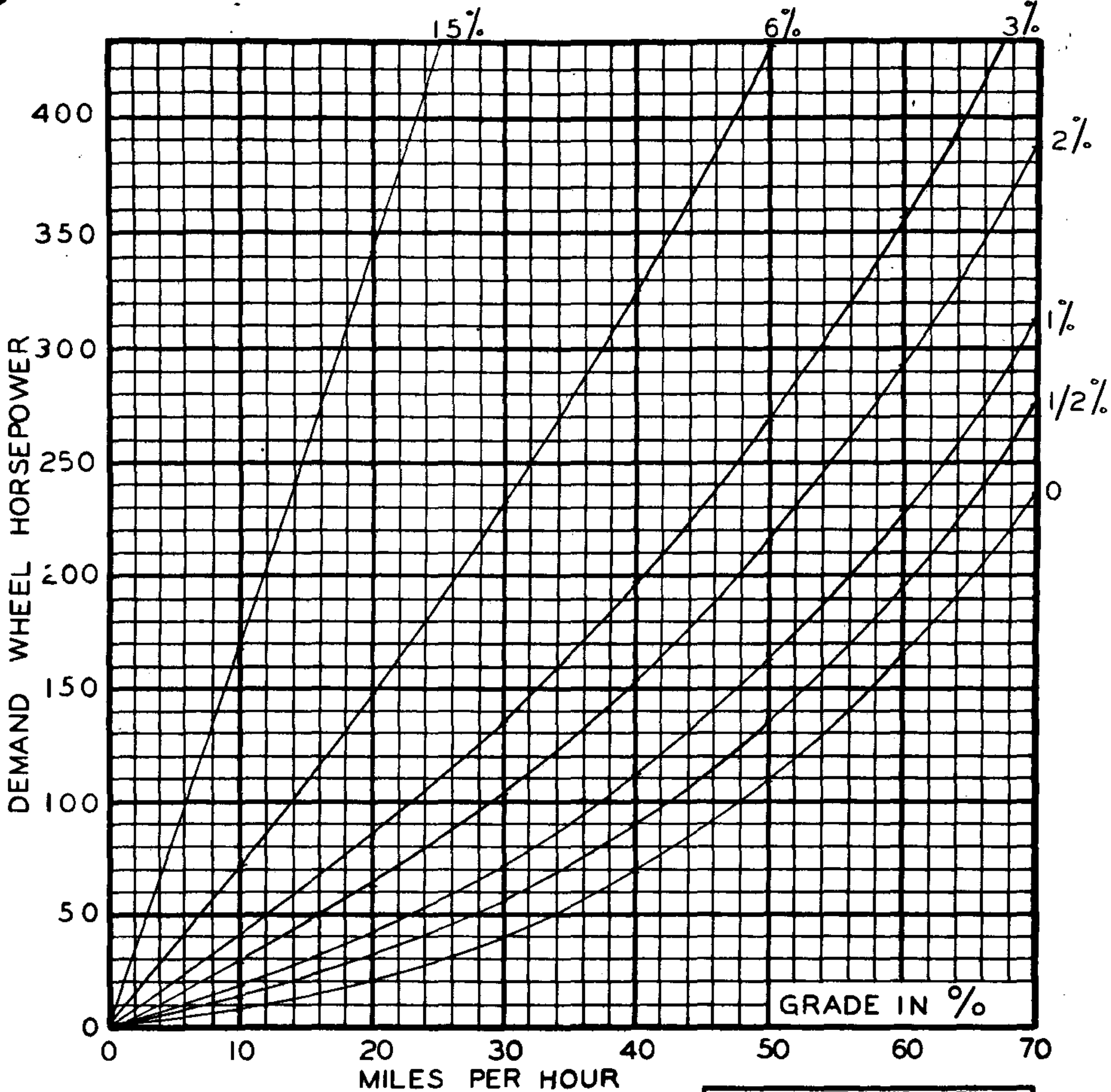
TIRE REVS/MILE ____________________

GCW. 40,000 LBS.
HEIGHT 11 FT.
WIDTH 8 FT.

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

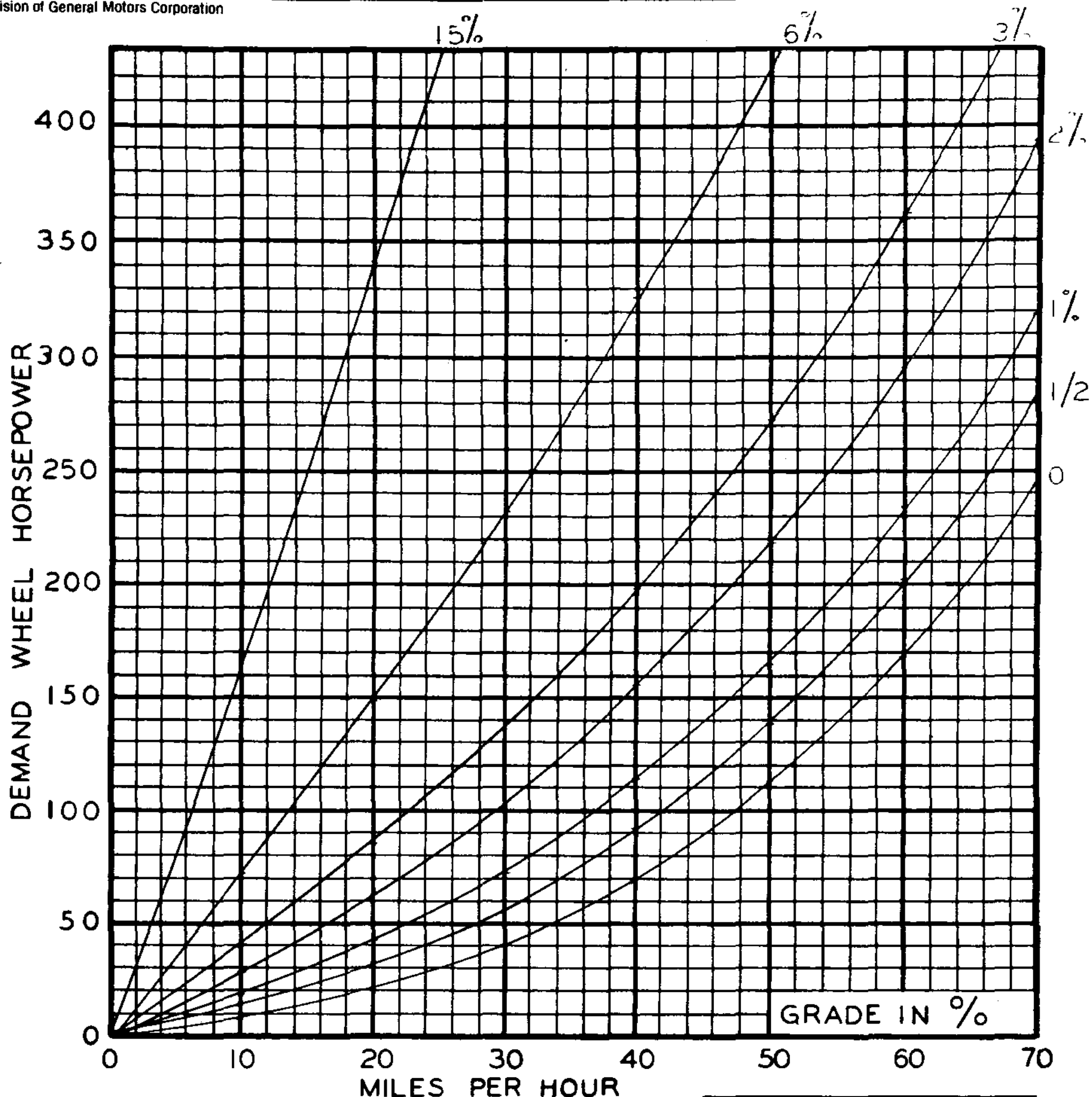
TIRE REVS/MILE ____________

GCW. 40,000 LBS.
HEIGHT 12 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M ______ INJ. ________

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

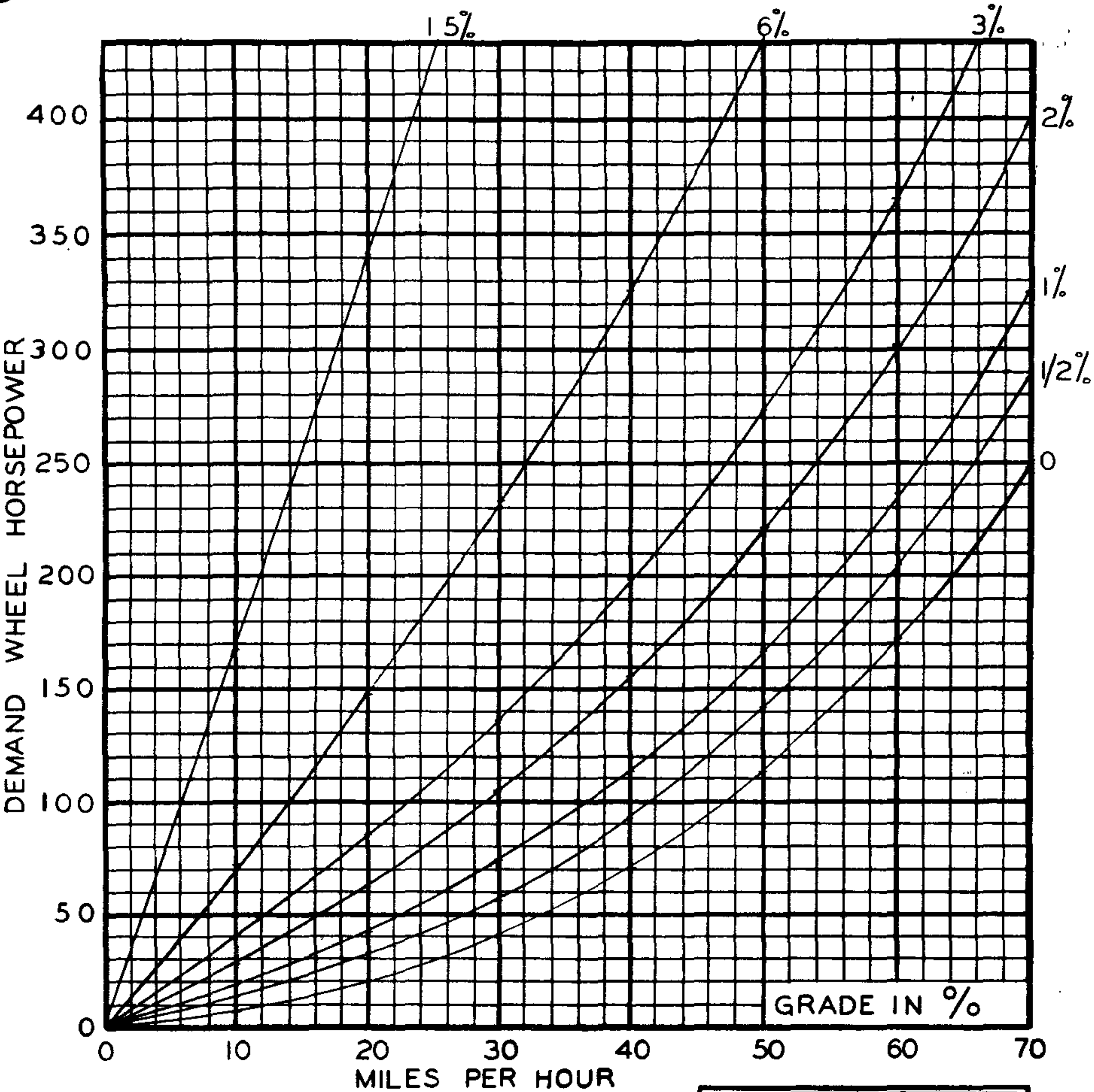
TIRE REVS/MILE ____________

GCW. 40,000 LBS.
HEIGHT 12 1/2 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

