INTERNATIONAL

L-LINE

PRODUCT INFORMATION

No. 2

GMC AND STUDEBAKER COMPARISONS

LC-160 AND LC-180 COMPARISONS

LB-140 MILK DELIVERY CHASSIS

HEAVY DUTY DIESEL TRACTORS

HEAVY–HEAVY DIESEL CHASSIS

Motor Truck Division

INTERNATIONAL HARVESTER COMPANY

180 NORTH MICHIGAN AVENUE CHICAGO 1, ILLINOIS

L-Line Product Information
- No. 2 -
(Form No. CT-62)

INTRODUCTION

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NOTE: The tabs below have been converted to links for your convenience. (Click on the red-boxed areas to go to the section of interest)

This booklet has been prepared to assist International Motor Truck dealers and salesmen in their every day selling problems.

As noted on the tabs, the following major subjects are discussed:

GMC - Comparisons
Studebaker - Comparisons
(these two sections are being provided here in response to requests received during the April-May Product meetings.)
LC-160 - Comparisons
LC-180 - Comparisons
LB-140 - Milk Delivery Unit.
Diesel units - L-190, L-200 series
Heavy duty units, gasoline and diesel.

The information contained in this book can be of inestimable value to every individual selling International trucks, if the material is digested and then used properly.

We recommend that all sales people become familiar with the features and design of our product, and to then make certain that all prospective truck buyers are made aware of the many salient features designed and built into the L-line of Internationals.

Also see some additional cost-comparison data at the end.

September, 1950

Data and Specifications in this booklet are obtained from sources considered to be reliable, but are not guaranteed to be current or correct.

NOTE:

The Product Information Booklet, Form No. CT-310 used during the April-May 1950 meetings contained information on International L-line units versus certain competitive units.

On May 15, 1950 new axle ratings and gross vehicle weight ratings were announced. These new ratings should be used in place of the ratings listed in the CT-310. For your ready reference, the new ratings are listed below.

Only the Maximum Rating for each Series is Shown

Chassis Series	Front Axle	Rear Axle	G.V.W.
L-110	2,500 lb.	3,300 lb.	5,400 lb.
L-120	2,720	4,500	6,500
L-130	3,100	6,000	8,600
L-150	3,900	10,000	12,500
L-160	4,700	13,000	16,000
L-170	5,000	14,500	19,000

GMC - Comparisons

SELLING THE L-110 SERIES AGAINST THE GMC FC-100 SERIES

	L-110 Series	GMC FC-100 Series
Max. Gross Vehicle Weight	5400 lb.	4600 lb.
Number of Wheelbases	2(115"-127")	2(116"-125-1/4")
Front Axle - rating	2500 lb.	2200 lb.
Track	60-1/2"	56-1/2"
Weight of I-Beam	50 lb.	32 lb.
Wheel Spindle - Inner	1-10/32"	1-9/32"
Outer	13/16"	12/16"
Engine - Cu. In. Displacement	220	228
Max. Horsepower	100 @ 3600	96 @ 3200
Exhaust valve seat insert	Yes	No
U-Flex oil ring	Yes	No
Projected main bearing area	15.848	14.97
Standard air cleaner	Oil bath	Oil wetted
Crankshaft weight	93	85
Clutch - Diameter	10"	9"
Lining area (sq. in.)	91.82	66
Transmission		
3 Speed Syncromesh Std.	Yes	Yes
3 Speed heavy duty Syncro. optional	Yes	No
4 Speed optional	Yes	Yes
Rear Axle - Rating	3300 lb.	3300 lb.
Hypoid-Semi-Floating	Yes	Yes
Straddle mounted pinion	Yes	No
Welded cover for additional strength	Yes	No
Ratios available	3.72, 4.11	4.11
Brakes - Type	Full Duo-Servo	Modified Duo-Servo
Front size	12x1-3/4	11x1-3/4
Rear size	12x1-3/4	11x1-3/4
Lining area - sq. in.	156.4	164.0
Front Springs - size	42-1-3/4	38-1-3/4
Push Button Starter	Yes	No

SELLING THE L-120 SERIES AGAINST THE GMC FC-150 SERIES

	L-120 Series	GMC FC-150 Series
Max. Gross Vehicle Weight	6500 lb.	5800 lb.
Number of wheelbases	2(115"-127")	1(125-1/4")
Turning Radius - Centerline of Tire (Comparable wheelbase)	20½'	22'
Front Axle - Rating	2700 lb.	2500 lb.
Track	60½"	57"
Engine - cu. in. Displacement	220	228
Max. Horsepower	100 @ 3600	96 @ 3200
Exhaust valve seat insert	Yes	No
U-Flex oil ring	Yes	No
Projected main bearing area	15.848	14.97
Standard air cleaner	Oil bath	Oil wetted
Crankshaft weight	93	85
Clutch - Standard	10"	10-3/4"
Lining area (sq. in.)	91.82	110
Optional clutch	11"	None
lining area (sq. in.)	111.52	
Transmission		
3 Speed syncromesh standard	Yes	Yes
3 Speed heavy-duty syncrom. optional	Yes	No
4 Speed optional	Yes	Yes
Rear Axle - Ratios available	4.1, 4.777, 5.13	4.57, 5.14
Full floating, hypoid	Yes	Yes
Welded cover for additional strength	Yes	No
Brakes - type	Full duo-servo	Modified duo-servo
Front size	12x1-3/4	11x1-3/4
Rear size	12x2	12x2
Front Springs - size	42x1-3/4	38x1-3/4
Push Button Starter	Yes	No

SELLING THE L-130 SERIES AGAINST THE GMC FC-250 SERIES

	L-130 Series	GMC FC-250 Series
Max. Gross Vehicle Weight	8600 lb.	8800 lb.
Turning Radius - centerline of tire (134" WB on L-130, 137" WB on GMC)	22'	24'
Front Axle - Track	60-1/2"	56-1/4"
I-Beam	2-7/8x2x3/8	2-1/4x2x11/32
Wheel spindle - Inner	1-18/32	1-13/32
Outer	30/32	27/32
Engine, cu. in. Displacement	220	228
Max. Horsepower	100 @ 3600	96 @ 3200
Exhaust valve seat inserts	Yes	No
U-Flex oil ring	Yes	No
Projected main bearing area	15.848	14.97
Standard air cleaner	Oil bath	Oil bath
Crankshaft weight	93	85
Clutch - Standard	10"	10-3/4"
Lining area (sq. in.)	91.82	110
Optional clutch	11"	None
lining area (sq. in.)	111.52	
Transmission - Standard	4 speed	4 speed
Optional 3 speed heavy-duty with remote control	Yes	No
Rear axle - ratios available	4.88, 5.571, 6.166	5.14
Hypoid - full floating	Yes	Yes
Wheel bearing inside diamater - Inner	2-32/64	2-17/64
Outer	2-2/32	2-1/32
Welded cover for additional strength	Yes	No
Axleshaft diameter - Minimum	1-25/64"	1-22/64"
Push Button Starter	Yes	No

SELLING THE L-150 SERIES AGAINST THE GMC FC-280 SERIES

	L-150 Series	GMC FC-280 Series
Max. Gross Vehicle Weight	12,500 lb.	11,000 lb.
Std. Chassis Weight - less cab	4,066 lb.	3,850 lb.
Comparable wheelbase - 7.00x20 10-ply tires		
Number of wheelbases	3 (130, ~~138~~, 154)	2(137, 161)
Front Axle Rating	3,900 lb.	4,500 ~~3,500~~ lb.
I-Beam size	2-7/8x2x3/8	2-1/4x2x5/16
Track (7.50x20 tires)	62-7/16"	56"
King Pin diameter	1-1/8"	59/64"
Wheel spindle diameter - Inner	1-18/32	1-13/32
Outer	30/32	27/32
Frame - Short Wheelbase	8-1/8x2-15/16x3/16	7x2-3/4x7/32
Section Modulus	6.05	5.52
Long WB - section modulus	6.05	8.80
Engine, cu. in. Displacement	220	228
Max. horsepower	~~Yes~~ 100 AT 3100 R P M	~~No~~ 100-3400 R P M
Exhaust valve seat inserts	Yes	No
U-Flex oil ring	Yes	No
Projected Main Bearing Area	15.848	14.97
Standard air cleaner	Oil bath	oil bath
Crankshaft weight	93	85
8 Flow Roto valves	yes	yes
Clutch - Standard	10"	10-3/4"
Lining area	91.82	110
Optional clutch	11"	None
Lining Area	111.52	None
Transmission - Standard	4 Speed Spur Gear	4 Speed Syncromesh
Optional	4 Speed	None
Rear Axle, Hypoid Full Floating	Yes	Yes 11,000
Rating	10,000 lb.	~~10,500~~ lb.
Ratios available	4.88, 5.57, 6.16	5.43, 6.17
Springs - Front Size	46x2	40x2
Rear size	50x2-1/2	46x2-1/2
Push Button Starter	Yes	No
Two Speed axle	yes	no

SELLING THE L-160 SERIES AGAINST THE GMC FC-300 FC-350 SERIES

	L-160 Series	GMC FC-300 Series	GMC FC-350 Series
Max. Gross Vehicle Weight	16,000 lb.	14,000 lb.	16,000 lb.
Chassis Weight, less cab Comparable W.B. 7.50x20 10-ply tires	4,555	4,225	4,410
Wheelbase length for 60" CA	130"	137"	137"
Turning Radius, short W.B.	22'	27'	22'
Front Axle - Rating	4,700	3,500 4,500	4,500
I-Beam size	3x2-1/8x1/2	2-1/4x2x5/16	2-5/8x2x3/8
Track (7.50x20)	63"	56"	62-3/8"
King Pin Diameter	1-8/64"	59/64	1-7/64
Engine, cu. in. displacement	240	248	248
Projected Main bearing area	15.848	14.97	14.97
Cranklin diameter	2-6/16	2-5/16	2-5/16
Crankshaft weight	95	85	85
Clutch size	11"	10-3/4	10-3/4
Lining area (sq. in.)	111.52	110	110
Transmission - 4 speed syncromesh	Yes	Yes	Yes
Rear Axle - Hypoid	Yes	Yes	Yes
Rating	13,000	10,500	12,500
Ratios available	5.285, 6.166 6.66, 7.16	5.43, 6.17	6.17
Axleshaft diameter at spline	1-12/16"	1-9/16"	1-12/16"
Optional 2 speed	Yes	Yes	Yes
Make	Eaton	Eaton or Timken	Eaton or Timken
Shift	Electric	Vacuum	Vacuum
Springs - Front Size	46x2-1/4	45x2	45x2
Rear size	52x2-1/2	46x2-1/2	46x2-1/2
Auxiliary size	34x2-1/2	31x2-1/2	31x2-1/2
Push Button Starter	Yes	No	No

Studebaker - Comparisons

SELLING THE L-110 SERIES AGAINST THE STUDEBAKER 2R5

	L-110 Series	2R5 Series
Maximum Gross Vehicle Weight (Lb.)	5,400	4,600
Std. Chassis Weight, Less Cab, Comparable W.B. and Tires (Lb.)	2,505	2,150
Wheelbases Available	2(115,127)	1(112")
Turning Radius, (Short W.B.)	19'	19'10"
Front Axle - Rating (Lb.)	2,500	2,200
I-Beam	2-4/16x1-11/16 x10/32	2-3/16x1-10/16 x7/32
Spindle Diam. at Inner Brg.	1-5/16"	1-4/16"
King Pin Diameter	55/64"	52/64"
Engine - Type	Valve-In-Head	L-Head
Cubic Inch Displacement	220	169.6
Maximum Net Horsepower	90 @ 3600	75 @ 3600
Maximum Net Torque	167 @ 1200	133 @ 2000
Number of Piston Rings	4	3
U-Flex Oil Ring	Yes	No
Valve Seat Inserts	Yes	No
Crankshaft Weight (Lb.)	93	47-1/2
Main Bearing Diameter	2-12/16"	2-7/16"
Projected Main Bearing Area	17.014	12.4
Rifle Drilled Connecting Rod	Yes	No
Clutch	10"	9-1/4"
Lining Area (Sq.In.)	91.82	77.85
Transmission - Synromesh, Remote Control	Yes	Yes
Torque Capacity (Lb.Ft.)	230	160
Rear Axle - Hypoid Semi-Floating	Yes	Yes
Rating (Lbs.)	3,300	3,200
Axle Shaft Diameter at Spline	1-9/32"	1-7/32"
Straddle Mounted Pinion	Yes	No
Ratios Available	3.73 or 4.1	4.82
Welded cover for additional strength	Yes	No
Front Springs - Size	42x1-3/4	40x1-3/4
Shackled at Rear	Yes	No
Rubber Bushing	Yes	No
Steering	True Geometric	Cross-Steering

SELLING THE L-120 SERIES AGAINST THE STUDEBAKER 2-R-10

	L-120	2-R-10
Maximum Gross Vehicle Rating	6,500 lbs.	6,100 lbs.
Std. Chassis Weight, less cab, comparable tires and WB.	2,927 "	2,400 "
Number of wheelbases	2(115"-127")	1(122")
Turning radius (long WB)	20-1/2'	21'2"
Front axle, rating	2,700 lbs.	2,200 lbs.
I-Beam	2-7/16x1-13/16x10/32	2-3/16x10/16x7/32
Spindle diameter at inner brg.	1-5/16"	1-4/16"
King pin diameter	55/64"	52/64"
Engine, type	Valve-in-head	L-Head
Cubic Inch Displacement	220	169.6
Maximum net horsepower	90 @ 3600	75 @ 3600
Maximum net torque	167 @ 1200	133 @ 2000
Number of piston rings	4	3
U-Flex oil ring	Yes	No
Valve seat inserts	Yes	No
Crankshaft weight (lbs.)	93	47-1/2
Main bearing diameter	2-12/16"	2-7/16"
Projected main bearing area	17.014	12.4
Rifle drilled connecting rod	Yes	No
Clutch	10"	9-1/4"
Lining area (sq. in.)	91.82	77.85
Transmission-Syncromesh, remote control	Yes	Yes
Torque capacity (lb. ft.)	230	160
Rear axle - full floating	Yes	Yes
Type of gears	Hypoid	Spiral Bevel
Housing	Banjo with welded cover	Split
Ratios available	4.1, 4.77, 5.13	4.86, 5.57
Front springs, shackled at rear	Yes	No
Steering	True geometric	Cross-steering

SELLING THE L-150 SERIES AGAINST THE STUDEBAKER 2R16A

	L-150	2R16A
Maximum Gross Vehicle Weight	12,500 lb.	14,000 lb.
Std. Weight, short cab, comparable tires	4,092 lb.	3,695 lb.
Turning radius, short WB	22'	22' 7"
Front axle - I-beam	2-7/8x2x3/8	2-1/2x2x1/4
King pin diameter	1-8/64"	1-7/64"
Engine type	Valve-in-head	L-head
Cubic inch displacement	220	245.6
Maximum horsepower	100	102
Number of piston rings	4	3
U Flex oil ring	Yes	No
Valve seat inserts	Yes	No
Crankshaft weight	93 lb.	83 lb.
Total Projected Main brg. area	17.014 15.8	14.38
Rifle drilled connecting rods	Yes	No
Clutch size	10"	10-e/4"
Area (sq. in.)	91.82	104.55
Optional clutch size	11"	none
Area (sq. in.)	111.52	
Transmission - 4 speed sliding gear	Yes	Yes
Torque capacity (lb. ft.)	230	216
Optional 4 speed transmission available	Yes	Yes
Synchromesh	Yes	No
Torque capacity (lb. ft.)	275	225
Rear axle rating (lbs.)	10,000	11,500
Type gears	Hypoid	Spiral bevel
Housing	Banjo with welded cover	Split
Ratios available	4.88,5.57,6.16	5.66,6.66
Front springs, shackle location	Rear	Front
Size	46x2	42x2
Pin diameter	6/8"	5/8"
Rear springs, size	50x2-1/2	45x2-1/2
Steering	True geometric	Cross-steering
two speed axle	yes	no

SELLING THE L-160 SERIES AGAINST THE STUDEBAKER 2R-17A

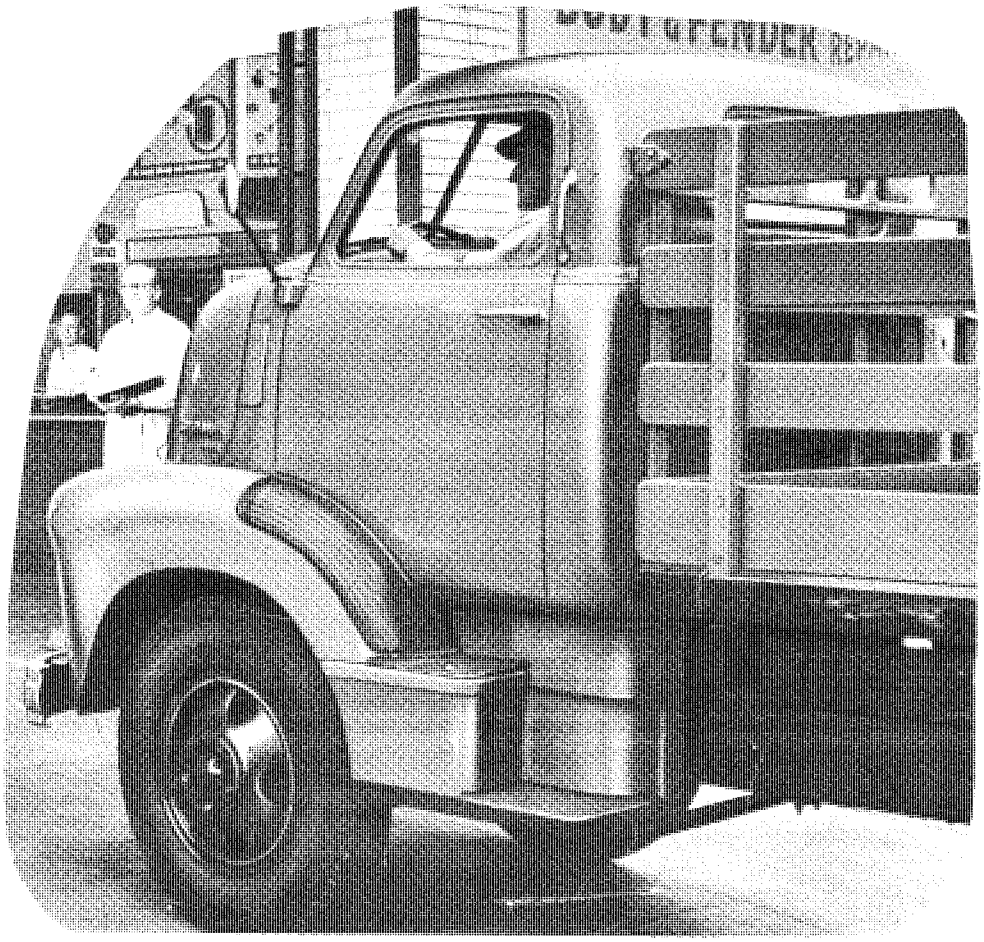
	L-160	2R-17A
Maximum Gross Vehicle Weight Rating	16,000 lbs.	16,000 lbs.
Std. chassis Weight less cab, short WB. comparable tires (lbs.)	4,465	4,180
Turning Radius, short WB	22'	23'
Front axle, rating (lbs.)	4,700	4,500
I-Beam	3x2-1/8x1/2	2-1/2x2x1/4
King Pin diameter	1-8/64"	1-7/64"
Tread (7.50x20)	63"	62"
Engine, type	Valve-in-head	L-head
Cubic inch displacement	240	245.6
Maximum horsepower	108	102
Number of piston rings	4	3
U-Flex oil ring	Yes	No
Valve seat inserts	Yes	No
Crankshaft weight	95 lb.	83 lb.
Total projected main bearing arm	17.014	14.38
Rifle drilled connecting rod	Yes	No
Clutch size	11"	10-3/4"
Lining area (sq. in.)	111.52	104.55
Transmission	Warner T-98	Warner T-97
4 Speed	Yes	Yes
Syncromesh	Yes	No
Torque capacity (lb. ft.)	275	225
Rear axle, rating	13,000 lb.	13,000 lb.
Hypoid gears, banjo housing	Yes	Yes
Available ratios	5.285, 6.166, 6.166 or 7.16	6.2, 6.8
Electric shift on 2-speed	Yes	No
Front springs - size	46x2-1/4	42x2
Shackle location	Rear	Front
Spring pin diameter	6/8	5/8
Rear springs, size	52x2-1/2	45x2-1/2
Steering	true geometic	cross steering

LC-160 - Comparisons

SELLING THE LC-160 SERIES AGAINST THE CHEVROLET 5000 SERIES

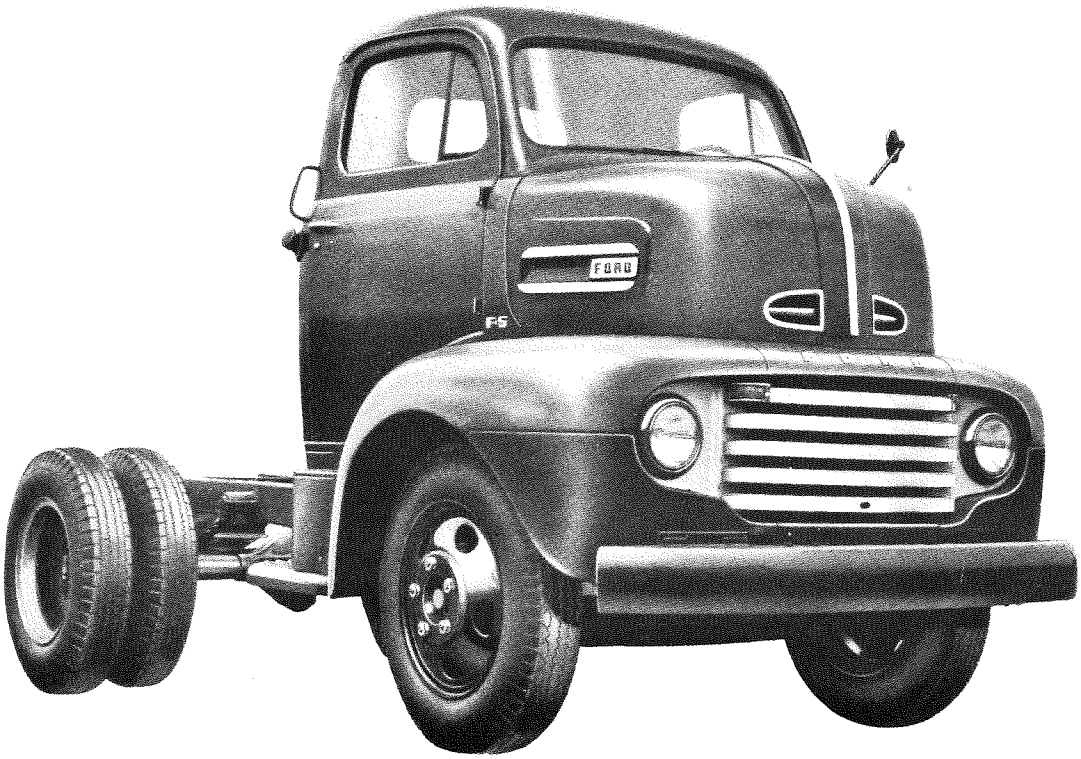
	LC-160 Series	5000 Series
Maximum Gross Vehicle Weight	16,000 lb.	16,000 lb.
Overall Dimension, bumper to back of cab	82-5/8"	88-1/4"
Wheelbase required for 60" CA dimension	106"	110"
Turning radius, short wheelbase	18-1/2'	20'
number of wheelbases	5 (106,130,142,154,172)	3 (110,134,158)
Front axle, rating	4700 lb.	4500 lb.
I-beam	3x2-1/8x1/2	2-5/8x2x3/8
kingpin diameter	1-8/64"	1-7/64"
tread	63"	60-1/4"
Engine-horsepower	108	100
torque	192	190
cubic inch displacement	240	235.5
full pressure lubrication	Yes	No
rifle drilled connecting rods	Yes	No
exhaust valve seat inserts	Yes	No
aluminum pistons	Yes	No
number of piston rings	4	3
V-flex oil ring	Yes	No
projected bearing area (sq.in.)	15.8	12.2
Crankpin diameter	2-6/16"	2-5/16"
crankshaft weight	96.6 lb.	69.6 lb.
Clutch, diameter	11"	10-3/4"
area (sq. in.)	111.5	104.6
type	Coil spring	Diaphragm
Transmission, 4-speed syncromesh	Yes	Yes
torque capacity, (lb.ft.)	275	200
Rear axle, hypoid	Yes	Yes
wheel bearing diameter, inner	2-5/8	2-5/8
outer	2-1/2	2-1/4
welded cover for additional strength	Yes	No
pinion bearing	Two-roller	One double row ball
ratios available	5.285 6.166 6.66 7.16	6.17
optional two-speed	Eaton	Timken
electric shift	Yes	No
ratios available	5.14/7.15 5.83/8.11 6.33/8.81	6.13/8.10

	LC-160 Series	5000 Series
Brakes	Two - cylinder	Modified duo-servo
front size	12-1/8x2-1/4	14x2
rear size	14-1/8x3	16x3
total lining area (sq.in.)	294.4	330
optional rear size	15x4	None
total area with oversize rear (sq.in.)	375.5	
Front springs	46x2-1/4	40x2
shackle location	rear	front
spring pin diameter	6/8"	5/8"
Rear springs	52x1/2	46x2-1/2
spring pin diameter	1"	7/8"
Heavy duty springs as optional	Yes	No



SELLING THE LC-160 SERIES
AGAINST THE FORD F-5 COE AND F-6 COE

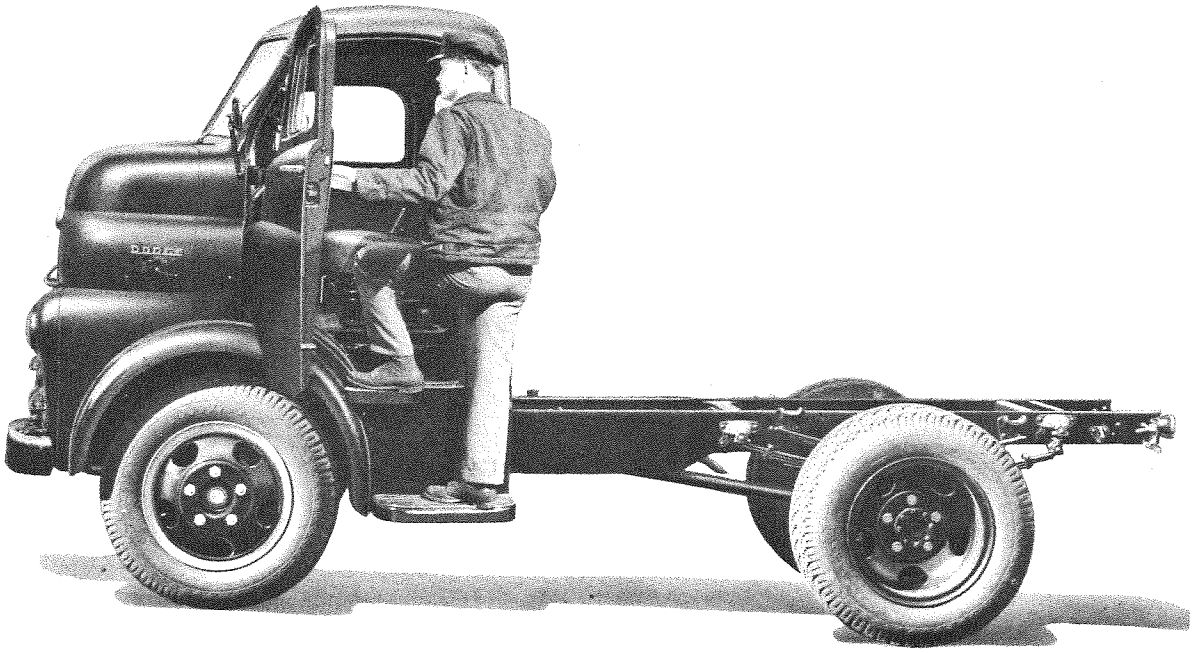
	LC-160 Series	F-5 COE	F-6 COE
Maximum Gross Vehicle Weight (Lb.)	16,000	14,000	16,000
Number of Wheelbases	5(106,130,142,) 154,172)	3(110,134,) 158)	3(110,134,) 158)
Wheelbase Length with 60" CA	106"	110"	110"
Overall Length-Bumper to Back of Cab	82-5/8"	88"	88"
Turning Radius - Short Wheelbase	18-1/2'	20'	20'
Front Axle - Rating (Lb.)	4,700	4,500	4,500
I-Beam	3x2-1/8x1/2	2-11/16x 2-1/16x7/16	2-11/16x 2-1/16x7/16
Engine	SD-240	239 V-8 or	226-6 or 254-6
Maximum Horsepower	108	100	95 106
Maximum Torque	192	180	180 210
Rifle Drilled Connecting Rods	Yes	No	No No
U-Flex oil Ring	Yes	No	No No
Clutch	11"	11"	
Transmission	4 Speed	4 Speed	
Syncromesh	Yes	with 254" Engine only, other - Spur Gear	
Rear Axle - Rating (Lb.)	13,000	10,800	13,000
Type	Hypoid	Spiral Bevel	Hypoid
Wheel Bearing Diameter			
Inner	2-5/8	2-5/8	2-5/8
Outer	2-1/2	2-1/4	2-1/4
One Piece Housing	Yes	No	No
Minimum Diameter of Housing	4-1/4	3-3/4	4
Brakes	2 Cylinder	Lockheed	Lockheed
Springs - Front Size	46x2-1/4	38x2-1/4	38x2-1/4
Rear Size	52x2-1/2	45x2-1/2	45x2-1/2
Auxiliary	Standard	Optional	Standard



SELLING THE LC-160 SERIES
AGAINST DODGE MODELS GM AND HM

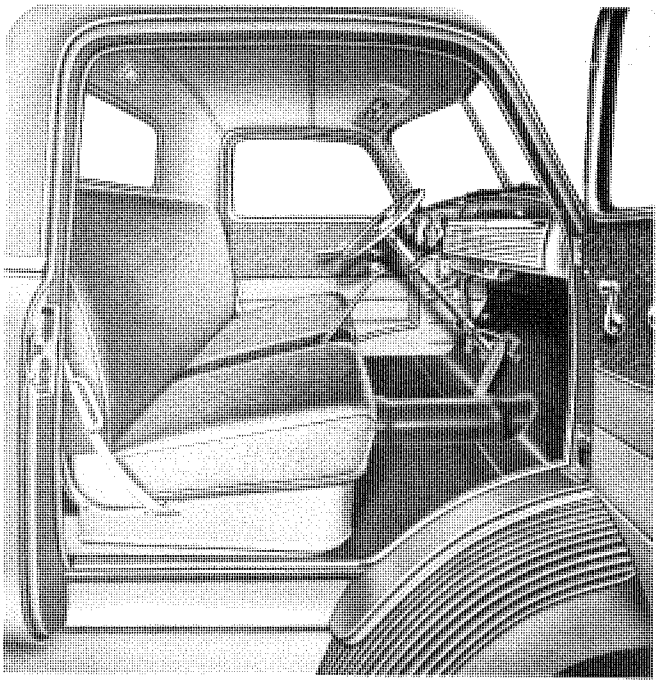
	LC-160 Series	GM	HM
Maximum Gross Vehicle Weight (Lb.)	16,000	14,750	16,250
Wheelbase required for 60" CA	106"	107"	107"
Overall Dimension Bumper to back of Cab	82-5/8"	83-5/8"	83-5/8"
Turning Radius - Short Wheelbase	18-1/2'	19-1/2'	19-1/2'
Front Axle - Rating (Lb.)	4,700	4,500	4,500
I-Beam	3x2-1/8 x1/2	2-5/8x2 x7/16	2-5/8x2 x7/16
Track (7.50x20)	63"	62"	62"
Frame - Short Wheelbase	7.10	6.44	6.44
Long Wheelbase	8.17	8.69	8.69
Engine - Type	Valve-In-Head	L-Head	L-Head
Net Horsepower	93	91	91
Cubic Inch Displacement	240	236.6	236.6
Cradle Mounted	Yes	No	No
Rifle Drilled Connecting Rods	Yes	No	No
Number of Camshaft Bushings	4	3	3
Projected Main Bearing Area	15.85	12.63	12.63
Main Bearing Journal Diameter	2-3/4"	2-1/2"	2-1/2"
Crankpin Diameter	2-3/8"	2-1/8"	2-1/8"
U-Flex Oil Ring	Yes	No	No
Timing Gears	Gears	Chain	Chain
Crankshaft Weight (Lb.)	96.6	80	80
Engine Weight (Lb.)	635	600	600
Vibration Dampener	Yes	No	No
Clutch - Pilot Bearing	Ball	Bronze Bushing	Bronze Bushing
Transmission - 4 Speed Syncromesh	Yes	Yes	Yes
Syncromesh in	3 Speeds	2 Speeds	2 Speeds
Torque Capacity (Lb.Ft.)	275	200	200
Rear Axle - Rating (Lb.)	13,000	11,500	13,000
Straddle Mounted Pinion	Yes	No	No
Electric Shift on 2 Speed	Yes	No	No
Brakes - Type	2-Cylinder	Lockheed	Lockheed
Vacuum Booster	Std.	Opt.	Std.
Lining Thickness, Front	5/16	4/16	4/16
Rear	25/64	16/64	16/64
Total Lining Area, Std. Brakes	294.4	336	336
Oversize Brakes	375.5	-	-

	LC-160 Series	GM	HM
Front Springs	46x2-1/4	45x2	45x2
Rear Springs	52x2-1/2	52x2-1/4	52x2-1/4
Steering	True Geometric	Cross Steering	Cross Steering



SELLING THE LC-160 SERIES AGAINST THE GMC FF-350 SERIES

	LC-160 Series	GMC FF-350 Series
Maximum Gross Vehicle Weight (Lb.)	16,000	16,000
Turning Radius - Short W.B.	18-1/2'	20'
Overall Front Bumper to Back of Cab	82-5/8"	87-1/4"
Front Axle - Rating (Lb.)	4,700	4,500
I-Beam	3x2-1/8x1/2	2-5/8x2x3/8
King Pin Diameter	1-8/64"	1-7/64"
Engine - Cu.In. Displacement	240	248
Projected Main Bearing Area	15.848	14.97
Crankpin Diameter	2-6/16"	2-5/16"
Crankshaft Weight (Lb.)	95	85
Clutch - Size	11"	10-3/4"
Lining Area (Sq.In.)	111.52	110
Rear Axle - Rating (Lb.)	13,000	12,500
Ratios Available	5.285,6.166 6.66,7.16	6.17
2 Speed Axle Available	Yes	Yes
Type of Shift	Electric	Vacuum
Springs - Front Size	46x2-1/4	45x2
Rear Size	52x2-1/2	46x2-1/2

