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FORKLIFT TRUCKS, GASOLINE-ENGINE-DRIVEN, 4000- TO 6000-POUND-CA--ETC(U)
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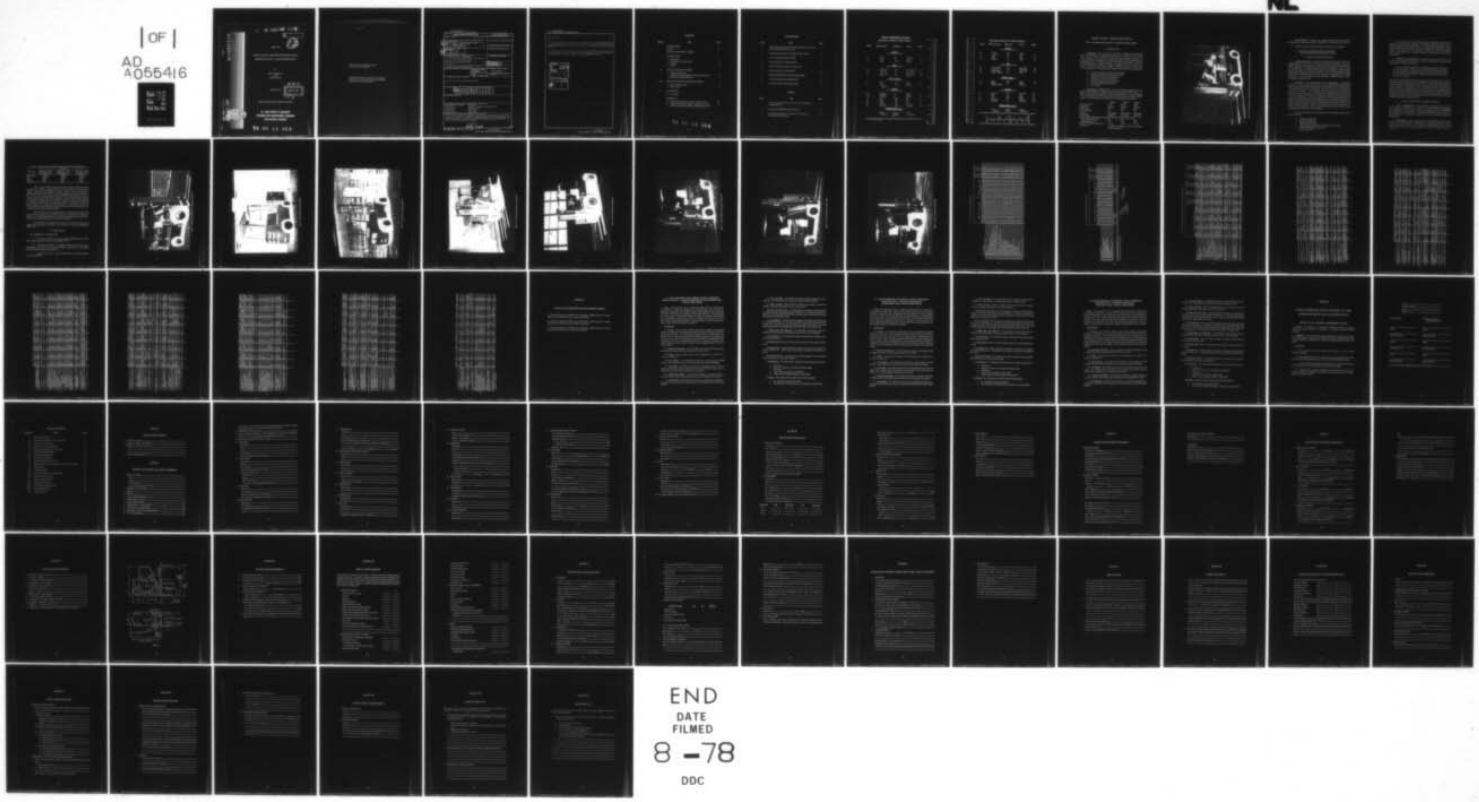

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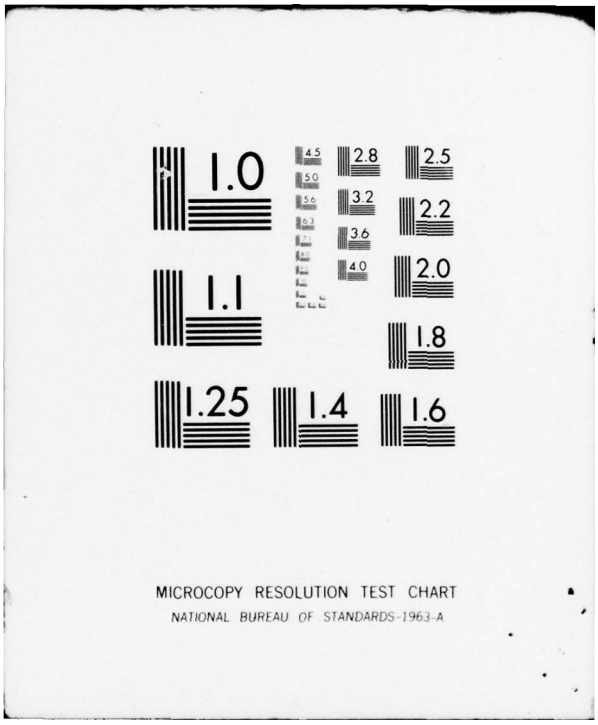
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Report 2231

FORKLIFT TRUCKS, GASOLINE-ENGINE DRIVEN, 4000- TO 6000-POUND-CAPACITY – MANUFACTURER SURVEY

by

James E. Stephens, Jr.
and
Jesse W. Reid, Jr.