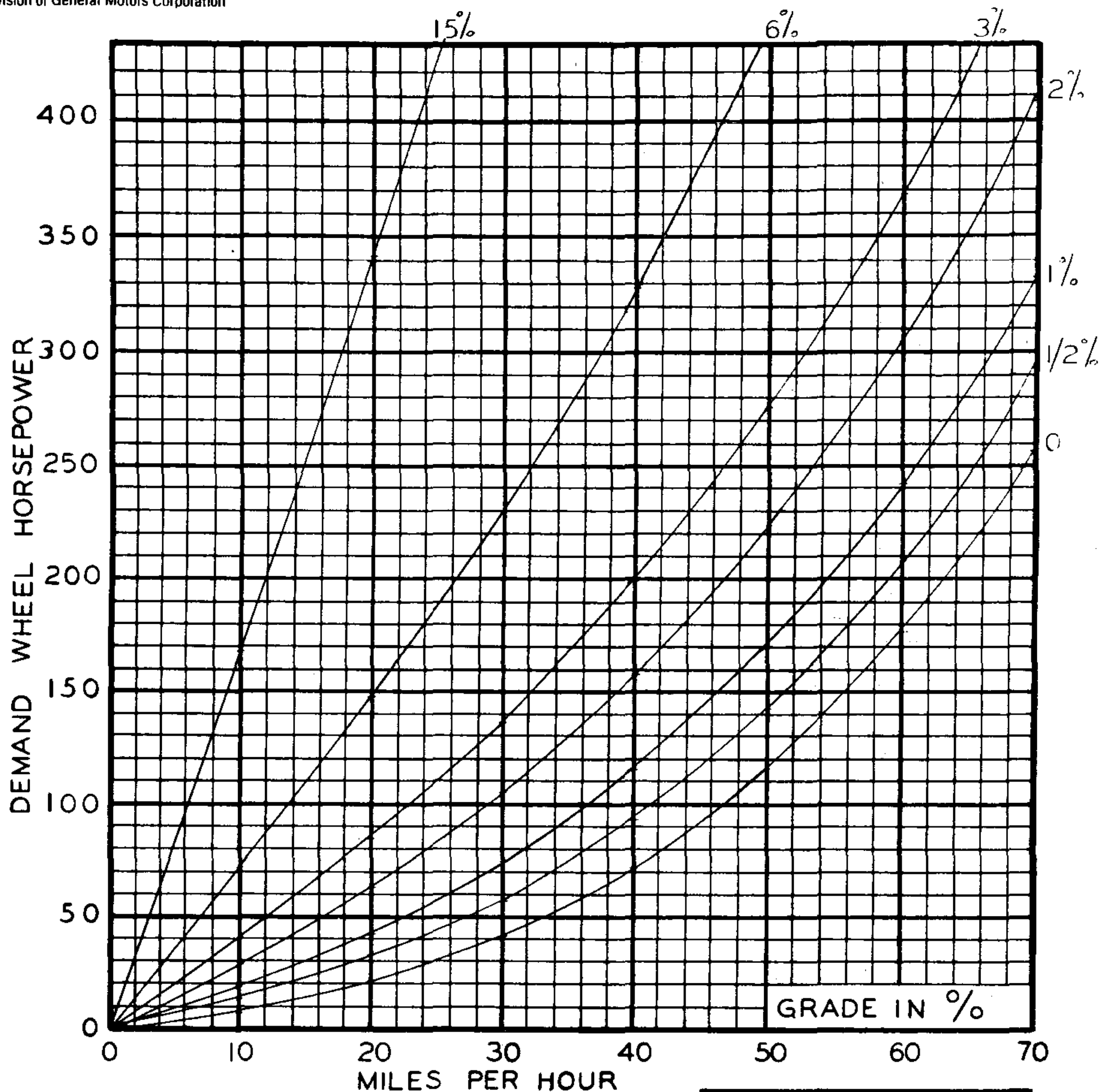
TIRE REVS/MILE ____________________

GCW. 40,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

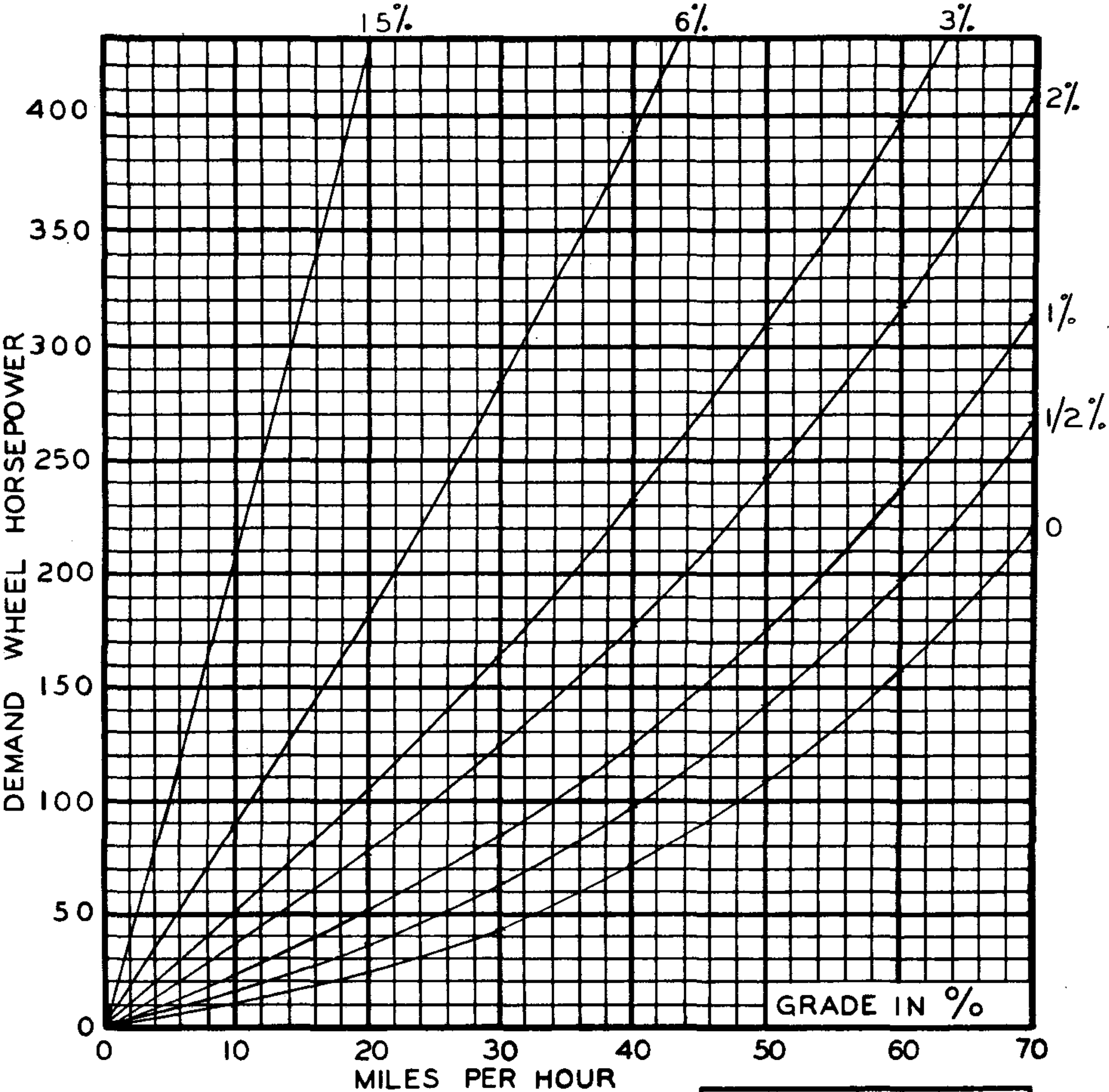
TIRE REVS/MILE ____________________

GCW.	40000	LBS.
HEIGHT	13 1/2	FT.
WIDTH	8	FT.

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	50,000	LBS.
HEIGHT	9	FT.
WIDTH	8	FT.

VEHICLE ________________

ENGINE ________________

GOV. R.P.M. ______ INJ. ______

TRANS. ________________

AUX. TRANS. ________________

REAR AXLE ________________

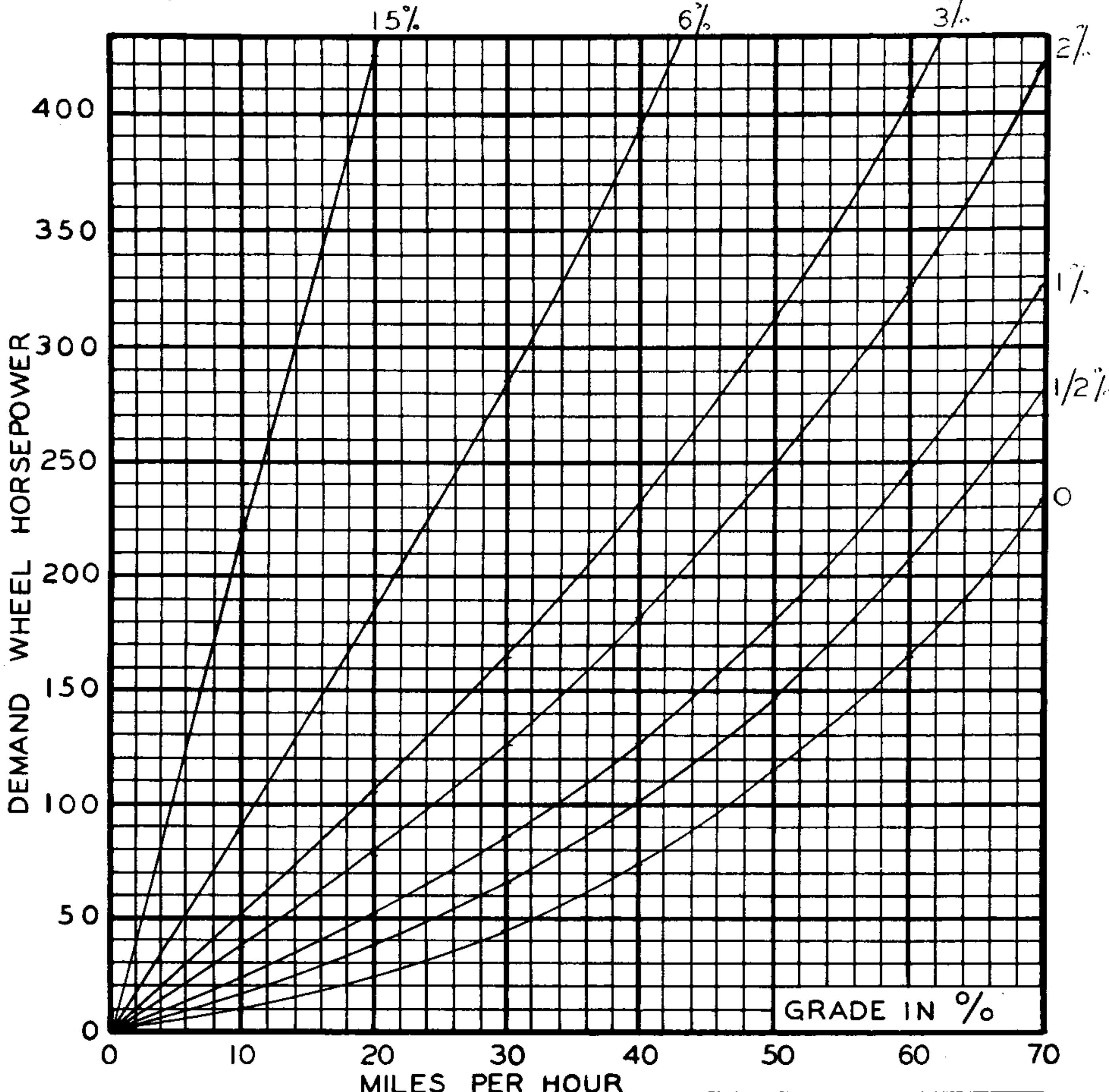
TIRE SIZE ________________

TIRE REVS/MILE ________________

REMARKS ________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 50,000 LBS.
HEIGHT 10 FT.
WIDTH 8 FT.

VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

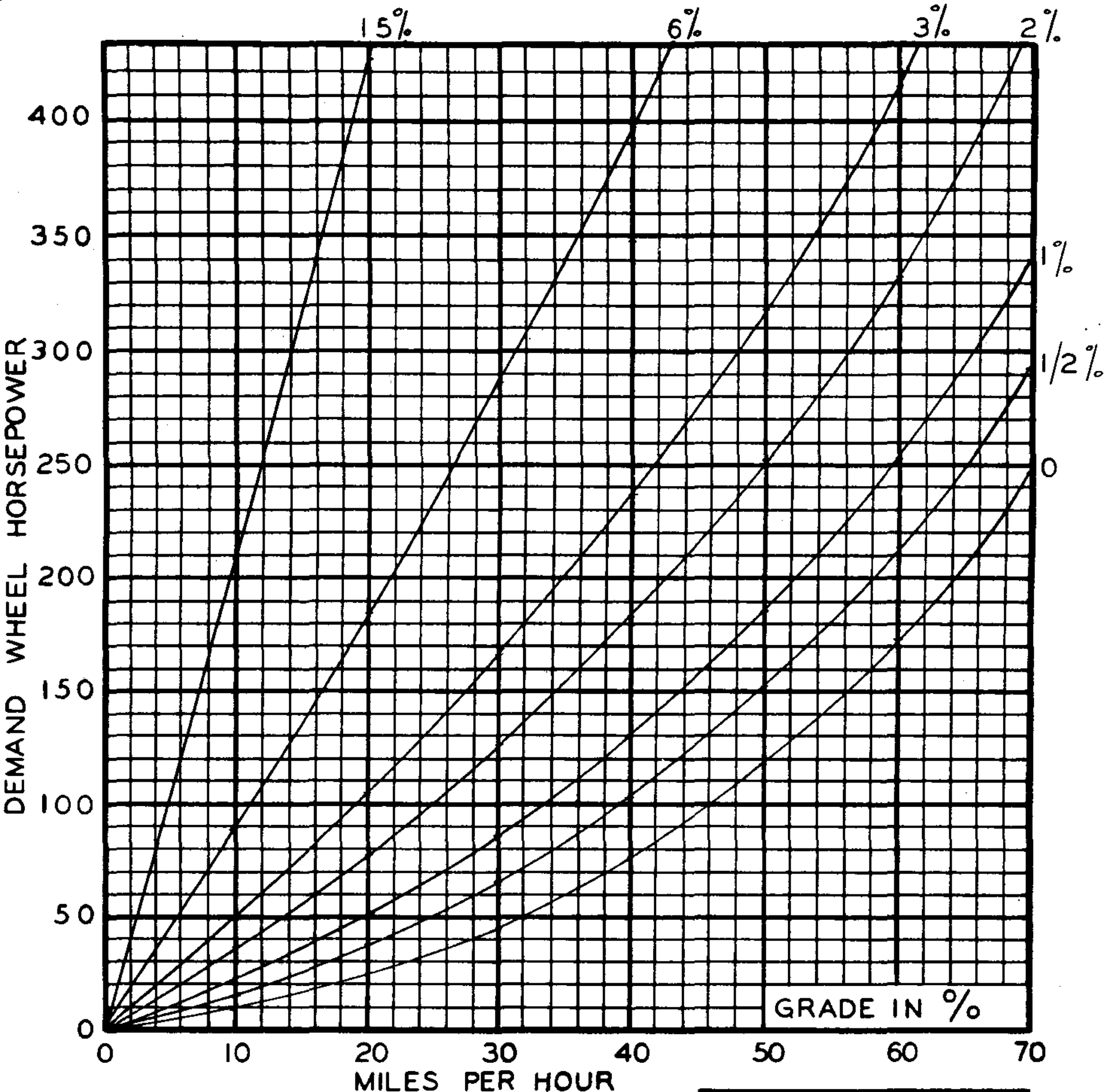
TIRE SIZE ____________

TIRE REVS/MILE ____________

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	50000 LBS.
HEIGHT	11 FT.
WIDTH	8 FT.

VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

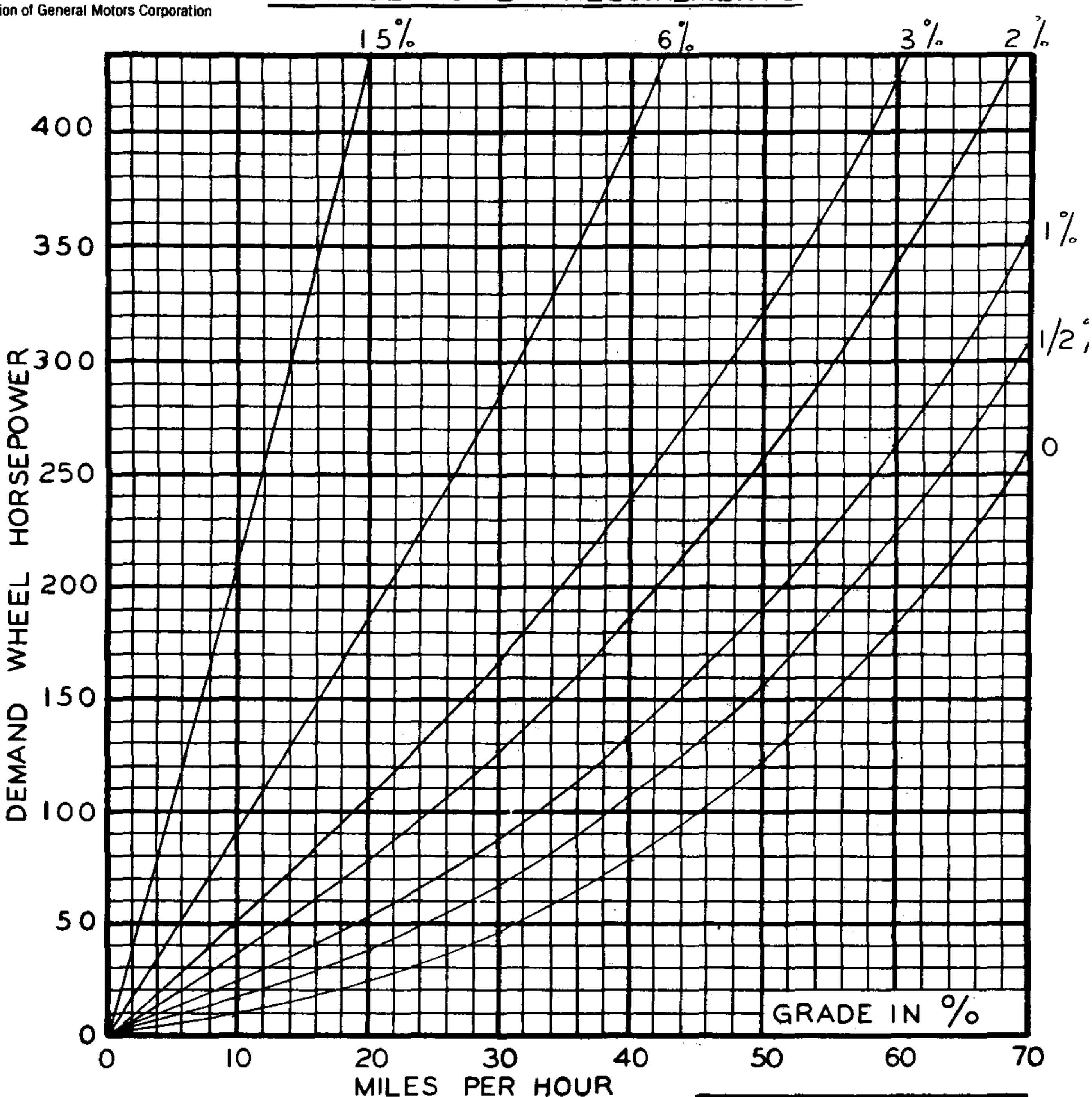
TIRE SIZE ____________________

TIRE REVS/MILE ____________________

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

TIRE REVS/MILE ____________

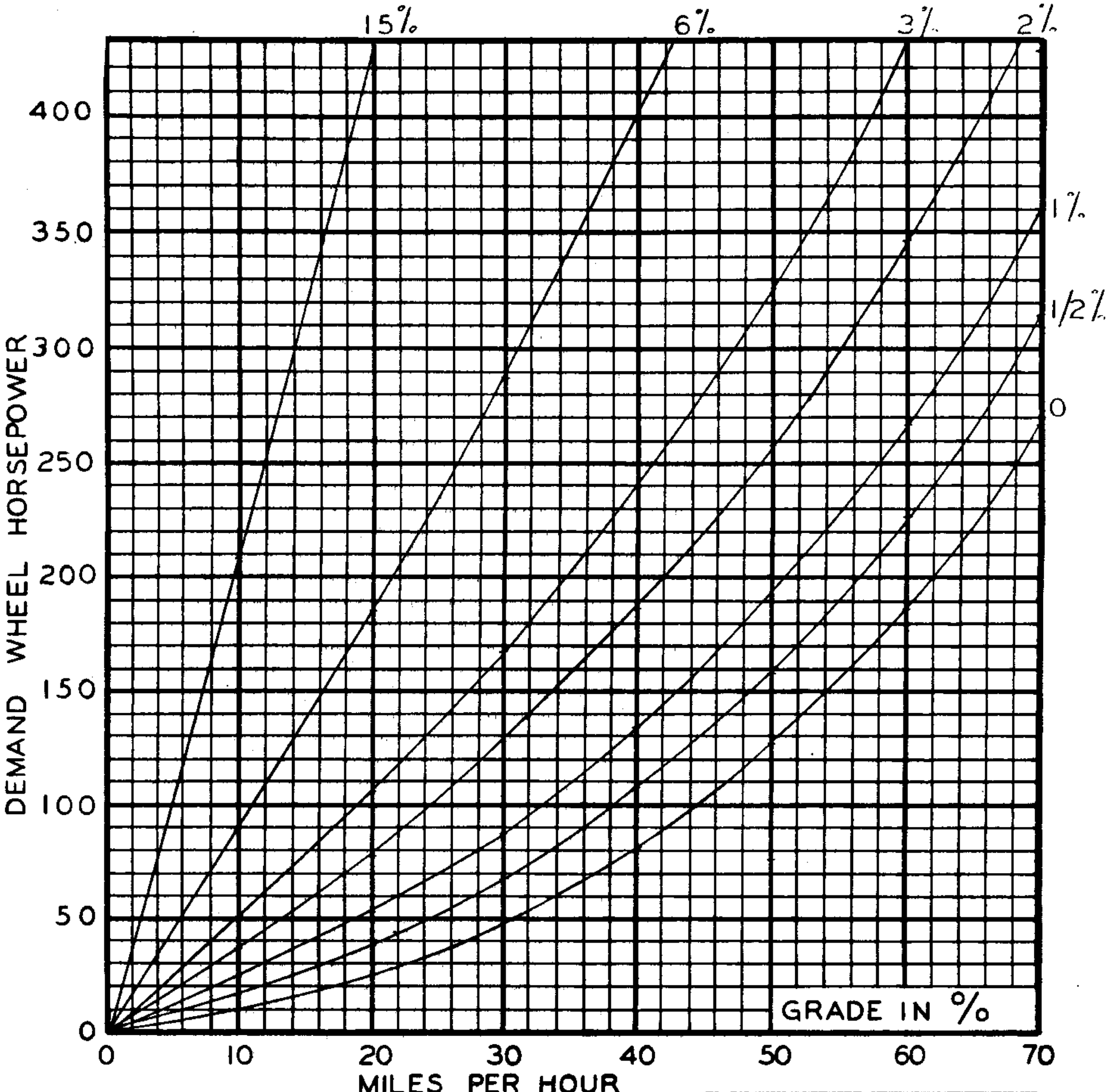
GCW. 50,000 LBS.
HEIGHT 12 FT.
WIDTH 8 FT.

REMARKS ____________

7SA535
R5-0097

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ______ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

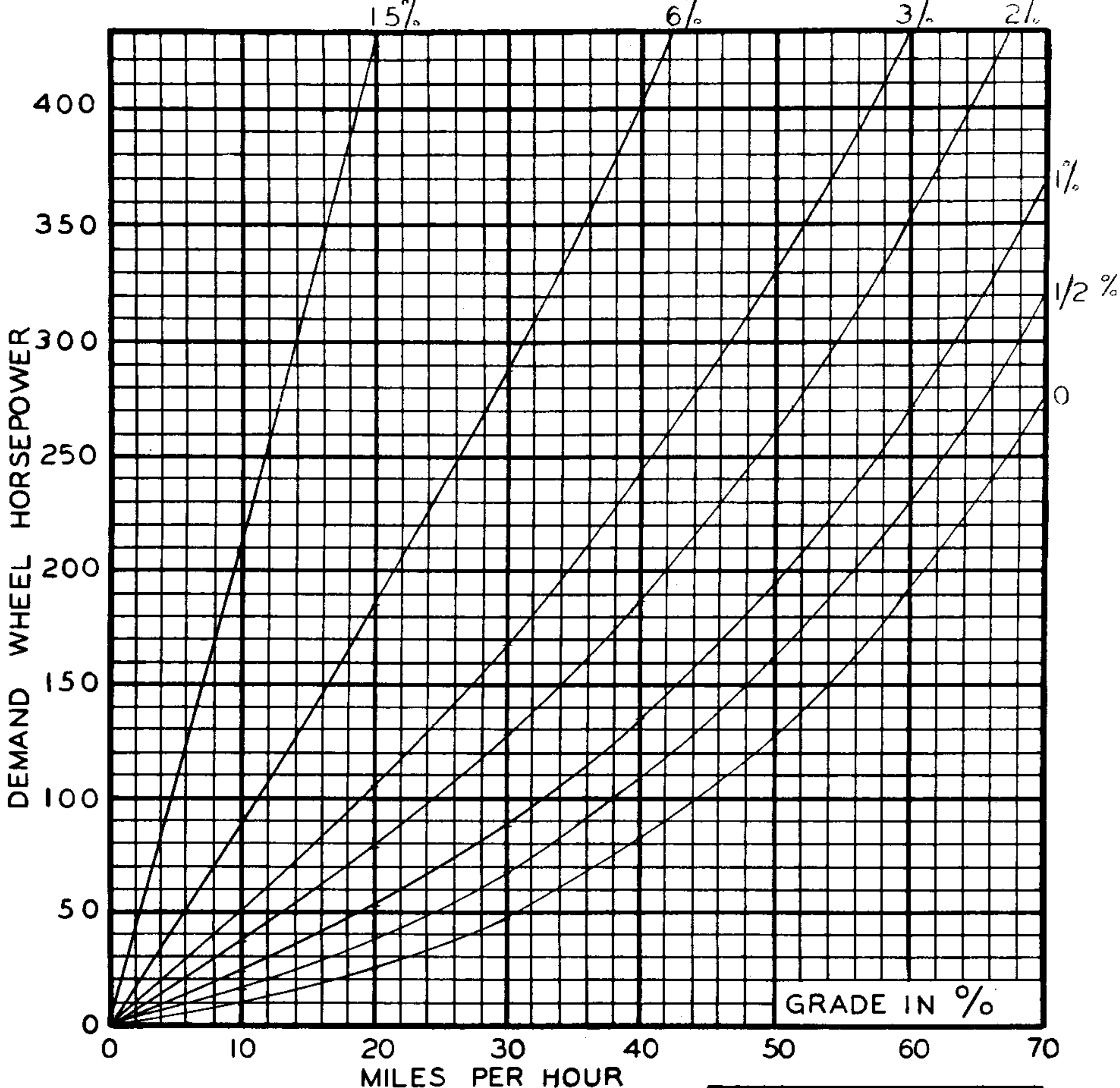
TIRE REVS/MILE ____________________

GCW.	50,000	LBS.
HEIGHT	12 1/2	FT.
WIDTH	8	FT.