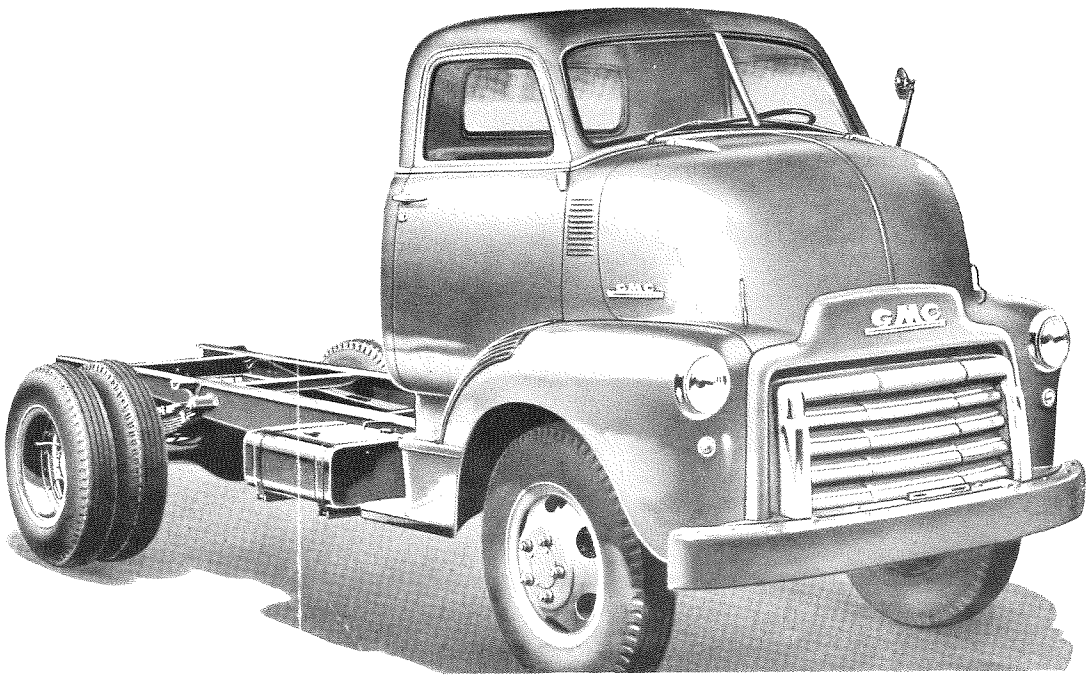


MEMO

LC-180 - Comparisons

SELLING THE LC-180 SERIES
AGAINST THE GMC - HF-450 SERIES

	LC-180 Series	HF-450 Series
Maximum Gross Vehicle Weight (Lb.)	21,000	19,500
Overall Dimension Bumper to Back of Cab	82-5/8"	87-1/4"
Front Axle - Rating (Lb.)	5,500	6,000
Frame, Section Modulus	9.22	10.1
Engine, Type	Valve-In-Head	Valve-In-Head
Displacement	269.1	269.5
Air Cleaner	2-1/2 Pint Oil Bath	One Pint Oil Bath
Crankshaft Weight (Lb.)	106	85
Replaceable Sleeves	Yes	No
Transmission - 5 Speed Constant Mesh	Yes	Yes
Standard Type	Overdrive	Direct-In-Fifth
Charge for Optional Type	None	$12.80
Rear Axle - Rating (Lb.)	16,000	14,000
Make	International	Timken H-100
Ratios Available	5.57,6.5,7.16	6.17,7.2
Axle Shaft Minimum Diameter	1-23/32"	1-21/32"
Brakes - Total Lining Area	383.2	435
Optional Oversize Area	445.0	None



SELLING THE LC-180 SERIES AGAINST THE DIAMOND T 509 SC

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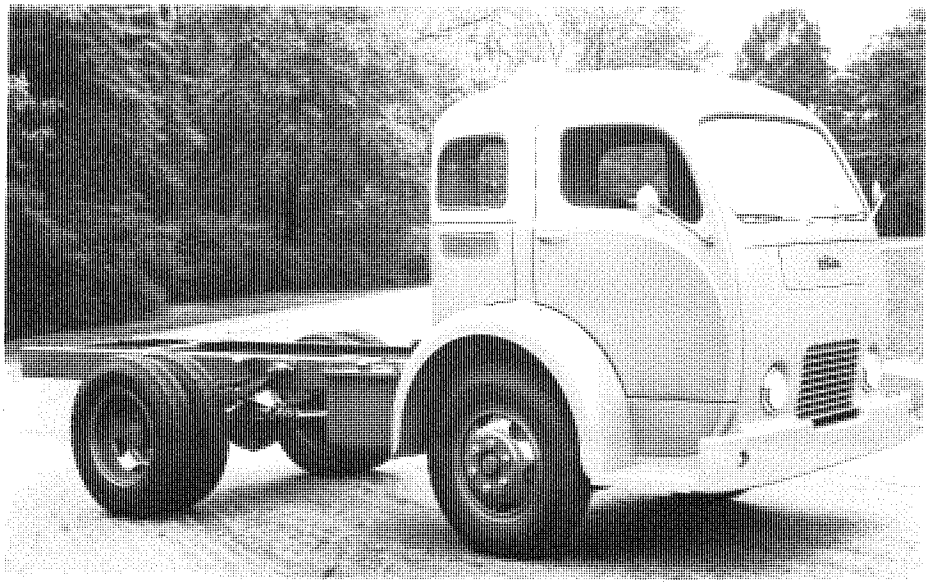
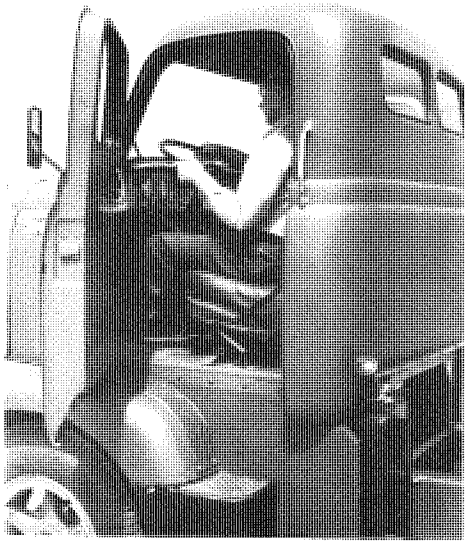
	LC-180 series	509 SC
Maximum Gross Vehicle Weight Rating	21,000 lb	15,000 lb.
Dimension - bumper to back of cab	82-5/8"	79-9/16"
Wheelbase required for 84" CA	130"	130"
Frame size	9 x 3 x 1/4	8 x 3-1/32 x 7/32
Section modulus	9.22	6.94
Front axle rating	5500 lb.	4600 lb.
I-beam size	3-1/4x2-1/8x1/2	2-7/8x2-5/8x3/8
Rear Axle Rating	16,000 lb.	11,000 lb.
Axle shaft diameter at spline	1-7/8"	1-3/4"
Transmission, standard	F-51	T-9
Optional	F-51-C	Clark 205V
Clutch size	11"	11"
Engine	BD-269	Hercules JXB
Type	Valve-in-head	L-head
Bore x stroke	3-9/16 x 4-1/2	3-5/8 x 4-1/4
Displacement	269	263
Horsepower	100 @ 3000	94 @ 3000
Torque	222@ 1600	201@ 1300
Maximum Tire Size	9.00 x 20	9.00 x 20

SELLING THE LC-180 SERIES AGAINST THE WHITE 3016 (Cab-Over-Engine)

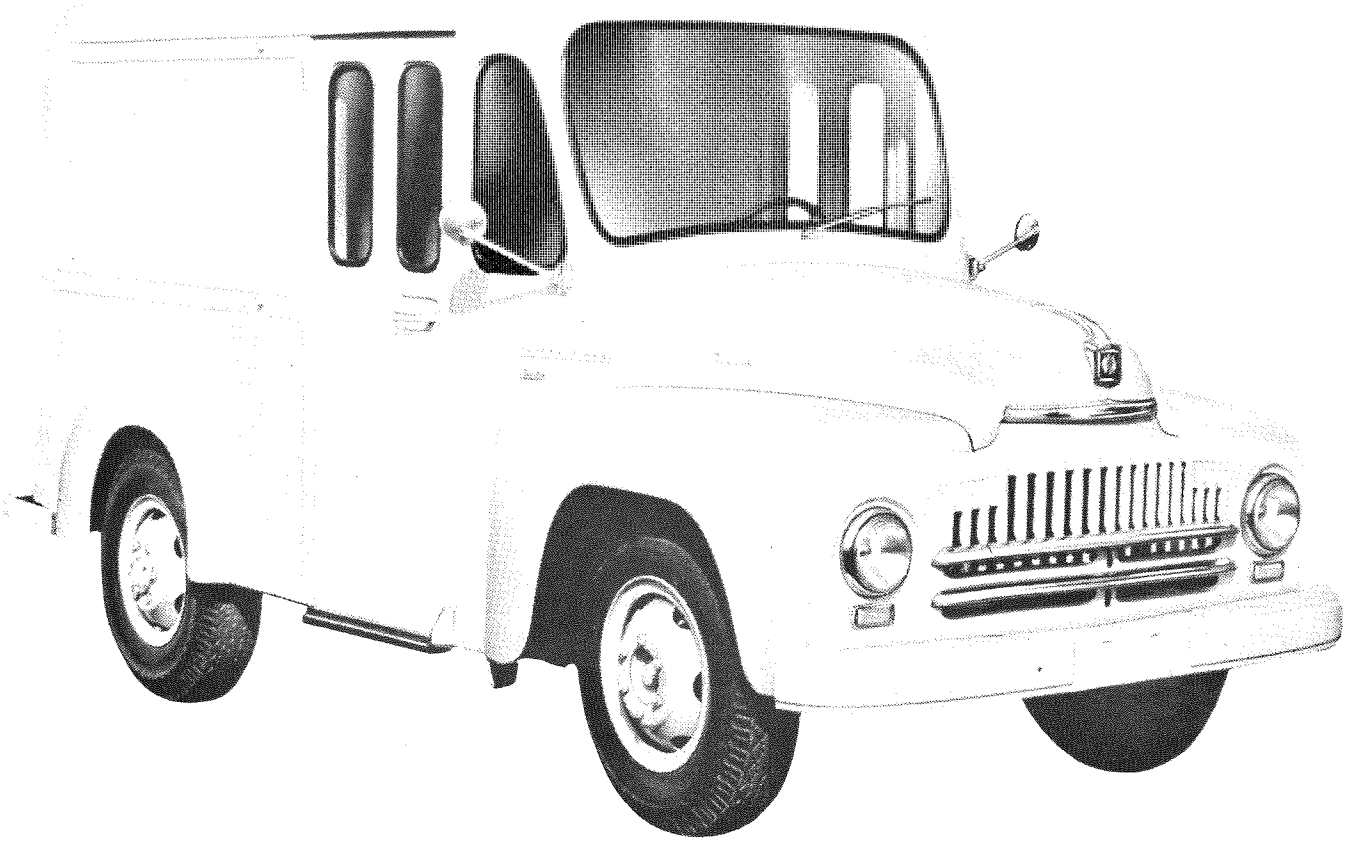
	LC-180 Series	3016
Maximum Gross Vehicle Weight Rating	21,000 lb.	18,500 lb.
Dimension, bumper to cab	82-5/8"	80-1/16"
Turning Radius - 66" CA	19-1/2'	
70-1/2" CA		19-1/2'
Engine, Type	Valve-in-head	L-head
Displacement	269	298
Horsepower	100 @ 3000	110 @ 3100
Max. Torque	222	230
Battery	19 plate	15 plate
	135 amp.	119 amp.
Frame size	9 x 3 x 1/4	8 x 3 x 1/4
Rear Axle Rating	16,000	14,000
Axle shaft diam. at spline	1-7/8	1-7/8
Transmission, standard	F-51	4-speed
Optional	F-51-C	5 speed
Brakes, Total area	383.2 sq. in.	371 sq. in.
Hand brake	drum	drum
Size	9-1/2 x 3	7-13/16 x 2-1/2
Area	74.46 sq. in.	59.06 sq. in.
Maximum Tires	9.00 x 20	9.00 x 20

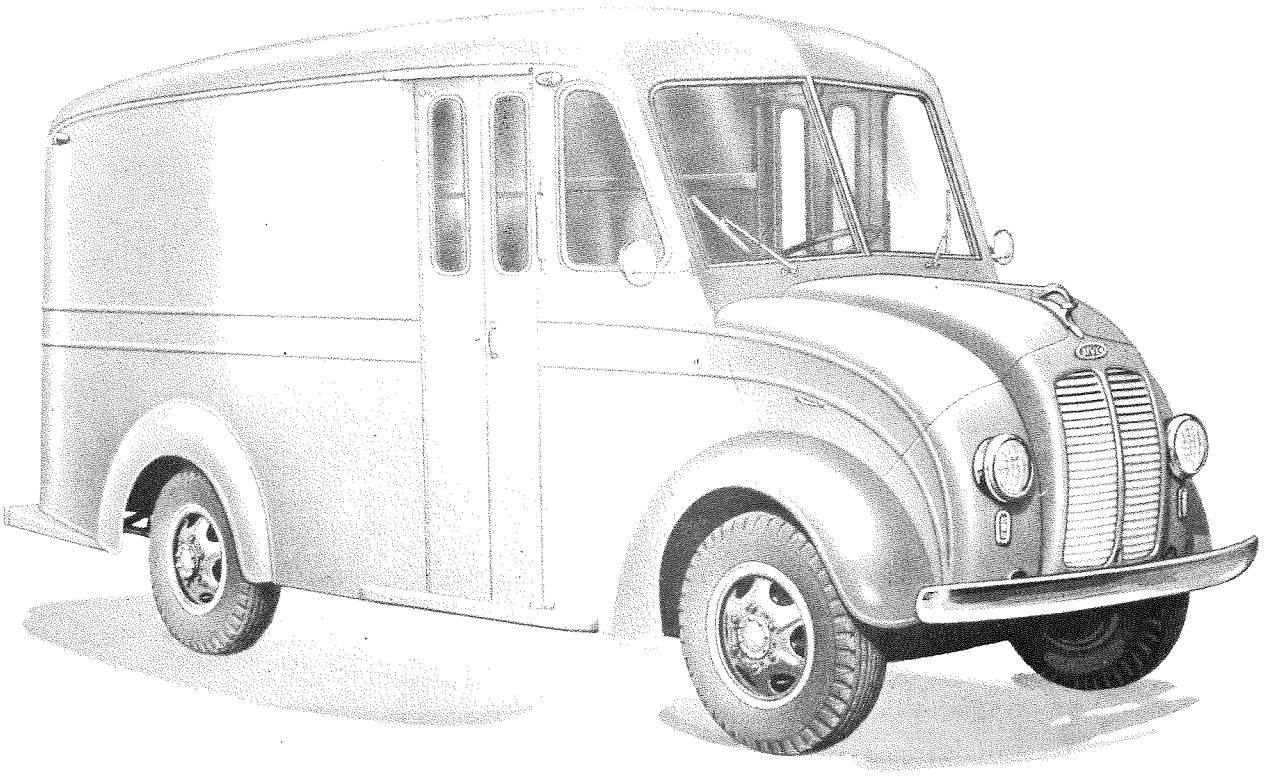




MEMO

LB-140 – Milk Delivery Unit



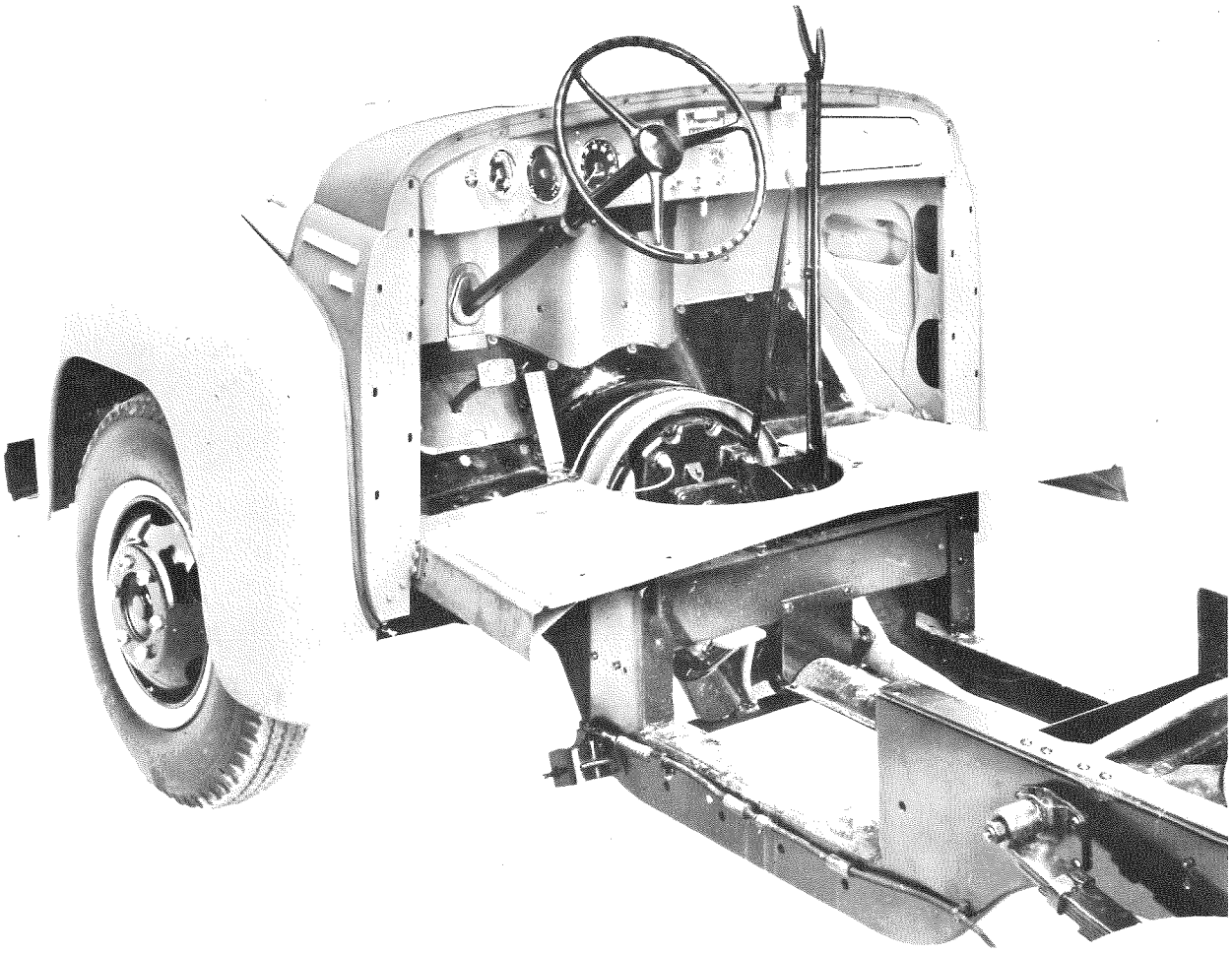


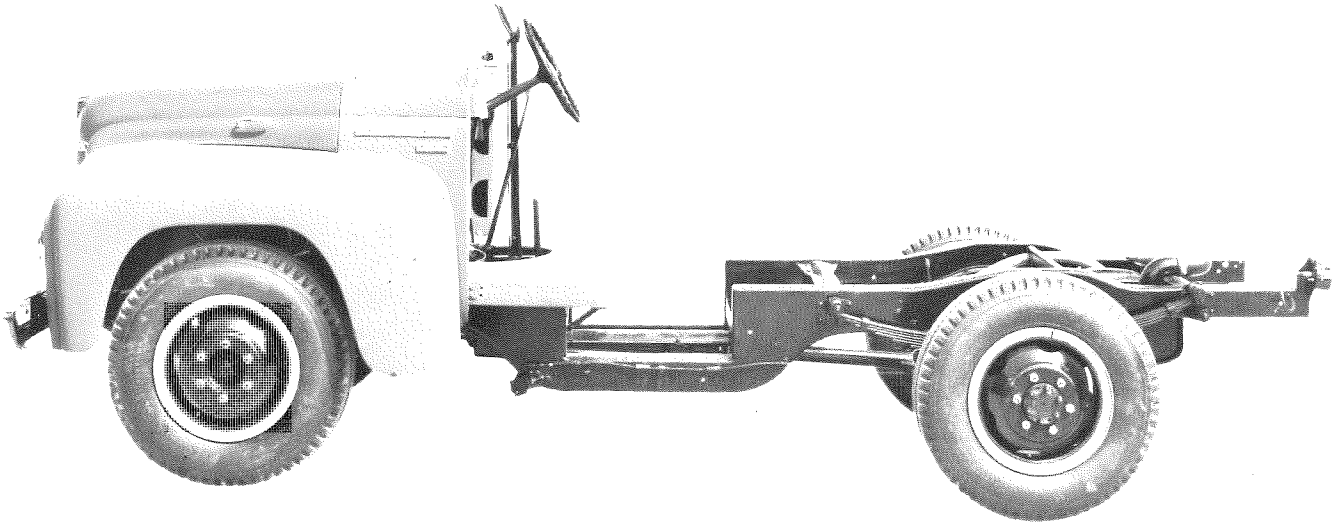
SELLING THE LB-140 AGAINST DIVCO

	LB-140 Series	Divco UM	Divco ULM
G.V.W. rating (lb.)	9,000	7,500	12,000
Wheelbase	109"	100-3/4"	127-1/2"
Overall length	191-1/8"	179-3/16"	220"
Turning radius	18-1/2'	18-1/2'	24'
Engine, displacement (cu.in.)	240	162.4	229.6
bore & stroke	3-9/16x4.018	3-7/16x4-3/8	3-7/16x4-1/8
number of cylinders	6	4	6
type	Valve-in-Head	L-Head	L-Head
horsepower	108 @ 3600	47 @ 2800	75 @ 2800
pistons	Aluminum	Alloyiron	Aluminum
Clutch	None	10"	10"
Transmission	Special drop shaft 2-speed; designed for use with converter coupling	4-speed	4-speed
Rear axle-full floating	Yes	Yes	Yes
type gears	Hypoid	Spiral bevel	Spiral bevel
housing	One piece banjo	Split	Split
axle shaft at spline	1-33/64"	1-28/64"	1-28/64"
Springs - front size	42x1-3/4	36x2-1/4	36x2-1/4
	52x2-1/4	45x2-1/4	45x2-1/4
Front shock absorbers	Std.	Std.	Std.
Steering gear	Cam. & twin lever	Worm & roller	Worm & roller
Frame size	7-1/2x3x7/32	5-1/2x2x3/16	5-1/2x2x3/16 (Reinforced at center with 1/4" angle)
Brakes-front size	12x1-3/4	14x2	14x2
rear size	14x2-1/2	14x2	16x3
Tires	8.25x17 Max. single	7.50x16 single or dual	7.50x16 dual or 6.50x20 dual

BODY COMPARISON

	LB-140 Series	DIVCO UM	DIVCO ULM
Body -case capacity- square bottles	64	57 (includes 7 cases in front)	116 (includes 4 cases in front)
Drivers step-off ground, with tire size	14-5/8" 7.50x17	14-1/16" 7.00x16	15-3/4" 6.50x20
Overall height (empty) (same tires as above)	97-5/8"	92-3/4"	100-3/8"
Overall width	74-5/8"	77-1/4"	84"
Inside width	63"	Tapers 61⅓" to 63½"	Tapers 65-1/8" to 68-1/4"
Load compartment length at floor	81"	69-3/3"	112"
Door opening-height	67"	67"	71"
width	28"	24"	24"
Height-floor to top of windshield	67-1/2"	67"	67"
Height of tunnel in driver compartment	1-3/8"	7-1/2"	7-1/2"
Insulation - roof	Std.	Std.	Std.
sides	Std.	Extra	Extra
floor	Std.	Extra	Extra





How the new Converter-Coupling contributes
to more economical truck operation

Development of the new Converter-Coupling marks an important contribution to the advancement of motor truck transportation.

This unit -- standard for LB-140 model, makes possible major savings in operating and maintenance costs. In addition, it cuts down driving effort by relieving the driver of many fatiguing details.

Why the Converter-Coupling is ideal
for multi-stop operations

Engineering-wise, the conventional transmission, incorporating a train of multiple-step gears, is generally considered one of the most efficient means of transmitting power and torque at various speed ratios. However, in the case of multi-stop operations, this higher specific efficiency does not always mean maximum operating economy -- because all the losses involved in frequent start-and-stop vehicle operation do not occur in the transmission.

For example, a conventional transmission puts a truck in motion through a series of gear steps. This results in certain disadvantages in multi-stop operations, where frequent starting and stopping tends to produce lower fuel economy, greater wear on the drive line because of the number of shock loads on transmission gears, clutch, ring gear and pinion, and greater tire wear because the sudden changes in speed cause slippage.

The Converter-Coupling is designed to overcome these problems. It eliminates the conventionally geared transmission and clutch. The required torque multiplication for starting is developed hydraulically within the unit. The unit itself automatically progresses through an infinite number of ratios without gear shifting.

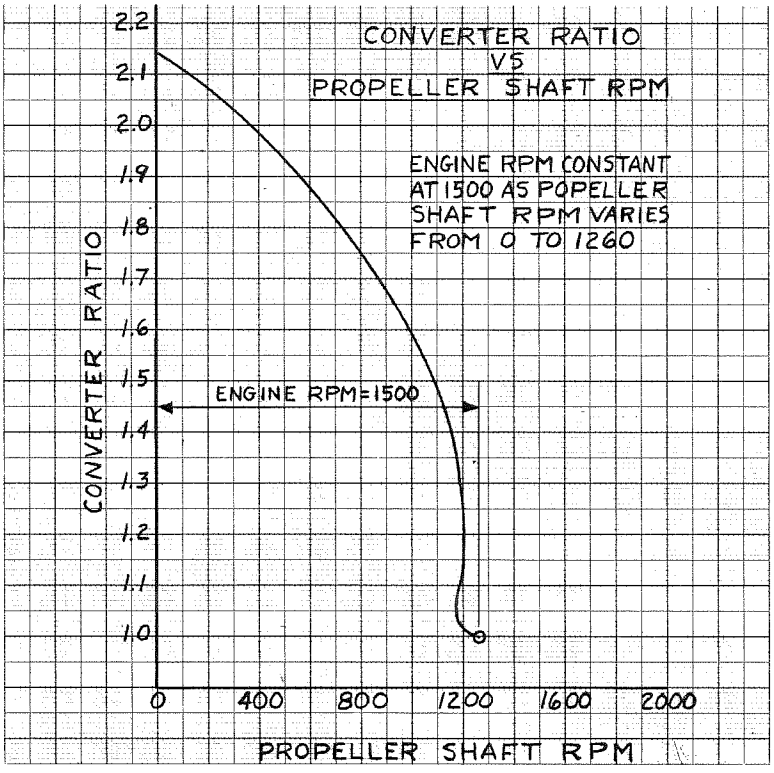
This smooth transition from "stop" to "go" saves the truck owner from excessive fuel, maintenance, and tire bills. It also helps the driver by eliminating the mental effort of gear selection and the manual effort of gear shifting.

Converter-Coupling performs dual role

The Converter-Coupling is a two-in-one unit - a combination hydraulic converter and hydraulic coupling designed to step up the overall economy and performance of multi-stop truck transportation. It achieves this by performing two functions.

As a converter, it produces sufficient torque multiplication to start a vehicle without gearshifting. As a coupling, it hydraulically transmits engine torque to the propeller shaft without multiplication. The change from converter function to coupling function occurs automatically when the propeller-shaft r.p.m. reaches a certain speed.

Torque multiplication produced by the unit in putting a vehicle in motion is called the "converter ratio." Table following shows the relationship between the converter ratio and the propeller shaft r.p.m. as the vehicle moves from standstill to cruising speed.



The converter ratio is highest when the propeller shaft r.p.m. is zero. At this point the converter is capable of producing its greatest torque multiplication - in this case, a torque multiplication of approximately 2.2 times. As the propeller shaft speed increases, the converter ratio gradually and automatically decreases. When the accelerator pedal is in a wide open position, engine r.p.m. is 1500; it remains at this figure until shaft speed is approximately 1500 r.p.m.

At this point an over-riding clutch changes the unit's function from that of converter to coupling. Note that this change-over is completely automatic without any shifting on the part of the driver.

In reviewing the dual role performed by the Converter-Coupling, remember this: the function of the converter portion of the unit is to start loads smoothly without gear shifting. The converter alone cannot be used to provide torque multiplication for severe continuous operation when negotiating long severe grades. Provisions for doing that are covered in the explanation which follows.

Special drop-shaft transmission provides low range
for use in case of severe operations

To provide increased torque under adverse conditions, a special drop-shaft transmission is used with the Converter-Coupling. This transmission provides two ranges of forward gears in addition to reverse.

High range permits the Converter-Coupling to perform efficiently under normal operating conditions. In this range the converter provides all the torque necessary for starting. Combined with the proper axle ratio, engine torque transmitted through the coupling keeps the truck moving even on average grades at good speed.

Low range is provided for use when operating conditions are extremely severe. For example, before climbing a long grade, transmission must be changed from high to low.

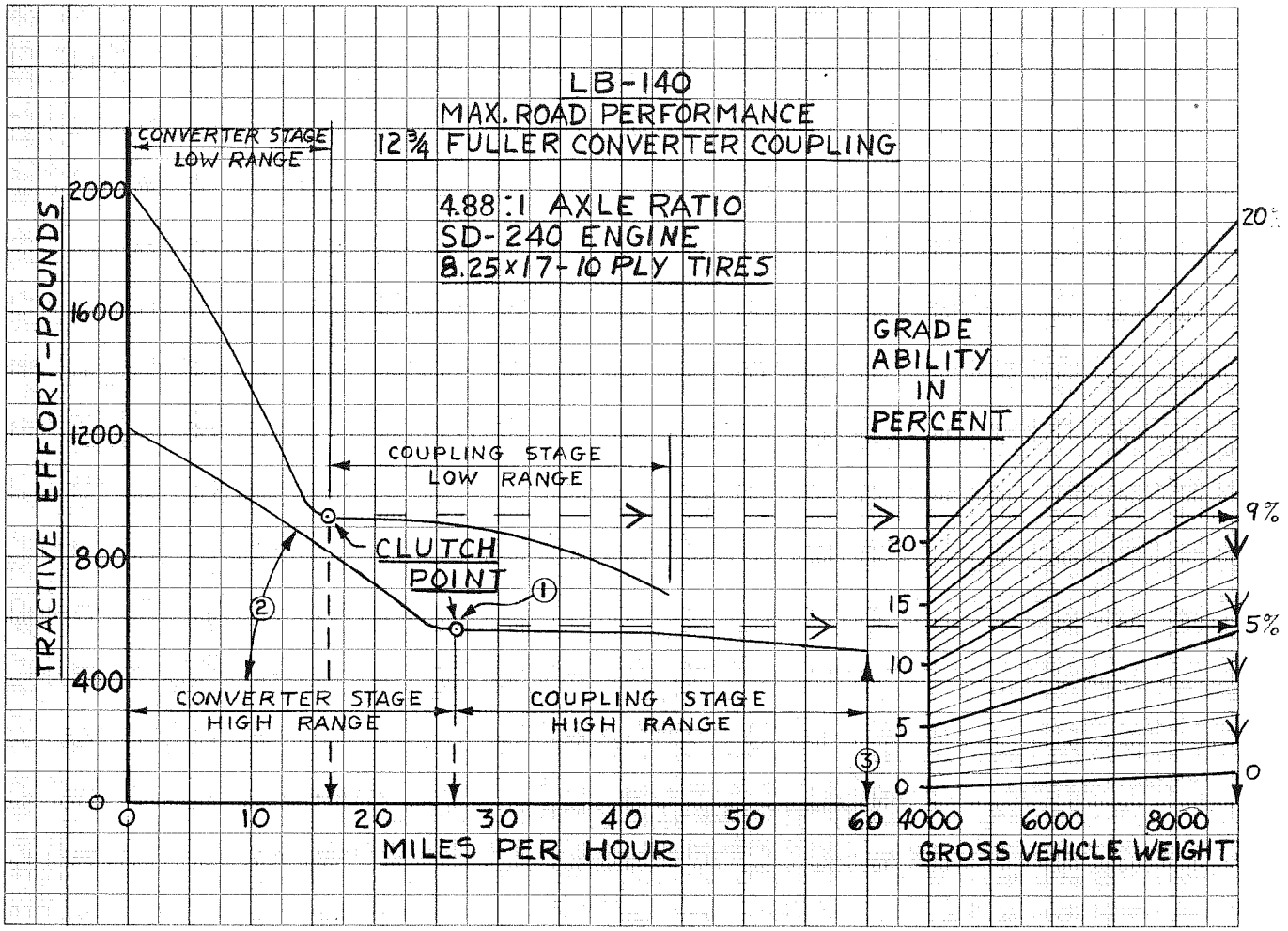
There are two things to remember about high and low ranges:

First, shifting from one range to another must be accomplished only when the truck is standing still. This eliminates the need for a conventional clutch.

Second, high range is not designed to provide torque for continuous severe operation such as going up a long hill. In a case of this kind, low range is to be used.

Correct axle ratio an important factor in all-round efficiency of vehicle equipped with Converter-Coupling

Table below charts the performance ability of a truck when the Converter-Coupling is used with a SD-240 engine and a 4.88 axle ratio.



The lower curve shows what the vehicle can do in high transmission range. With 9,000 pounds GVW, maximum grade-ability of 5% is reached at Point #1 when the vehicle is

going 27 m.p.h. This means that, where grades do not exceed 5%, the 4.88 axle ratio permits the Converter-Coupling to operate continually in high range without any need to shift to low range.

The Converter-Coupling provides a smooth flow of torque at every speed. Even at Point #2, where the converter provides torque multiplication for starting, there are no "steps" such as you find when a conventionally geared transmission is used. Notice also that this combination of Converter-Coupling and axle ratio provides ample road speed with little loss in grade-climbing ability (Point#3).

The upper curve gives the performance ability of the truck in low transmission range. With 9,000 pounds GVW, the vehicle has a maximum gradeability of 9% at 17 m.p.h.

These facts and figures show that with the SD-240 Engine, a 4.88 axle ratio permits a truck equipped with a Converter-Coupling to operate continually in high transmission range on level ground and on grades up to 5%. Operation on grades of 5% and up to 9% requires the use of low transmission range.