February 1978

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U.S. ARMY MOBILITY EQUIPMENT
RESEARCH AND DEVELOPMENT COMMAND
FORT BELVOIR, VIRGINIA

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Pneumatic Tire	Specification
Solid-Rubber Tire	Procurement

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report results from recent emphasis on procurement of commercial items in lieu of Military Adaptation of Commercial Items (MACI). To satisfy the prerequisites for procuring/fielding commercial material-handling equipment, MERADCOM implemented a seven-phase program. This report presents the results of the first two phases.

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Four major manufacturers of forklift trucks were visited by a Survey Team using a Manufacturer Survey Questionnaire (Technical Information Package (TIP)). Each manufacturer proposed a model which should satisfy the three size requirements in the item descriptions used in conjunction with the TIP.

Results from the survey include a candidate make and model list for the three size requirements. The results support this general conclusion: Commercial forklift trucks do not differ significantly from forklift trucks previously procured by the Army using MACI specifications.

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ILLUSTRATIONS

TABLES

METRIC CONVERSION FACTORS

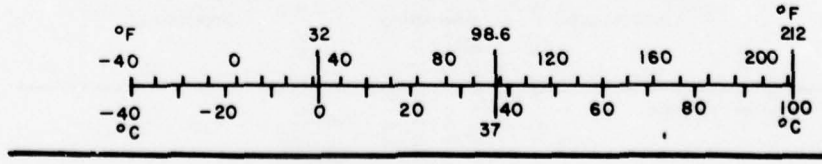
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric tons	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

* 1 in = 2.54 cm (exactly).

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10 000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric tons (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



FORKLIFT TRUCKS, GASOLINE-ENGINE-DRIVEN, 4000- TO 6000-POUND-CAPACITY – MANUFACTURER SURVEY

I. INTRODUCTION

1. **Background.** On 24 May 1976, the Office of Management and Budget directed the Government to emphasize the acquisition of commercial, off-the-shelf products in order to achieve optimal effectiveness in supply support operations. The resulting emphasis on procurement of commercial products included the forklift truck procured previously as a Military Adaption of Commercial Item (MACI). Therefore, MERADCOM initiated a program to develop a procurement document whereby commercial, off-the-shelf, forklift trucks (4000- to 6000-pound-capacity) could be procured and supported. This program for the forklift trucks includes the following steps:

a. Prepare the Manufacturer Survey Questionnaire.
b. Conduct and report the Manufacturer Survey.
c. Prepare the User Survey Questionnaire.
d. Conduct and report the User Survey.
e. Develop the procurement specification.
f. Procure commercial forklift trucks.
g. Type Classify.

2. **Description of Forklift Truck.** In the past, Military adaptations of commercial forklifts (4000- to 6000-lb) have been procured using MIL-T-52862. (A 4000-lb forklift procured using MIL-T-52862 is shown in Figure 1.) This specification in turn was assumed to represent the requirement baseline for commercially available forklifts. These forklifts can be described by the following general parameters:

	Size 1	Size 2	Size 3
Lift Capacity (lb):	4000	4000	4000
Engine Type:	Gasoline	Gasoline	Gasoline
Lift Height (in.):	144	180	180
Load Center (in.):	24	24	24
Tire Type:	Solid-Rubber	Solid-Rubber	Pneumatic
Transmission:	Automatic	Automatic	Automatic
Maneuverability (right-angle turn dimension (in.) with 48-in. by 48-in. pallet):			
Without Sideshifter (in.):	150	150	196
With Sideshifter (in.):	154	160	200
Ambient Temperature Range (°F):	0–110	0–110	0–110
Typical Use:	In general warehouses, depots, and other defense installations.		

Figure 1. Allis-Chalmers Model ACC40 forklift truck procured by using Military Specification MIL-T-52862.

3. **Report Objective.** The objective is to report the results of the survey of four manufacturers of commercial forklifts: Allis-Chalmers, Clark, Hyster, and Towmotor.

4. **Scope.** This report considers the initial two elements of this program:

a. Developing the Manufacturer Survey Questionnaire.
b. Conducting and Reporting the Manufacturer Survey.