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS ____________

REAR AXLE ____________

TIRE SIZE ____________

TIRE REVS/MILE ____________

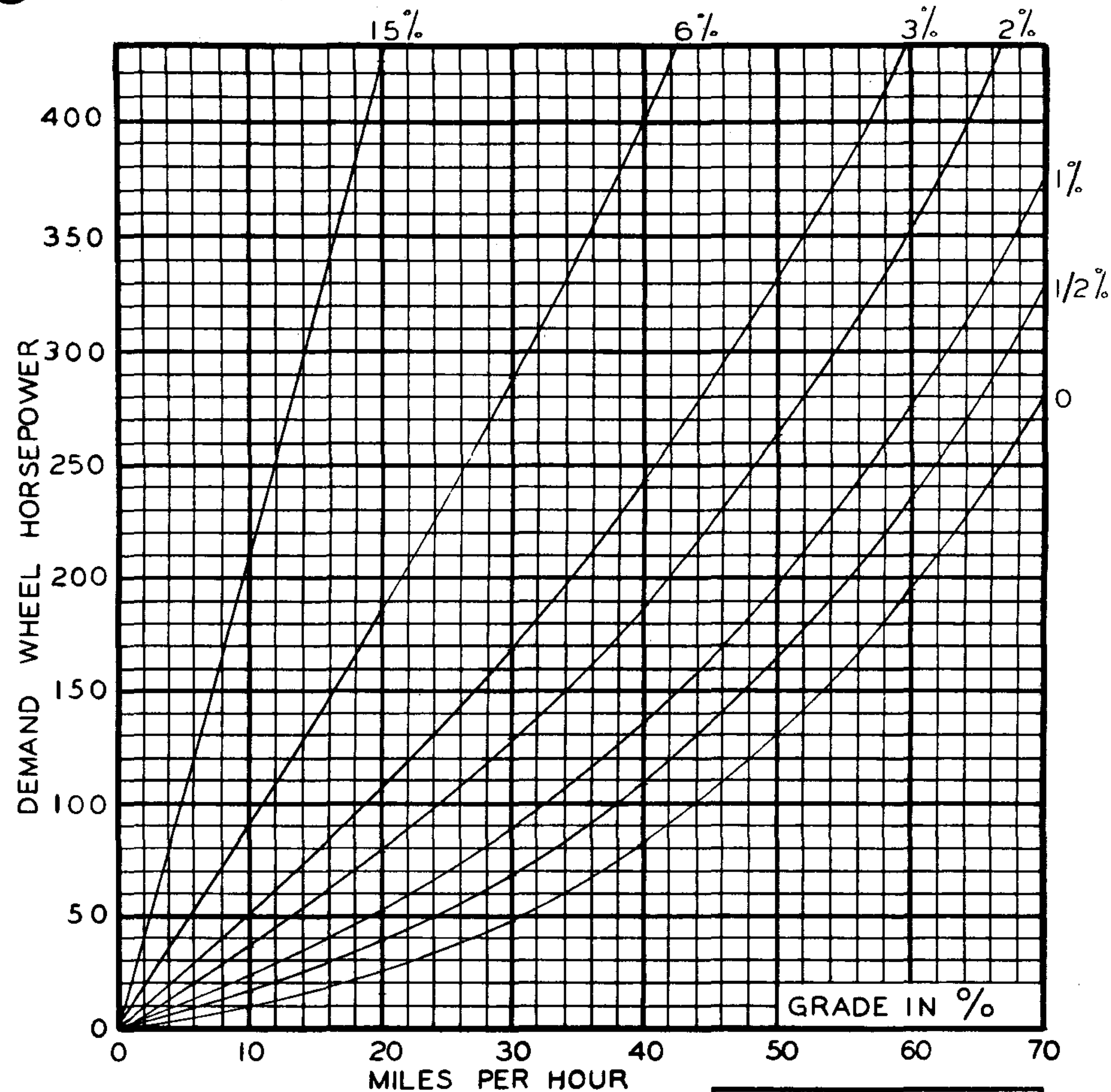
GCW. 50,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ____________

7SA535
R5-0097
39

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

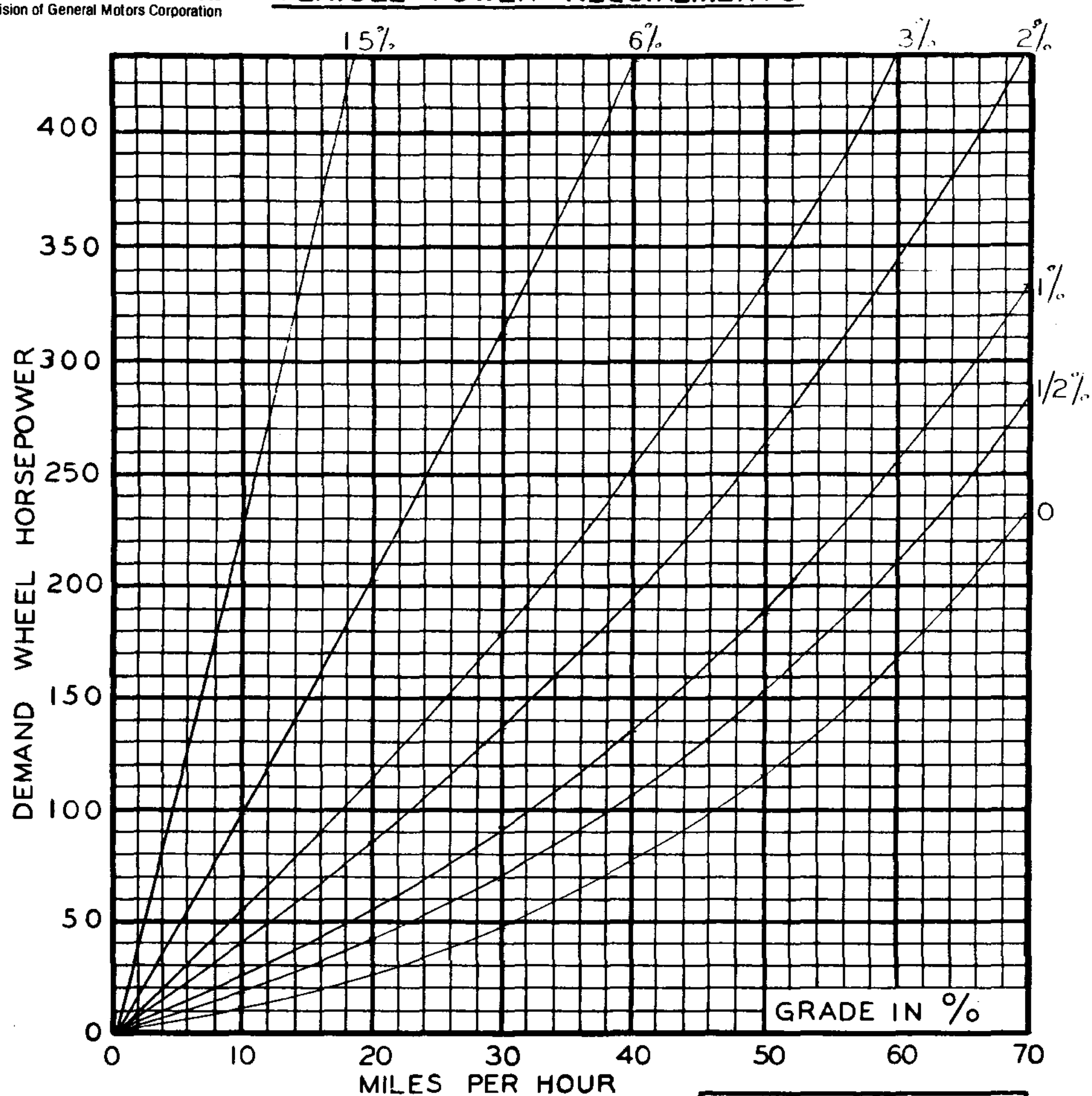
TIRE REVS/MILE ____________________

GCW. 50,000 LBS.
HEIGHT 13 1/2 FT.
WIDTH 8 FT.

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

TIRE REVS/MILE ____________________

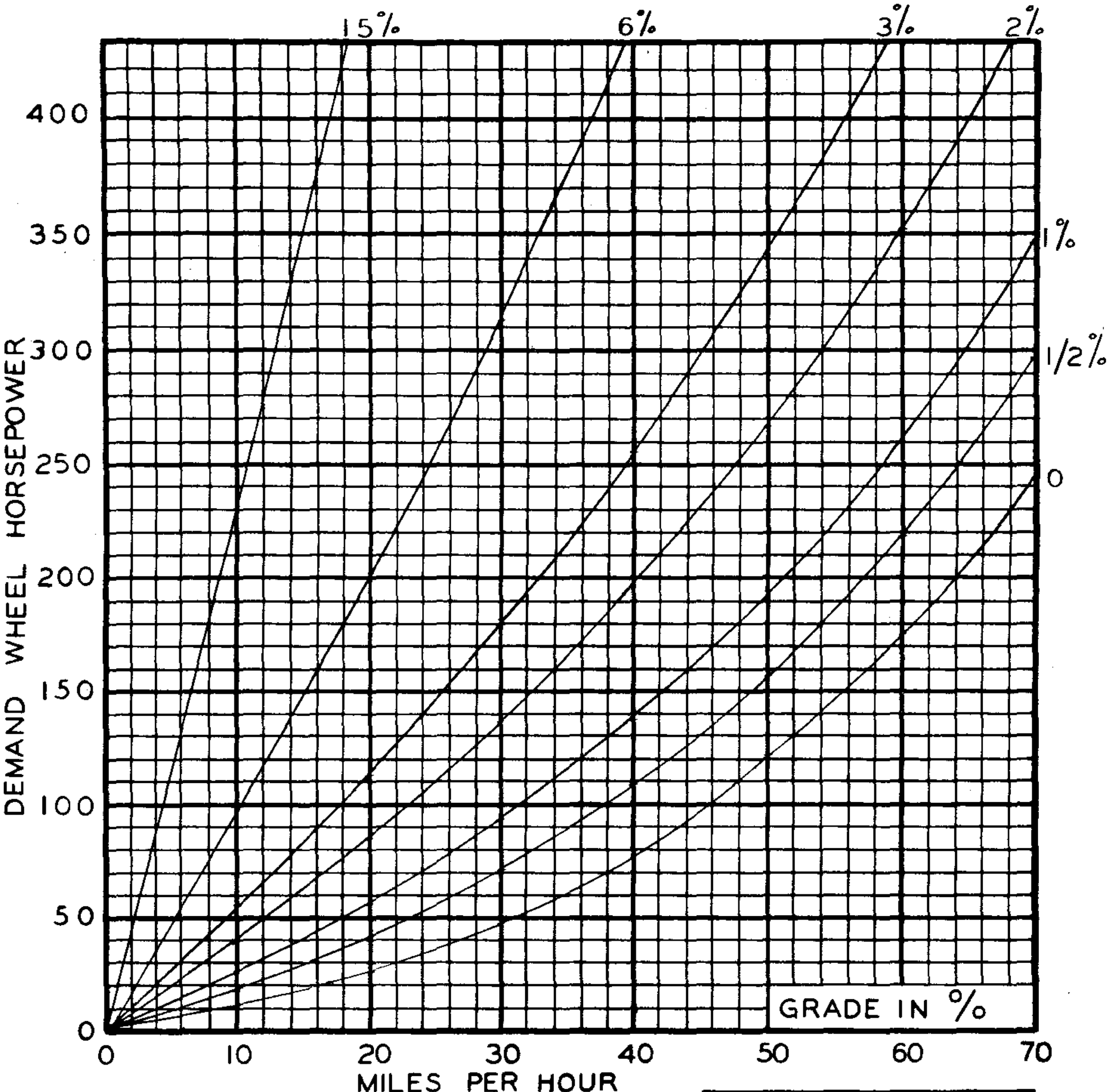
GCW. 55,000 LBS.
HEIGHT 9 FT.
WIDTH 8 FT.