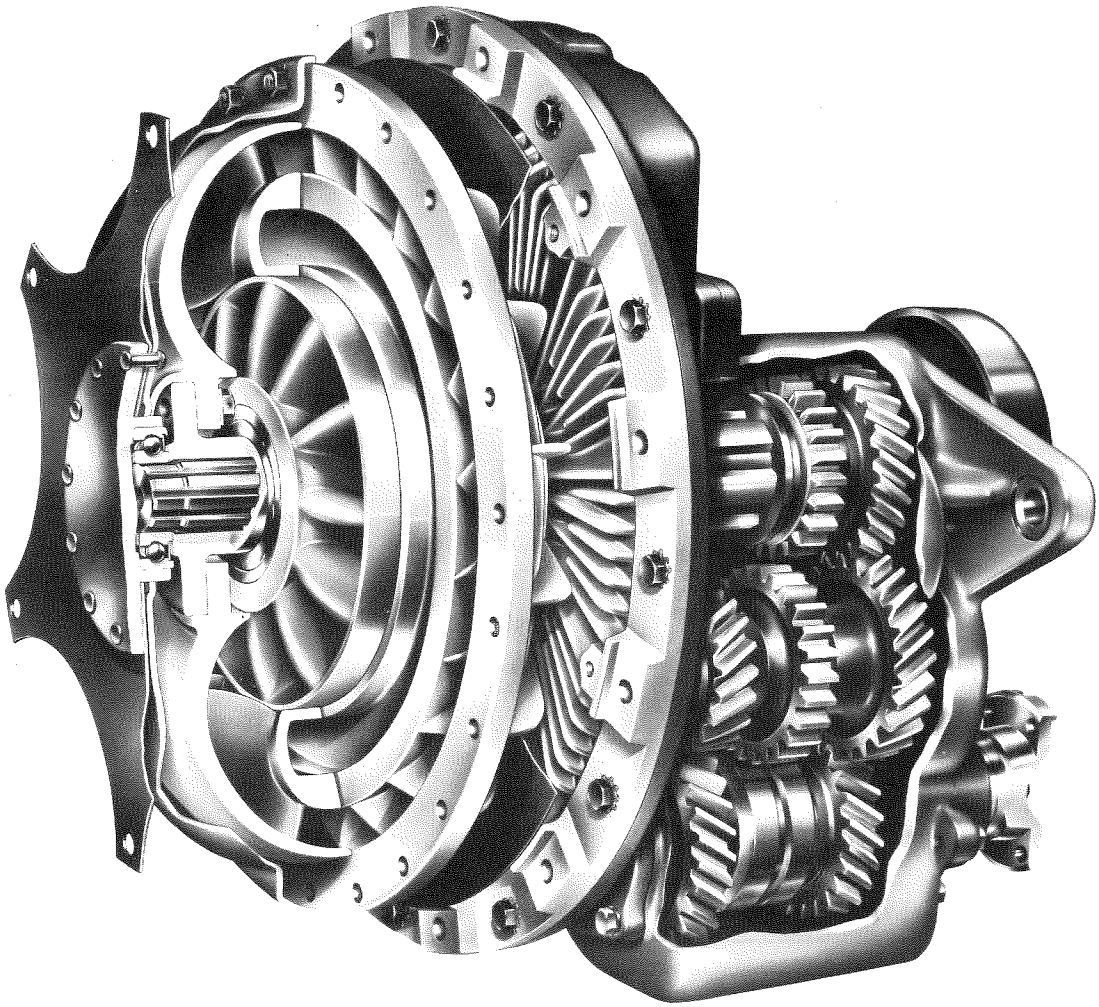
Instruct truck users fully. The Converter-Coupling is new. For this reason, you can't expect customers to know how to use the unit correctly unless you tell them. One thing you can't emphasize too strongly is the importance of using low range, rather than the converter, for climbing sustained hills. Failure to point out this simple fact can mean the difference between a satisfied customer and a dissatisfied one.

Of course, to do either of the above jobs well, you have to know the Converter-Coupling thoroughly. A detailed study of this new unit is contained in pages following.

THE FULLER SEMI-AUTOMATIC TRANSMISSION FOR THE LB-140 DELIVERY TRUCK

(From a talk made by Fuller Manufacturing Co. representative at Fort Wayne during the week of September 11, 1950)

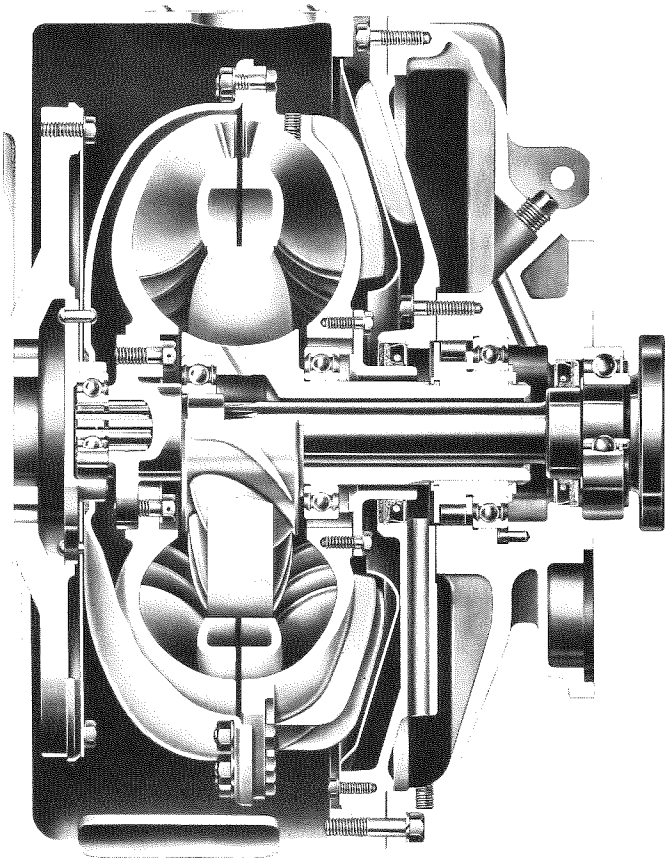
Many of you have heard of tests being conducted throughout the nation during the last several years to determine the performance of a torque converter unit in delivery vehicles. The culmination of these tests resulted in the Fuller 12C-2A301 transmission that you see in this illustration.



This unit was designed specifically for the LB-140 delivery vehicle after ten years of design, development and test. The frequent stops required in service such as milk delivery made it desirable to replace the clutch and conventional transmission with a fluid drive which could be left engaged at all times, both driving and parked without attention. Thus the operator can brake to a stop, set his parking brake, deliver the produce, release his parking brake, step on the accelerator and be on his way. So long as the direction of drive is not changed or unusually poor road conditions prevail, the operator will not bother the transmission shift lever or have to engage a clutch.

This performance is accomplished by the combination of a single stage hydraulic torque converter and a two-speed transmission drop gear unit. The converter picks up the load and provides an infinitely variable torque multiplication, ranging from 2.2 to 1 when the vehicle is stalled, to 1 to 1 when cruising speed is reached. The transmission behind the converter provides two forward ratios of 1.64 to 1 and 1 to 1 and two reverse ratios of 1.71 to 1 and 1.04 to 1. The low ratios, when multiplied by the torque converter, thus provide overall maximum ratios of 3.61 to 1 forward and 3.76 to 1 reverse to give the vehicle enough ability for the worst conditions.

The operation of the converter section is entirely automatic. This unit technically is a single stage three element converter coupling. The power path progresses through the parts as follows respectively: flywheel, flexible driving disc, converter cover, impeller, fluid, runner, runner shaft, transmission mainshaft, transmission intermediate countershaft, transmission lower countershaft, to vehicle propeller shaft. The impeller thus runs at engine speed, acting as a centrifugal pump. The



oil in the converter is circulated in a closed path in a counter-clockwise direction in the upper half sectional view. The circulating oil acting on the turbine blading in the runner drives it at some speed less than the engine speed depending on the output torque requirements. The reactor, which is in the fluid circuit, but is not in the power path directly, stands still, imparting torque to the case through a free wheel unit when torque multiplication is required to drive the vehicle, and turns at about runner speed and in the same direction when no more than engine torque is required, at which time the unit acts as a fluid coupling transmitting only one to one torque.

The torque which the reaction runner imparts to the case is transferred to the circulating oil by turning its direction to add momentum in the same direction as the impeller is rotating. In this manner the runner must take out of the fluid system both the torque of the impeller and the torque of the reactor, resulting in a torque multiplication which is infinitely

variable within limits.

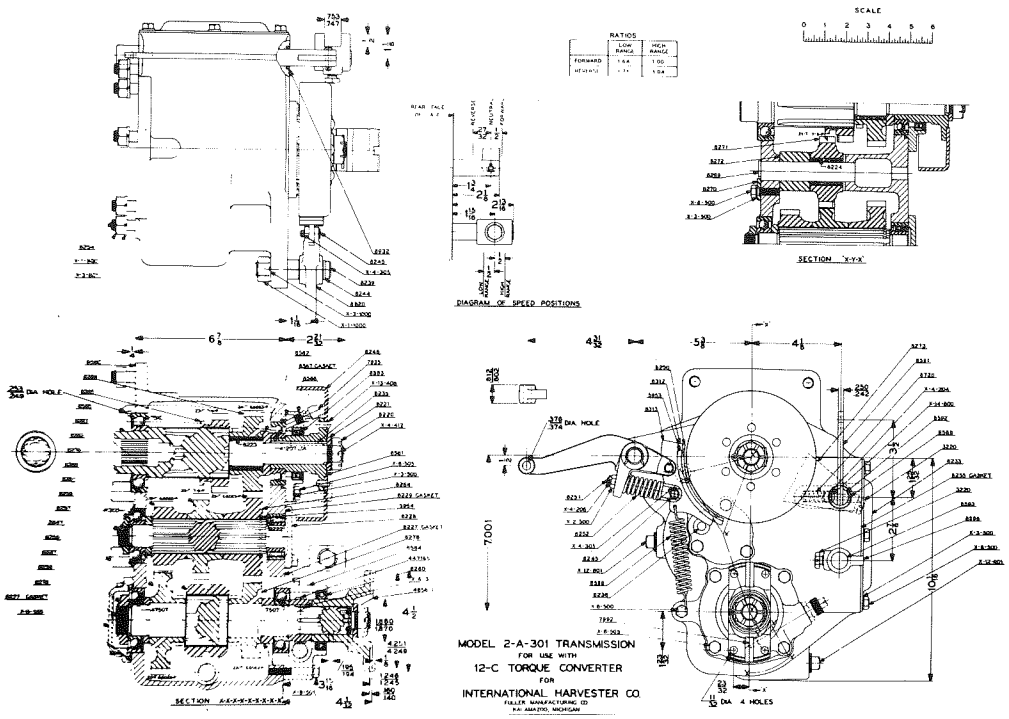
The mechanical features of the converter are noteworthy. The thin flexible driving disc permits satisfactory operation when slight misalignments between the engine and converter exist due to the commercial manufacturing tolerances required.

The converter has a built-in cooling feature. The converter oil is circulated through the oil reservoir by the pressure drop across the reactor blading. The front portion of the oil reservoir is formed by an aluminum cooler plate finned for fast heat transfer. Slots are provided so outside air can be drawn in over this cooler plate. The fast air circulation is produced by the rotation of the centrifugal fan blading cast integral with the aluminum impeller. This warmed air is exhausted through ports in the flywheel housing.

The converter operates under a hydrostatic pressure of from five to ten pounds gage to eliminate cavitation. This pressure is the result of expansion of the oil in the unit as it is heated in the closed chamber and the air space above the oil in the reservoir is compressed.

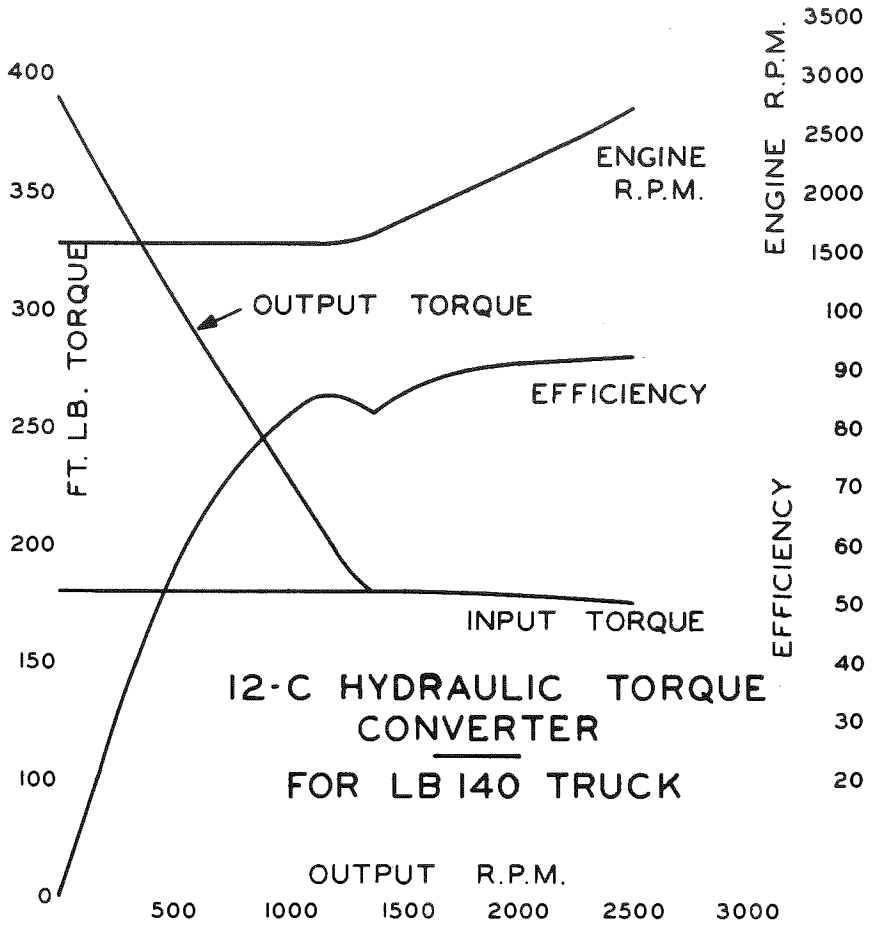
The rotating parts are all held in alignment and supported by ball bearings. This feature reduces the frictional drag and insures long bearing life to the unit.

The drop gear transmission has several unique features. The forward speeds are obtained by the use of constant mesh helical gearing to provide quiet operation.



A rocking brake at the rear of the transmission mainshaft provides means for easy shifting by holding and slowly turning the mainshaft as the shift lever is moved. This rocking action is accomplished by pushing a thumb button on the forward and reverse shift lever which controls a power cylinder connected to the rocking brake arm. Low range, which is not expected to be used very frequently, can be obtained by moving a separate lever.

In the above manner, the best features of a torque converter and fluid coupling are combined in one unit. The actual performance figures to be expected (for wide open throttle) are shown on the chart.

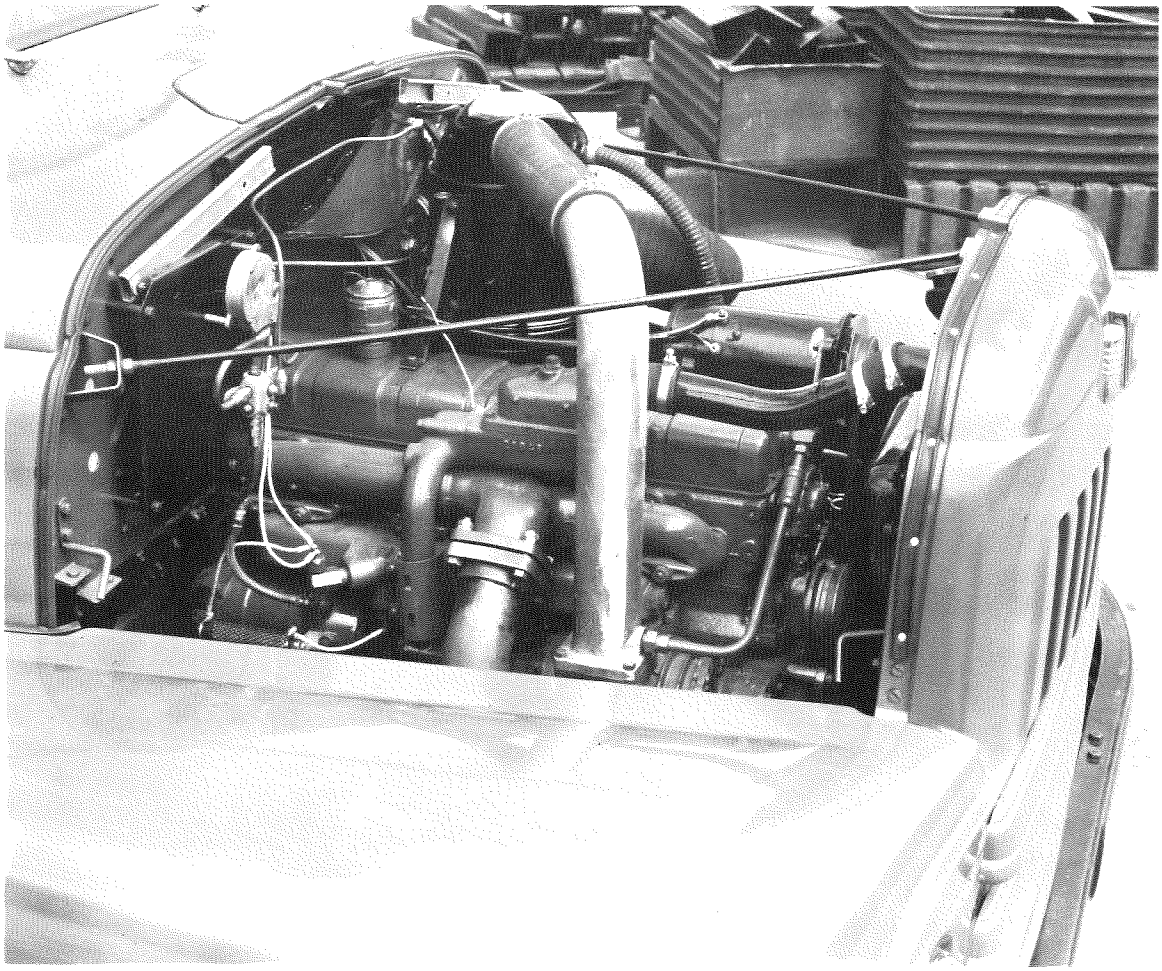


The engine speed and the engine input torque to the converter remain practically constant throughout the converter range until almost to the point at which the unit passes into its coupling phase of operation. The output torque falls off gradually as the output speed rises until it is one to one in the coupling range.

International Harvester now leads the field in this endeavor to supply delivery vehicles to the trade which are easier, faster and less tiring to operate, thus permitting more work to be done at less cost.

MEMO

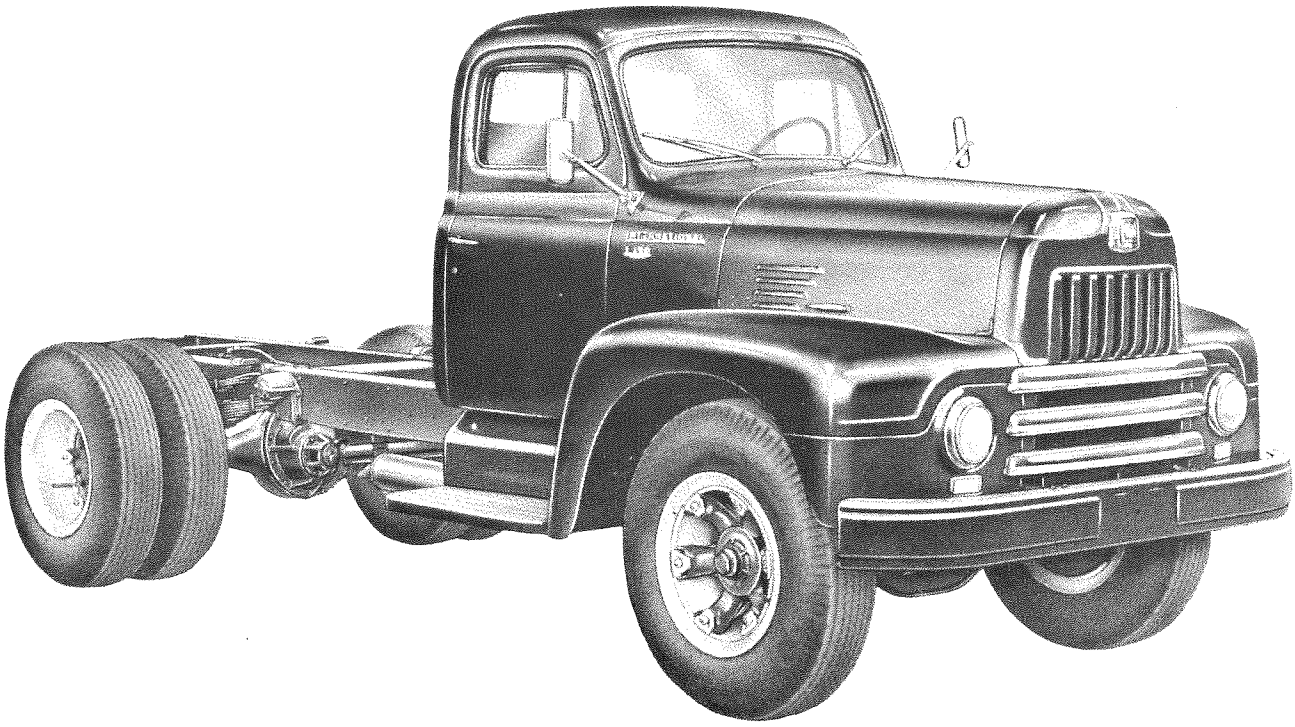
Diesel Units – L-190, L-200 Series

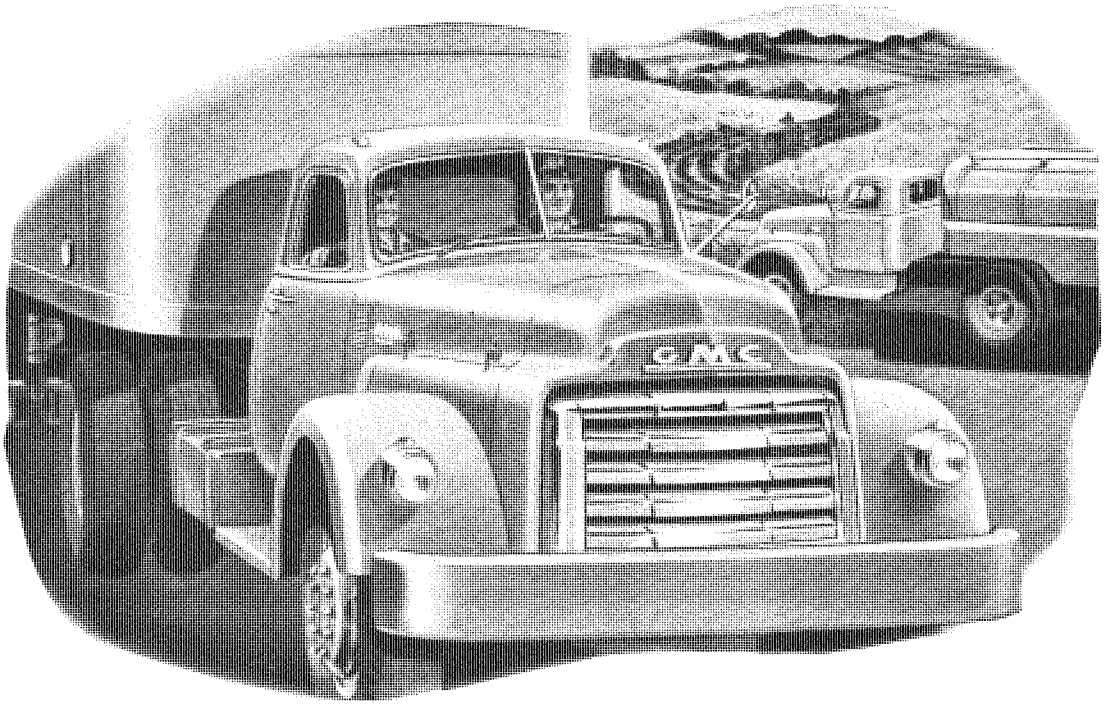


SELLING THE LD-195
AGAINST THE GMC HDCR-640 SERIES

	LD-195 Series	HDCR-640
Maximum Gross Vehicle Weight	24,000 lb.	22,000 lb.
Maximum Gross Combination Weight	48,000 lb.	45,000 lb.
Std. chassis and cab weight, air brakes, 10.00x20 tires on 7.00 rims, short WB	8,506 lb.	9,370 lb.
Overall dimension-bumper to back of cab	108-5/16"	117"
Wheelbase required for 60" CA dimension	133"	141"
Engine	Cummins JSB-600	GMC 4-71
type	4 cycle diesel 6 cylinder	2 cycle diesel 4 cylinder
bore & stroke	4-1/8x5	4-1/4x5
displacement (cu.in.)	401	283.7
governor set at RPM	2500 rpm	2000 rpm
max. horsepower	150 @ 2500	133 @ 2000
max. torque	345 @ 1600-2000	400 @ 1200-1300
Transmission-standard	F-54	Spicer 4453A
type	Constant mesh	Syncromesh
optional auxiliary	6231	6231
Front axle rating	6800 lb.	8000 lb.
Rear axle-rating	18,500	17,000
make model	Eaton 1715	Eaton 1795
ratios available	5.57,6.5,7.16	5.57,6.5
optional axles	Timken or Eaton Double reduction, two speed, or single speed	Eaton double reduction and two speed
Brakes-standard	Wagner "F" and "FR" Hydraulic	Air
front size	15x2-1/4	17-1/4x3
rear size	16x5	16-1/2x5-1/2
total lining area (sq.in.)	486.8	591
optional air brakes		
front size	16x2-1/4	
rear size	16-1/2x6	
total lining area (sq.in.)	560.6	
Hand brake	Drum type 9-3/4x4	Disk type 16"
Air operated radiator shutters	optional	standard
Frame	9x3-1/2x1/4	9-15/16x3-1/4x1/4

	LD-195 Series	HDCR-640
Springs-front size	52x3	50x1/2
Maximum tires available	10.00	10.00
Maximum rim available	7.5	7.0





SELLING THE LD-205
AGAINST THE GMC - HDCR-650 SERIES

	LD-205 Series	HDCR-650
Maximum Gross Vehicle Weight (Lb.)	27,000	24,000
Maximum Gross Combination Weight (Lb.)	55,000	55,000
Std. Chassis Weight with Cab, 11.00x20 Tires, 84" CA (Lb.)	9,087	9,800
Overall Dimension, Bumper to Back of Cab	108-5/16"	117"
Wheelbase required for 84" CA Dimension	157"	165"
Engine	Cummins JSB-600	GMC 4-71
Type	4 Cycle Diesel, 6 Cylinder	2 Cycle Diesel, 4 Cylinder
Bore x Stroke	4-1/8x5	4-1/4x5
Displacement (Cu.In.)	401	283.7
Governor Set at	2,500 RPM	2,000 RPM
Max. Horsepower	150 @ 2,500	133 @ 2,000
Max. - Torque	345 @ 1,600-2,000	400 @ 1,200-1,300
Transmission - Standard	F-54	Spicer 4453A
Type	Constant Mesh	Syncromesh
Optional Auxiliary	6231	6231
Front Axle - Rating (Lb.)	7,500	8,000
I-Beam	3-13/16x2-1/2 x5/8	3-12/16x2-1/2 xl/2
Rear Axle - Standard	Eaton 1895	Eaton 1895
Optional	Eaton 2695	Eaton 2695
	Eaton 18600	Eaton 18600
	Timken Q-100,200,300	
	Timken R-100,200,300	
Rating (Lb.)	22,000	19,000
Brakes - Standard	Wagner "F" and "FR" Hydraulic	Air
Front Size	15x2-1/4	17-1/4x3
Rear Size	16x6	16-1/2x6
Total Lining Area (Sq.In.)	555.9	624
Optional Air Brakes		
Front Size	16x2-1/4	
Rear Size	16-1/2x6	
Total Lining Area	560.6	

	LD-205 Series	HDCR-650
Hand Brake	Drum Type 12x5	Disk Type 16"
Air Operated Radiator Shutter	Optional	Standard
Frame - Size	9-1/8x3-1/2 x5/16	9-15/16x3-1/2 x1/4
Section Modulus	12.80	11.75
Springs - Front Size	52x3	50x2-1/2
Maximum Tire Size Available	11.00x22	11.00x22

SELLING THE LD-205

AGAINST THE MACK MODEL A-51-T

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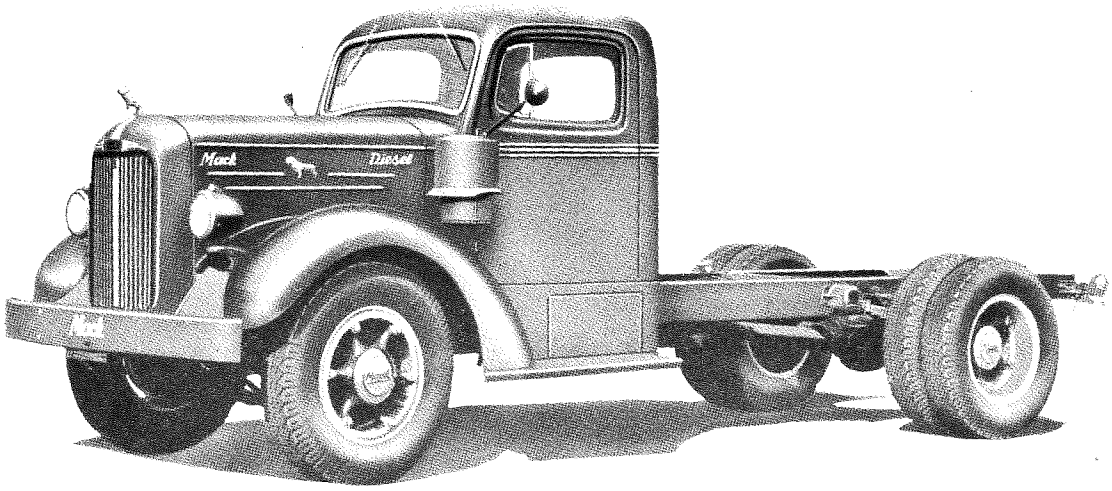
	LD-205	A-51-T
Standard Chassis Weight, Short WB, Cab, 1100x20	9065 lb.	9625 lb.
Engine	Cummins JBS-600	Mack END-510
Bore	4-1/8	4-7/16
Stroke	5	5-1/2
Displacement	401	510
Governor set at - rpm	2500	2400
Max. Horsepower	150	138
Max. Torque	360	368
Frame, Material	Carbon steel	Carbon steel
Size	9-1/8 x 3-1/3 x 5/16	9 x 3-1/4 x 1/4
Springs - Front Size	52 x 3	42-1/2 x 2-1/2
Maximum tire size	11.00 x 22	11.00 x 20



TRUCK MODEL: LD-195 & LD-205

ENGINE MODEL: JBS-600 NET TORQUE: 345 LB. FT.

RECOMMENDED RPM FOR ROAD OPERATION: 2350 ENGINE RPM

TIRE SIZE: 10.00 x 20 LOADED RADIUS: 19.6" TIRE CAPACITY: 43,500 LBS.

TRANSMISSION MODEL: F-54

TRANSMISSION RATIOS: 1) 7.07 2) 3.50 3) 1.72 4) 1.00 5) .776

REAR AXLE MODEL: EATON 17600 or 18600

REAR AXLE RATIOS: 5.57/7.60

ROAD RESISTANCE 24 LBS. PER TON

GEAR COMBI-NATIONS	TOTAL TRANS-MISSION REDUC-TIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 50,000 LBS	GRADE ABILITY GOVERNED RPM 55,000 LBS	GRADE ABILITY GOVERNED RPM 60,000 LBS	MPH @ 1800	MPH @ 2500	MAXIMUM RPM FOR SHIFT-ING GEARS
1st Low	7.07	53.73	19.2	17.4	15.8	3.9	5.4	2500
1st High	7.07	39.38	13.8	12.4	11.3	5.3	7.4	1830 2500
2nd Low	3.50	26.60	8.9	8.0	7.2	7.9	10.9	1690 2500
2nd High	3.50	19.50	6.2	5.5	5.0	10.8	15.0	1830 2500
3rd Low	1.72	13.07	3.8	3.3	2.9	16.1	22.3	1675 2500
3rd High	1.72	9.58	2.4	2.1	1.8	21.9	30.4	1830 2500
4th Low	1.00	7.60	1.7	1.4	1.2	27.6	38.4	1985 2500
4th High	1.00	5.57	.9	.7	.6	37.7	52.3	1830 2500
5th High	.776	4.32	.4	.3	.2	48.6	67.4	1830

TRUCK MODEL: LD-195 & LD-205

ENGINE MODEL: JBS-600 NET TORQUE: 345 Lb. Ft.

RECOMMENDED RPM FOR ROAD OPERATION: 2350 Engine RPM

TIRE SIZE: 10.00x20 LOADED RADIUS: 19.6" TIRE CAPACITY: 4350 Lbs.

TRANSMISSION MODEL: F-54B Aux. Trans. Model: 6231-A

TRANSMISSION RATIOS: 1) 8.08 2) 4.67 3) 2.62 4) 1.38 5) 1.00

AUX. TRANS. RATIOS: Over .86 Direct 1.00 Under 1.24

REAR AXLE RATIOS: 6.5

ROAD RESISTANCE 24 LBS. PER TON

GEAR COMBINATIONS	TOTAL TRANSMISSION REDUCTIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE-ABILITY GOVERNED RPM 50,000 LBS.	GRADE-ABILITY GOVERNED RPM 55,000 LBS.	GRADE-ABILITY GOVERNED RPM 60,000 LBS.	MPH @ 1800	MPH @ 2500	MAX. RPM FOR SHIFTING GEARS
1st Under	10.00	65.12	23.6	21.3	19.4	3.2	4.5	2500
1st Direct	8.08	52.52	18.8	17.0	15.4	4.0	5.5	2015 2500
1st Over	6.95	45.17	16.0	14.4	13.1	4.6	6.5	2015 2500
2nd Under	5.79	37.64	13.1	11.8	10.7	5.6	7.7	2085 2500
2nd Direct	4.67	30.36	10.3	9.3	8.4	6.9	9.6	2015 2500
2nd Over	4.02	26.11	8.7	7.8	7.1	8.0	11.1	2150 2500
3rd Under	3.25	21.12	6.8	6.1	5.5	9.9	13.8	2020 2500
3rd Direct	2.62	17.03	5.3	4.7	4.2	12.3	17.1	2015 2500
3rd Over	2.25	14.65	4.4	3.9	3.4	14.3	19.9	2150 2500
4th Under	1.71	11.11	3.0	2.6	2.3	18.9	26.3	1895 2500
4th Direct	1.38	8.97	2.2	1.9	1.6	23.4	32.5	2020 2500
4th Over	1.19	7.73	1.7	1.5	1.2	27.2	37.7	2150 2500
5th Direct	1.00	6.50	1.3	1.0	.9	32.3	44.9	2100 2500
5th Over	.86	5.59	.9	.7	.6	37.6	52.2	2102

TRUCK MODEL: LD-195 & LD-205

ENGINE MODEL: JBS-600 NET TORQUE: 345 LB. FT.

RECOMMENDED RPM FOR ROAD OPERATION: 2350 ENGINE RPM

TIRE SIZE: 10.00 x 20 LOADED RADIUS: 19.6" TIRE CAPACITY: 4350 LBS.

TRANSMISSION MODEL: F-54-B

TRANSMISSION RATIOS: 1) 8.08 2) 4.67 3) 2.62 4) 1.38 5) 1.00

REAR AXLE MODEL: EATON 17600 or 18600

REAR AXLE RATIOS: 5.57/7.60

ROAD RESISTANCE 24 LBS. PER TON

GEAR COMBINATIONS	TOTAL TRANSMISSION REDUCTIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 50,000 LBS.	GRADE ABILITY GOVERNED RPM 55,000 LBS.	GRADE ABILITY GOVERNED RPM 60,000 LBS.	MPH @ 1800	MPH @ 2500	MAXIMUM RPM FOR SHIFTING GEARS
1st Low	8.08	61.41	22.1	20.0	18.3	3.4	4.7	2500
1st High	8.08	45.01	15.9	14.4	13.1	4.7	6.5	1830 2500
2nd Low	4.67	35.49	12.3	11.1	10.0	5.9	8.2	1970 2500
2nd High	4.67	26.01	8.7	7.8	7.0	8.1	11.2	1830 2500
3rd Low	2.62	19.91	6.4	5.7	5.1	10.5	14.2	1915 2500
3rd High	2.62	14.59	4.3	3.8	3.4	14.4	20.0	1830 2500
4th Low	1.38	10.49	2.8	2.4	2.1	20.0	27.8	1800 2500
4th High	1.38	7.69	1.7	1.4	1.2	27.3	37.9	1830 2500
5th High	1.00	5.57	.9	.7	.6	37.7	52.4	1832

TRUCK MODEL: LD-195 & LD-205

ENGINE MODEL: JBS-600 NET TORQUE: 345 Lb. Ft.

RECOMMENDED RPM FOR ROAD OPERATION: 2350 Engine RPM

TIRE SIZE: 10.00x20 LOADED RADIUS: 19.6" TIRE CAPACITY: 4350 Lbs.

TRANSMISSION MODEL: F-54 B Aux. Trans. Model: 6231-A

TRANSMISSION RATIOS: 1) 8.08 2) 4.67 3) 2.62 4) 1.38 5) 1.00

AUX. TRANS. RATIOS: Over .86 Direct 1.00 Under 1.24

REAR AXLE RATIOS: 5.57

ROAD RESISTANCE 24 Lbs. per ton

GEAR COMBI-NATIONS	TOTAL TRANS-MISSION REDUC-TIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 50,000 LBS.	GRADE ABILITY GOVERNED RPM 55,000 LBS.	GRADE ABILITY GOVERNED RPM 60,000 LBS.	MPH @ 1800	MPH @ 2500	MAX. RPM FOR SHIFT-ING GEARS
1st under	10.00	55.81	20.0	18.1	16.5	3.7	5.2	2500
1st direct	8.08	45.01	15.9	14.4	13.1	4.7	6.5	2015 2500
1st over	6.95	38.70	13.5	12.2	11.1	5.4	7.5	2150 2500
2nd under	5.79	32.25	11.1	9.9	9.0	6.5	9.0	2085 2500
2nd direct	4.67	26.01	8.7	7.8	7.0	8.1	11.2	2015 2500
2nd over	4.02	22.37	7.3	6.5	5.9	9.4	13.0	2150 2500
3rd under	3.25	18.10	5.7	5.1	4.5	11.6	16.1	2020 2500
3rd direct	2.62	14.59	4.3	3.8	3.4	14.4	20.0	2015 2500
3rd over	2.25	12.55	3.6	3.1	2.8	16.7	23.2	2150 2500
4th under	1.71	9.52	2.4	2.1	1.8	22.1	30.6	1895 2500
4th direct	1.38	7.69	1.7	1.5	1.2	27.3	37.9	2120 2500
4th over	1.19	6.62	1.3	1.1	.9	31.7	44.1	2150 2500
5th direct	1.00	5.57	.9	.7	.6	37.7	52.3	2100 2500
5th over	.86	4.79	.6	.4	.3	43.8	60.9	2150

TRUCK MODEL: LD-195 & LD-205

ENGINE MODEL: JBS-600 NET TORQUE: 345 Lb. Ft.

RECOMMENDED RPM FOR ROAD OPERATION: 2350 Engine RPM

TIRE SIZE: 10.00x20 LOADED RADIUS: 19.6" TIRE CAPACITY: 4350 Lbs.

TRANSMISSION MODEL: F-54

TRANSMISSION RATIOS: 1)7.07 2)3.50 3)1.72 4)1.00 5).776

REAR AXLE MODEL: Timken L-300 (Q-300 & R-300 L-205)

REAR AXLE RATIOS: 6.36/8.28 (6.42/8.38 Only)

ROAD RESISTANCE 24 LBS. PER TON

GEAR COMBINATIONS	TOTAL TRANSMISSION REDUCTIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 50,000 LBS.	GRADE ABILITY GOVERNED RPM 55,000 LBS.	GRADE ABILITY GOVERNED RPM 60,000 LBS.	MPH @ 1800	MPH @ 2500	MAX RPM FOR SHIFTING GEARS
1st Low	7.07	58.54	21.1	19.0	17.3	3.6	5.0	2500
1st High	7.07	44.96	15.9	14.3	13.0	4.7	6.5	1920 2500
2nd Low	3.50	28.98	9.8	8.8	8.0	7.2	10.0	1610 2500
2nd High	3.50	22.26	7.3	6.5	5.9	9.4	13.1	1920 2500
3rd Low	1.72	14.24	4.2	3.7	3.3	14.7	20.5	1600 2500
3rd High	1.72	10.94	3.0	2.6	2.3	19.2	26.7	1920 2500
4th Low	1.00	8.28	2.0	1.7	1.4	25.3	35.2	1890 2500
4th High	1.00	6.36	1.2	1.0	.8	33.0	45.9	1920 2500
5th High	.776	4.93	.7	.5	.4	42.5	59.1	1920

Specifications
Cummins Model JS - 600 Diesel Engine

Bore:	4-1/4"
Stroke:	5"
Piston Displacement (cu. in.):	401
Horsepower:	150 HP @ 2500 RPM (See Performance Curve).
Firing Order:	1-5-3-6-2-4
Crankcase Oil Capacity (gallons):	3
Net Weight With Standard Accessories:	1475 Approximately

Bearings:

Camshaft-	7 bearings -front, 1-3/4"; all other 1-7/8" diameter
Crankpin-	2-5/8" diameter, Removable precision type shells
Main-	7 bearings, 3-7/8" diameter. Removable continuous groove, strip type, precision shells.
Piston Pin-	3 bearings, 2 in piston and 1 in rod, 1-1/2" diameter

Camshaft:
Located in fuel pump side of engine. Helical gear drive.

Crankcase:
Iron alloy, cast integral with block.

Crankshaft:
Special Tocco-hardened steel. All bearings Tocco-hardened.

Cylinders:
Cast enbloc, with removable wet liners.

Governor:
Mechanical flyball type, built integral with fuel pump. 2 governor speed control springs: idling speed, no-load control spring and maximum speed control spring, non-adjustable. 6% to 8% regulation. Overspeed shutdown control.

Head, Cylinder:
Detachable, single casting.

Lubrication:
Force feed to all bearings. Gear type pump.

Piston Pins:
Full floating (see "Bearings - Piston Pin").

Pistons:
Special alloy aluminum, Cam ground.

Pumps:

Fuel-	Cummins DD distributor type, built in unit with governor.
Fuel Priming-	Fuel pump mounted.
Lubricating Oil-	Gear type, gear driven.
Water:	Centrifugal type. Driven off gear train. Capacity dependent on engine installation and speed.

Rings, Piston:
3 compression rings, 2 oil rings.

Rods, Connecting:
Drop forged, 9 1/2" center to center. Rifle drilled for pressure lubrication to piston pin.

Rotation:
Clockwise when viewed at timing gear end.

Thermostats:
With main and by-pass flow control.

Valves, Intake and Exhaust:
Heat-resisting alloy steel, diameter 1 3/8".

Hand Priming Pump:
Mounted on fuel pump.

Filters:
Fuel Oil.
Full-flow lubricating oil filter.

Oil Cooler:
Ross, tube and shell type.

Cleaner, Air:
Oil bath type with fresh air intake. Mounted under hood.

Electrical Equipment:
Delco-Remy 12 volt system. 12 volt starting motor; 50 ampere generator (600 watts at 12 volts nominal); 1.5 to 1 generator to engine ratio.

Breather:
Mounted on rocker arm cover.

Heavy Duty Units, Gasoline and Diesel

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On the following pages you will find a general discussion on Cummins diesel engines which you will want to thoroughly understand before attempting to sell truck chassis equipped with these engines.

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CUMMINS DIESELS AND COMPETITIVE POWER

CUMMINS DIESELS COMPARED WITH GASOLINE ENGINES

Diesel and gasoline engines are similar in that both are internal combustion engines using liquid fuel. The principle differences are the method of introducing fuel into the engine and in the compression ratios used. The method of introducing fuel into the gasoline engine limits the compression ratios which may be used and thereby affects the efficiency. High compression ratios and high efficiencies are possible with a Diesel engine because of the method of introducing the fuel.

Air only is taken into a Diesel engine cylinder during the intake stroke. This air can be compressed to the most desirable pressure and temperature because it has not been mixed with fuel. Fuel is injected into the cylinder when the piston is near the top of the intake stroke and the heat of the compressed air ignites the fuel. The rate of injection and the rate of burning are controlled by the Exclusive Cummins Injector so that power is evenly distributed through a predetermined portion of the power stroke and high peak pressures are avoided.

As a contrast, air and gasoline are mixed in the carburetor of a gasoline engine and this explosive vapor enters the cylinder during the intake stroke of the piston. Ignition is accomplished by means of a spark. Compression pressures must be limited to pressures at which the cylinder temperature will not exceed the ignition temperature of the gasoline or premature firing in the cylinder will occur.

CUMMINS DIESELS COMPARED WITH OTHER DIESELS

The basic differences in Diesel engines are in their fuel and combustion systems. Also, Cummins Diesels and most other highspeed and medium speed Diesels operate on the four cycle principle but some two-cycle engines are manufactured.

The type of fuel system used influences the type of combustion chamber which may be used. The most widely used Diesel engine fuel systems are:

1. Exclusive Cummins Fuel System which uses a single plunger pump to meter the fuel for all cylinders, a rotating distributor disc which distributes the fuel charge to the injector, and a camshaft actuated injector which forces the fuel into the cylinder as a fine spray. Cummins Bulletin No. 5275, "The Exclusive Cummins Fuel System", explains the operating principles of this fuel system.

2. Combined metering-injection pump for each cylinder is used by the largest number of Diesel engine manufacturers. Individual plunger type pumps usually mounted at the side of the cylinder block meter the fuel and deliver the fuel to the cylinder through a series of tubes and check valves. With such an arrangement, the pumps must create pressures of 1500 to 2000 lbs. per square inch to permit injection of the fuel into the cylinder. This high pressure and variation in wear, manufacturing tolerances, tube lengths, etc. make it nearly impossible to make accurate metering adjustments. Usually, the various cylinders receive different amounts of fuel and fuel consumption becomes excessive at high speeds unless a timing device is applied to compensate for the fuel delivery lag which appears to be characteristic of highspeed operation of this type fuel system. Pressures sufficient to inject fuel in a condition suitable for ignition and combustion in an open type combustion chamber do not appear practical and engines using combined metering-injection pumps are usually equipped with precombustion chambers, turbulence chambers or air cell arrangements to create turbulence required to ignite and completely burn the fuel.

3. Unit Injection System which combines the metering and injection function into a single unit for each cylinder. Some of the disadvantages of the combined metering-injection pump described in paragraph 2 are minimized by these units which are located in the cylinder head. However, the problem of calibrating to permit delivery of equal amounts of fuel to each cylinder is probably as difficult of solution as with the previously described competitive system. The unit injector does create a sufficient pressure to inject the fuel directly into the combustion chamber, but a somewhat more refined and more expensive fuel than that used in other Diesel engines usually is recommended.

4. Single Metering Pump - Multiple Injection Pump System which uses a single plunger pump to meter the fuel for all cylinders and an individual metering pump for each cylinder. This system also must use high pressures to deliver fuel to the cylinders through tubes and check valves and also requires a precombustion chamber because of the condition in which fuel is delivered. This system has not been adapted to automotive engines.

AUTOMATIC TIMING DEVICES NOT REQUIRED WITH CUMMINS DIESELS

Torque of Cummins Diesels is somewhat lower at high RPM's than at slower speeds principally because of a time lag which occurs between delivery of the fuel and ignition at high RPM's. The length of time between injection and ignition requires the same portion of a second regardless of RPM's so that at high RPM's the piston has moved farther up on its compression stroke when ignition occurs than at low RPM's.

The time lag is more pronounced in Diesels equipped with the other fuel systems described than in Cummins Diesels because of an additional hydraulic time lag between the time of port cut-off in the injection pump and the delivery of fuel to the cylinder. The motion of the Exclusive Cummins injector is controlled positively by the engine camshaft so that no hydraulic time lag occurs and fuel delivery to the cylinder occurs at the same crankshaft position regardless of RPM.

Usually manufacturers using the other fuel systems must select a timing which is a compromise between that most desirable at slow speed and that more desirable at high speeds. Efficiency is best at the compromise RPM and decreases at higher and lower RPM's. High fuel consumption at high RPM's results mainly from the hydraulic and ignition time lags. One manufacturer has attempted to correct this inefficiency at high RPM by the use of a special timing device to advance the point of fuel pump cut-off at high RPM's and to retard the fuel pump cut-off at low RPM's so that fuel delivery to the cylinder will occur at the same crankshaft position at all engine speeds.

CUMMINS DIESELS COMPARED WITH TWO-CYCLE DIESELS

Cummins Diesels, like most other highspeed and medium speed Diesel and gasoline engines operate on the four cycle principle. Each cylinder has a power stroke on every other revolution of the engine. The events occur in the following sequence:

1. Intake stroke - Piston moves down drawing air into the cylinder.

2. Compression stroke - Piston moves up with valves closed, compressing the air.

3. Power stroke - The burning gases force the piston down.

4. Exhaust stroke - The piston moves up driving out the burned gases through the exhaust valves.

Two cycle type engines are designed on the basis that more power can be obtained from an equal engine displacement by doubling the number of power strokes.

The events listed above for the four cycle engine also occur in the two cycle engine but are accomplished in one downward and one upward stroke of the piston.

Air is blown into the cylinder during the first portion of the upward stroke of the two cycle engine piston and the air is compressed on the remainder of the upward stroke after the intake ports have been closed off. The expanding gases force the piston down until the exhaust valve opens and the intake ports are again uncovered during the latter part of the downward stroke.

Theoretically a two cycle engine should produce twice as much power for each cubic inch displacement as a four cycle engine, if 4 cycle efficiency were maintained. However, current two cycle engines have only 42% less displacement than four cycle engines developing equal power. The principal reasons for this relative inefficiency are:

1. The exhaust valves must open sooner during the power stroke of the two cycle engine than is customary with four cycle engines permitting more heat (potential power) to be lost in the exhaust.

2. Large quantities of air are blown through the two cycle cylinder to scavenge the exhaust gases and to cool the piston crown. As a full stroke is not provided to permit the piston to push out the burned gases as with four cycle Diesels, air must be blown through the cylinder to clear the cylinder of burned gases. The piston crown also does not have sufficient time between strokes to cool satisfactorily and sufficient air must be blown through the cylinder to provide adequate cooling. This blowing of air is a parasitic load on the engine - using power but not creating additional power.

QUESTIONS AND ANSWERS CONCERNING DIESEL ENGINES AND PARTICULARLY ABOUT CUMMINS DIESELS

1. WHAT IS A DIESEL ENGINE?

The Diesel is a type of internal combustion engine, using compression for ignition. No artificial ignition is required to start combustion. As the air in the cylinder is being compressed by the upward (compression) stroke of the piston, the temperature of the air increases with the increased pressure until it is sufficient to ignite the fuel which is injected into the cylinder.

2. WHAT ARE THE PRINCIPAL DIFFERENCES BETWEEN DIESEL AND GASOLINE ENGINES?

1. A higher compression ratio is used in a Diesel engine.
2. The method of igniting the fuel in the combustion chamber.
3. The method of supplying the fuel to the combustion chamber.
4. The grade and type of fuel used.

3. WHAT IS COMPRESSION RATIO?

Compression ratio compares the volume of air in a cylinder before compression with its volume after compression. A 16 to 1 compression ratio means that the air is squeezed into 1/16 of the space at the end of the stroke. Generally, the higher the compression ratio, the more efficient is the internal combustion engine.

4. HOW DOES COMPRESSION RATIO AFFECT THE TEMPERATURE OF THE AIR?

As the piston moves upward on its compression stroke, the pressure is increased to approximately 500 to 600# and with this increase in pressure the temperature of the air is raised to approximately 1000° F. This temperature is higher than the firing temperature of the fuel.

5. WHAT COMPRESSION RATIOS ARE USED IN GASOLINE ENGINES?

Gasoline engines use compression ratios from 5 1/2 to 7 1/2. The compression pressures at partial loads are reduced because of the action of the butterfly valve in the carburetor creates a higher vacuum in the intake manifold. This reduces engine efficiency at part loads. A Diesel engine has the same manifold pressures at all loads. Thus, the compression ratio remains constant and efficiency is the same.

6. WHY CAN'T GASOLINE ENGINES TAKE ADVANTAGE OF THE GREATER EFFICIENCY POSSIBLE WITH HIGHER COMPRESSION RATIOS?

Because the mixture of air and gasoline in the engine cylinder will preignite if the temperature is raised above its ignition temperature. An example of this condition is knocking (premature firing) when a poor grade gasoline is used in a high compression engine. The maximum compression ratio of a gasoline engine is limited by the ignition temperature (octane rating) of the gasoline that is commercially available.

7. DOES THE HIGH COMPRESSION IN A DIESEL ENGINE HAVE A MORE HARMFUL EFFECT UPON THE BEARINGS, CYLINDERS, PISTONS AND RINGS THAN THE LOWER COMPRESSION OF THE GASOLINE ENGINE?

No, because the peak firing pressures in a Diesel are no higher than those of the gasoline engines. Because the rate of injection and burning of fuel in a Diesel is controlled, the combustion pressure is controlled. The Diesel does not have the sharp explosion in the cylinder and resulting shock loads on bearings, pistons and rings.

8. AFTER THE AIR IS COMPRESSED, WHAT FOLLOW?

The fuel is injected into the cylinder, and because the air temperature has already been raised (by compression) to a temperature in excess of the fuel's ignition temperature, combustion occurs. An electrical ignition system is not needed on a Diesel engine. This is one key to Diesel engine economy and simplicity.

9. HOW DOES THIS DEVELOP POWER?

The expansion of the gases produced by the burning of the fuel oil and air drives the piston downward. As the rate of combustion can be controlled in a Diesel by controlling the injection, it is possible to distribute the downward force evenly over the length of the power stroke.

10. COMPRESSION RATIO AND EFFICIENCY

The thermal efficiency of an internal combustion engine is roughly proportional to its compression ratio. Cummins Diesels compress the intake air into a volume 1/12 to 1/18.25 of the original volume depending upon the engine model. Therefore, Cummins Diesels are said to have compression ratios of (12 to 18¼) to 1. "See Index and condensed specifications page Cummins General Engine Catalog #5218-C

11. ADVANTAGE OF HIGH COMPRESSION

The advantage of high compression is that the expansion ratio is in direct relationship with compression ratio. If a Diesel has a compression ratio of 15.5 to 1, the hot gases after combustion expand from a small volume to a volume approximately 15.5 times greater. More of the energy of the expanding gases is used in a Cummins Diesel to push the piston down and a smaller percentage of the energy is lost in the exhaust because the gases have been expanded to lower pressures and temperatures in the cylinder than in gasoline engines in which the gases expand only 5 to 7 times.

THE METHOD OF SUPPLYING THE FUEL

1. DO ALL DIESEL ENGINES DELIVER THE FUEL TO THE CYLINDERS IN THE SAME WAY?

No, the Exclusive Cummins Fuel System is different from those in use on all other Diesels.

2. IN WHAT WAY IS THE CUMMINS FUEL SYSTEM DIFFERENT FROM OTHERS?

The Cummins fuel pump has a single metering plunger which measures the fuel to be delivered to each cylinder. It delivers the fuel through a distributor to the different injectors. The Cummins injector plunger, which is actuated from the camshaft supplies the force needed to push the fuel into the cylinder as a fine spray. A complete description of the Cummins fuel system will be found in booklet entitled "The Exclusive Cummins Fuel System". Notice the sketch traces the course of the fuel from the tanks to the cylinders.

In general, the fuel systems on Diesels competitive to Cummins have a separate pump for each cylinder. This pump must meter the fuel and build up enough pressure to deliver the fuel into the cylinder against the maximum cylinder pressure through hydraulically operated valves. Because of differences in valve spring tensions normal differences in pump and valve wear and normal machining variations in manufacturing, it is almost impossible to adjust these individual pumps so that equal amounts of fuel will be delivered to each cylinder.

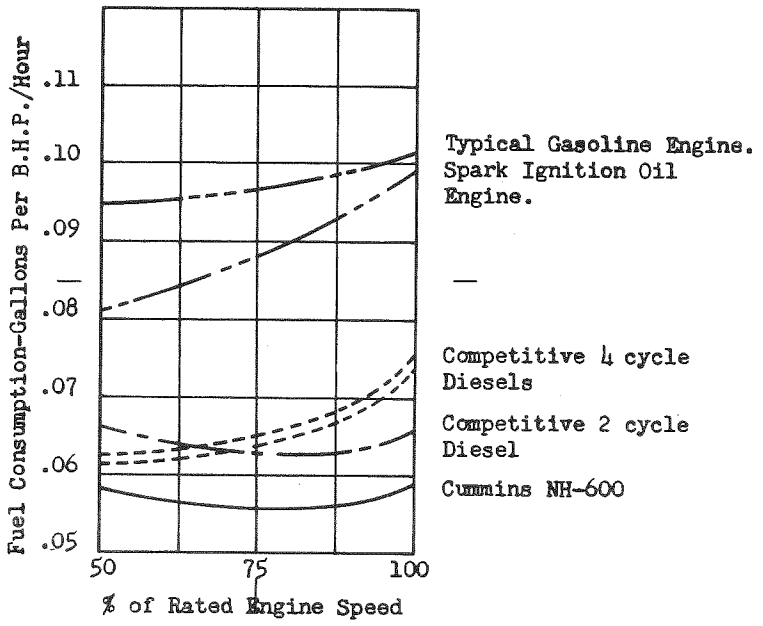
Many Diesel engine manufacturers emphasize their special combustion systems. They use these systems only because their fuel system is not capable of delivering fuel in a form that is easily ignited and burned in an open combustion chamber.

3. WHAT EFFECT DOES THE FUEL SYSTEMS HAVE ON THE COST OF OPERATING A DIESEL ENGINE?

The curves below compare Cummins NH-600 fuel consumption with the published curves of comparable engines at their maximum ratings. These curves show the relative inefficiency of the conventional fuel and combustion systems at high engine speeds (4 cycle curves).

The two cycle engine shown uses a fuel system which is similar to the conventional system in having individual pumps for each cylinder. However, as the pump and injector for each cylinder is one unit, it is possible to build up sufficient pressure to inject the fuel as a spray and to burn it in a combustion chamber similar to Cummins. It is necessary to use a lighter fuel (more expensive) to obtain satisfactory combustion and this combined with the increased fuel consumption indicated below, makes a two cycle engine's fuel bill higher than a Cummins!

Maximum Horsepower Fuel Consumption
Cummins NHB & Various Competitive
Engines in 200 H. P. Range



4. HOW IS THE FUEL SUPPLY TO CYLINDERS OF CUMMINS DIESELS REGULATED?

By varying the quantity of fuel injected. This is accomplished by controlling the length of the stroke of the metering plunger. This is operated by the foot throttle in automotive applications or a hand throttle in industrial or marine applications.

There is also a fly-ball type governor (a section of the fuel pump) which regulates the amount of fuel in the idling ranges (to prevent stalling) and in the top ranges to prevent racing engine above the recommended governed R.P.M.

All Cummins Diesels can be equipped with a hydraulic governor which increases or decreases the fuel delivery by changing the length of stroke of the metering plunger. This type of governor will maintain constant engine speeds at varying loads.

5. IS THE DIESEL ENGINE CONTROLLED IN ABOUT THE SAME WAY AS A GASOLINE ENGINE?

Yes so far as starting and as the operation is concerned, but since no electrical ignition is used, the Diesel engine is stopped by cutting off the fuel supply to the cylinders.

When stopping the engine by use of the idling control, the motion of the metering plunger is stopped, and delivery of fuel to the cylinders is stopped.

The foot or hand throttle controls the RPM in both types of engines in most applications. For constant speed operations, the governor controls the RPM and the throttle is locked in wide open position.

FUELS

1. WHAT KINDS OF FUEL OIL CAN BE SUCCESSFULLY USED IN A CUMMINS DIESEL ENGINE?

Copies below are the fuel oil specifications recommended by Cummins Engine Company, Inc.

Fuel oil should be a neutral distillate petroleum oil, free from suspended matter, and not a mixture of light oil and heavy residue.

Physical and chemical properties should meet the following requirements:

Viscosity @ 100° F	
Centistokes	2.4 minimum - 5.0 maximum, or
Saybolt Universal	34 minimum - 42 maximum
Gravity - Degree A.P.I.	30 minimum - 42 maximum
Cetane Number	45 minimum - except that in warm weather and where no starting difficulties are encountered, the cetane number may be a minimum of 40.
Pour Point	10°F below lowest temperature expected
Distillation	
At least 10% should distill below	460° F.
At least 90% should distill below	675° F.
End point should not exceed	725° F.
Minimum Recovery	98%
Conradson Carbon Residue	Not to exceed .25% on 10% bottoms
Ash	Not to exceed .02% of weight
Bottom Sediment and Water	Maximum .05% of weight
Sulphur	Not to exceed 1% of weight
Copper Strip Corrosion	3 hours @ 122° F. - Pass

2. DOES THE FUEL OIL RECOMMENDED FOR USE IN CUMMINS DIESELS HAVE ANY LUBRICATING PROPERTIES? ARE SUCH PROPERTIES ESSENTIAL?

It has, and those properties are essential because all parts of the fuel pump are dependent upon fuel oil for lubrication. This is also true of the injector plunger.

3. WHAT IS VOLATILITY?

Volatility is a measure of the rate at which a liquid will vaporize or evaporate. Butane, which will evaporate rapidly at normal temperatures is an example of a highly volatile liquid. Gasoline is also classed as having a high volatility as its evaportation rate is high, especially in high air temperatures. Diesel fuel has a low volatility and it will evaporate slowly. Diesel fuel is less volatile than gasoline, therefore, it has less fire hazard.

4. WHAT IS FUEL ENERGY?

Fuel energy is measured in standard heat (BTU) units and gives a comparison of the power possibilities of different fuels. As a Diesel engine converts a higher percentage of the heat units in its fuel into power at the flywheel than any other type of power plant, it is the most efficient type of power. Diesel fuel has more heat (BTU) units per gallon, and so gives more work per gallon of fuel consumed.

5. WHAT IS THERMAL EFFICIENCY?

Thermal efficiency is a term used to measure the percent of fuel energy which is converted into power. A Cummins Diesel converts as much as 35% of the fuel energy into power at the flywheel. A gasoline engine might convert up to 25% of the fuel energy into power. Therefore, a Cummins Diesel has a thermal efficiency of about 35% and a gasoline engine less than 25%.

6. HOW DOES THE WEIGHT OF GASOLINE AND FUEL OIL COMPARE?

A comparison of weights and heat units (BTU's) is given below:

Fuel	Average Lbs. per Gall.	Average BTU per Lb.	Average BTU per Gallon
Diesel Fuel	7.4	19,000	141,000
Gasoline	6.2	20,600	128,000
Propane	4.2	21,650	91,800
Butane	4.8	21,500	102,400

There is more power in each gallon of fuel oil than in any of the other fuels commonly used in internal combustion engines. Divide the BTU's by cost per gallon of fuels in your territory and see how much more power you get for each cent when buying Diesel fuel.

7. WHAT IS THE WEIGHT OF A QUANTITY OF DIESEL FUEL OIL TO PROVIDE ABOUT THE SAME CRUISING RANGE AS A GASOLINE TRUCK UNDER IDENTICAL CONDITIONS OF LOAD AND OPERATION?

The following tabulation shows differences in weights of gasoline and fuel oil that must be hauled to give equal mileage when the miles per gallon of the Diesel are 1 1/2, 2 and 2 1/2 times as high as for a gasoline engine.

Gallons of Gasoline per Trip	Gallons of Diesel Fuel per Trip	Weight of Gasoline	Weight of Diesel Fuel	Reduction of Weight for Equal Mileage
90	60	560#	450#	110#
120	60	740#	450#	290#
150	60	930#	450#	480#

L U B R I C A T I O N

1. WHAT LUBRICATING OIL IS RECOMMENDED FOR CUMMINS DIESEL ENGINES?

The following grades of lubricating oils should be used in the crankcase:

Hotweather (80 degrees F. and above)	SAE No. 30
Average Weather (20 to 80 degrees)	SAE No. 20
Cold Weather (20 degrees and below) and in all new or rebuilt engines with new bearings for first refill period	SAE No. 10

The SAE numbers given should be adhered to closely. It would not be satisfactory, for instance, to substitute an SAE No. 30 light grade, or SAE No. 20 light grade, for the corresponding straight SAE No. 30 or 20.

We do not recommend any fixed brands of oil for crankcase lubrication. We do, however, recommend that only the oils manufactured by a recognized concern and the best quality Diesel engine lubricating oil obtainable be used.

Price should not be a deciding factor as it is well known that the best oil is the most economical in the long run, although its price per gallon may be higher.

However, the true measure of oil quality is its performance in service. Lubricating oils of the additive type properly compounded, or straight mineral oils, either of which have proven satisfactory in extensive field service in Cummins engines are acceptable.

2. HOW OFTEN SHOULD THE CRANK CASE LUBRICATING OIL BE CHANGED?

The lubricating oil should generally be changed at the end of each period of 500 gallons of fuel oil consumption, until the correct change period for the operation can be determined. With a Diesel engine, the frequency of oil change will depend mainly on the type of operation.

3. ARE ALL MODERN INTERNAL COMBUSTION ENGINE LUBRICATION SYSTEMS THE SAME IN PRINCIPLE?

Yes, generally speaking, but they vary as to the degree of full pressure lubrication. Most internal combustion engines use a pump to deliver oil to main bearings. In some engines oil lines are extended to the connecting rod bearings and to otherbearings. Full pressure lubrication, as supplied in Cummins Diesels, means that oil is delivered under full pump pressure to all main bearings, connecting rod bearings, piston pins, rocker lever bushings, and other bearing surfaces.

4. WHAT TYPE OF LUBRICATING OIL FILTERS ARE RECOMMENDED FOR USE WITH CUMMINS DIESELS?

Cummins supplies a screen in the crankcase and a lubricating oil strainer in the pump discharge line as standard equipment.

All oil going into the pump and to the engine must pass through this strainer. A by-pass or bleeder type filter can also be supplied on request. Such a filter is recommended for use on any Cummins Diesel that is operating in a dusty atmosphere in order to remove grit from the lubricating oil.

5. HOW DOES THE OIL COOLER OPERATE?

The oil cooler is a water cooled radiator thru which the hot crank case oil circulates. It is cooled by the engine cooling water (coming in from the bottom of the truck radiator at its coolest temperature). Hence, the hot oil meets the coolest water and returns to the cylinder block many degrees cooler.

During cold weather the hot recirculating jacket water instead of cold water from the radiator passes through the oil cooler, changing the cooler into an oil heater. The oil cooler performs a two fold purpose cooling the oil when hot and heating the oil when cold.

An oil cooler is supplied as standard equipment on NHRS-600, NHS-600 and HRS-600 Cummins Diesels and is available as optional equipment for other models. This equipment is recommended for other models when high horsepower output, high atmospheric temperatures and insufficient circulation of air around the oil pan results in excessively high oil temperatures. High oil temperatures will reduce the effectiveness of the lubricant and may result in increased wear of parts.

SUPERCHARGING

1. WHAT IS A SUPERCHARGER?

A supercharger is actually an air pump that operates in much the same manner as a gear type lubricating oil pump.

A supercharger is a pump used to pack more air into the cylinder chamber. By packing in more air (oxygen), more fuel can be burned and more power developed. 14.3 pounds of air needed to burn one pound of fuel. "See Bulletin #5303".

2. Up to 50% more H.P. ... same basic engine -- that's the common goal of heavy-duty equipment owners today. Everybody wants more horsepower - but they want it contained in the same space and with no increase in engine weight.

There's one best answer to the problem: supercharging. The only economical way to get more horsepower is to burn more fuel completely - by providing enough air to permit perfect combustion.

Cummins supercharged Diesel Engines are designed and built to produce the power you want: to give you more horsepower with the same basic engine.

3. IS A SUPERCHARGER ALWAYS A BLOWER AND IS A BLOWER (AS USED ON THE 2 CYCLE DIESEL ENGINE) A SUPERCHARGER?

A supercharger is always a type of blower, but a blower may or may not be a supercharger. The primary purpose of a super-charger is to increase the weight of air in the cylinder in order to increase the horsepower and its use as a blower to aid in exhausting burned bases is of a secondary nature.

The main function of a blower on a two cycle engine is to blow the exhaust gases from the cylinder and any supercharging effects are secondary.

4. WHY IS A BLOWER USED ON A 2 CYCLE DIESEL ENGINE?

It is used to remove the burned gases from the cylinder. All of the following happens in one revolution of the crankshaft:

1. Intake of air
2. Compressing of air
3. Combustion
4. Scavenging of burnt gases

In the 4 cycle engine these four operations occur during two revolutions of the crankshaft, and the exhaust stroke of the piston following the power stroke does the scavenging.

FOUR CYCLE VS. TWO CYCLE

1. WHAT ARE SOME ADVANTAGES OF THE CUMMINS 4 CYCLE DESIGN OVER A TWO CYCLE DIESEL?

In the 2 cycle engine the exhaust is thru a poppet valve, while the inlet is thru the side ports of the cylinder wall leaving a considerable area without water jacketing.

The piston of the 2-cycle engine with combustion on each stroke requires more cooling. This is done by oil cooling the piston, which tends to increase carbon formation and lubricating oil temperatures.

A lighter fuel oil is usually recommended in the field for the 2 cycle engine. This has lower lubricating qualities and generally costs a penny or two more per gallon than the fuels which are specified for the Cummins Diesel engine.

2. WHAT ADVANTAGES DOES A TWO CYCLE DESIGN HAVE OVER A FOUR CYCLE ENGINE?

The principal advantage of a two cycle engine is that equivalent horsepower can usually be built into a smaller and lighter unit than can a 4 cycle engine.

FUEL ECONOMY

1. WHAT IS MEANT BY "LOAD FACTOR" WITH REFERENCE TO AN ENGINE, AND WHAT IS THIS FACTOR FOR ENGINES USED IN VARIOUS OPERATIONS?

"Load factor" is the percentage of full throttle or full load at which an engine operates. In highway applications the engine may operate at full throttle when climbing hills, at part throttle when operating in level country, and at idling position when standing. However it is found that the average of these conditions for engines in highway service falls between 1/3 and 1/2 of continuous full throttle horsepower, so that we can say the "load factor" is 33% to 50%.

An off-the-highway truck, especially when hauling out of a pit will have a very high load factor for the hauling portion of the cycle as nearly full horsepower is used in climbing the grades. However, the return trip does not require much power so that the average will also fall into the 33 to 50% range mentioned above.

2. IS "LOAD FACTOR" OF IMPORTANCE WHEN CONSIDERING CUMMINS DIESEL FUEL ECONOMY IN COMPARISON WITH GASOLINE ENGINES?

Yes, because:

At wide open throttle, the Diesel will burn less than 1/2 as many gallons of fuel as a comparable gasoline engine.

At 3/4 open throttle, the Diesel will burn less than 1/2 as many gallons of fuel as a comparable gasoline engine.

At 1/2 open throttle, the Diesel will burn only 3/8 as many gallons of fuel as on comparable engine. (gasoline)

At 1/4 open throttle, the Diesel will burn only 1/3 as many gallons of fuel as a comparable gasoline engine.