REMARKS ____________________

7SA535
R5-0097

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ________________

ENGINE ________________

GOV. R.P.M. ______ INJ. ______

TRANS. ________________

AUX. TRANS. ________________

REAR AXLE ________________

TIRE SIZE ________________

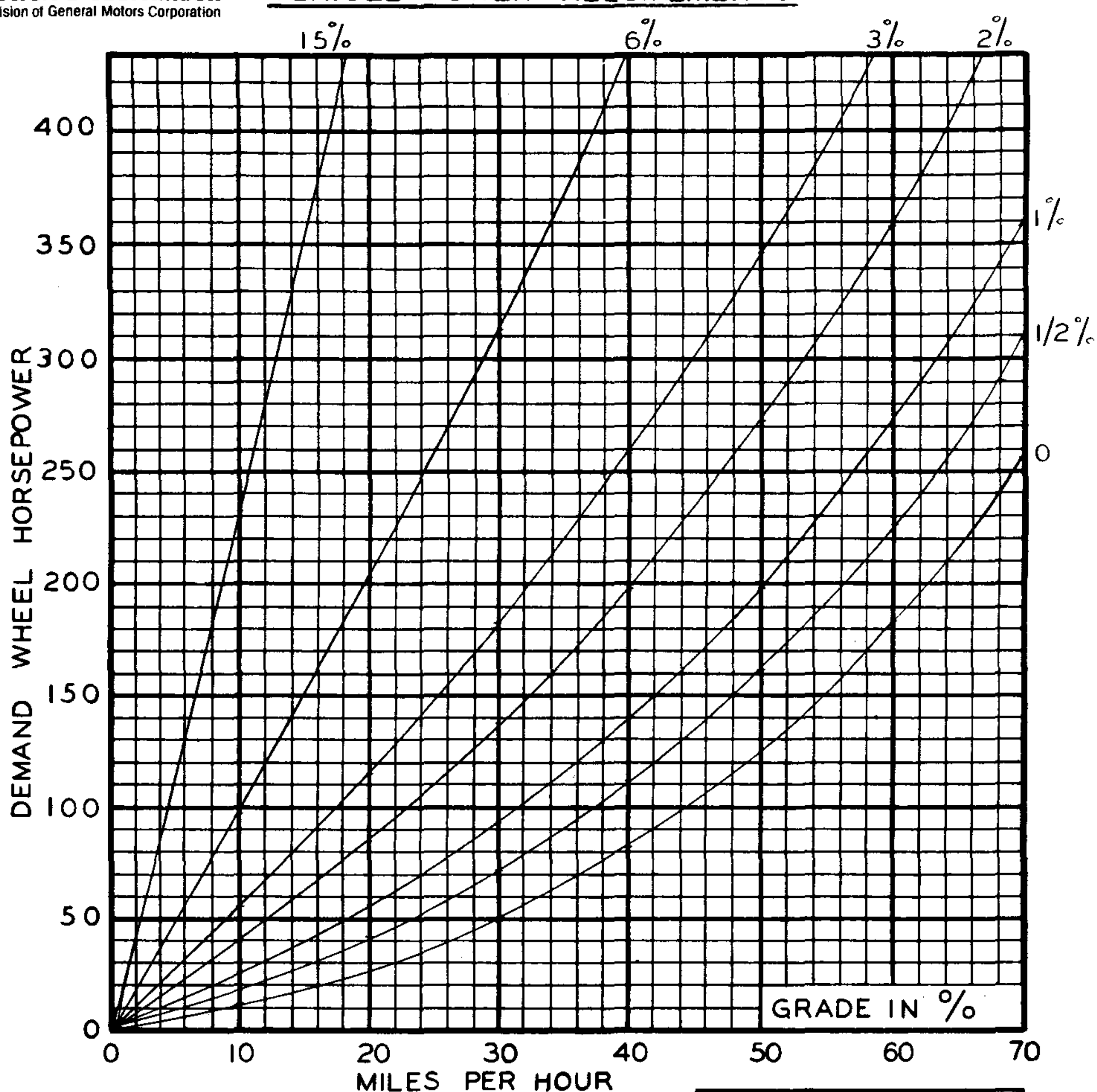
TIRE REVS/MILE ________________

GCW. 55,000 LBS.
HEIGHT 10 FT.
WIDTH 8 FT.

REMARKS ________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

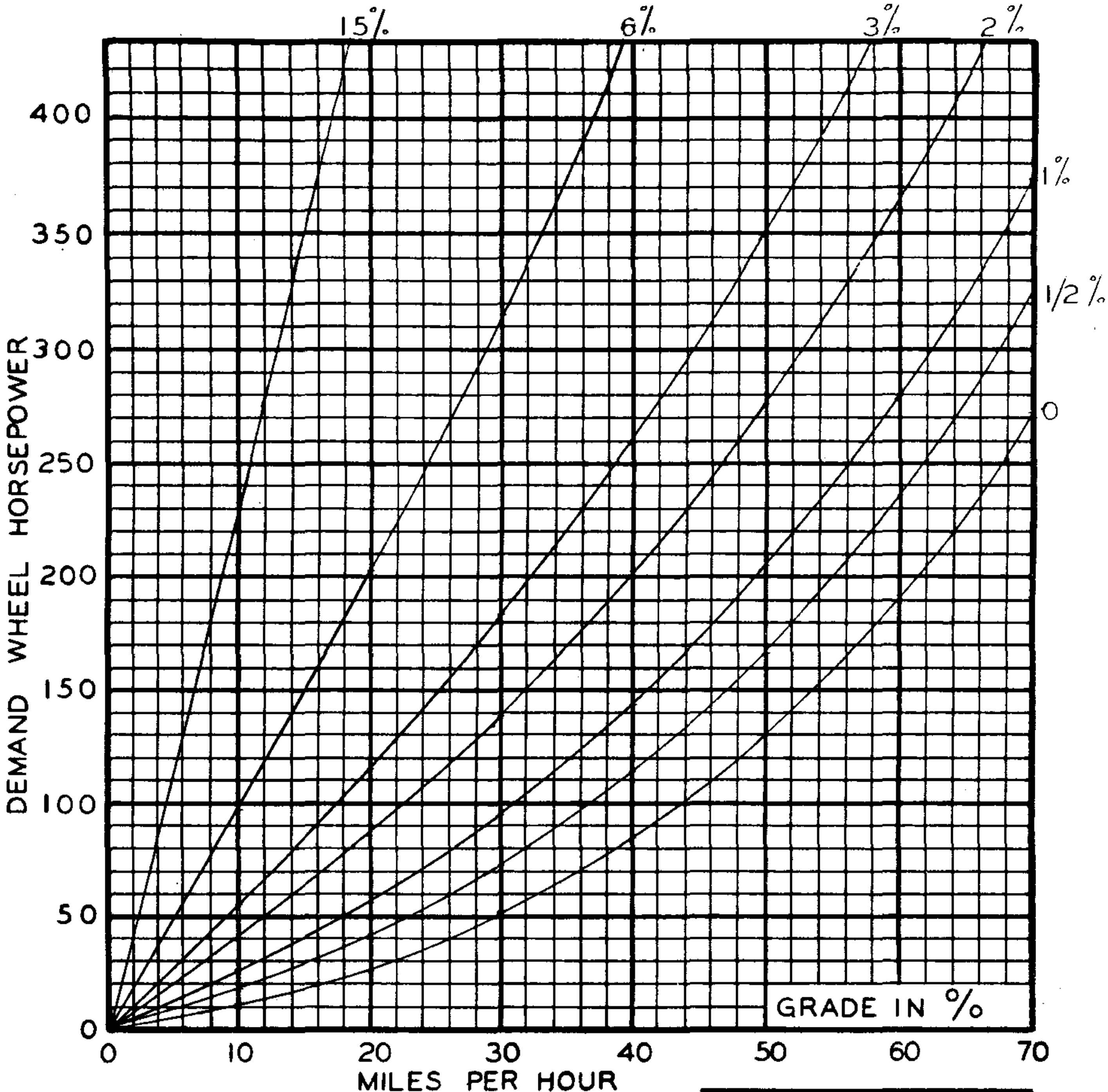
TIRE REVS/MILE ____________

GCW. 55,000	LBS.
HEIGHT 11	FT.
WIDTH 8	FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

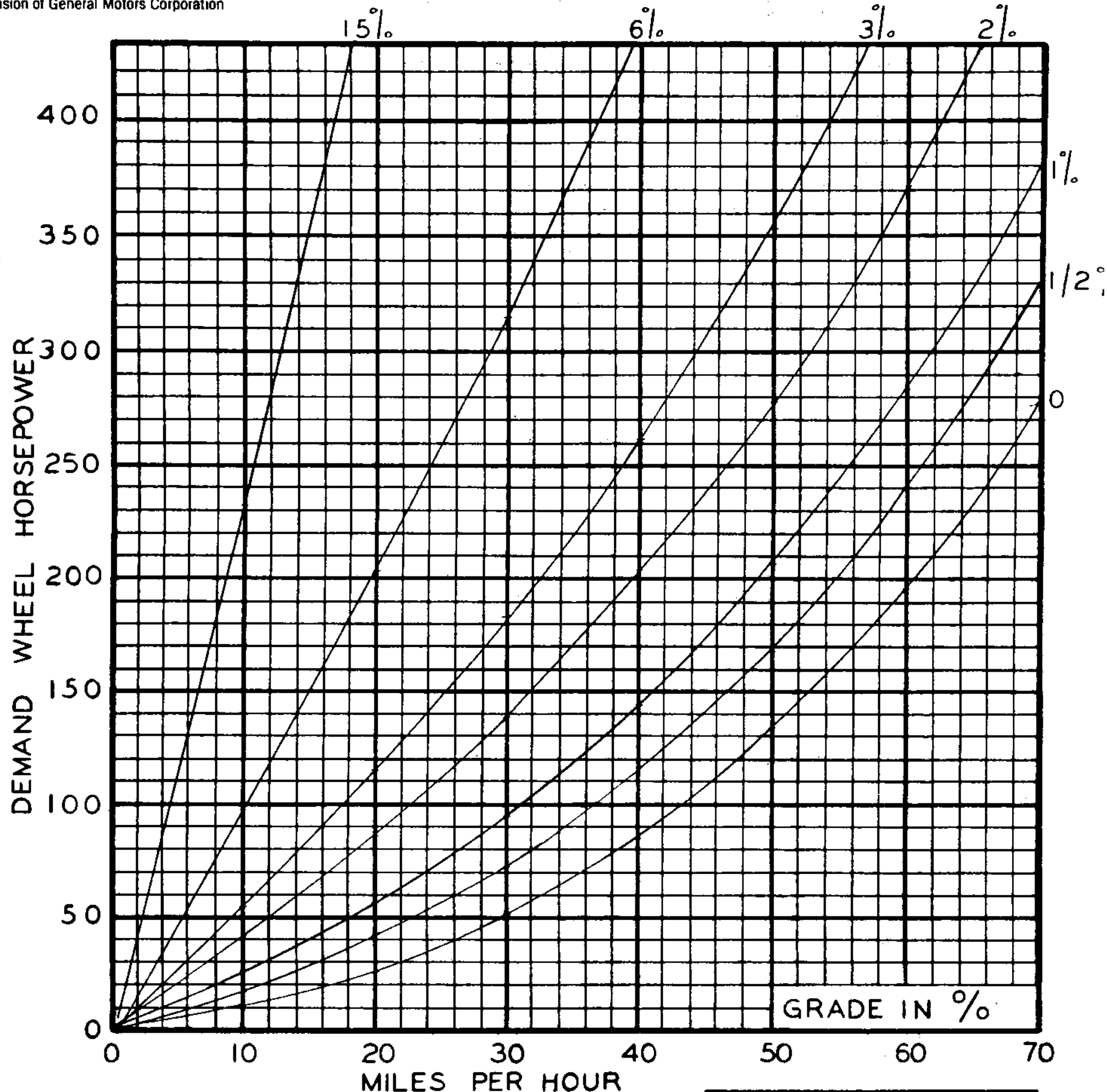
TIRE REVS/MILE ____________

GCW. 55,000 LBS.
HEIGHT 12 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ________________