When idling, the Diesel will burn only 1/4 as many gallons of fuel as a comparable gasoline engine.

The Diesel engine has approximately the same compression pressures in the cylinder at all throttle positions so that the efficiency remains very nearly the same. The gasoline engine does not. This is because the betterfly valve in the carburetor closes as the throttle of a gasoline engine is released, increasing the vacuum in the intake manifold. This in turn lowers the pressures in the cylinder (including compression pressure) resulting in aless efficient engine during low throttle operations.

3. HOW MUCH FUEL WILL A CUMMINS DIESEL SAVE OVER A GASOLINE ENGINE WHICH IS OPERATING UNDER THE SAME CONDITIONS?

Records show that Cummins Diesels will cut the fuel usage from 35 to 70%, with a reduction of 50% considered a conservative figure.

The Cummins Diesel Engine will require only one gallon of fuel to do the work that the gasoline engine requires two gallons of fuel to accomplish.

4. WHAT WILL BE THE REDUCTION IN FUEL COSTS BY CHANGING FROM GASOLINE TO CUMMINS POWER?

While no definite figures can be given until the conditions of the individual operations are examined and local fuel costs known, the Diesel offers big savings because of the reduction in fuel used and the lower cost of the fuel. Savings of as much as 2¢ a mile are common, and 3¢ to 4¢ are not uncommon for automotive applications.

It is not a question whether enormous fuel savings are available; it is only a question of whether the operation justifies the higher original investment in equipment to substitute Diesel fuel for gasoline. Admittedly, there are some operators who are not prospects for Diesel Trucks.

5. WHAT IS THE MINIMUM GROSS VEHICLE WEIGHT FOR WHICH THE DIESEL ENGINE OFFERS ATTRACTIVE FUEL COST ECONOMIES FOR HIGHWAY OPERATIONS?

This is not a question which can be answered by a formula or a minimum weight figure. The job and operating conditions will govern this factor entirely.

For instance, any of the following conditions indicate an advantage for Diesel power:

(a) Medium loads at high average speed and long distances.
(b) Heavy loads, short mileages, and adverse grade conditions.
(c) Heavy loads, long distances at high average speeds.
(d) High engine operating hours.
(e) High acceleration factors, and short distances.

For instance, many textile manufacturers haul finished goods in their own trucks. Let us assume that 24,000 pounds is the maximum pay load possible, because the bulk of the material would require additional length, of trailer. The engine weight does not have to be considered as the unit will not be operating up to State limitations. The units usually haul a load one way and return empty and operate 80,000 miles per year.

In such an operation, a Cummins Diesel would get about 7 miles per gallon, and a gasoline engine about 5 miles per gallon.

A year's operation would result in the use of:

Diesel fuel - - $\frac{80,000}{7}$ = 11,400 gallons

Gasoline - - $\frac{80,000}{5}$ = 16,000 gallons

Difference 5,400 gallons

If we assume a price differential of 4¢ per gallon in favor of Diesel fuel, the saving per year would be over $1500, which means that the extra cost of the Diesel Truck would be paid for in less than one year.

6. WHAT IS THE MINIMUM MONTHLY MILEAGE ABOVE WHICH THE DIESEL ENGINE OFFERS ATTRACTIVE FUEL COST ECONOMIES?

This is not a question which can be answered by a formula or a minimum mileage figure. The job and operating conditions will govern this factor entirely.

For instance, an earth hauling truck may not put on very many miles in a year in comparison to highway operations, but the operating hours may be higher.

Operating hours and not mileage are a determining factor for industrial applications.

Fuel savings are not the entire story. Reduced down time, reduced maintenance costs, less maintenance personnel, improved schedules, and increased production are also reasons why Cummins Dieselspay off better than fuel costs alone might indicate.

S A F E T Y

1. ARE THUCK FIRE INSURANCE RATES LOWER WHEN DIESEL OIL IS USED FOR FUEL?

Basic fire insurance rates generally favor the operator of Diesel powered equipment because there is less danger of fire than with gasoline powered equipment. A recent survey indicates that fire insurance rates of Diesel trucks are approximately 15% lower than rates for gasoline trucks.

It is significant that most operators transporting highly inflammable fuels prefer Cummins Diesels.

SERVICING CUMMINS DIESELS

1. HOW OFTEN MUST THE CUMMINS DIESEL BE OVERHAULED?

Due to the wide variations in loads, terrain, operating speeds, etc., it is not possible to establish a rule for overhauls based on miles. There is a direct relation between fuel consumed and engine wear, however, and overhaul periods can be determined by the amount of fuel used. This is logical -- the harder an engine is used, the greater will be the amount of fuel burned and the more rapid will be the engine wear.

It has been found that, with a Cummins Diesel, which receives the week to week preventive service recommended in the instruction manual, one "in-the-frame" overhaul is advisable after 16,000 to 20,000 gallons of fuel have been used, and a major "motor stand" overhaul is advisable after 32,000 to 40,000 gallons of fuel have been consumed. This is easily converted into mileage figures when operating statistics become available. For instance, if the truck's operator is getting 5 miles per gallon (which is not unusual for 50,000 to 60,000# G.V.W. operations), the "in-the-frame" overhaul would occur at 80,000 to 100,000 miles, and the major overhaul at 16,000 to 200,000 miles.

2. WHAT IS THE COST OF OVERHAULING A CUMMINS DIESEL?

The anticipated cost of the first overhaul, in which the engine remains in the chassis, is between $400 and $700, and of the major overhaul on a "motor stand", from $900 to $1300. These figures are based on engines receiving good treatment and periodic maintenance, according to recommendations in the Cummins instruction manual.

3. IS THE WEEK TO WEEK MAINTENANCE OF THE CUMMINS DIESEL GREATER THAN FOR A GASOLINE ENGINE?

No. The maintenance costs of the Cummins Diesel is normally less than a comparable gasoline engine at any time, but more so during this particular period. The Diesel does not require an ignition system, hence electrical troubles from such items as spark plugs, spark coils, distributors, points, etc., are not present.

4. WHAT ENGINE PARTS AND SUB-ASSEMBLIES ARE AVAILABLE IN CUMMINS PARTS STOCKS AROUND THE COUNTRY?

At most points, the following new and rebuilt items are available at an appropriate exchange price, subject to the condition of the material turned in:

Rocker housings and levers
Fuel pump
Injectors
Lubricating oil pump
Water pump
Governor
Electrical parts used for starting and battery charging.

5. WHERE ARE PARTS AND SERVICE AVAILABLE FOR CUMMINS DIESEL ENGINES?

Parts and service for Cummins Diesel Engines are available at all Cummins Dealerships and their branches.

A map showing their locations is available to you at any Cummins Dealership, of which there are over 200 in the United States and over 20 in Canada. The points in the United States are so located that no stock of parts is farther away than about one hour's flying time, over-night train time, or 6 to 10 hours bus time. These Dealerships carry parts stocks adequate for the engine population to assure a supply to meet the needs of all operators on short notice "See Service Map-Bulletin #6202-4".

6. WHAT SHOULD AN OWNER DO WHEN HE RECEIVES A NEW CUMMINS POWERED TRUCK?

He should immediately contact the Cummins Dealer in his territory if the Dealer has not already been in touch with him. The Dealer will make certain that the engine is correctly adjusted and operating properly. He will also instruct the operators in the care and maintenance of the Cummins Diesels. This service is rendered free of charge.

OPERATION OF CUMMINS DIESELS

1. IS THE POWER OF A DIESEL ENGINE SUBJECT TO THE SAME LOSSES DUE TO ALTITUDE AS THE GASOLINE ENGINE?

The answer is that the loss is approximately the same, and is held to be approximately 3% per each 1000 feet above sea level.

This loss of power due to altitude is the result of less weight of oxygen in the air and the effect is the same for one engine as another.

2. WHY IS THE AIR SUPPLY TAKEN OUTSIDE OF THE ENGINE COMPARTMENT ON I.H.C. CUMMINS DIESEL POWERED TRUCK?

The external air intake system maintains lower air intake temperatures and materially increases the useable horsepower output. The gain in power is appreciable because of the difference in temperature of the air outside the hood and under the hood where it is continually being heated. An engine's power loss is commonly held to be as much as 1% for each ten degrees of intake air temperature above 90 degrees.

3. IS A SIX CYLINDER DIESEL ENGINE NOISIER AND ROUGHER THAN A GASOLINE ENGINE?

The six cylinder Diesel may be a little rougher than a gasoline engine at very low RPM, because of the higher compression, but this smooths out as momentum increases until it is as smooth as a gasoline engine at the operating speeds.

Noise in a Diesel engine or a gasoline engine is entirely the result of muffling, and an equally good job can be done on both.

4. WHY DO DIESEL AND GASOLINE ENGINES START HARD AT LOW ATMOSPHERIC TEMPERATURES?

All internal combustion engines start hard at low atmospheric temperatures because:

1. Lubricating oil becomes stiff on bearings and cylinder walls increasing the friction and consequently the power required for cranking the engine.

2. The power available for cranking becomes less as the temperature drops. A fully charged battery will lose 50° of its charge at 0° F atmospheric temperature. In a gasoline engine, all the power available may be used for cranking and no current may be available for ignition.

3. At extremely low temperatures, ice may form in gasoline lines or fuel oil may congeal on the walls of tubing, reducing the flow of fuel to the engine.

4. In a gasoline engine, condensation may form and freeze on the distributor points, preventing ignition. In a Diesel, the compression temperature may drop to a point at which the fuel will not ignite.

5. WHAT EQUIPMENT IS AVAILABLE THAT WILL ASSURE QUICK STARTING UNDER WINTER CONDITIONS?

Cummins cold starting equipment is now available for Models JS-600, H-600, HR-600, HRBB-600, HS-600, HRS-600, NH-600, NHS-600 and NHRS-600. This equipment is an intake air preheater. By heating the intake air as it goes into the engine, the compression temperature is also raised so that fuel injected into the engine cylinder will ignite.

A second and perhaps more satisfactory solution for stationary applications is the installation of a water heater to heat the engine coolant before starting the engine. This method not only increases the compression temperatures by heating the cylinder wall but also reduces the power required for cranking. This results from heating the oil film on the cylinder walls and the addition of some heat to other moving parts of the engine.

Where temperatures are extreme and starts will have to be made at 10° F and below the Cummins Dealer should be consulted.

6. WHY DOES A DIESEL ENGINE SMOKE AND HOW CAN THIS CONDITION BE REMEDIED?

A smoky Diesel engine exhaust indicates that more fuel is being injected into the cylinders than the air (oxygen) in the cylinders can burn completely. This condition results if:

1. The fuel pump is not properly adjusted and is delivering too much fuel.

2. Injector cup holes are plugged or worn preventing even distribution of fuel in the cylinder.

3. Improper Intake & Exhaust Valve adjustment.

4. The flow of air is restricted.

5. Engine operates at a high altitude resulting in less weight of air being drawn into the cylinder.

6. Air intake is located so that hot air (with less weight) is being drawn into the cylinder.

7. Engine operating temperature is too low. (Should be 160-180° F.

8. Improper fuels are used. (See Fuel Recommendations)

The following corrections should be made:

1. The fuel pump should be calibrated to deliver the correct amount of fuel as shown in the Cummins Operator's Instruction Manual. This recommended setting will give the maximum possible power with a clear exhaust under normal operating conditions.

2. Injector cups should be cleaned at regular intervals determined by the experience in the particular application.

3. Valve Clearances should be checked and adjusted regularly.

4. The Cummins Diesel is installed so that the air intake system will not restrict the air flow. Dirty air cleaners, however, will restrict the air flow and result in a smaller amount of air in the cylinder.

5. The fuel pump can be "cut-back" if the engine is to remain at high altitudes. Horsepower would remain about the same for operation at high altitude but there would be less smoke, higher efficiency, and lower maintenance.

6. If the air intake is located outside of the engine hood, the outside air temperature does not vary sufficiently to add to the smoke problem.

7. Cummins Diesel is equipped with thermostats to maintain the correct operating temperature (160 to 180° F.)

8. Cummins fuel oil recommendations are shown elsewhere. Fuel oil used should agree with these specifications.

7. DOES A DIESEL ENGINE CARBON UP CONSIDERABLY?

No. Except when improper engine operating conditions exist or when poor or incorrect grades of fuel and lubricating oils are used. Carbon and sludge are formed most rapidly when an engine, either gasoline or Diesel, is operated "cold". The Cummins Diesel is equipped with thermostats that permit the engine water to recirculate until the engine is warm and regulates the water temperature between 160° and 180° during operation, which is the recommended temperature.

8. WHAT IS THE "CUMMINS SNEEZER"?

The "Cummins Sneezer" is an air cell in the top of the piston crown. This air cell traps a quantity of air during the compression stroke of the engine. When the piston starts its downstroke and the pressure decreases, this trapped air is "sneezed" into the cylinder through the outlet which is pointed directly at the injector tip.

This feature increases turbulence in the cylinder, improves the mixing of the burning fuel with air, increases combustion efficiency and assists in keeping the injector tip free of carbon.

9. IS THE DIESEL ENGINE EFFECTIVE AS A COMPRESSION BRAKE FOR TRUCKS?

Theoretically, the braking effect of the Diesel Engine is slightly less than in a comparable gasoline engine. Actual experience and road tests have shown that there is no appreciable difference.

This question is frequently raised by people who have never operated Diesel trucks but it is not an issue with operators who have Diesel experience.

SPECIAL EQUIPMENT

1. WHAT IS DUST PROTECTION EQUIPMENT AND WHAT IS ITS USE?

Dust protection equipment is generally considered to include pre-cleaners for air cleaners, by-pass type lubricating oil filter, special oil bath type air cleaners for the air compressor, oil bath type engine breather, and sealed ball joints.

The purpose of this equipment is to prevent dust and grit from entering the engine and increasing the wear of bearings, cylinder walls, etc. This equipment should be specified for all engines that will operate under dusty conditions such as earth moving trucks, shovels, scrapers, rock crushers, etc.

CUMMINS QUALITY CONTROL

1. WHAT IS QUALITY CONTROL?

Quality control as practiced by Cummins assures the customer of a uniform product manufactured according to the best engineering practices.

2. WHAT ARE THE ADVANTAGES OF CUMMINS QUALITY CONTROL?

1. Records are maintained so that parts do not just pass inspection. They are manufactured as close to the correct dimension as it is possible to make them.

2. Gauges are checked regularly against master gauges and reworked, if needed, in Cummins gauge room.

3. The most modern and accurate equipment - electric gauges, air gauges magnaflux machines and so on - are used before parts are approved.

4. Each piece of the principal engine components such as bearings, liners, pistons, crankshafts, camshafts is inspected.

5. The chemical and physical properties of the materials being used to manufacture Cummins Diesel Parts are tested by experienced metallurgists.

3. HOW IS A CUSTOMER SURE OF OBTAINING GENUINE CUMMINS PARTS?

1. By buying only from authroized Cummins Dealers. A map showing the location of all Cummins Dealers and their branches will be forwarded upon request. This map demonstrates the nearness of Gneuine Cummins Parts and Service to all locations in the United States and Canada and throughout the World.

2. By looking for the registered trademark "Cummins (R)". This trademark is assurance that the part has passed Cummins "Quality Control".

These are the only ways that a customer can be assured of receiving parts that are correctly engineered and accurately manufactured for his Cummins Diesel.

CUMMINS ENGINE TESTS

1. WHAT TESTS AND INSPECTIONS ARE GIVEN A CUMMINS DIESEL BEFORE SHIPMENT FROM THE FACTORY?

All Cummins Diesels are "run-in" on production engine test stands. They are then torn down and bearing surfaces, cylinder liners, rings, valves, etc. are inspected to make certain that these parts have begun to "wear in" properly. The engine is then rebuilt and run again at its full horsepower for several hours before it is shipped.

Most engine manufacturers do not have comparable engine "run in" and tear down tests.

Cummins realizes that proper "breaking-in" is a major factor in long service of engine parts. Cummins procedure assists in eliminating the possibility of damaged parts due to improper operation during the initial operating period.

CUMMINS WARRANTY

1. WHAT IS THE CUMMINS WARRANTY?

(See reprint attached)

Warranty

CUMMINS DIESEL

100,000 MILES OR ONE YEAR

THE DIESEL ENGINES FURNISHED BY CUMMINS ENGINE COMPANY, INC. are warranted to be free from any defects in workmanship and material under normal use and service, our obligation under this Warranty being limited to replacing or repairing at our factory in Columbus, Indiana, any part or parts returned to us with transportation charges prepaid, which our examination shall disclose to our satisfaction to have been thus defective, within the first twelve months or the first 100,000 miles of operation, whichever shall first occur, from date of delivery of the engine to the original purchaser, this Warranty being expressly in lieu of all other Warranties express or implied and of all other obligations or liabilities on our part. We neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our engines. ¶ This Warranty shall not apply to any part or parts which shall have been altered or repaired outside of our factory, nor to parts which have been subjected to misuse, abuse, neglect, accident or to damage caused by overspeeding, nor to part or parts not manufactured or approved by us, nor to part or parts of engines improperly applied or installed. Any improper installation or application, or any substitution of parts not manufactured or approved by us, shall void all Warranties express or implied on our part. ¶ We make no Warranty as to normal wear and tear, nor do we agree to be liable for loss of time to the user while the engine or other equipment is out of commission, nor for any labor or other expense, damage or loss occasioned, or claimed to be occasioned, by such defective parts. ¶ We make no Warranty in respect to starters, generators, transmissions, clutches, compressors, or any accessories not manufactured by us. These are usually warranted by their respective manufacturers.

CUMMINS ENGINE COMPANY, INC.

CUMMINS ENGINE COMPANY, INC. SEAL COLUMBUS, IND.

Irwin Miller

PRESIDENT

81.

MEMO

INTERNATIONAL

LD-300 and LFD-300 Series

Motor Truck Chassis

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We are now in production of an entirely new line of Diesel Powered motor truck chassis with power plants ranging in size from 165 HP to 300 HP, and specifically designed for the East, Midwest, South and Southwest.

These new units are "Heavy Duty Engineered" from the ground up as diesel units. No compromise is made with gasoline engine construction. A complete line is being offered to fit your customers' every hauling need at lowest cost.

In this booklet we will outline only the highway and combination highway - off-highway units. Four by two (4 x 2) trucks will be designated LD-305 Roadliner and LD-304 Loadstar. Six by four (6 x 4) vehicles will be the LFD-305 Roadliner and LFD-302 heavy duty.

Specifications, features and appearance are all geared toward giving you the most acceptable diesel powered vehicles being built today. The units are specialized for YOUR market!

Brief basic specifications follow.

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	Roadliner LD-305	Loadstar LD-304
Gross Vehicle Weight Rating....	30,000 lbs.	36,000 lbs.
Gross Combination Weight	68,000 lbs.	76,000 lbs.
Wheelbases Available.....	145" - 157" - 169"	145" - 157" - 169"
Cab-to-axle dimensions.....	72" - 84" - 96"	72" - 84" - 96"
Bumper to Front Axle.....	50-1/2"	50-1/2"
Front Axle to Back of Cab.....	73"	73"
Bumper to Back of Cab.....	123-3/4"	123-3/4"
Frame.....	9-7/8x3-7/16x1/4	10x3-1/2x5/16
Section Modulus.....	11.54	14.6
Engine.....	Cummins HRB-600	Cummins HRB-600
Maximum Horsepower.....	165	165
Maximum Torque.....	540 @ 1000 RPM	540 @ 1000 RPM
Governed Engine RPM.....	1800	1800
Clutch.....	Spicer 14" - 2 plate	Spicer 14" - 2 plate
Transmission.....	Fuller 5-C-720	Fuller 5-C-720
Front Axle.....	83F	83F
Rear Axle.....	Timken R-100	Timken U-200
Available Ratios.....	4.11, 5.29, 6.16, 6.84	5.91, 6.51, 7.21, 7.79, 8.69
Steering Gear.....	Ross TA-71	Ross TA-71
Brakes.....	Air	Air
Front Size.....	17-1/4 x 3	17-1/4 x 3
Rear Size	16-1/2 x 7	16-1/2 x 7
Total Lining Area.....	719 sq. in.	719 sq. in.
Compressor.....	7-1/4 cu. ft.	7-1/4 cu. ft.
Springs - Front Size.....	48" x 4"	48" x 4"
Lbs./in. Deflection.....	1490	1650
Rear Size.....	56 x 3	56 x 3
Lbs./in. Deflection.....	1575	2000
Auxiliary Size.....	36 x 3	36 x 3
Wheels.....	Cast Spoke	Cast Spoke
Rims.....	7.50	7.50
Tires.....	10.00 x 20 - 12 ply	10.00 x 20 - 12 ply
Fuel Tank.....	50 gallon	50 gallon
Generator.....	50 amp.	50 amp.
Batteries.....	2 - 12 volt	2 - 12 volt

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	Roadliner LFD-305	Model LFD-302
Gross Vehicle Weight Rating....	40,000 lbs.	45,000 lbs.
Gross Combination Weight.....	72,000 lbs.	76,000 lbs.
Wheelbases Available.....	145", 157", 169", 193".	145", 157", 169", 193".
Cab-to-axle dimensions.....	72" 84" 96" 120".	72" 84" 96" 120".
Bumper to Front Axle.....	50-1/2"	50-1/2"
Front axle to back of cab.....	73"	73"
Bumper to Back of Cab.....	123-1/2"	123-1/2"
Frame.....	9-7/8x3-7/16x1/4	10x3-1/2x5/16
Section Modulus.....	11.54	14.6
Engine.....	Cummins HRB-600	Cummins HRB-600
Maximum Horsepower.....	165	165
Maximum Torque.....	540 @ 1000	540 @ 1000
Governed Engine RPM.....	1800	1800
Clutch.....	Spicer 14" - 2 plate	Spicer 14" - 2 plate
Transmission.....	Fuller 5-C-720	Fuller 5- C- 720
Front Axle.....	83F	83F
Rear Axle.....	Hendrickson-Eaton 36M	Hendrickson-Eaton 36M
Ratios(incl. power div.)...	5.75, 6.94	5.75, 6.94
Steering Gear.....	Ross TA-71	Ross TA-71
Brakes, Air - Front Size.....	17-1/4 x 3	17-1/4 x 3
Rear Size.....	16-1/2 x 7	16-1/2 x 7
Total Lining Area.....	1080 sq. in.	1080 sq. in.
Compressor.....	7-1/4 cu. ft.	7-1/4 cu. ft.
Springs, Front Size.....	48 x 4	48 x 4
Lbs./in. Deflection.....	1650	1650
Rear Size.....	34 x 4	34 x 4
Lbs./in. Deflection.....	9800	14,500
Wheels.....	Cast Spoke	Cast Spoke
Rims.....	7.50	7.50
Tires.....	10.00 x 20 - 12 ply	10.00 x 20 - 12 ply
Fuel Tank.....	50 gallon	50 gallon
Generator.....	50 amp.	50 amp.
Batteries.....	2- 12 volt	2 - 12 volt

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Alternate Attachments Applicable to All Units

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Engines -

Cummins HRBB-600 ..... 175HP
Cummins NHB-600..... 200HP
Cummins HBS-600..... 200HP
Cummins HRBS-600..... 225 HP
Cummins NHBS-600..... 275 HP
Cummins NHRBS-600..... 300 HP

Transmissions -

Fuller 5-C-72 - Direct in Fifth
Fuller 5-A-1120 - Overdrive in Fifth
Fuller 10-B-1120 - Ten Speed
Spicer 8041 - 4 speed
Spicer 8241 - 4 speed
Spicer 8051 - 5 speed
Spicer 8251 - 5 speed
Spicer Transmissions also available with aluminum housing.

Auxiliary Transmissions -

Fuller 3-B-65
Fuller 3-A-65
Spicer 8031G
Spicer 8031C
Spicer 8031L
Spicer auxiliaries also available with aluminum housing.
Note:
LFD models in the 145" and 157" WB not available with auxiliary transmissions; 10-B-1120 ten speed should be specified for use in these wheelbases.

Miscellaneous -

Comfo-Vision Sleeper Cab
Semi-trailer brake connections
12 cu. ft. air compressor
Air horn
Heater and defroster
R. H. Rear view mirror
Illuminated Signal arm
Cab marker lights
Sliding rear window
DeLuxe oil filter
Luber-finer oil filter
50 gallon right side tank
Dual 50 gallon Safety tanks
Budd disc wheels
Tachograph
Radiator and Headlight Guard
8031 top mounted P. T. O.
Cab rear window guard

Alternate Attachments Applicable To 4 x 2 Units

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LD-305
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Rear Axles -

Timken R-200 double reduction
Timken R-300 two-speed
Timken S-200 double reduction
Timken S-300 two speed
Eaton 22500 two speed. (This axle and the Timken S-Series are available with aluminum housing.)

Tires -

10.00 x 22 - 12 ply
11.00 x 20 - 12 ply
11.00 x 22 - 12 ply

LD-304
******

Rear Axle -

Timken U-300 two speed

Frame -

Double Channel

Tires -

10.00 x 20 - 14 ply	11.00 x 22 - 12 ply
10.00 x 22 - 12 ply	11.00 x 22 - 14 ply
10.00 x 22 - 14 ply	11.00 x 24 - 12 ply
11.00 x 20 - 12 ply	11.00 x 24 - 14 ply
11.00 x 20 - 14 ply	

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Alternate attachments Applicable to 6 x 4 Units

LFD-305
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Rear Axle -

36M with Aluminum Housing

Tires -

10.00 x 22 - 12 ply; 11.00 x 20 - 12 ply; 11.00 x 22 - 12 ply.

LFD-302
****

Front Axle -

Eaton 82F (15,000 lb. capacity)

Rear Axle -

Timken SW-456 worm drive

Frame -

Double Channel

Tires -

10.00 x 20 - 14 ply	11.00 x 20 - 12 ply
10.00 x 22 - 12 ply	11.00 x 20 - 14 ply
10.00 x 22 - 14 ply	11.00 x 22 - 12 ply
	11.00 x 22 - 14 ply

Heavy-duty diesel powered motor trucks are being used in increasingly large numbers by operators in all districts due to their inherent overall long term economy. Due to experience in Engineering and building specialized hauling units for the highly critical Western trade, we are in a position to produce for you a superior unit specialized for your area.

Briefly, a few of the outstanding features of the new 300 series are:

CAB

Heavy-duty Comfo-vision - especially adapted at Emeryville for Heavy-duty operations.

RADIATOR

Heavy-duty sectional type assembly
Cast upper tank - fabricated steel lower tank
Bolted in core assembly
Over 1000 s q. in. frontal area
Square type frontal area for utmos t efficiency
Thermostatically controlled Kysor shutters are standard equipment.

FRONT SPRINGS

Shackled at rear
4" spring width
Threaded pins and bushings
Easy riding

STEERING

Geometrically perfect with the radius of drag link in same arc as spring action.
High numerical overall ratio for ease of handling
Variable ratio gear of large capacity
Accessible for service

ENGINE MOUNTING

Cradled in rubber both front and rear
Mounting in web of frame for utmost stability

PARALLEL COMPONENTS

All driving members - engine, transmissions and rear axle - assembled in frame parallel to each other for vibration-free operation
Assures equal angles on all propeller shaft joints

FRAMES

Heat-treated chrome manganese frame rails with crossmembers, brackets, etc., constructed to give maximum strength with minimum weight.

DIMENSIONS

Wheelbas es, bumper to axle and axle to back of cab dimensions engineered for maximum payload capacity within Your District's legal limits.

CHOICE

Wide choice of engines, transmissions and rear axles available to fit every hauling requirement.

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Roadliner models are recommended for general highway transport service.

LH-304 and LFD-302 models hould be specified for low boy trailers, dump trucks, and similar operations.

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Orders may be placed now with Emeryville Operation for 300 Series trucks.

Production is being accellerated as rapidly as possible in an attempt to offer 30 day delivery to the customer.

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NEW INTERNATIONAL 300 SERIES MOTOR TRUCKS

****

1. HEAVY-DUTY ENGINEERED from the ground up as diesel units.

2. SET BACK AXLE

   a. More load on front axle

   b. Better maneuverability

   c. Weight distribution and dimensions as requested by Districts and trade.

   d. 50-3/4" BA; 73" AC; 123-3/4" BC.

3. RADIATOR

   a. Square frontal area - 1003 sq. in. - efficiency

   b. Heavy-duty bolted construction
      Cast upper tank - fabricated steel lower tank
   c. Mounting - large area rubber pads - spring loaded studs

   d. Shutters - standard equipment

4. ENGINE MOUNTING

   a. Six rubber mounts support engine (at three points)

   b. Eliminates vibration

5. FRONT SPRINGS AND MOUNTING

   a. 4" width - greater strength and life

   b. Threaded pins and bushings - long life, strength, ease of movement.

   c. Stability (solid feel)

   d. Easier ride - four inch 3/8" leaf -- three inch 7/16" leaf for eye strength. 3/8" easier ride.

   e. Shackled at rear - minimum road shock

   f. Springs made of finest chrome vanadium steel.

6. STEERING

   A. Geometrically perfect
      Drag link similar arc to spring movement
      No road shock transmitted to wheel
      Stability

   b. High numerical overall ratio - ease of steering even with heavy front axle loads.

7. ACCESSIBILITY

a. Engine very accessible for all types of service. Convenient access thru front step construction, deep hood, etc.

b. New easy entrance into cab - step on side shields.

8. CAB - HEAVY DUTY COMFO-VISION

a. Note roominess even with large steering wheel accomplished thru scientific positioning of wheel and seat.

b. Instrument panel

Enlarged to include full complement of individual type instruments for trucks basically designed for diesel power.

Removable panel including <u>all</u> electrically operated instruments -- ease of service.

<u>Dual</u> ammeters and air pressure gauge

Front wheel limiting valve - standard equipment

c. Structural additions to heavy-duty cab understructure

1. Extra heavy full-width rear cross sill

2. Longitudinal side sills

3. Gusset support between floorboard support members and longitudinal sills.

4. Added longitudinal center channel

5. Two additional vertical stringers in rear of cab.

6. Dual rear cab mounting supports.

d. Heavy - duty Comfo-Vision sleeper cab also incorporates items listed under a, b, and c above.

9. FRAME CONSTRUCTION

a. Chrome manganese pressed steel heat-treated side rails.

b. Engine mounts and crossmembers from front bumper to rear of cab mounted in web of frame.

c. Special cross tube assembly - gives frame support at rear engine mount position. Protects flywheel housing by removing stress. Substantial support for running boards, fenders, and battery box assemblies.

d. Cold squeeze riveted with most modern hydraulic equipment

10. REAR SPRING SUSPENSION - Single Rear Axle units -

    a. Hotchkiss drive

    b. Spring rate and capacities engineered to components and work truck is to do.

11. PARALLEL COMPONENTS

    a. Engine, transmissions and rear axle or bogie assembly are installed in truck parallel to each other.

    b. Assures parallel universal joint flanges and therefore equal angles on all joints giving vibrationless, trouble-free operation.

12. REAR BOGIE - 6 x 4 Units

    a. Hendrickson-Eaton 36M standard

       Advantages: Power divider; suspension; drive
       Comparison; Mack and Timken

    b. Timken 3013, 456 and 460 optional (3013 used for extremely short units)

13. COMPARISON 300 and 400 SERIES

    a. 300 BA 50-3/4"; AC 73"; BC 123-3/4"

    b. 400 BA 28-1/2"; AC 95"; BC 123-1/2"

    c. Set back apparently most adaptable other than West, but watch possibility of 400 application if formula dictates legal limits on particular haul (Particularly on 6 x 4 units)

    d. 300 features discussed which will be common to 400 series.

14. ENGINES, TRANSMISSIONS AND AXLES AVAILABLE

    Advantages of larger, longer lasting power units.

15. TYPICAL UNITS

    a. Five speed main - two speed rear axle

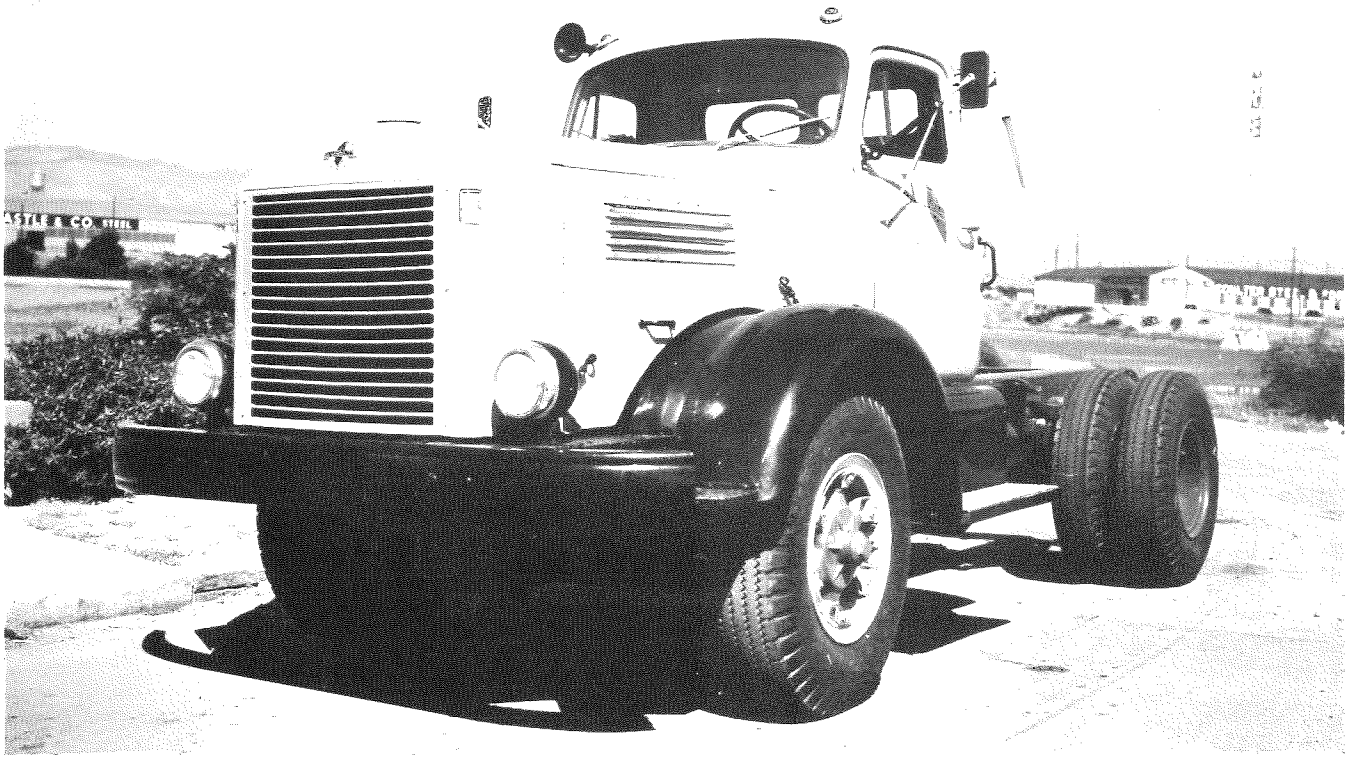
    b. Ten speed main - single speed rear axle

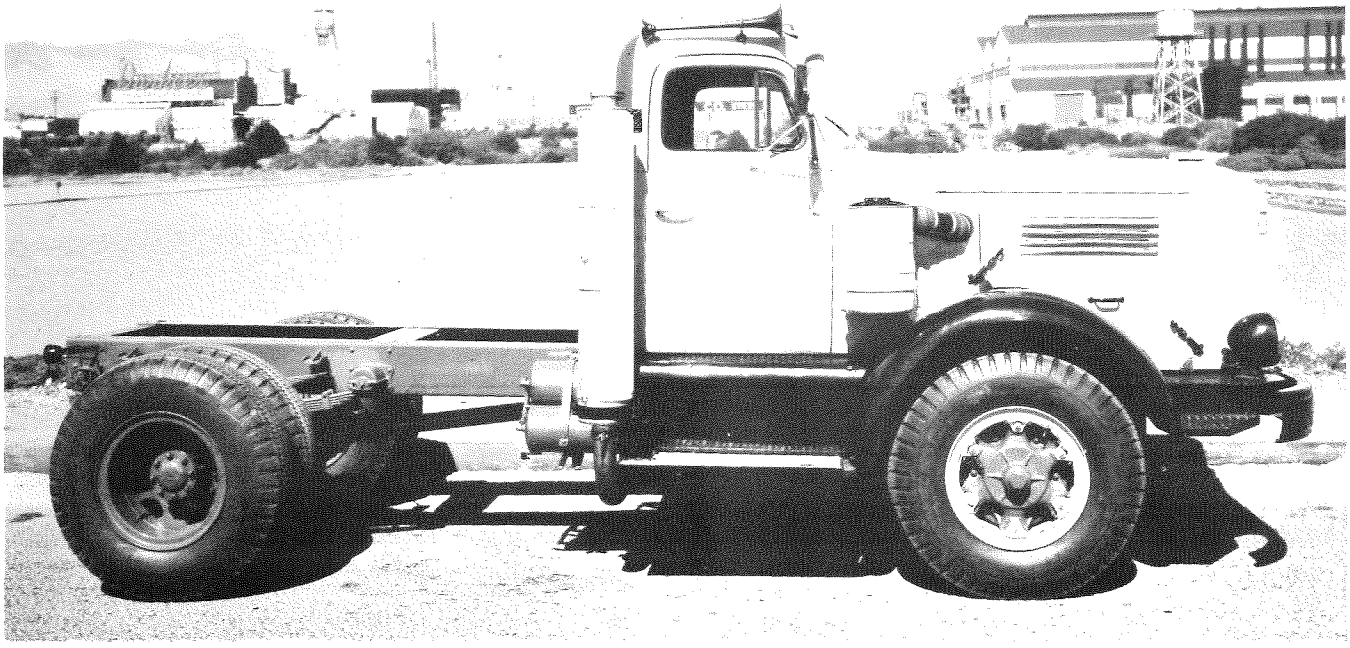
    c. Five speed main - three speed auxiliary - single speed rear axle.