ENGINE ________________

GOV. R.P.M. ______ INJ. ______

TRANS. ________________

AUX. TRANS. ________________

REAR AXLE ________________

TIRE SIZE ________________

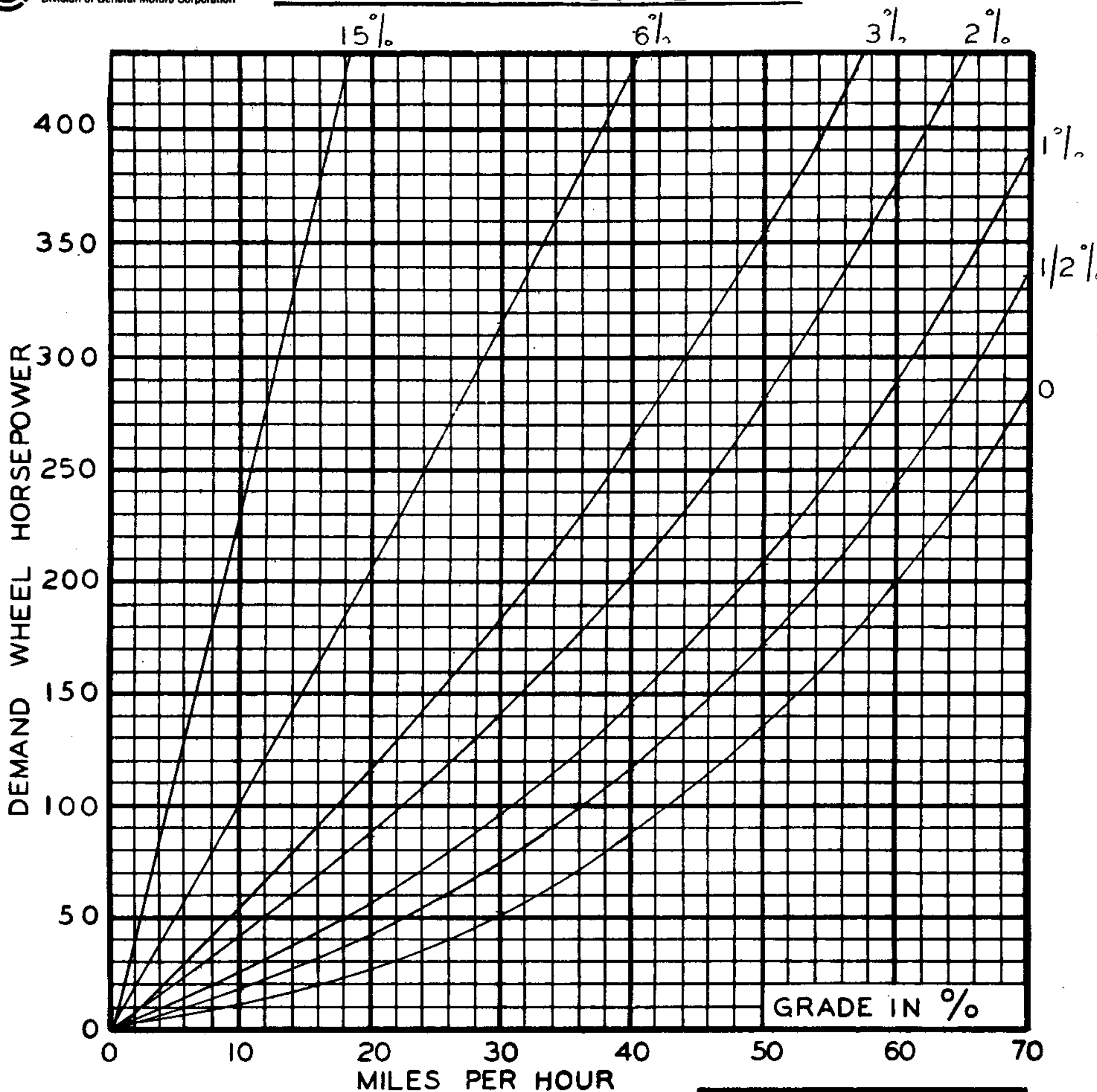
TIRE REVS/MILE ________________

GCW. 55,000 LBS.
HEIGHT 12 1/2 FT.
WIDTH 8 FT.

REMARKS ________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

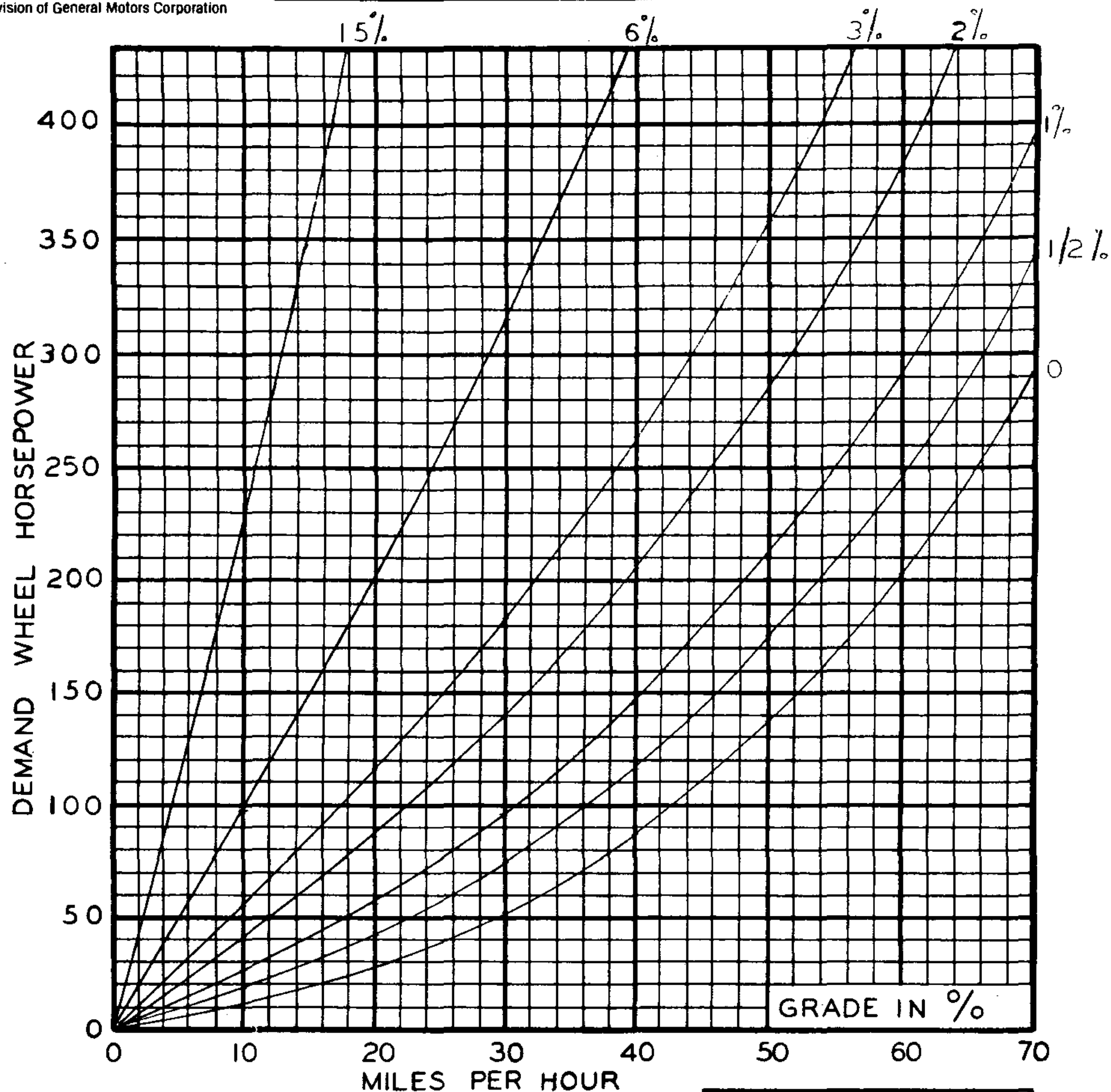
TIRE REVS/MILE ____________

GCW. 55,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________________

ENGINE ____________________

GOV. R.P.M. ________ INJ. ________

TRANS. ____________________

AUX. TRANS. ____________________

REAR AXLE ____________________

TIRE SIZE ____________________

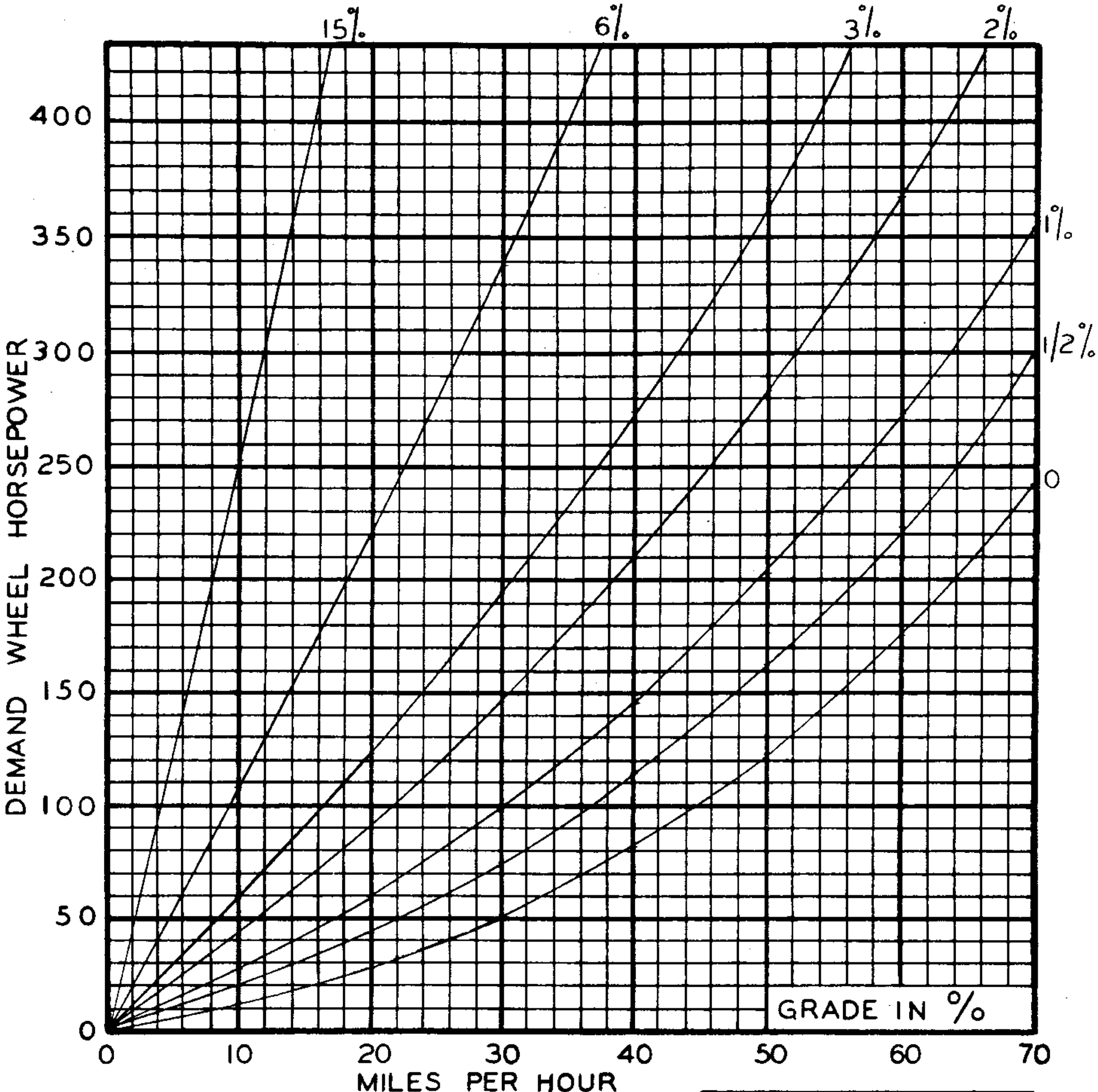
TIRE REVS/MILE ____________________

GCW. 55,000	LBS.
HEIGHT 13 1/2	FT.
WIDTH 8	FT.

REMARKS ____________________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

TIRE SIZE ____________

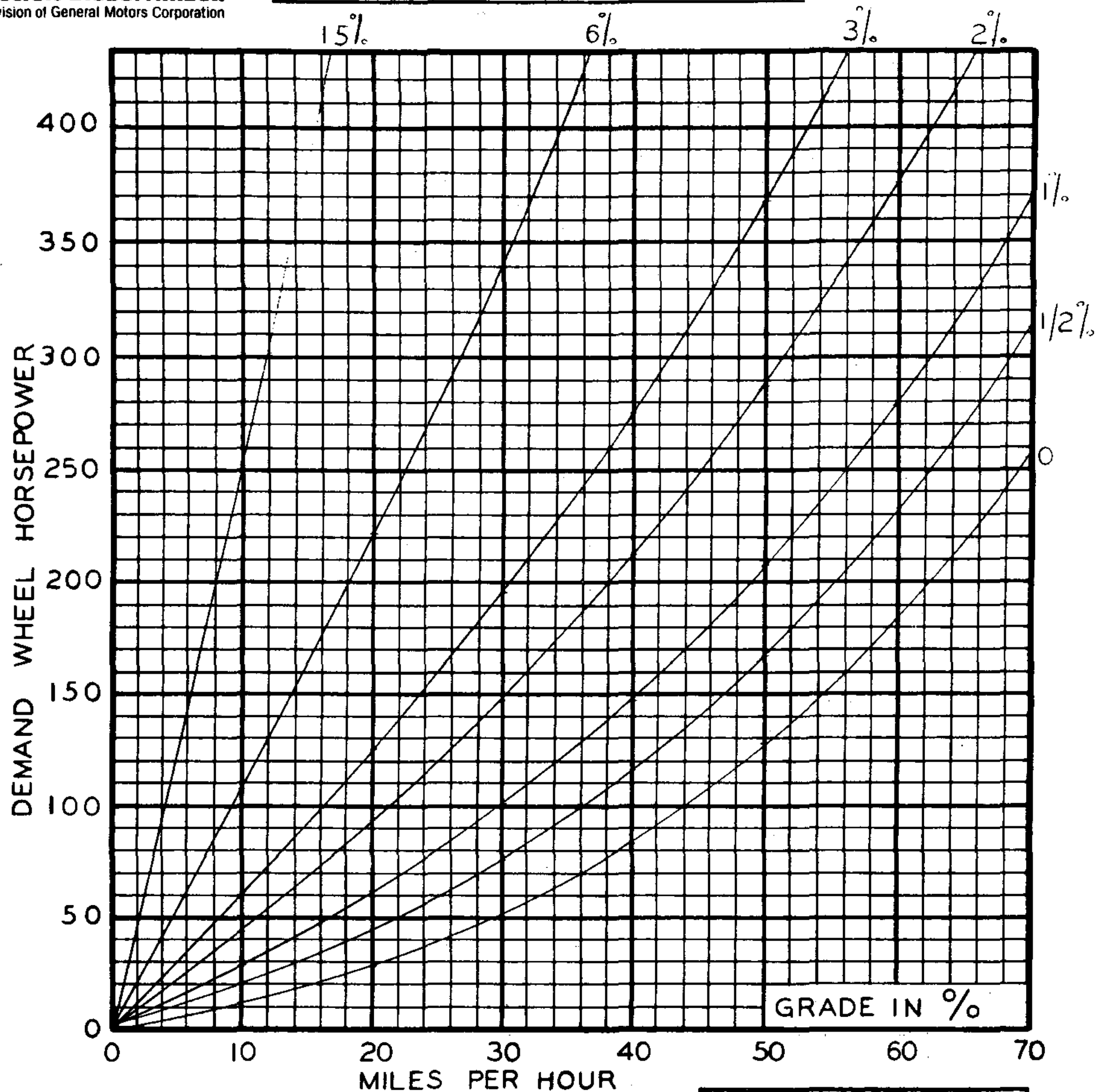
TIRE REVS/MILE ____________

GCW. 60,000 LBS.
HEIGHT 9 FT.
WIDTH 8 FT.

REMARKS ____________

Detret Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 60,000 LBS.
HEIGHT 10 FT.
WIDTH 8 FT.

VEHICLE ______

ENGINE ______

GOV. R.P.M. ______ INJ. ______

TRANS. ______

AUX. TRANS. ______

REAR AXLE ______

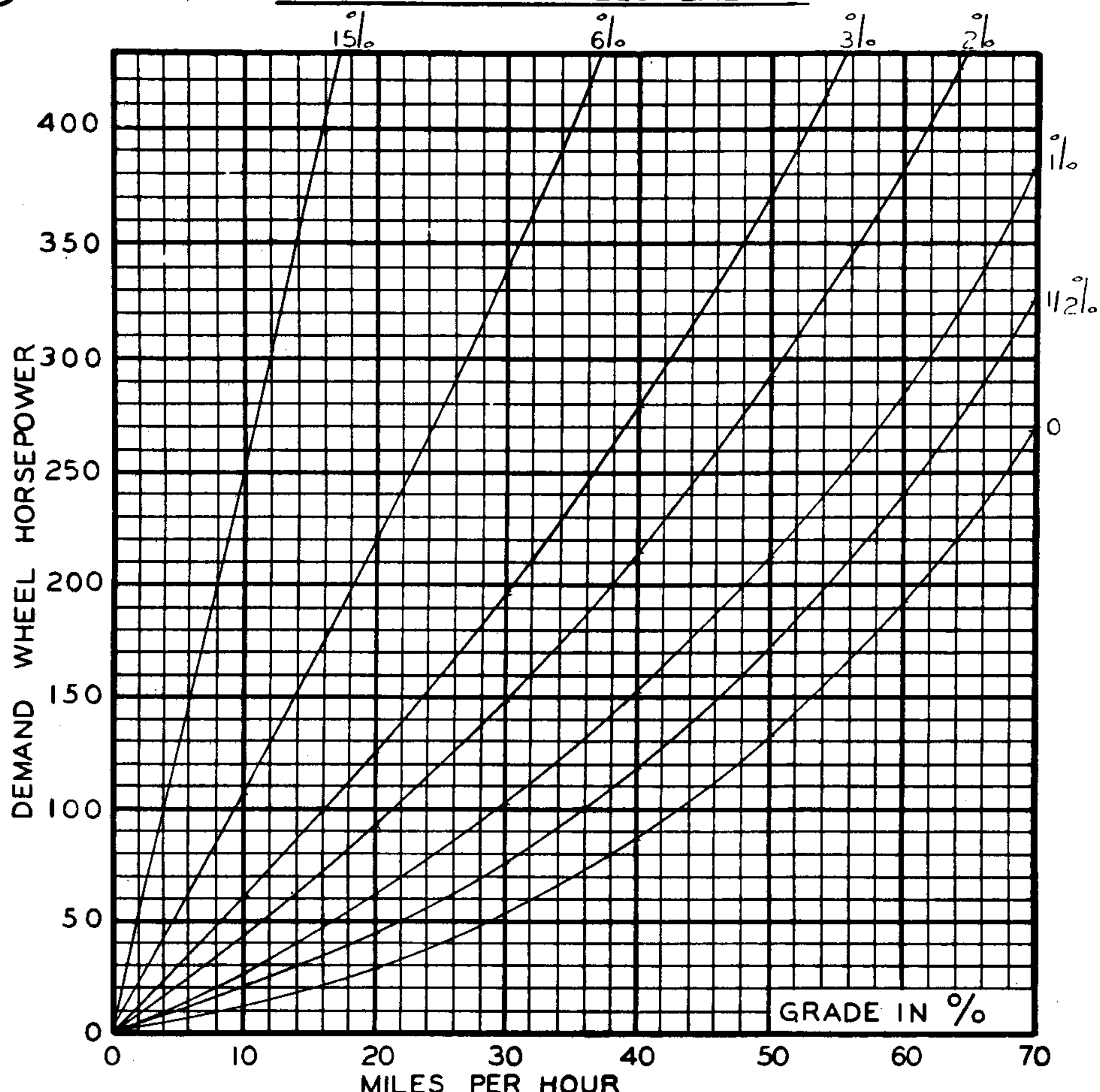
TIRE SIZE ______

TIRE REVS/MILE ______

REMARKS ______

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ______

ENGINE ______

GOV. R.P.M ______ INJ. ______

TRANS. ______

AUX. TRANS. ______

REAR AXLE ______

TIRE SIZE ______

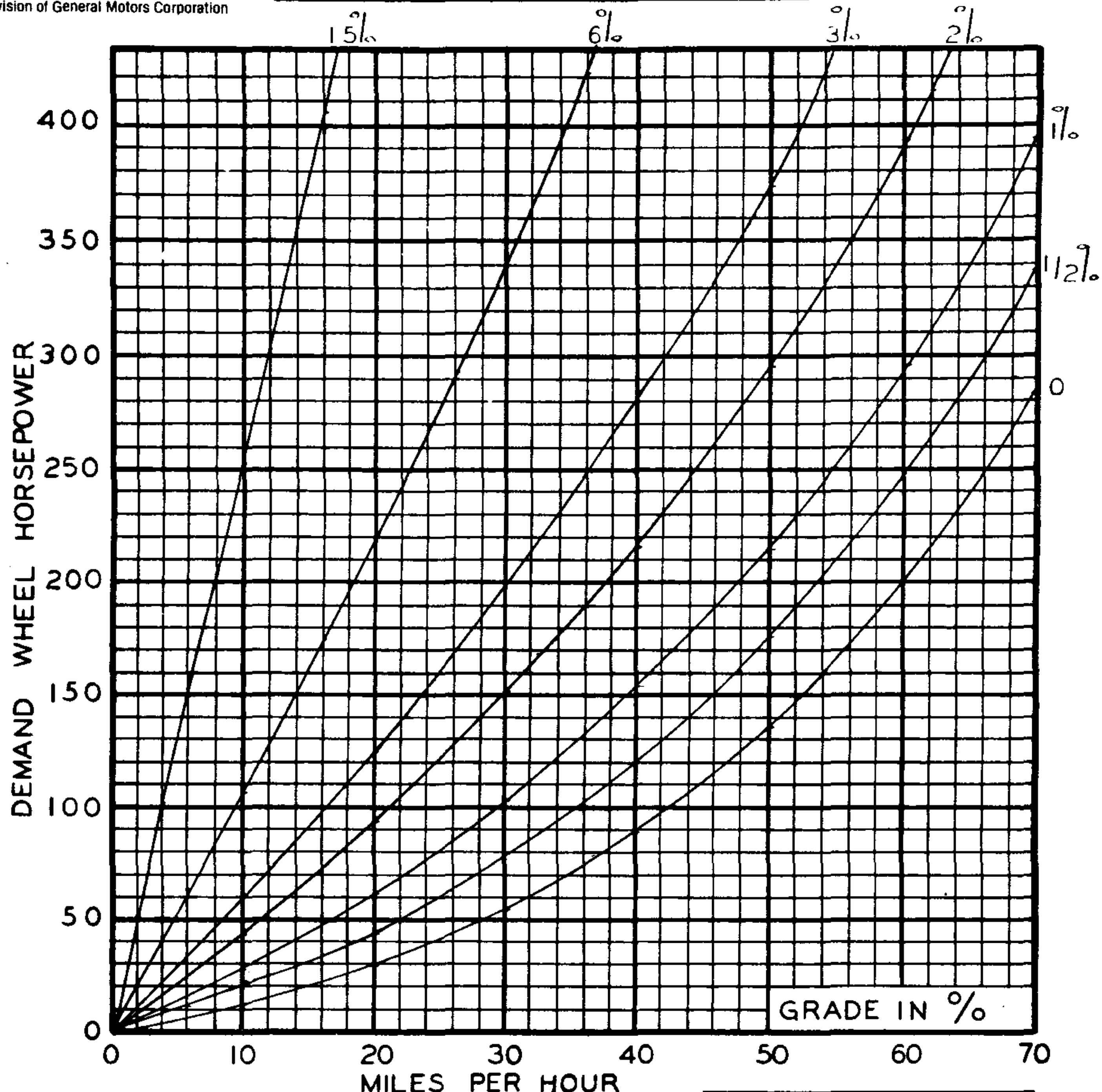
TIRE REVS/MILE ______

GCW. 60,000 LBS.
HEIGHT 11 FT.
WIDTH 8 FT.