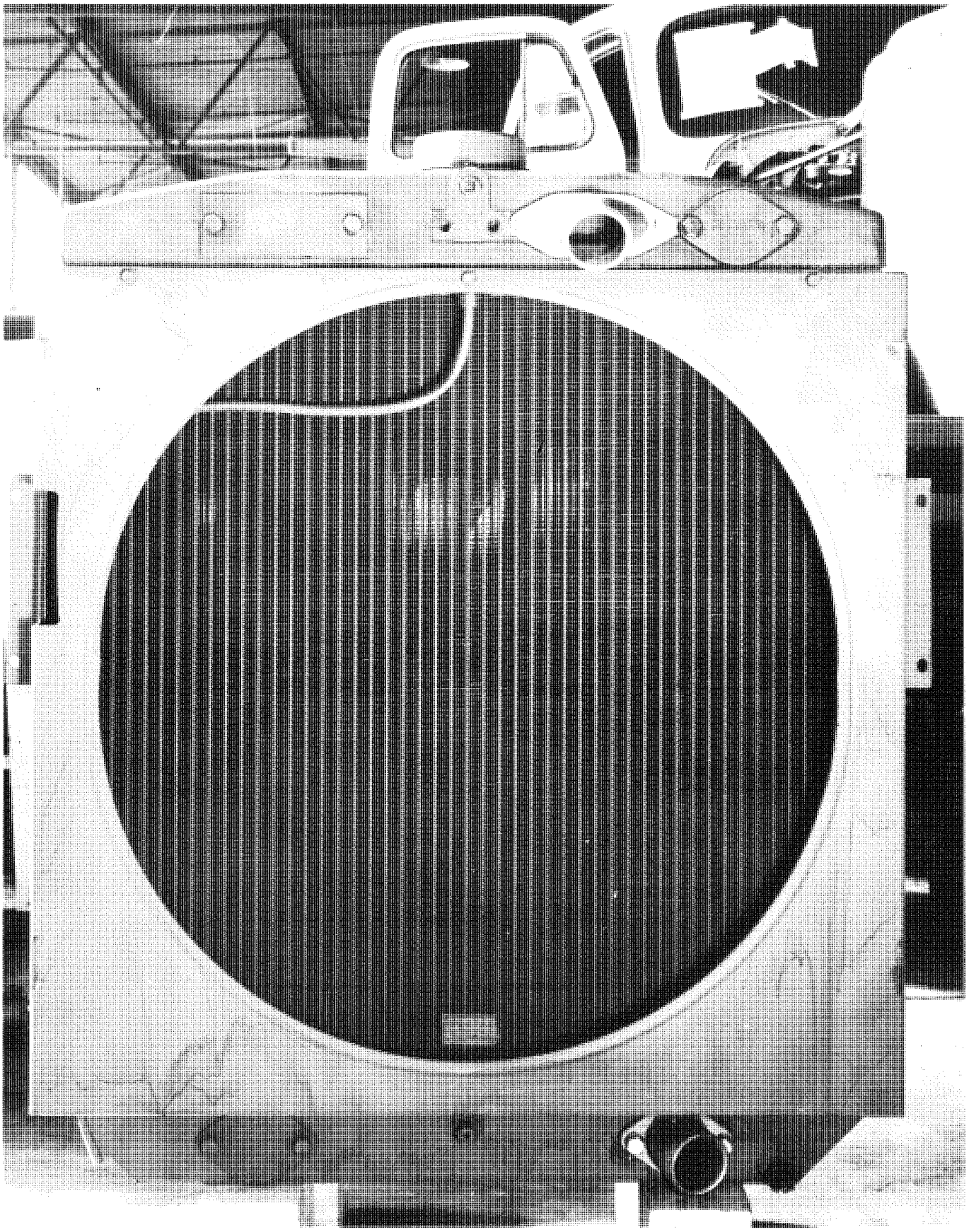
16. 310, 320, 410 and 420 UNITS

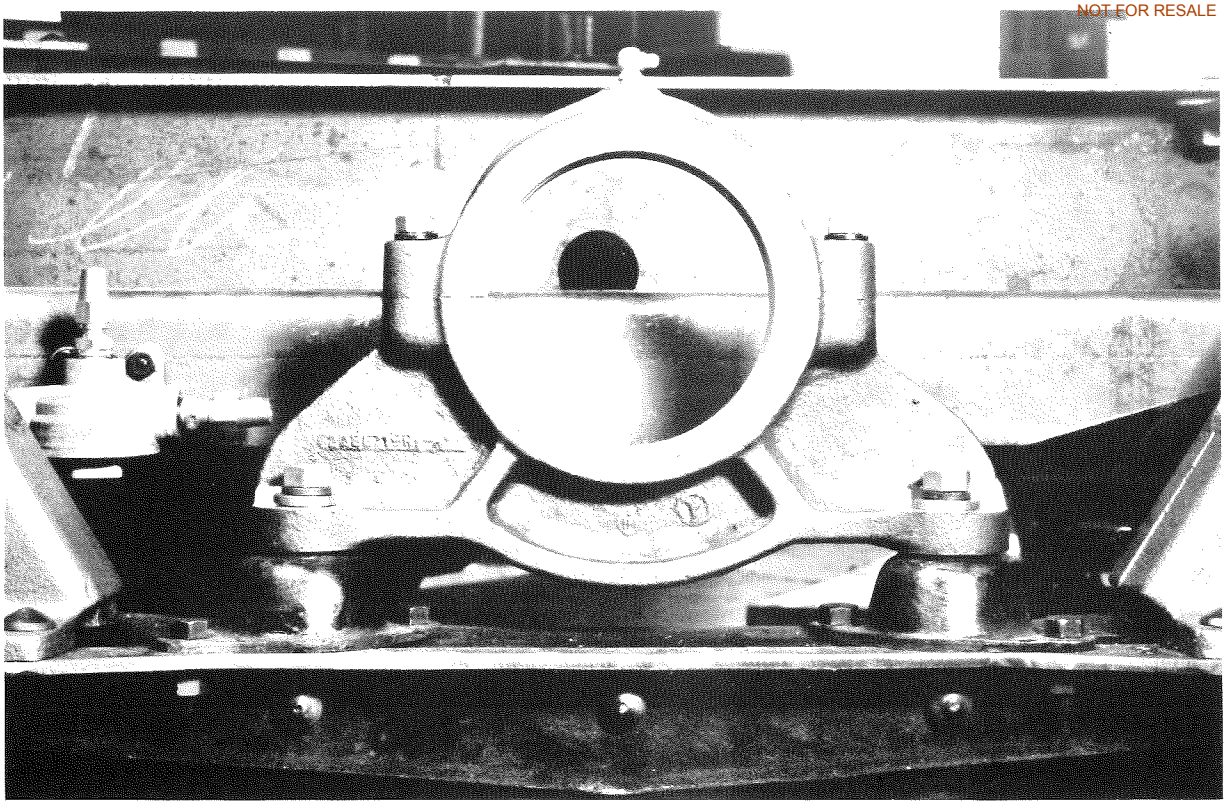
17. SPECIAL AND CUSTOM UNITS for unusual applications

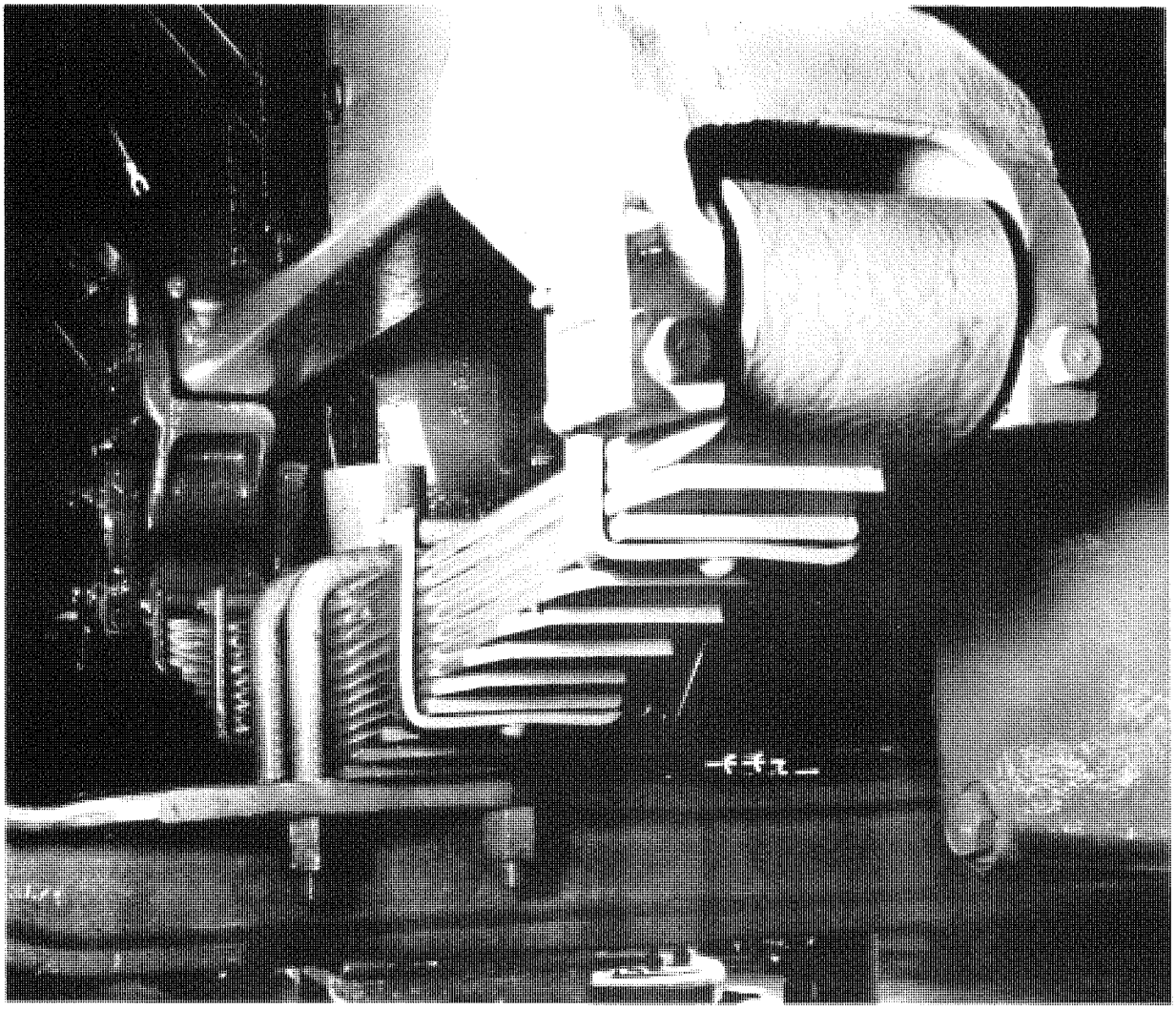
18. PRICES, DISCOUNT, FREIGHT, CT-350 and literature information.