REMARKS ______

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE __________

ENGINE __________

GOV. R.P.M _____ INJ. _____

TRANS. __________

AUX. TRANS. __________

REAR AXLE __________

TIRE SIZE __________

TIRE REVS/MILE __________

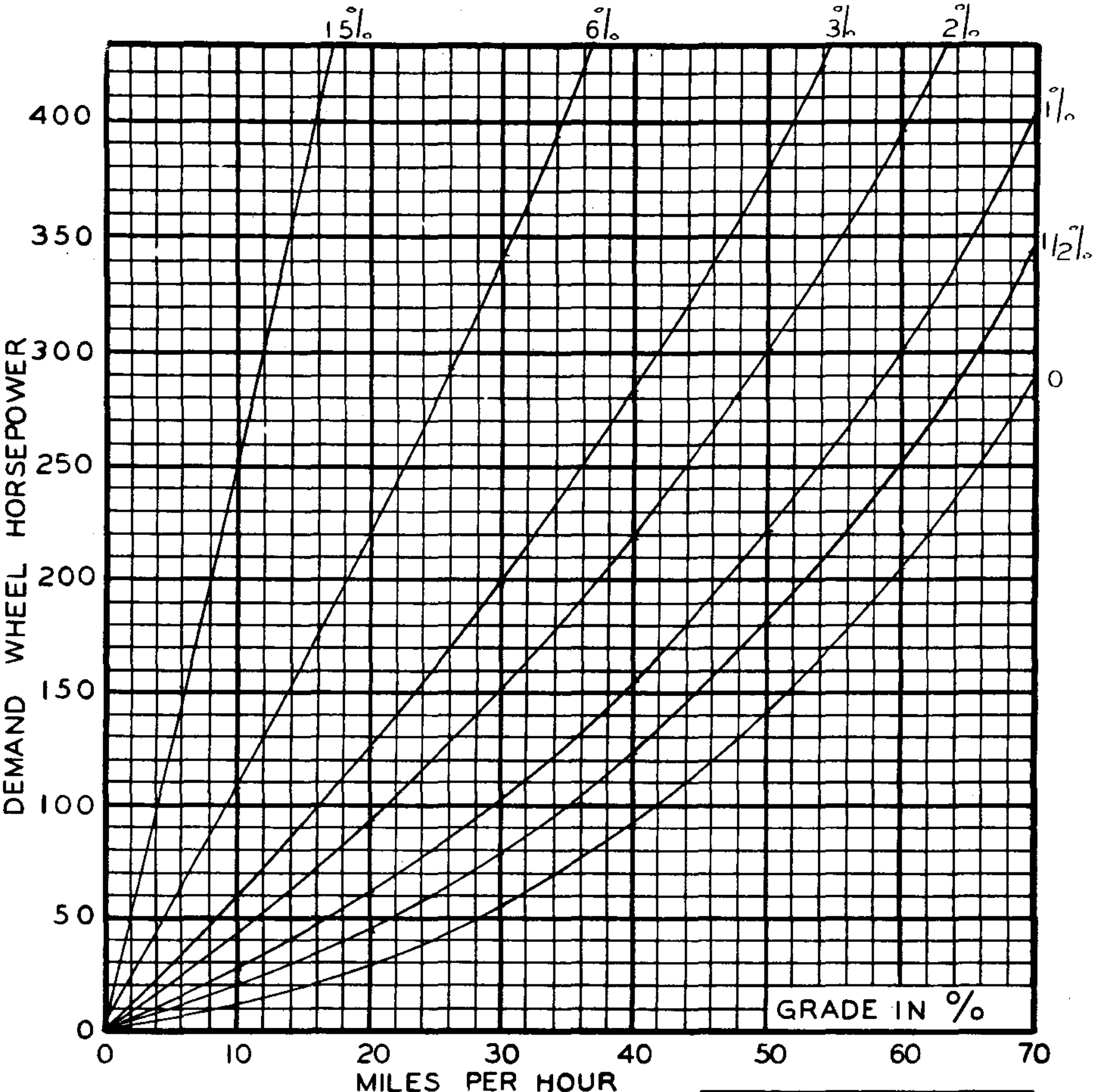
GCW. 60,000 LBS.
HEIGHT 12 FT.
WIDTH 8 FT.

REMARKS __________

7SA535
R5-0097
51

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW.	60,000 LBS.
HEIGHT	12 1/2 FT.
WIDTH	8 FT.

VEHICLE ____________

ENGINE ____________

GOV. R.P.M. ______ INJ. ______

TRANS. ____________

AUX. TRANS. ____________

REAR AXLE ____________

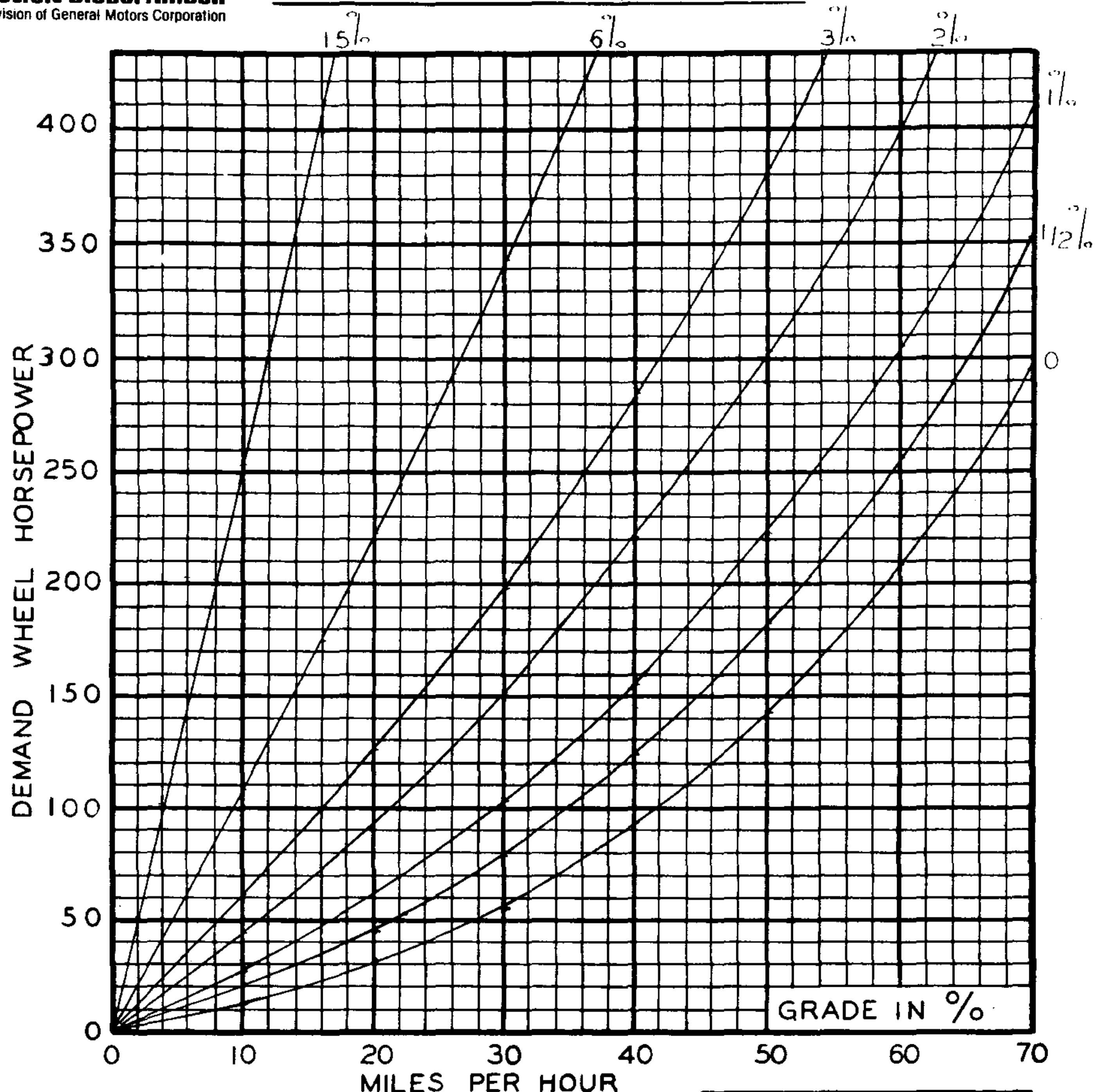
TIRE SIZE ____________

TIRE REVS/MILE ____________

REMARKS ____________

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



VEHICLE ______________

ENGINE ______________

GOV. R.P.M ______ INJ. ______

TRANS. ______________

AUX. TRANS ______________

REAR AXLE ______________

TIRE SIZE ______________

TIRE REVS/MILE ______________

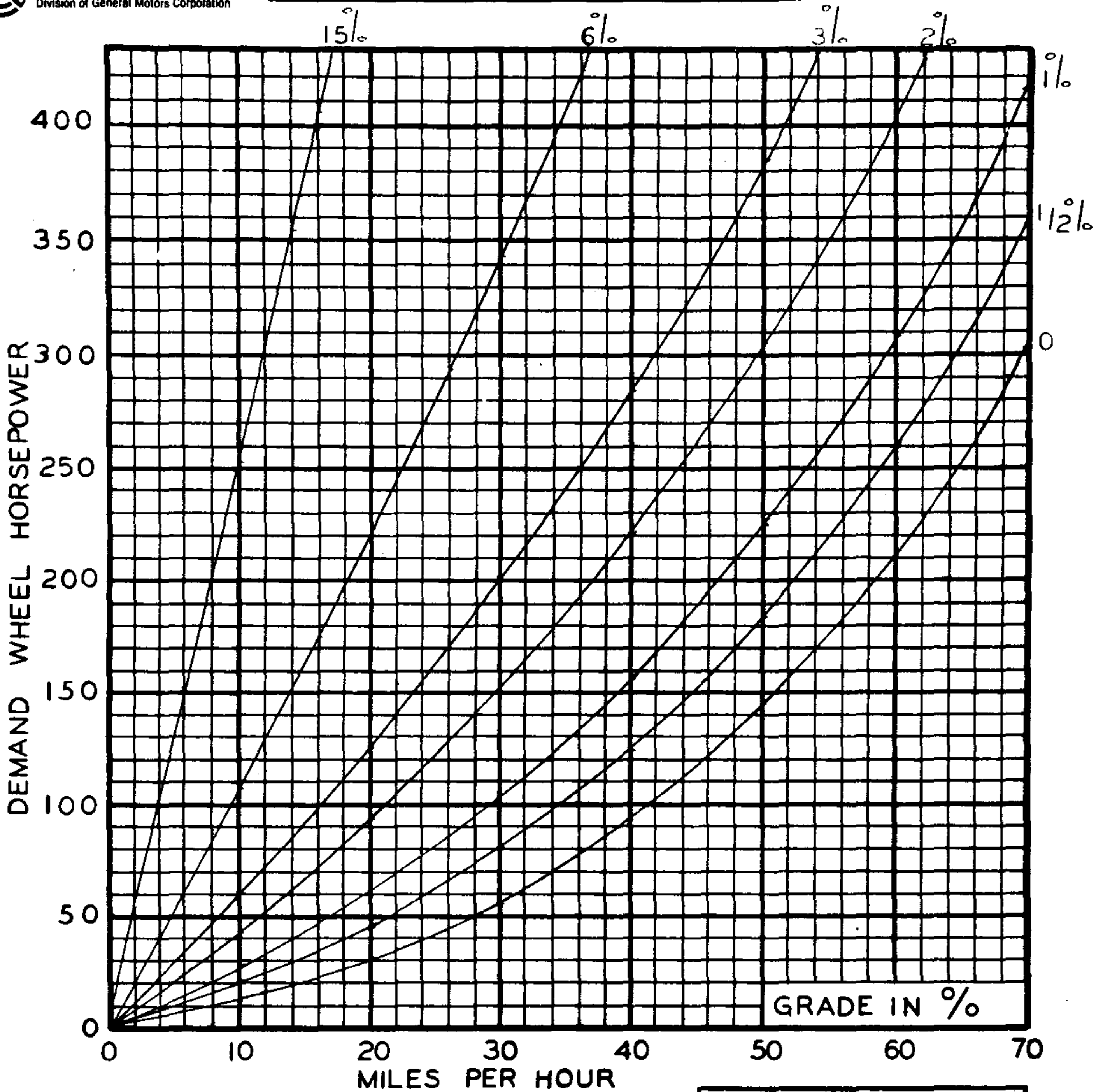
GCW. 60,000 LBS.
HEIGHT 13 FT.
WIDTH 8 FT.

REMARKS ______________

7SA535
R5-0097
53

Detroit Diesel Allison
Division of General Motors Corporation

VEHICLE POWER REQUIREMENTS



GCW. 60,000 LBS.
HEIGHT 13 1/2 FT.
WIDTH 8 FT.

VEHICLE ______________

ENGINE ______________

GOV. R.P.M. ______ INJ. ______

TRANS. ______________

AUX. TRANS. ______________

REAR AXLE ______________

TIRE SIZE ______________

TIRE REVS/MILE ______________

REMARKS ______________