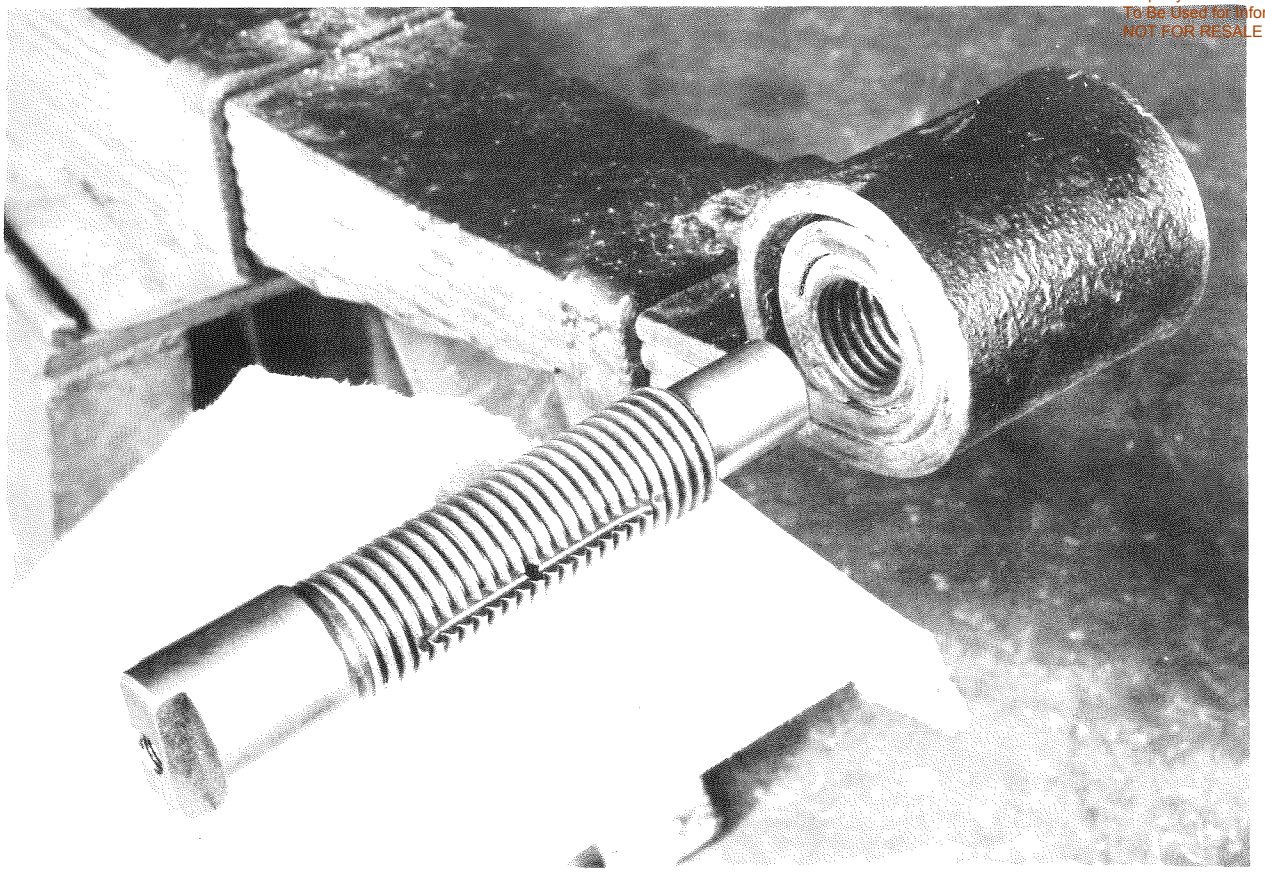


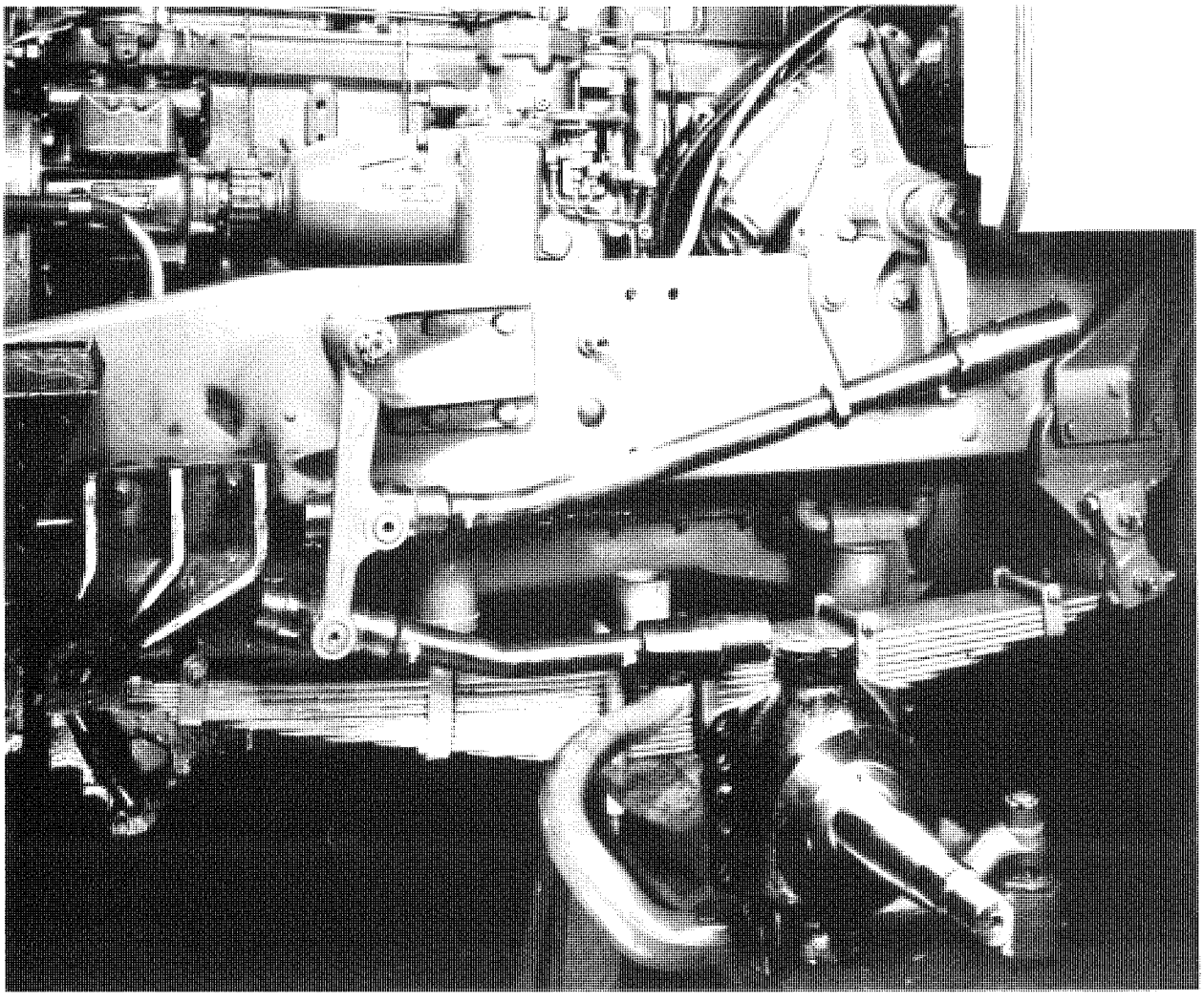


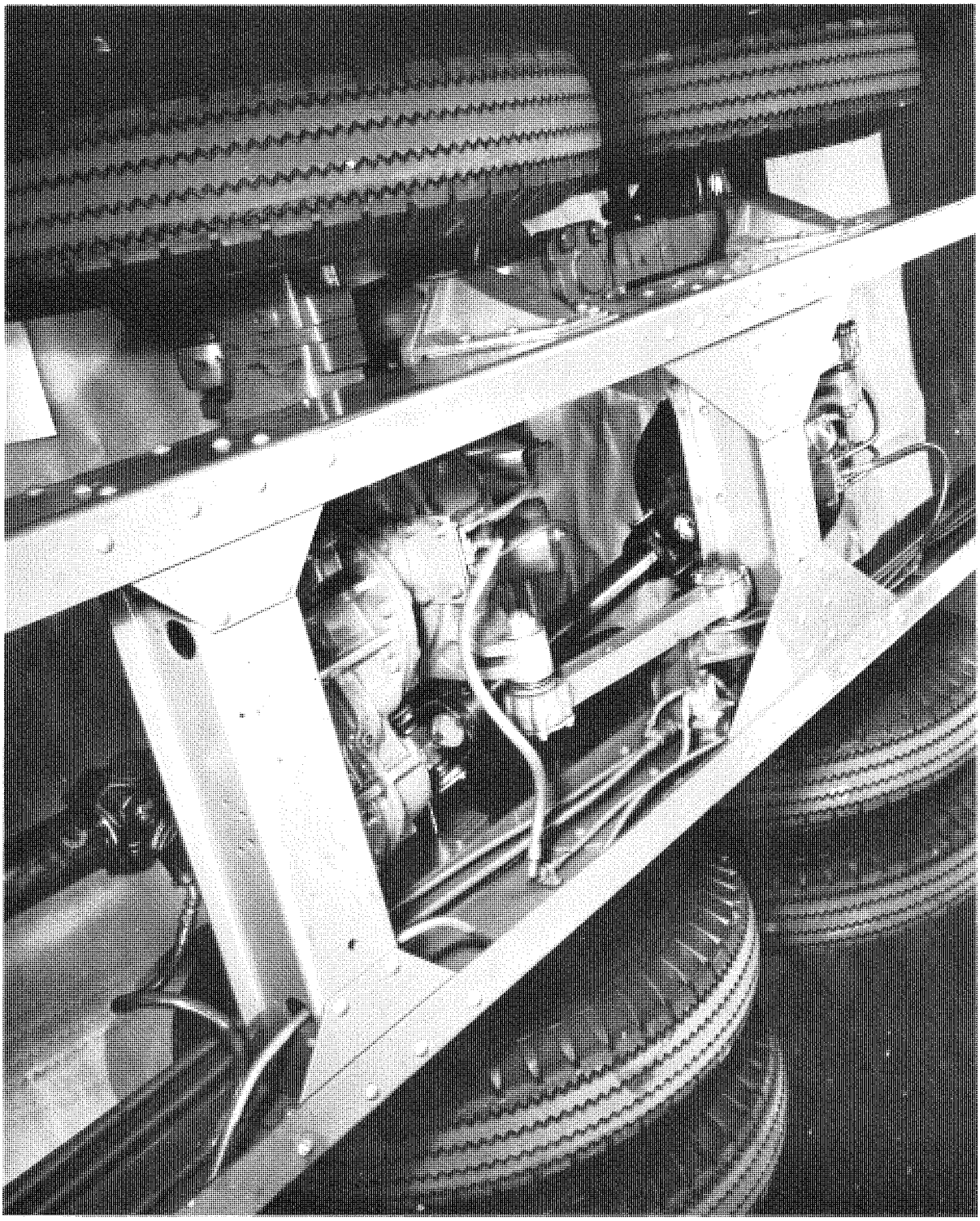


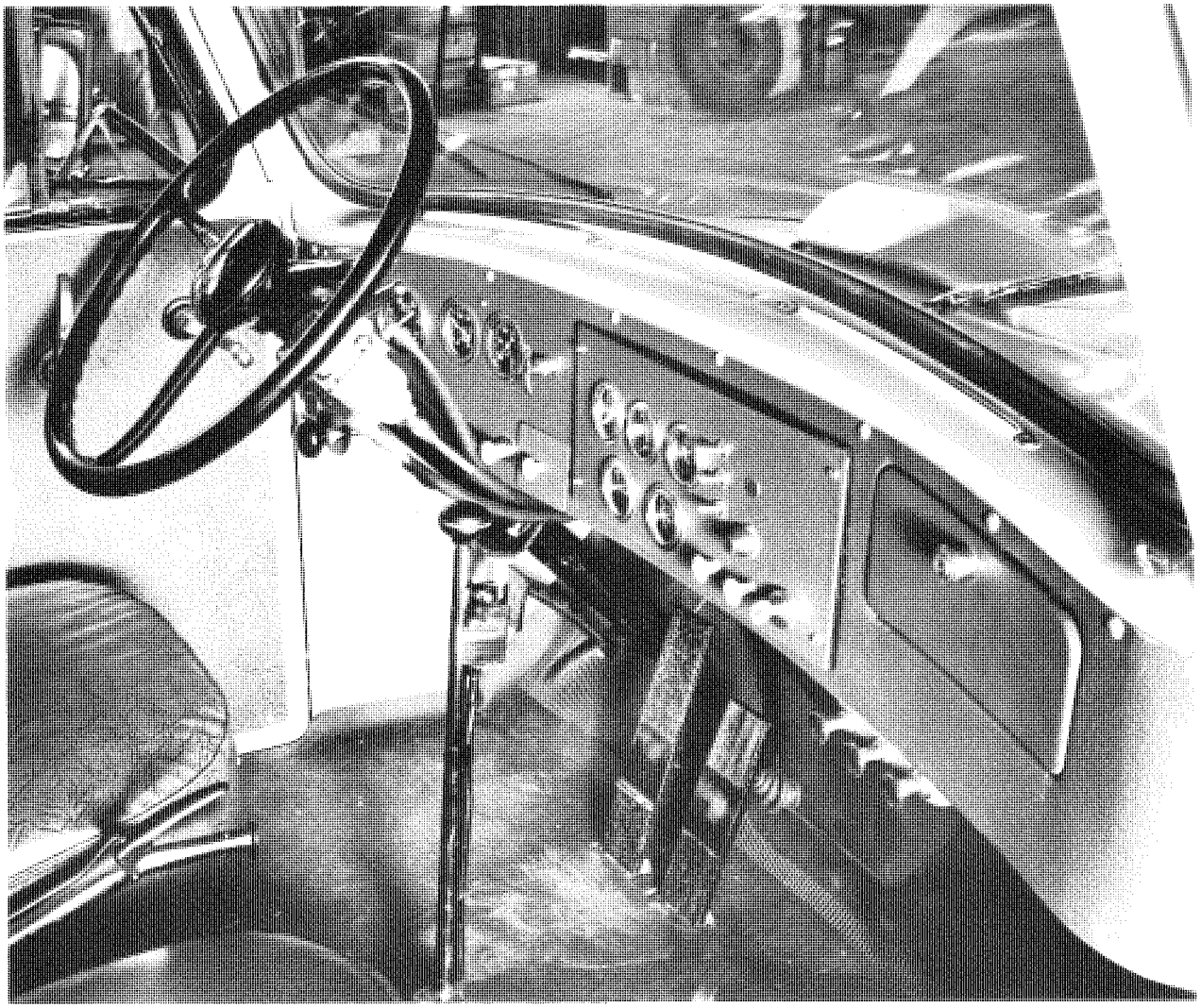


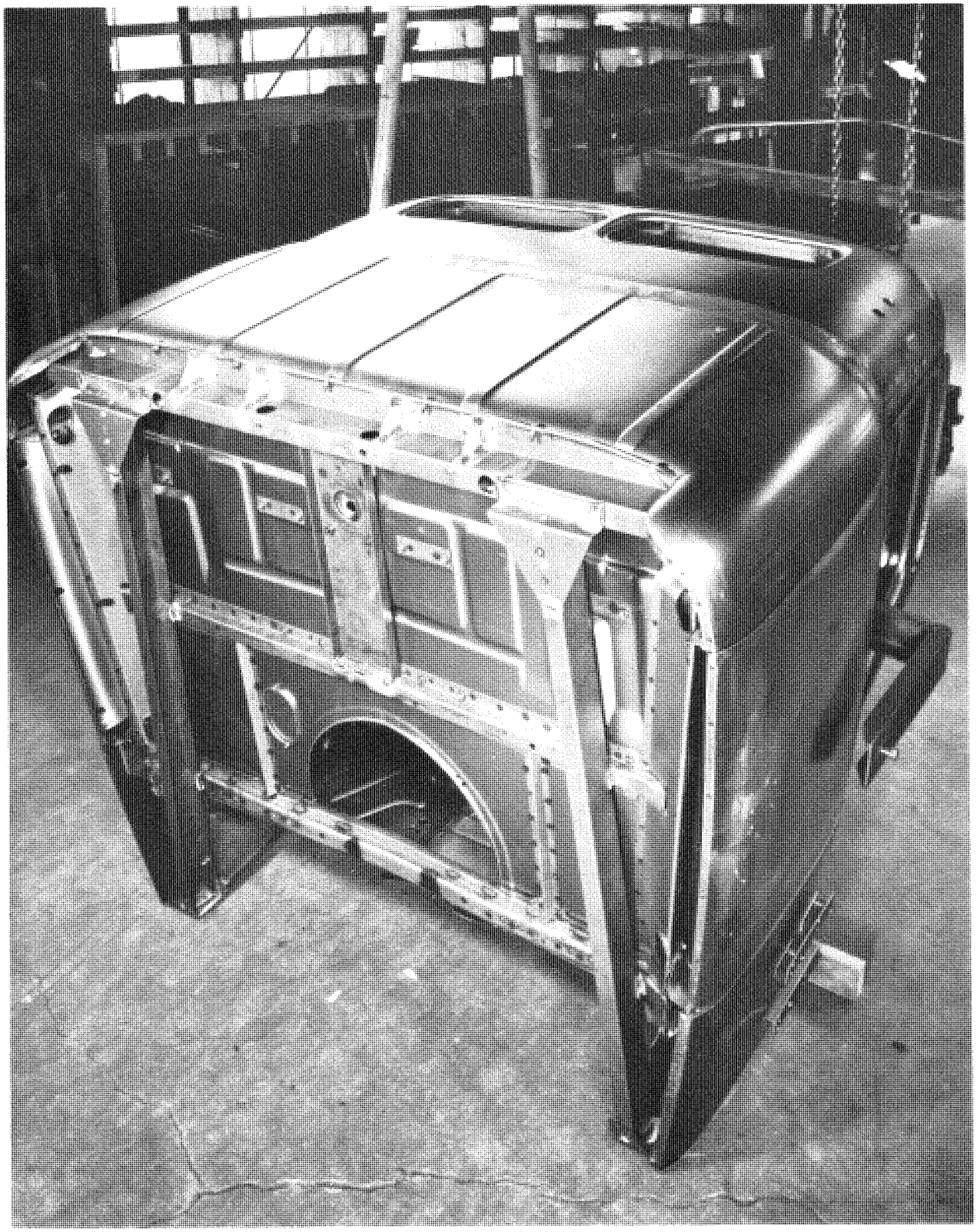


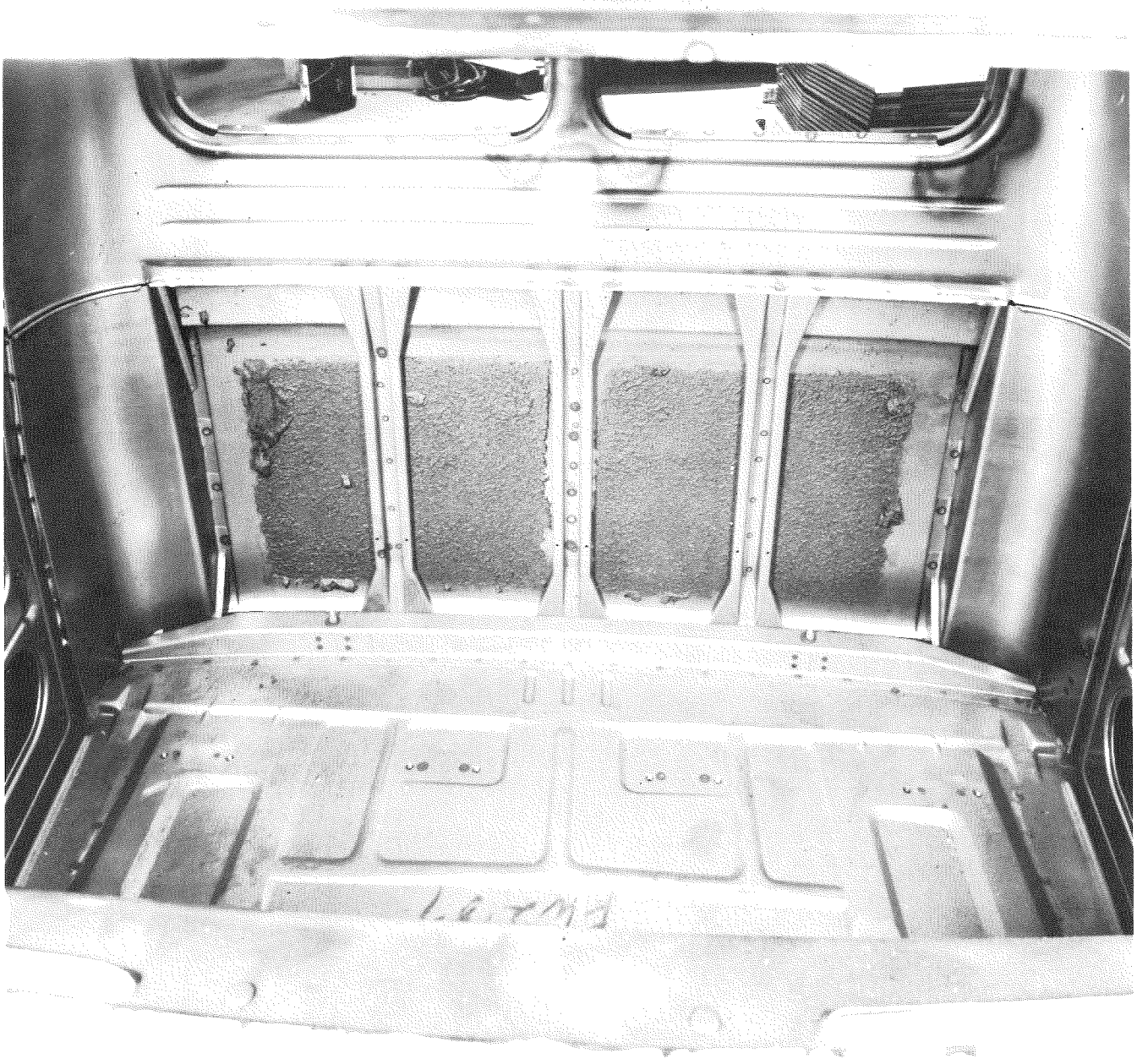


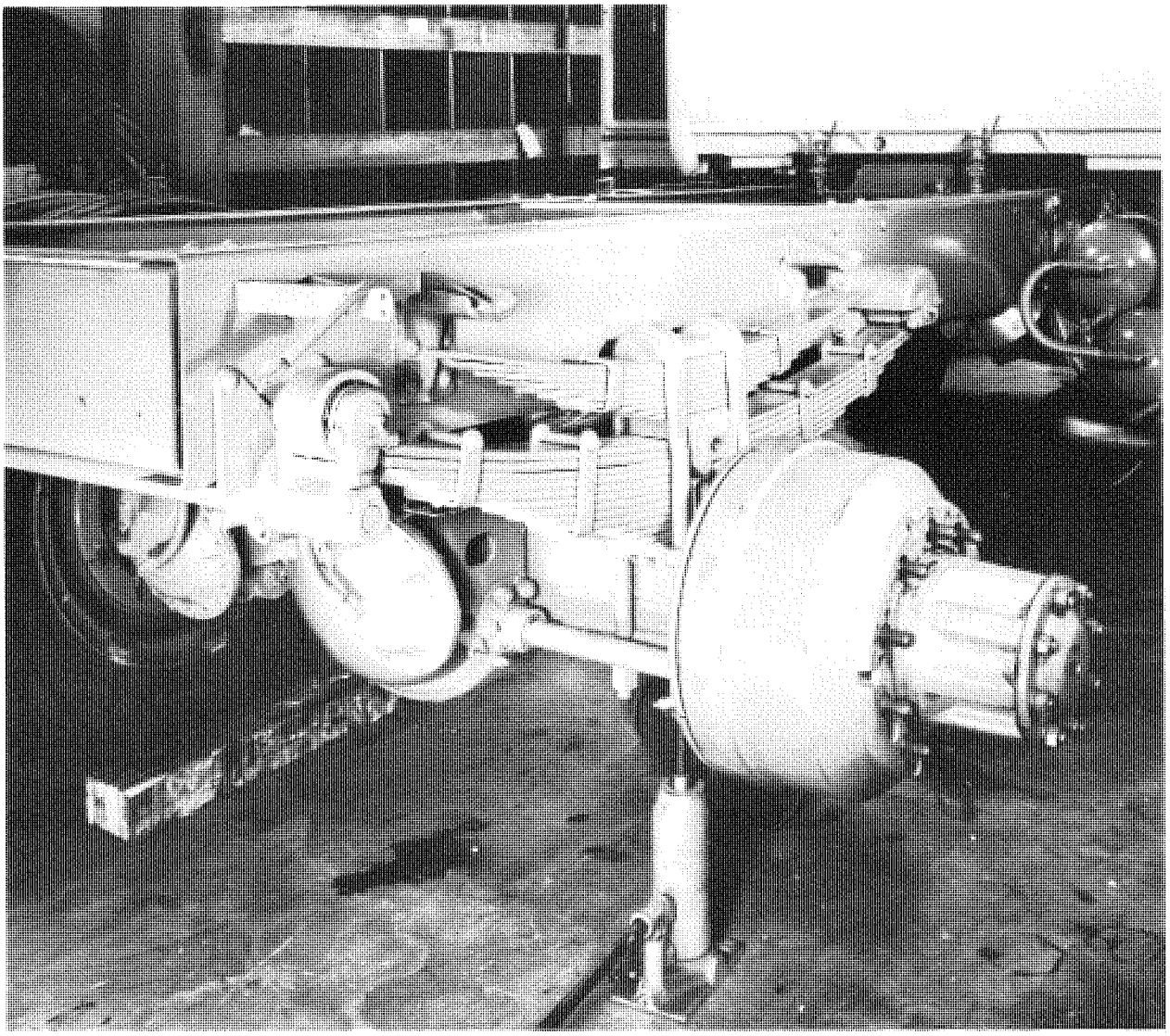


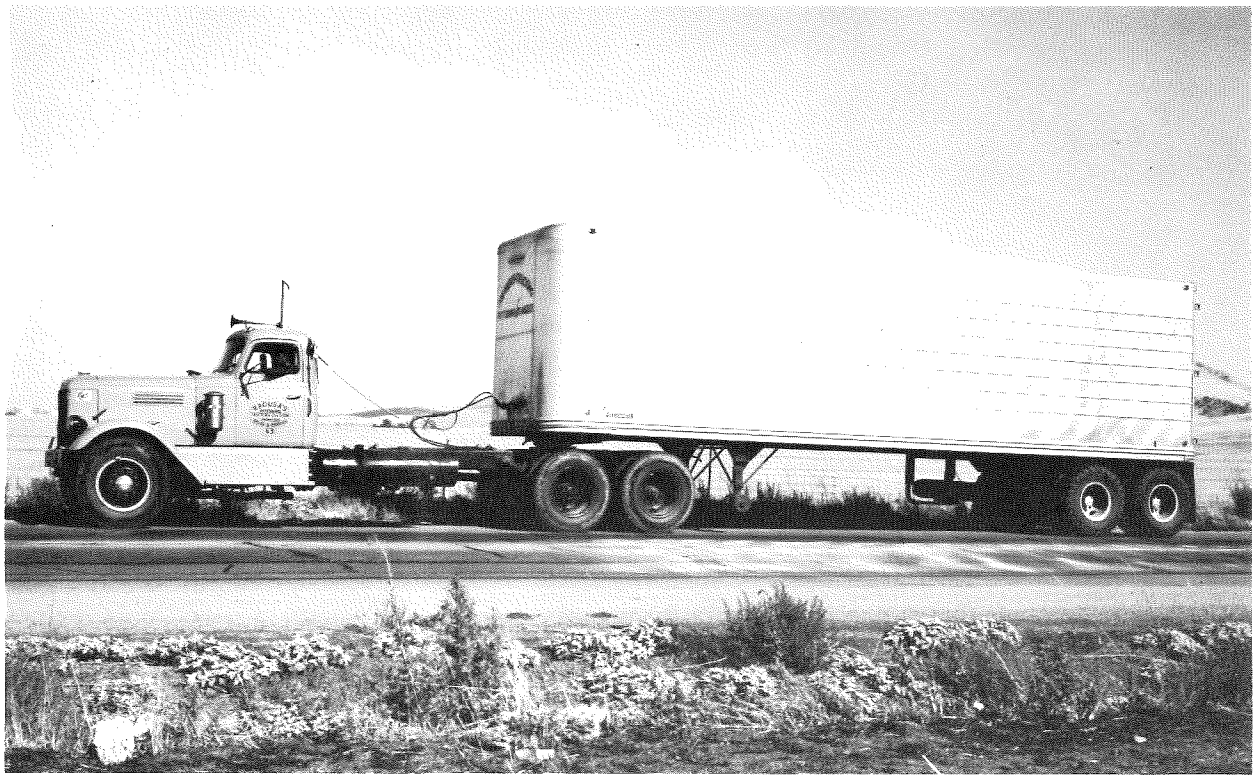












W E I G H T

MODEL: LD-305

Chassis #501

Wheelbase, 145"

Engine HRB-600

Transmission, 5-C-720

Rear Axle, R-300

Tires, 11:00x20

Fuel Tank, 50 gal. Std.

Comfo-Vision Cab

Heater and Defroster

Semi-trailer connections

Air Horn

Cab Marker Lights

Illuminated Signal Arm

R. H. Rear View Mirror

20 Gals. Fuel @ 7.5 lbs. per gal.

Scale Weight:	Front	7,820
	Rear	4,220
	Total	12,040
	Less Fuel	150
	NET WEIGHT	11,890

TRUCK MODEL: LD-305

ENGINE MODEL: HRB-600 NET TORQUE: 435 Lb. Ft. at 1800 RPM

RECOMMENDED RPM FOR ROAD OPERATION: 1700 - 1800

TIRE SIZE: 10.00x22 LOADED RADIUS: 20.5 in. TIRE CAPACITY: 4275 Lbs.

TRANSMISSION MODEL: 5-C-720

TRANSMISSION RATIOS: 1) 6.37 2) 3.40 3) 1.74 4) 1.00 5) .75 Rev.) 6.37

REAR AXLE MODEL: R-300 (Two-Speed)

REAR AXLE RATIOS: High 4.52 Low 5.91

ROAD RESISTANCE 24 Lbs. Per Ton

GEAR COMBINATIONS	TOTAL TRANSMISSION REDUCTIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 55,000 LBS	GRADE ABILITY GOVERNED RPM 60,000 LBS	GRADE ABILITY GOVERNED RPM 65,000 LBS	GRADE ABILITY GOVERNED RPM 70,000 LBS	MPH @ 1700	MPH @ 1800	RPM FOR SHIFTING GEARS
1st Low	6.37	37.65	13.7%	12.4%	11.3%	10.4%	5.5	5.8	1800
1st High	6.37	28.79	10.1	9.2	8.4	7.7	7.2	7.6	1375 1800
2nd Low	3.40	20.09	6.7	6.0	5.5	5.0	10.3	10.9	1250 1800
2nd High	3.40	15.37	4.8	4.3	3.9	3.5	13.5	14.3	1375 1800
3rd Low	1.74	10.28	2.8	2.5	2.2	1.9	20.2	21.2	1210 1800
3rd High	1.74	7.86	1.9	1.6	1.4	1.2	26.4	28.0	1375 1800
4th Low	1.00	5.91	1.1	.9	.7	.6	35.0	37.1	1360 1800
4th High	1.00	4.52	.5	.4	.3	.2	45.9	48.6	1375 1800
5th Low	.75	4.43	.5	.4	.3	.1	46.9	49.6	1765 1800
5th High	.75	3.39	.1	.0			61.9	64.9	1375

TRUCK MODEL: LD-305

ENGINE MODEL: HRBB-600 NET TORQUE: 422 Lbs. Ft. at 2000 RPM

RECOMMENDED RPM FOR ROAD OPERATION: 1800 - 1900

TIRE SIZE: 10.00x22 LOADED RADIUS: 20.5 in. TIRE CAPACITY: 4275 Lbs.

TRANSMISSION MODEL: 5-C-72

TRANSMISSION RATIOS: 1) 7.33 2) 4.43 3) 2.62 4) 1.69 5) 1.00 Rev.) 7.40

REAR AXLE MODEL: R-300 (Two-Speed)

REAR AXLE RATIOS: High 4.52 Low 5.91

ROAD RESISTANCE 24 Lbs. Per Ton

GEAR COMBINATIONS	TOTAL TRANSMISSION REDUCTIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 55,000 LBS	GRADE ABILITY GOVERNED RPM 60,000 LBS	GRADE ABILITY GOVERNED RPM 65,000 LBS	GRADE ABILITY GOVERNED RPM 70,000 LBS	MPH @ 1850	MPH @ 2000	RPM FOR SHIFTING GEARS
1st Low	7.33	43.32	15.3%	13.9%	12.8%	11.8%	5.2	5.6	2000
1st High	7.33	33.13	11.4	10.4	9.5	8.7	6.8	7.3	1530 2000
2nd Low	4.43	26.18	8.8	7.9	7.2	6.6	8.6	9.3	1580 2000
2nd High	4.43	20.02	6.4	5.8	5.2	4.8	11.2	12.2	1530 2000
3rd Low	2.62	15.48	4.7	4.2	3.8	3.4	14.5	15.8	1545 2000
3rd High	2.62	11.84	3.3	2.9	2.6	2.3	19.0	20.6	1530 2000
4th Low	1.69	9.99	2.6	2.3	2.0	1.8	22.5	24.4	1670 2000
4th High	1.69	7.64	1.7	1.4	1.2	1.1	29.5	32.0	1530 2000
5th Low	1.00	5.91	1.0	.8	.7	.5	38.1	41.3	1550 2000
5th High	1.00	4.52	.5	.3	.2	.1	49.9	54.0	1530

E S T I M A T E D W E I G H T

MODEL: LD-305

Wheelbase 145"

Engine, HRB-600

Transmission, R-95-C

Rear Axle, R-100

Tires, 10:00x22, 12-ply

Fuel Tank, 50 Gal. Std.

Comfo-Vision Cab

Heater and Defroster

Semi-trailer connections

Air Horn

Cab Marker Lights

Illuminated Signal Arm

R. H. Rear View Mirror

No Fuel

Front	7,940
Rear	4,080
Total	12,020

TRUCK MODEL: LD-305

ENGINE MODEL: HRB-600 NET ROQUE: 435 Lb. Ft. at 1800 RPM

RECOMMENDED RPM FOR ROAD OPERATION: 1700 - 1800

TIRE SIZE: 10.00x22 LOADED RADIUS: 20.5 in. TIRE CAPACITY: 4275 Lbs.

TRANSMISSION MODEL: R-95-C Ten-Speed (Roadranger)

TRANSMISSION RATIOS: Low Range 1) 9.70 2) 7.45 3) 5.82 4) 4.49 5) 3.55 Rev.) 12.50

High Range 1) 2.73 2) 2.10 3) 1.64 4) 1.266 5) 1.00 Rev.) 3.52

REAR AXLE MODEL: R-100 REDUCTION: 4.11

ROAD RESISTANCE 24 Lbs. Per Ton

GEAR COMBINATIONS	TOTAL TRANSMISSION REDUCTIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 55,000 LBS	GRADE ABILITY GOVERNED RPM 60,000 LBS	GRADE ABILITY GOVERNED RPM 65,000 LBS	GRADE ABILITY GOVERNED RPM 70,000 LBS	MPH @ 1700	MPH @ 1800	RPM FOR SHIFTING GEARS
1st Low	9.70	39.87	14.5%	13.1%	12.0%	11.1%	5.2	5.5	1800
2nd Low	7.45	30.62	10.8	9.8	9.0	8.2	6.7	7.1	1385 1800
3rd Low	5.82	23.92	8.2	7.4	6.7	6.2	8.7	9.2	1400 1800
4th Low	4.49	18.45	6.0	5.4	4.9	4.5	11.2	11.9	1395 1800
5th Low	3.55	14.59	4.5	4.0	3.6	3.3	14.2	15.1	1420 1800
1st High	2.73	11.22	3.2	2.8	2.5	2.2	18.5	19.6	1385 1800
2nd High	2.10	8.63	2.2	1.9	1.6	1.4	24.0	25.5	1385 1800
3rd High	1.64	6.74	1.4	1.2	1.0	.8	30.7	32.6	1405 1800
4th High	1.266	5.20	.8	.6	.5	.4	39.9	42.3	1390 1800
5th High	1.00	4.11	.4	.2	.1	.0	50.2	53.5	1420

E S T I M A T E D W E I G H T

MODEL: LD-305

Wheelbase 145"

Engine HRB-600

Transmission 5-C-720

Auxiliary 3-B-65

Rear Axle R-100

Tires 10:00x22, 12-ply

Fuel Tank 50 Gal. Std.

Comfo-Vision Cab

Heater and Defroster

Semi-trailer connections

Air Horn

Cab Marker Lights

Illuminated Signal Arm

R. H. Rear View Mirror

No Fuel

Front	7,920
Rear	4,160
Total	12,080

TRUCK MODEL: LD-305

ENGINE MODEL: HRB-600 NET TORQUE: 435 Lbs. Ft. at 1800 RPM

RECOMMENDED RPM FOR ROAD OPERATION: 1700 - 1800

TIRE SIZE: 10.00x22 LOADED RADIUS: 20.5 TIRE CAPACITY: 4275 Lbs.

TRANSMISSION MODEL: 5-C-720

TRANSMISSION RATIOS: 1) 6.37 2) 3.40 3) 1.74 4) 1.00 5) .75 Rev.) 6.37

AUXILIARY TRANSMISSION MODEL: 3-B-65

AUXILIARY RATIOS: Under 1.239 Direct 1.00 Over .804

REAR AXLE MODEL: R-100 AXLE REDUCTION: 5.28

			ROAD RESISTANCE 24 Lbs. Per Ton						
GEAR COMBI-NATIONS	TOTAL TRANS-MISSION REDUC-TIONS	TOTAL REDUCTION ENGINE TO WHEELS	GRADE ABILITY GOVERNED RPM 55,000 LBS	GRADE ABILITY GOVERNED RPM 60,000 LBS	GRADE ABILITY GOVERNED RPM 65,000 LBS	GRADE ABILITY GOVERNED RPM 70,000 LBS	MPH @ 1700	MPH @ 1800	RPM FOR SHIFT-ING GEARS
1st Under	7.89	41.66	15.2%	13.8%	12.7%	11.7%	4.9	5.2	1800
1st Direct	6.37	33.63	12.0	10.9	10.0	9.2	6.1	6.5	1455 1800
1st Over	5.12	27.03	9.4	8.5	7.8	7.1	7.6	8.1	1455 1800
2nd Under	4.21	22.23	7.5	6.8	6.2	5.6	9.3	9.8	1480 1800
2nd Direct	3.40	17.95	5.8	5.2	4.7	4.3	11.5	12.2	1455 1800
2nd Over	2.73	14.41	4.4	4.0	3.6	3.2	14.3	15.2	1445 1800
3rd Under	2.16	11.40	3.3	2.9	2.6	2.3	18.1	19.2	1425 1800
3rd Direct	1.74	9.19	2.4	2.1	1.8	1.6	22.5	23.9	1455 1800
3rd Over	1.40	7.39	1.7	1.4	1.2	1.0	28.0	29.7	1445 1800
4th Under	1.24	6.55	1.3	1.1	.9	.8	31.6	33.5	1595 1800
4th Direct	1.00	5.28	.8	.7	.5	.4	39.2	41.6	1455 1800
4th Over	.80	4.22	.4	.3	.2	.1	49.1	52.0	1445 1800
5th Direct	.75	3.96	.3	.2	.1	.0	52.3	55.4	1685 1800
5th Over	.60	3.17	.0				65.4	69.2	1445

APPROXIMATE CHARGES FOR COST COMPARISON, TWO-SPEED AXLE AS COMPARED TO TEN SPEED ROADRANGER TRANSMISSION AS COMPARED TO 3-SPEED AUXILIARY TRANSMISSION IN MODEL LD-305:

R-300	Two-Speed Rear Axle	$275.00	List Additional
R-95-C	Ten-Speed Roadranger Transmission	$600.00	List Additional
3-B-65	Three-Speed Auxiliary Transmission	$450.00	List Additional

CUMMINS DIESEL ENGINES

MODEL	NET WEIGHT	RATED H.P. @ RPM	NET H.P. @ RPM	APPROX. NET TORQUE @ GOV. RPM
HRB	2400 Lbs.	165 - 1800	149 - 1800	435 - 1800
HRBB	2450 Lbs.	175 - 2000	161 - 2000	422 - 2000
NHB	2625 Lbs.	200 - 2100	188 - 2100	470 - 2100
NHBS	2775 Lbs.	275 - 2100	257 - 2100	645 - 2100
NHRBS	2725 Lbs.	300 - 2100	283 - 2100	750 - 2100

TRANSMISSIONS, MAIN

MODEL	FIFTH	FOURTH	THIRD	SECOND	FIRST	REVERSE	NET WEIGHT
5-C-72	1.00	1.69	2.62	4.43	7.33	7.40	465
5-C-720	.75	1.00	1.74	3.40	6.37	6.37	465
5-A-1120	.744	1.00	1.76	3.27	6.54	6.49	681
10-B-1120							
High	.636	1.00	1.76	3.08	6.54	6.49	960
Low	.835	1.31	2.31	4.04	8.59	8.52	
R-95-C							(Approx.)
High	1.00	1.26	1.64	2.10	2.73	3.52	800
Low	3.55	4.49	5.82	7.45	9.70	12.50	
8041		1.00	1.75	3.47	6.25	6.39	495
8241		1.00	1.72	2.88	5.19	5.31	495
8051	.65	1.00	1.75	3.47	6.25	6.39	614
8251	.69	1.00	1.72	2.88	5.19	5.31	614

TRANSMISSIONS, AUXILIARY

MODEL	UNDER	DIRECT	OVER	NET HEIGHT
3-A-65	2.221	1.00	.754	270
3-B-65	1.239	1.00	.804	270
8031-C	2.59	1.00	.75	425
8031-G	1.29	1.00	.84	425

R E A R A X L E S

MODEL	RATIOS					NET WEIGHT
R-100	4.11	5.28	6.16	6.83		1334
R-200	5.91	6.51	7.21			1490
R-300						
High	4.52	6.42				
Low	5.91	8.38				1550
S-200	5.91	6.51	7.21			1633
S-300						
High	4.52	6.42				
Low	5.91	8.38				1775
U-200	5.91	6.51	7.21	7.79	8.69	1710
U-300						
High	Same as S-300					1852
Low						
22501						
High	4.33	4.87				(Approx)
Low	5.89	6.63				2000

INTRODUCTION

****

In heavy duty tractor operations the following factors are of utmost importance because this size unit will be used to operate up to the limit of the state size and weight laws:

1. Selections of components which will carry maximum legal loads with safety.

2. Chassis weight must be kept to the minimum in order to permit maximum payloads.

3. Functional design must keep overall length to a minimum in order to use longest possible trailer equipment and keep wheelbase to a minimum in order to provide maximum possible maneuverability.

4. Flexibility of major units in order to properly meet operator requirements in various sections of the country.

At this time, we would like to quote to you a letter received at the Indianapolis Motor Truck District Office from a dealer who recently sold a model W-3042-L tractor unit.

"L. W. Hully
L. W. Madery
T. D. Mescall

This is in reply to Mr. Mescall's letter relative to W-3042-L delivered by Kepner Impl. Co. Mr. M. L. Kepner and I contacted Mr. Murphy today and learned that he is well pleased with the truck.

This truck pulls a 32' tandem trailer with 35,000# payload and runs from Denver, Ind. to New York and return. Mr. Murphy formerly used a KBS-11 on this run and stated that he now makes the round trip in one day less time and his fuel expense is one-half that of the KBS-11. On his last round trip the total cost of fuel was $25.60.

He pulls a load both to and from New York and travels at a speed of 55 to 70 miles per hour. He further stated that he must run at least 54 miles per hour to get best operating results.

Mr. Murphy also mentioned that it would be a great advantage to driver if front axle could be set back enough to provide for a shorter turning radius.

Generally speaking, I would say this customer is well pleased with the truck.

Yours truly,

(signed) P. F. Decker "

****

So you see, there are customers who are willing to invest more money in equipment that will save running time, operate cheaper and in the end, result in more overall profit.

And also note that the gross combination weight cannot be considered excessive, as it is well under 60,000 lbs.

LD-305 REPLACES THE KBD-12

****

Before proceeding with the program, let's take a few minutes to give the chief functional differences between the new LD-300 and the KBD-12.

From a functional angle, there are two ways of designing a conventional truck chassis. One of these would have the front axle as far back as practical, and the other would have the front axle as far forward as possible.

State laws are the influencing factors in the final decision. In some instances, maximum payload can be carried with the front axle back; and vica versa.

(See Figure #1)

In this illustration, because of the state law, it is possible to carry 600 lbs. more payload on the LD-305 than on the KBD-12 even though the KBD-12 chassis is lighter. As a matter of fact, this holds true in about 24 states for tandem axle semi-trailer coordination and in practically all others the front axle location makes no difference, as will be shown later.

The point is that those states where front axle back provides an advantage, will influence the type of vehicle used in other states for interstate operation.

Study your state requirements carefully in order to visualize which type provides the greatest advantage.

Now to help you visualize more completely the difference between the LD-305 and the KBD-12 when actually applied to state laws, see figure #2.

(Figure # 1)

Coordinated for operation in Illinois and Indiana.

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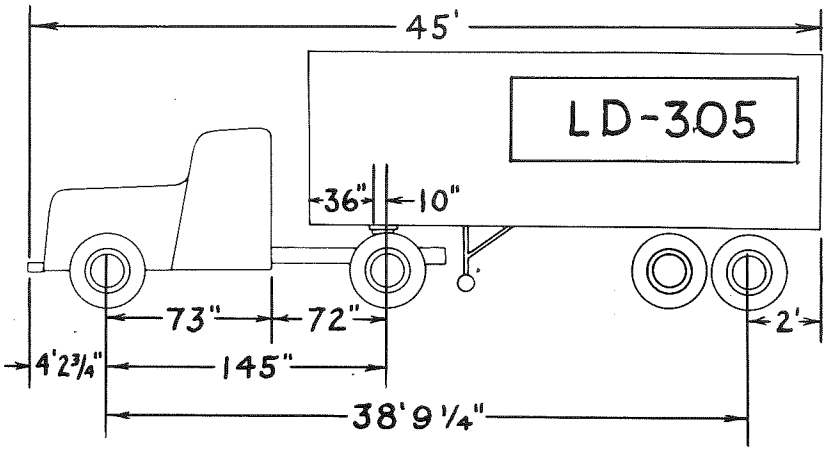

	Front	Rear	Trailer	Total
Chassis	7750	3895	-------	11,645
Trailer	150	3050	6800	10,000
PAYLOAD	945	11,055	25,200	37,200
Total	8845	18,000	32,000	58,845
Legal	9000	18,000	32,000	59,000

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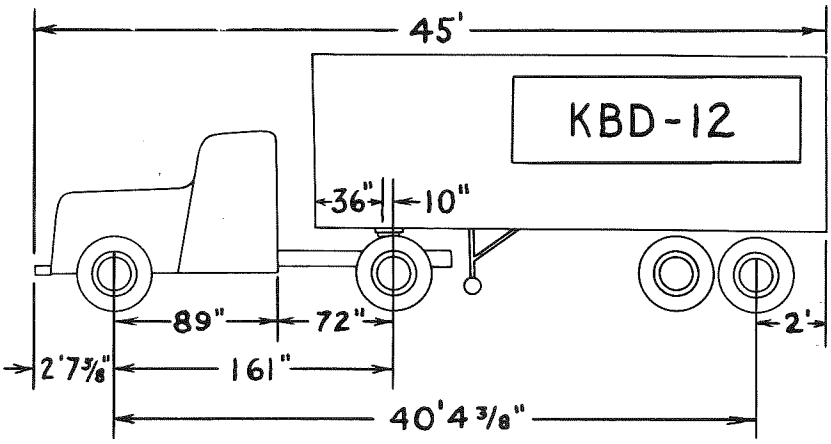


	Front	Rear	Trailer	Total
Chassis	7010	4330	-------	11,340
Trailer	140	3060	6800	10,000
PAYLOAD	790	10,610	25,200	36,600
Total	7940	18,000	32,000	57,940
Legal	9000	18,000	32,000	59,000

Notes on Figure # 1

LD-305 vs. KBD-12

1. 145" wheelbase vs. 161" -- or 16" shorter

2. 123-3/4" vs. 120-5/8" bumper to back of cab dimension

   Only 3" longer, but will accomodate NHB-600 diesel engine which is approximately 10" longer.

3. 600 lb. more payload with legal limit on rear axles.

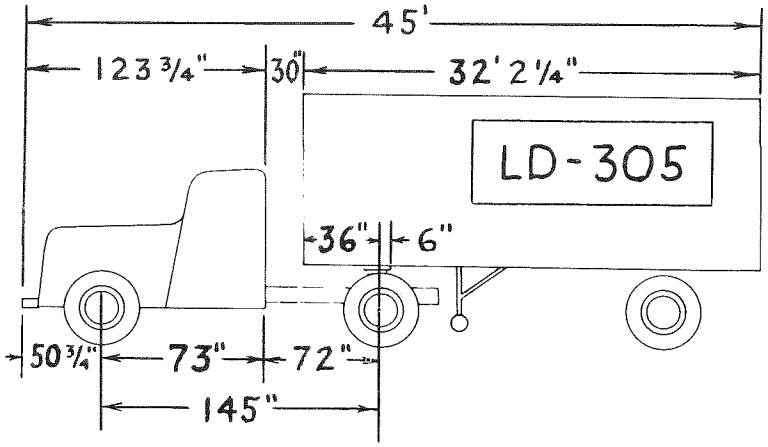
4. 27' Turning radius vs. 28-1/2' on KBD-12.

(Figure # 2)

LD-305 vs. KBD-12

****

**New York
**New Jersey
*New Hampshire
*Massachusetts
*Maine
*Connecticut
*Rhode Island



	Front	Rear	Trailer	Total
Chassis Weight.....	7750	3895	-------	11,650
Trailer.....	150	3050	4800	8,000
Payload.....	645	15,455	17,600	33,700
Total	8545	22,400	22,400	53,345 **
	8500	20,750	20,750	50,000 *

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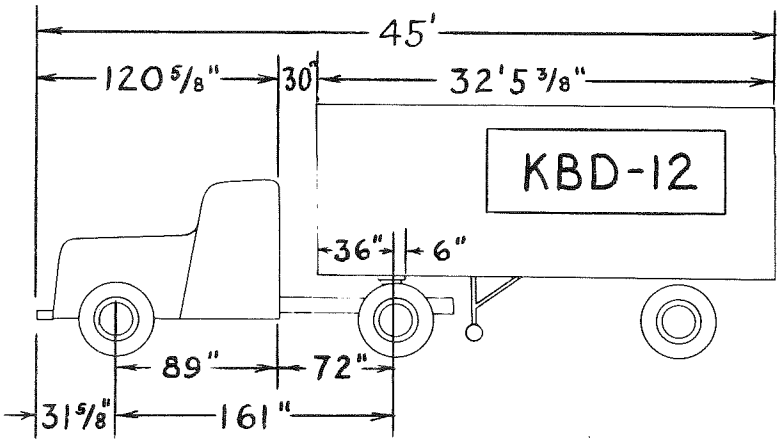


	Front	Rear	Trailer	Total
Chassis Weight.....	6910	4190	-------	11,100
Trailer.....	145	3055	4800	8,000
Payload.....	545	15,155	17,600	33,300
Total	7600	22,400	22,400	52,400 **
	7550	21,125	21,125	50,000 *

The foregoing illustrations give you a good idea of the chief difference between the LD-305 and the KBD-12.

Now let's take a quick glance at how we compare with our competition and also the KBD-12 from a major component standpoint.

MAJOR COMPONENTS *** HEAVY DUTY DIESEL EQUIPPED TRACTORS

Make	Internation.	Autocar	Autocar	Diamond T	GMC	Mack	White	Internat'l.
Model	LD-305	DC-75-T	DC-100-T	910-R	HDC-910	LJT	WC-26-TD	KBD-12
GVW	30,000	36,000	36,000	30-36,000	28,500			31,500
GCW	68,000	60,000	70,000	55,000	65,000	60,000		55,000
Frame - Type	Heat Treated	Heat Treated	Heat Treated	Heat Treated	Pressed St.	Heat Treated	Heat Treated	Pressed St.
Size	9 7/8 x 3 3/16 x 1/4	9 x 3 x 1/4	10 3/8 x 3 x 1/4	10 1/8 x 3 1/2 x 5/16	10 1/16 x 3 1/2 x 5/16	10 5/8 x 3 1/4 x 5/16		10 x 3 1/2 x 5/16
Engine - Standard	HRB-600	HB-600	HB-600	HRB-600	GMC 6-71	Mack 707 G	HRB-600	Cont'l 586
Optional	Any Cummins	HRB and HRBB only	Any Cummins	Cummins	None	Mack Diesel or Cummins	Cummins	HB or HRB only
Clutch	Spicer 14" 2 plate	Lipe 15" Single plate	Spicer 14" 2 plate	Lipe 15" Single plate	15" Single plate	15" Single Plate	14" Two plate	15" Single Plate
Transmission - Std.	Fuller 5-C-720	Autocar TF-5	Spicer 8041	Fuller 10-B-1120	Spicer 753-A	Mack Du-Plex, Two Lever Shift	Fuller 10-B-1120	Fuller 5-C-650
OPtional	Fuller 5 & 10 speed. Spicer	Spicer	Spicer	Spicer	Spicer	Spicer	Spicer	None
Auxiliary	Fuller or Spicer	Autocar or Spicer	Spicer	Spicer	Spicer	Spicer	Spicer	Spicer
Front Axle	Eaton	Timken	Timken	Timken	Eaton			Eaton
Rating	12,500	14,000	14,000	10,000	8000		10,000	8000
Rear Axle	Timken R, S, and U. Eaton 22,500	Autocar TK (26,000) Timken R-300 S-300, U-300	Autocar G (30,000) Timken R-300 S-300, U-300	Timken R, S and U. Eaton 22,500	Timken R Series			Timken R-100 and S Series
Brakes	Air	Air	Air	Air	Air	Air	Air	Air
Front size	17 1/4 x 3	17 1/4 x 3	17 1/4 x 3	17 1/4 x 3	17 1/4 x 3	17 1/4 x 4		17 1/4 x 3
Rear Size	16 1/2 x 7	16 1/2 x 6	16 1/2 x 6	16 1/2 x 7	16 1/2 x 6	17 1/4 x 6		16 1/2 x 7
Total area	719	658	658	722	648	710		719
Springs - Front	48 x 4	50 x 3	50 x 3	49 x 3	54 x 3	50 x 3 1/2		52 x 3
Rear	56 x 3	54 x 4	54 x 4	56 x 3 1/2	56 x 3	52-3/4 x 3 1/2		56 x 3
Auxiliary	36 x 3	33 x 4	33 x 4	34 x 3	35 x 3	38 x 3 1/2		36 x 3
Wheels	Spoke-Disc	Spoke	Disc	Spoke-Disc	Spoke-Disc	Spoke-Disc	Spoke-Disc	Spoke-Disc
Tires	10.00x20-12.00x24	10.00x20-11.00x22	10,00x20-12.00x24	9.00x20-11.00x24	10.00x20-12.00x24	10.00x20-12.00x24	9.00x20-11.00x24	11.00x20-11.00x24

NOTES ON MAJOR UNIT COMPARISON

****

You will note in checking the preceeding sheet that in every respect the LD-305 is a heavy duty unit that will stand up to and above all major competitive units.

Autocar has two models to be considered. The lighter DC-75-T is listed as being available only with the HRB-600 and HRBB-600 engines. For the NHB or other Cummins, the Heavier and larger DC-100-T is required. The LD-305 offers a wider variety of component units usually required by various customers.

The Diamond T 910-R has a lighter duty clutch, lighter front axle and springs than our LD-305. Other Components are practically equal to those we offer.

The GMC HDC-910 has lighter axles, clutch, transmission, smaller brakes etc. than our unit.

The LD-305 does not have to look up to the Mack in any way as regards specifications, components, or optional units.

The White WC-26 TD is the lightest unit White has with Diesel power. They change model designations for chassis with engines other than the HRB-600. As far as optional items such as axles, engines, transmissions, etc., the LD-305 offers more - by far.

****

The LD-305 is the unit to sell against these competitive units, and it lacks nothing that is required by the customer.

Be sure you choose the proper components, gear train, tires, etc., and you will have a well satisfied International user!

While a knowledge of unit comparison is necessary in selling motor trucks, it becomes equally important to be able to coordinate these units to carry maximum payload with maximum efficiency. To do this, we must take a look at chassis weight and its distribution. This knowledge can be converted into terms of dollars and cents.

1. Chassis Weight and/or distribution of this weight is very important in trucks of this size because every pound of excess means lost payload.

2. Here is direct quotation from a customer's letter regarding chassis weight:
"I should like to give you a few figures of what this added weight means to us. - The average rate we receive is $.55 per 100 lbs. on basis of 3 trips per week. 400 lb lost freight per trip over four years life of truck means a loss of $2745.00"

   At this rate, this means approximately $1.75 per year lost revenue per pound of excess chassis weight.

3. Now let's compare chassis weights of our competitors.

(All weights include cab, HRB engine, R-300 Axle, 11.00x20 tires on spoke wheels, oil, water, 40 gallons of diesel fuel.)

Make	Model	Front	Rear	Total	Notes
International	LD-305	7870	4075	11,945	5C-720 transm. 72" CA
Diamond T	910-R	6995	5380	12,375	72½" CA 7851 transm.
Autocar	DC-75-T	7665	4736	12,395	Autocar transm. 69" CA
Autocar	DC-100-T	8203	5421	13,624	8041, disc. 84" CA
GMC	HDC-910	7160	5420	12,580	6-71 84" CA 753-A transm.
Mack	LJT	7610	5390	13,000	Mack 5 speed Mack axle 72" CA
White	WC-26-TD	7070	5169	12,239	White axle 10-B-1120 72" CA

*All weights shown were developed from available reliable sources. Not responsible for possible discrepancies.

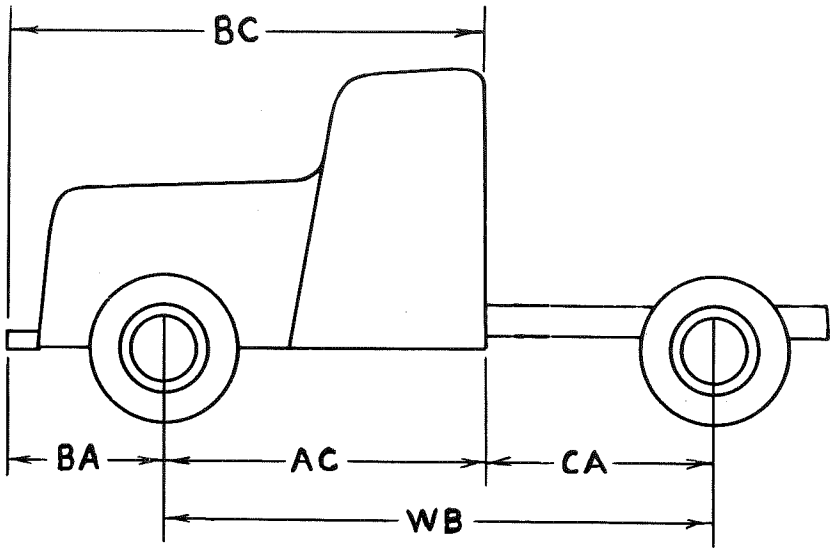
You will notice that the LD-305 is lighter than all competitors. All of this weight differential is not always converted to payload because of variation in State laws.

Illustrations which follow in this outline will show how chassis weight affects payload.

****

In addition to chassis weight, dimensions are also important to operators of these heavy units. Overall length must be kept to a minimum even with the largest available engines; wheelbases must be kept as short as possible; turning radius must be at a minimum.

Now let's take a look at just how we compare with the field from a dimensional standpoint.



Model	WB	CA	AC	BA	BC
LD-305	145	72	73	50-3/4	123-3/4
Autocar DC-75-T	142	69-3/4	72-5/16	50-1/2	122-3/4
Autocar DC-100-T	144	69-3/4	74-5/16	50-1/2	124-3/4
Diamond T 910R	154-3/4	72-1/2	82-1/4	39-1/2	121-3/4
GMC HDC 910	171	84	87	30	117
Mack LJT	146	72	74	46-1/8	120-1/8
White WC-26TD	146	72	74	41-9/16	115-9/16
LD-400 series	167	72	95	28-3/8	123-3/8
KBD-12	161	72	89	31-5/8	120-5/8

Note that for practically all competition with the so called front axle back, the dimensional advantages are practically a standoff. GMC and Diamond T have the front axle forward. This results in a decided advantage for the LD-305 as shown in wheelbase, turning radius, and also better load distribution.

For the complete picture in your own state, a detailed load distribution diagram is necessary.

****

In the foregoing an attempt was made to acquaint you with the manner in which the new LD-305 fits the various state laws and its relative merits when compared to competition.

The following tables will list the states in which the LD-305 or LD-400 series can be used economically and within the state laws.

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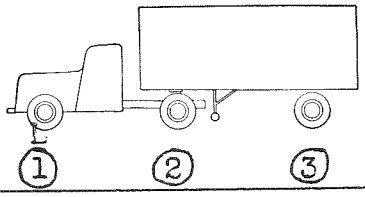
LD-305 WITH SINGLE AXLE SEMI-TRAILER



Axle No.	Legal				Practical			
	①	②	③	Total	①	②	③	Total
Connecticut	22400	22400	22400	50000*	8000	21000	21000	50000*
Washington DC	22000	22000	22000	63000**	10000	22000	22000	54000
Maine	22000	22000	22000	50000*	8000	21000	21000	50000*
Maryland	22400	22400	22400	62250**	10000	22400	22400	54800
Massachusetts	22400	22400	22400	50000*	8000	21000	21000	50000*
New Hampshire	N.R.	N.R.	N.R.	50000*	8000	21000	21000	50000*
New Jersey	22400	22400	22400	60000*	10000	22400	22400	54800
New York	22400	22400	22400	62250**	10000	22400	22400	54800
Rhode Island	22400	22400	22400	50000*	8000	21000	21000	50000
South Carolina	20000	20000	20000	63000**	10000	20000	20000	50000
Vermont	N.R.	N. R.	N.R.	50000*	8000	21000	21000	50000

N.R. -- No Restriction
* ----- Indicates Limiting Factor in Law.
** ----Indicates limiting factor in law (Bridge Formula)

****

Note: ---

1. There are 11 states that can use this model in conjunction with a single axle semi-trailer.

2. All of these states are in the East permitting from 20,000 lb. to 22,400 lb. per axle.

3. Terrain in these states require big equipment

4. Four of these states use the bridge formula or table restricting the gross combination weight. However the possible gross combination weight usually exceeds the practical limits. Therefore the front axle back permitting more load isan advantage.

5. Note how the LD-305 because of its lighter weight has an advantage over all competitors with their heaview chassis weight.

****

On the following two pages you will find a chart showing just how much gross combination weight is allowed for the tractor and tandem axle semi-trailer combination in those states where such combinations are practical.

Also, the practical limits are shown and indicate the loading per axle in order to reach the maximum practical limit.

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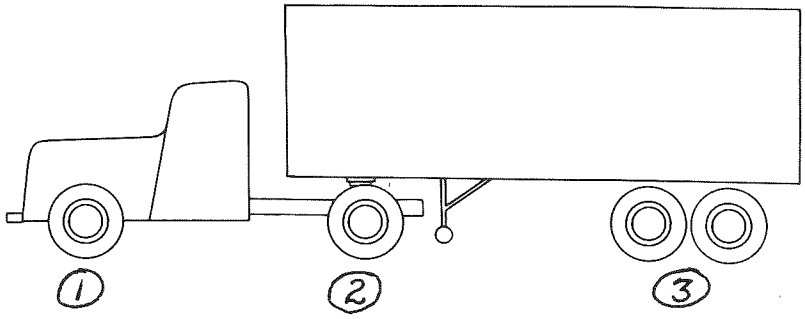
Legal and Practical Limits

For Tractor and Tandem Axle Semi-Trailer



	Legal				Practical			
	(1)	(2)	(3)	Total	(1)	(2)	(3)	Total
(A) Arizona	18,000	18,000	30,800	78,400	10,000	18,000	30,800	58,800
Arkansas	18,000	18,000	32,000	60,100	10,000	18,000	32,000	60,000
(A) California	18,000	18,000	32,000	68,000	10,000	18,000	32,000	60,000
(A) Colorado	18,000	18,000	35,200	72,000	10,000	18,000	35,200	63,200
Delaware	20,000	20,000	36,000	60,000	8,000	18,000	34,000	60,000
Dist. of Columbia	22,000	22,000	38,000	64,650	8,000	20,650	36,000	64,650
Florida	18,000	18,000	32,000	64,650	10,000	18,000	32,000	60,000
Georgia	18,000	18,000	30,800	56,000	7,200	18,000	30,800	56,000
(A) Idaho	18,000	18,000	32,000	72,000	10,000	18,000	32,000	60,000
Illinois	18,000	18,000	32,000	59,000	9,000	18,000	32,000	59,000
Indiana	18,000	18,000	32,000	72,000	10,000	18,000	32,000	60,000
Iowa	18,000	18,000	32,000	60,800	10,000	18,000	32,000	60,000
Kansas	18,000	18,000	32,000	63,890	10,000	18,000	32,000	60,000
Louisiana	18,000	18,000	32,000	68,000	10,000	18,000	32,000	60,000
Maryland	22,400	22,400	36,000	66,750	8,350	22,400	36,000	66,750
Michigan	18,000	18,000	26,000	62,000	10,000	18,000	26,000	54,000
Minnesota	18,000	18,000	28,600	59,250	10,000	18,000	28,600	56,600
Mississippi	18,000	18,000	28,650	64,650	10,000	18,000	28,650	56,650
Missouri	18,000	18,000	28,600	56,000	9,400	18,000	28,600	56,000

	Legal				Practical			
	(1)	(2)	(3)	Total	(1)	(2)	(3)	Total
(A) Montana	18,000	18,000	32,000	71,900	10,000	18,000	32,000	60,000
Nebraska	18,000	18,000	32,000	64,650	10,000	18,000	32,000	60,000
(A) Nevada	18,000	18,000	30,800	76,800	10,000	18,000	30,800	58,800
New Jersey	22,400	22,400	32,000	60,000	9,000	19,000	32,000	60,000
New Mexico	18,000	18,000	28,600	64,600	10,000	18,000	28,600	56,600
New York	22,400	22,400	36,000	63,000	10,000	21,000	32,000	63,000
North Carolina	18,000	18,000	36,000	56,000	8,000	16,000	32,000	56,000
North Dakota	18,000	18,000	30,000	60,000	10,000	18,000	30,000	58,000
Ohio	19,000	19,000	31,500	70,000	10,000	19,000	31,500	60,500
Oklahoma	18,000	18,000	32,000	60,000	10,000	18,000	32,000	60,000
Oregon	18,000	18,000	32,000	64,650	10,000	18,000	32,000	60,000
South Carolina	20,000	20,000	32,000	64,650	10,000	20,000	32,000	62,000
Texas	18,000	18,000	30,800	48,000	6,000	16,000	26,000	48,000
(A) Utah	18,000	18,000	33,000	79,900	10,000	18,000	33,000	61,000
Virginia	18,000	18,000	36,000	50,000	8,000	16,000	26,000	50,000
(A) Washington	18,000	18,000	32,000	72,000	10,000	18,000	32,000	60,000
West Virginia	18,000	18,000	36,000	52,930	6,930	16,000	30,000	52,930
Wisconsin	19,000	19,000	30,000	65,000	10,000	19,000	30,000	59,000
(A) Wyoming	18,000	18,000	32,000	71,400	10,000	18,000	32,000	60,000

(A) Bridge Formula permits more GCW than axle weight. Set back front axle required.

MAXIMUM WEIGHTS ALLOWED FOR OTHER COMBINATIONS

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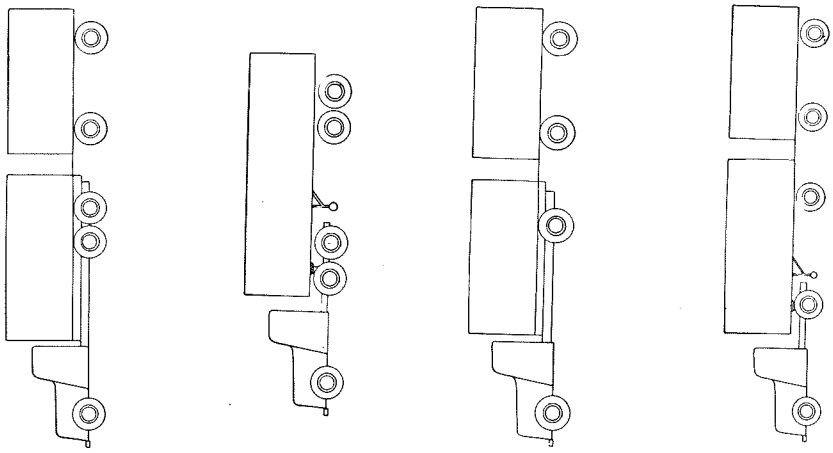

Arizona	76,800	76,800	72,000	76,800
Arkansas	73,280	73,280	72,000	N. P.
California	76,800	76,800	72,000	76,800
*Colorado	75,200	75,200	72,000	75,200
Connecticut	N. P.	50,000	N. P.	N. P.
Delaware	60,000	60,000	60,000	60,000
Florida	64,650	64,650	64,650	N. P.
*Georgia	51,800	51,800	51,800	N. P.
Idaho	72,000	72,000	72,000	72,000
Illinois	72,000	59,000	A60,000	72,000
Indiana	72,000	72,000	72,000	72,000
Iowa	N. P.	60,800	N. P.	N. P.
Kansas	63,890	63,890	63,890	N. P.
Kentucky	N. P.	42,000	N. P.	N. P.
Louisiana	68,000	64,000	54,000	N. P.

* Slightly more load using LD-405 & LFD-405 series because of greater spacing between axles.

A 63,000 lbs. if truck is licensed outside of Illinois.

Maine	50,000	50,000	50,000	N. P.
*Maryland	66,750	66,750	66,750	66,750
Massachusetts	50,000	50,000	50,000	N. P.
Michigan	86,000	76,000	72,000	90,000
*Minnesota	59,250	59,250	59,250	N. P.
Mississippi	52,650	52,650	52,650	N. P.
*Missouri	55,300	55,300	55,300	55,300
Montana	73,280	73,280	72,000	N. P.
Nebraska	64,650	64,650	64,650	N. P.
Nevada	76,800	76,800	76,800	76,800
New Hampshire	50,000	50,000	50,000	50,000
New Jersey	60,000	60,000	60,000	N. P.
*New Mexico	74,250	74,250	74,250	N. P.
New York	63,000	63,000	63,000	N. P.
North Carolina	58,800	58,800	58,800	N. P.
*North Dakota	59,250	59,250	59,250	N. P.
Ohio	78,000	78,000	78,000	78,000
Oklahoma	60,000	60,000	60,000	N. P.
Oregon	72,000	65,400	66,500	72,000
Pennsylvania	62,000	45,000	56,000	N. P.
Rhode Island	72,000	60,000	64,000	N. P.
South Carolina	68,350	68,350	68,350	N. P.
South Dakota	64,650	64,650	64,650	N. P.
Tennessee	42,000	42,000	42,000	N. P.
Texas	55,300	55,300	55,300	N. P.
Utah	79,900	79,900	72,000	79,900
Vermont	50,000	50,000	50,000	N. P.

* Slightly more load using LD-405 & LFD-405 series because of greater spacing between axles.

Virginia	50,000	50,000	50,000	N. P.
Washington	68,000	68,000	60,000	N. P.
West Virginia	80,000	80,000	64,000	80,000
*Wisconsin	65,000	65,000	65,000	N. P.
Wyoming	73,950	73,950	72,000	N. P.

* Slightly more load using LD-405 & LFD-405 series because of greater spacing between axles.

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Now let's see how much payload can be carried by the LD-305 with a tandem axle semi-trailer in various states, as compared to competitive units.

****

LD-305 vs. L-205

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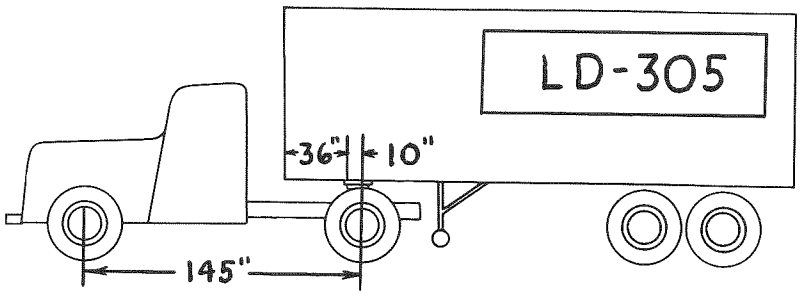

	Front	Rear	Trailer	Total
Chassis	7750	3895	-----	11,645
Trailer	150	3050	6800	10,000
PAYLOAD Weight	745	11,055	25,200	37,000
Total	8645	18,000	32,000	58,645
Legal	18,000	18,000	32,000	63,890 ← Kansas

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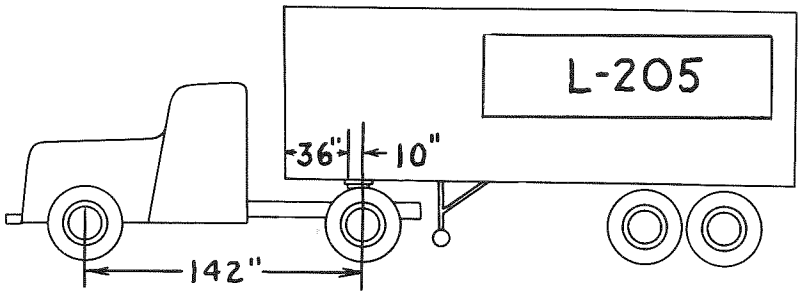


	Front	Rear	Trailer	Total
Chassis	4530	3875	-----	8,405
Trailer	150	3050	6800	10,000
PAYLOAD Weight	750	11,075	25,200	37,025
Total	5430	18,000	32,000	55,430
Legal	18,000	18,000	32,000	63,890 ← Kansas

LD305 vs. L-205

****

1. Chassis Weight practically 3000 lbs. heavier Yet payload not sacrificed in some states.

2. See your State laws, or table included in this outline on tandem axle semi-trailer combinations. This illustration is typical of not only Kansas, but many states.

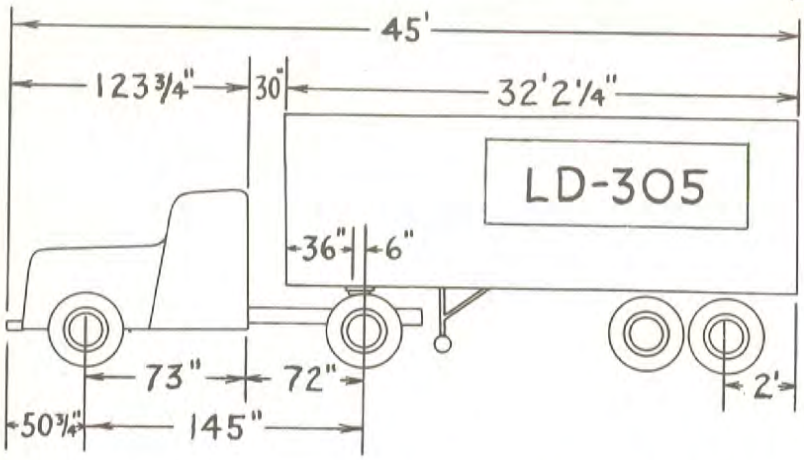
Arkansas	Kansas
California	Louisiana
Florida	Montana
Idaho	Nebraska
Illinois	Oklahoma
Indiana	Oregon
Iowa	Washington
Wyoming	

3. Above states have 18,000 lb. single axles, and 32,000 lb. tandem axles. Other states have slightly higher axle limitations resulting in additional load capacity.

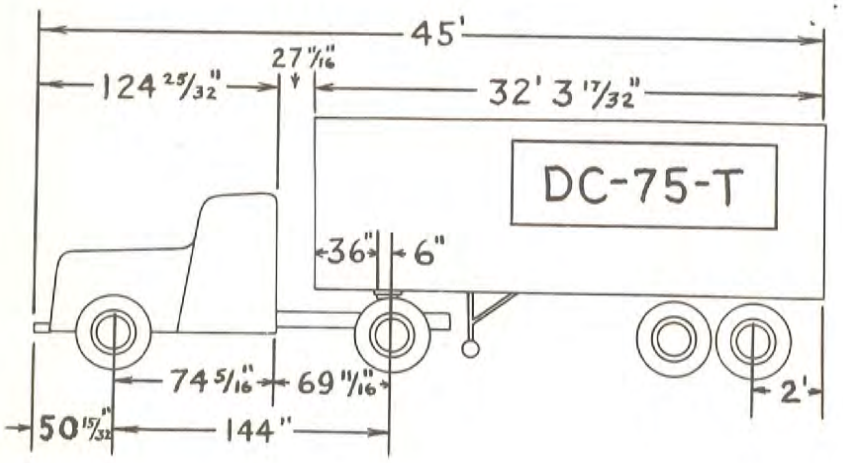
Colorado	New York
Delaware	North Carolina
Washington, D. C.	Utah
Maryland	Virginia
West Virginia	

LD-305 vs. Autocar DC-75-T

NEW JERSEY



	Front	Rear	Trailer	Total
Chassis Weight.....	7750	3895	-------	11,650
Trailer Weight.....	150	3050	6800	10,000
Payload.....	550	12,600	25,200	38,350
Total	8450	19,545	32,000	60,000



	Front	Rear	Trailer	Total
Chassis Weight.....	7665	4736	-----	12,395
Trailer Weight.....	150	3050	6800	10,000
Payload.....	540	11,636	25,200	37,605
Total	8355	19,422	32,000	60,000

LD-305 vs. AUTOCAR DC-75-T

****

1. From dimension standpoint no advantage either way.

2. LD-305 can gross same as Autocar but carry 745 pounds more payload.

3. At $1.75 per pound per year, this represents:

   $1303.75 per year or

   $5215.00 for four years

4. This competitor could practically give this model to the operator and the operator would make little or no additional revenue over four years life of the unit.

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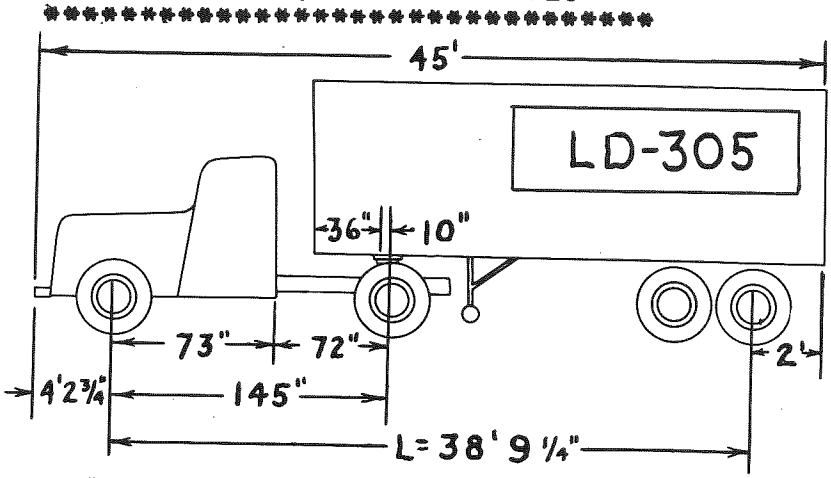
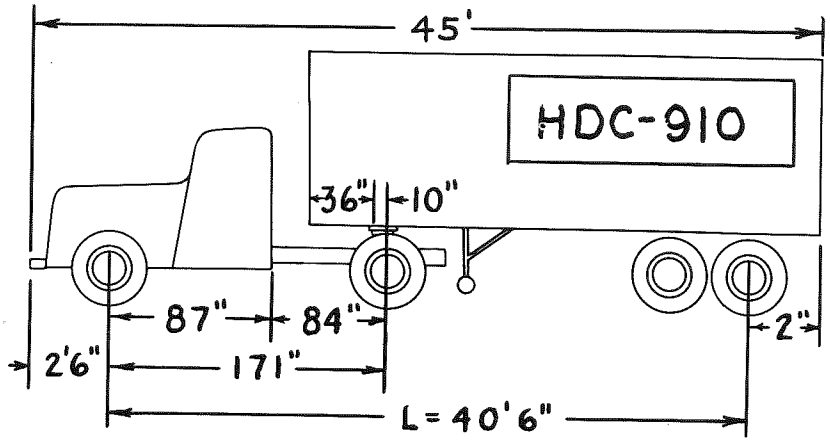
LD-305 vs. GMC HDC-910

OHIO



GCW - 38,000 plus L x 800 --- 69,040 lbs.

	Front	Rear	Trailer	Total
Chassis Weight.....	7750	3895	--------	11,650
Trailer Weight.....	160	3040	6800	10,000
Payload.....	935	12,065	24,700	37,700
Total	8845	19,000	31,500	59,350
Legal	19,000	19,000	31,500	69,040



GCW - 38,000 plus L x 800 --- 71,400 lbs.

	Front	Rear	Trailer	Total
Chassis Weight.....	7160	5420	--------	12,580
Trailer Weight.....	150	3050	6800	10,000
Payload.....	870	10,530	24,700	36,100
Total	8180	19,000	31,500	58,580
Legal	19,000	19,000	31,500	71,400

LD-305 vs. GMC-910

****

1. LD-305 carries 1600 pounds additional payload in Ohio, or $2800.00 per year additional revenue at $1.75 per pound per year.

2. Bridge formula ordinarily favors front axle located forward. In Ohio, the LD-305 can gross 69,040 lbs. while the GMC can gross 71,400 lbs. However, axle limitations and practical limits on front axle prevent using the maximum legal GCW.

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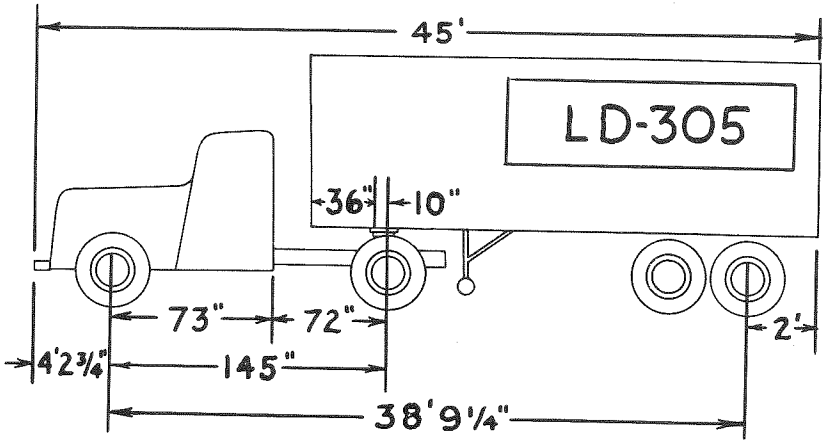
OHIO

LD-305 vs. Mack LJT
(Both with HRB-600 engine)



	Front	Rear	Trailer	Total
Chassis Weight.....	7870	4075	-------	11,945
Trailer Weight.....	160	3040	6800	10,000
Payload.....	885	11,885	24,700	37,470
Total	8915	19,000	31,500	59,415
Legal	19,000	19,000	31,500	69,040

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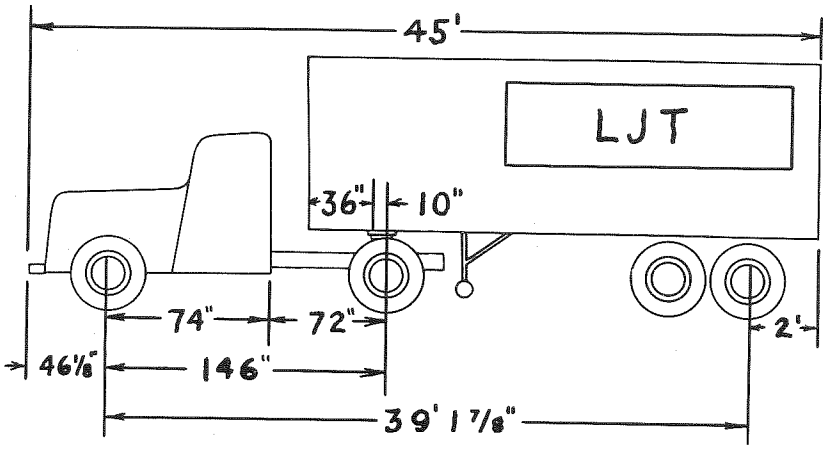
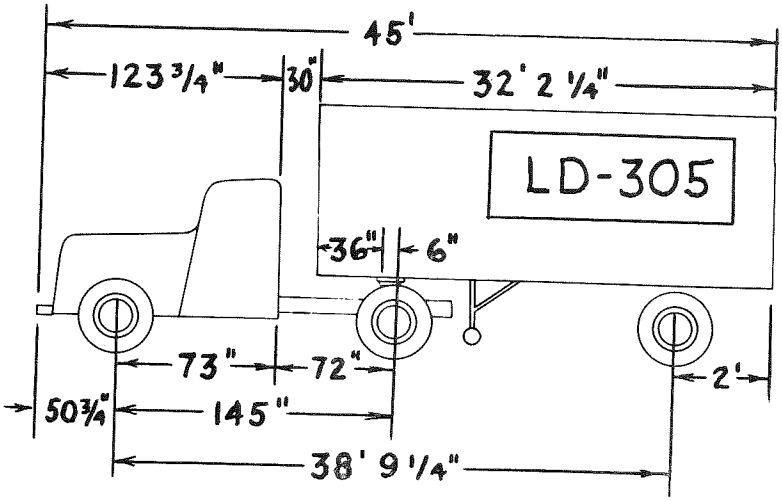


	Front	Rear	Trailer	Total
Chassis Weight.....	7610	5390	---------	13,000
Trailer Weight.....	150	3050	6800	10,000
Payload.....	870	10,560	24,700	36,130
Total	8630	19,000	31,500	59,130
Legal	19,000	19,000	31,500	69,200

LD-305 vs. Mack LJT
(Both with HRB-600 Engine)

New York
New Jersey



	Front	Rear	Trailer	Total
Chassis Weight.....	7870	4075	-------	11,945
Trailer Weight.....	150	3050	4800	8,000
Payload.....	675	15,275	17,600	33,550
Total	8695	22,400	22,400	53,495
Legal	22,400	22,400	22,400	59,250

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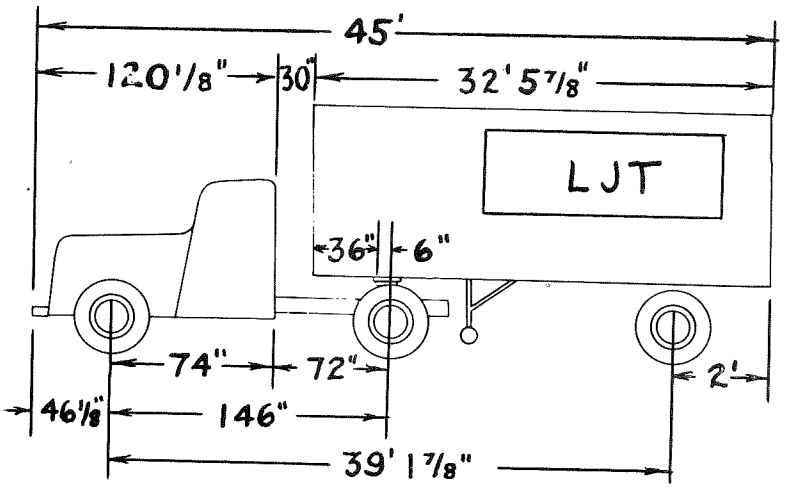

	Front	Rear	Trailer	Total
Chassis Weight.....	7610	5390	----------	13,000
Trailer Weight.....	150	3050	4800	8,000
Payload.....	610	13,960	17,600	32,170
Total	8370	22,400	22,400	53,170

LD-305 vs. Mack LJT

****

1. The LD-305 carries 1380 pounds additional payload on units operating in both New York and New Jersey. Based on $1.75 per pound per year, this means $2415.00 each year or $9660.00 in four years in additional revenue.

TWO SUGGESTED CHASSIS
FOR DEMONSTRATION, STOCK AND DELIVERY

****

LD-305 145"wb chassis and Comfo-Vision Cab
HRB-600 diesel engine (165 HP)
5-C-720 transmission
R-300 two speed rear axle (4.52/5.91 ratio)
11.00 x 20 tires -- cast spoke wheels
maximum road speed -- 64 MPH
Dual 50 gallon fuel tanks
Semi-trailer connections
Hand control
Air horn
Heater and defroster
Right hand rear view mirror
Cab marker lites
DeLuxe oil filter

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LD-305 145" wb chassis and Comfo-Vision Cab
HRB-600 diesel engine (165 HP)
R-95-C Road Ranger ten speed transmission
R-100 single reduction rear axle (4.11 ratio)
11.00 x 20 tires -- cast spoke wheels
maximum road speed -- 53 MPH
dual 50 gallon fuel tanks
Semi-trailer connections
Hand control
Air horn
Heater and defroster
Right hand rear view mirror
Cab marker lites
DeLuxe Oil Filter

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MEMO

MEMO

A Few Cost Comparisons

	International L-162 172" WB	Chevrolet 6000 179" WB
Chassis Cab 8.25x20 Tires Freight Handling Tax	$2,546.65	$2,537.90
2-speed axle	176.62	169.75
Oil Filter	7.82	11.70
F. A. Heater	57.46	73.00
Total	$2,788.55	$2,792.35

	International L-162 172" WB	Ford F-6 176" WB w/112 HP engine & deluxe cab
Chassis Cab 8.25x20 tires Freight Handling Tax	$2,546.65	$2,633.37
2-speed axle	176.62	163.85
Oil Filter	7.82	7.97
Rec. Heater	31.39	39.36
Heavy Duty Springs	13.03	65.00
Total	$2,775.51	$2,909.55

	International L-162 154" WB	G.M.C. 353 161" WB
Chassis		
Cab		
8.25x20 Tires		
Heavy Duty Springs		
Freight		
Handling		
Tax		
	$2,511.97	$2,510.94
2-speed axle	176.62	186.20
oil Filter	7.82	11.70
5-speed Transmission	52.14	180.99
Total	$2,748.55	$2,889.83

	International L-152 154" WB	Chevrolet 4000 161" WB
Chassis		
Cab		
7.50x20 Tires		
Freight		
Handling		
Tax		
	$2,207.59	$2,044.09
2-speed axle	158.54	169.75
Oil Filter	7.82	11.70
F. A. Heater	57.46	73.00
Total	$2,431.41	$2,298.54

	International L-152 130" WB	Ford F-4 134" WB (w/106 HP engine & Deluxe cab)
Chassis		
Cab		
7.00x20 tires - Sgl rear		
Freight		
Handling		
Tax		
	$1,909.63	$1,839.34
Oil Filter	7.82	7.97
Rec. Heater	31.39	39.36
Total	$1,948.84	$1,886.67

	International L-152 154" WB	Ford F-5 157" WB (w/106 HP engine & deluxe cab)
Chassis		
Cab		
6.50x20 tires (Ford)		
7.00x20 Tires (Int'l)		
Freight		
Handling		
Tax		
	$2,088.22	$1,961.55
2-speed axle	158.54	202.00
Oil Filter	7.82	7.97
Rec. Heater	31.39	39.36
Total	$2,285.97	$2,210.88

	International L-152 154" WB	GMC 283 161" WB
Chassis Cab 7.00x20 Tires Freight Handling Tax	$2,088.22	$2,014.49
F. A. Heater	57.46	69.16
Oil Filter	7.82	11.70
Total	$2,153.50	$2,095.35