II. SURVEY OF MANUFACTURERS

5. **Baseline Descriptions.** One important purpose of the Manufacturer's Survey Questionnaire was a dry run of the first step of a two-step procurement. Therefore, baseline descriptions were necessary to insure that each manufacturer responded to an identical baseline. The forklift descriptions presented in paragraph 2 were expanded into narrative formats to briefly state the Army's requirements for forklifts. These baseline descriptions are presented in Appendix A. Note that three different forklifts are described: A 4000-lb-capacity @ 144-in. lift height with solid-rubber tires; a 4000-lb-capacity @ 180-in. lift height with solid-rubber tires; a 6000-lb-capacity @ 180-in. lift height with pneumatic tires.

6. **Preparation of the Manufacturer Survey Questionnaire.** MERADCOM developed a survey questionnaire for use in the Commercial Equipment Program Surveys being reported and for eventual use in two-step procurement of forklift trucks. In two-step procurement, the manufacturer, as the first step, will use the questionnaire to describe his product. The Government will then evaluate each manufacturer's response to insure it represents the manufacturer's commercial product and satisfies the contract specification. Part of the Government's evaluation will include input from a survey of commercial users of these forklift trucks. The manufacturers judged to be responsive after this evaluation will be requested, as the second procurement step, to submit competitive bids based on their response/description, together with the Government's evaluation findings. Finally, the Government will use the information presented by the manufacturer in Step 1 to accept or reject the forklift trucks when they are inspected for acceptance by the Government.

These questionnaires were prepared to solicit the following information from the manufacturer:

a. Candidate model/name.
b. Standard equipment list.
c. Optional equipment list.
d. Major component specification/manufacturer/part number.
e. Logistical/maintenance impact data.
f. Commercial user list.

The manufacturer survey questionnaire was coordinated with the various interested agencies including TARCOM and DARCOM Packaging, Storage, and Containerization Center (User Representative). A comprehensive questionnaire resulted which was designated the Technical Information Package (TIP) (Appendix B) for the forklift. Each manufacturer was requested to complete the TIP for his forklift(s) which corresponded to the previously discussed and presented item description (Appendix A).

7. **Selection of the Manufacturers.** The following criteria similar to those used in other Army programs were developed to identify manufacturers of forklifts which closely match the Army's requirements:

> The manufacturer shall produce a standard forklift which corresponds to the item described. Furthermore, the manufacturer shall have marketed the standard forklift in significant quantities to commercial users for at least one year. However, normal product improvement changes introduced in this one year are acceptable.

Using these criteria, MERADCOM identified more than 30 manufacturers. Obviously, all 30 manufacturers could not be surveyed; therefore, the four major manufacturers of commercial forklifts (Allis-Chalmers, Clark, Hyster, and Towmotor) were selected as survey candidates. By coincidence, these four manufacturers have also supplied the majority of the Army's forklifts during the past several years. The decision to survey these four major manufacturers, however, does not preclude other manufacturers from bidding on a contract, provided they meet the previously stated criteria. However, if manufacturers other than the four selected submit bids, their commercial users will be surveyed as part of the first-step evaluation.

III. RESULTS OF SURVEY OF MANUFACTURERS

8. **Visits to Manufacturers.** Each manufacturer was visited and the Government's program to culminate in the purchase of commercial forklifts was explained. The manufacturer was requested to complete and send the TIPs to MERADCOM. The manufacturers were cooperative and fulfilled MERADCOM's request. The completed TIPs were too voluminous to include in this report and are filed separately at MERADCOM.

9. **TIP Evaluation.** Table 1 summarizes the forklifts depicted by the manufacturers in the TIPs submitted to MERADCOM. Only one manufacturer specified different models for the two lift-height requirements at 4000-pound capacity. Photographs of each of the nine makes/models listed in Table 1 are shown in Figures 2 through 9.

Table 1. Forklift Trucks Listed by Manufacturers in TIPs Submitted to MERADCOM

Manufacturer	Model No.		
	4000-lb-cap. @ 144-in. Lift Height (Size 1)	4000-lb-cap. @ 180-in. Lift Height (Size 2)	6000-lb-cap. @ 180-in. Lift Height (Size 3)
Allis-Chalmers	ACC45B	ACC45B	ACP70
Clark	C30040	C30040	C500Y70
Hyster	S50C	S50C	H70C
Towmotor	T40B	T50B	V60B

Table 2 prepared from the data presented in the TIPs, compares the various manufacturers' standard and optional features and states whether or not these will be supplied. In general, the comparison in Table 2 verifies a pre-survey observation – forklifts purchased via MIL-T-52862 do not differ significantly from commercial forklifts. This is true, as the requirements of MIL-T-52862 can be satisfied by optional or available special features from each manufacturer. Table 2 will be useful to develop the rationale concerning which features should be specified in the Army's specification for commercial forklift trucks. One approach would be to specify only the required features which are not standard with all manufacturers. This approach assumes that the manufacturers will provide their standard models even if these features are not mentioned in the specification (MIL-T-52932).

Table 3 compares the technical/automotive characteristics of standard, commercial forklifts from the four manufacturers surveyed. Technically/automotively the forklifts do not differ significantly from the forklifts procured previously using MIL-T-52862 except for certain features such as absence of lifting eyes.

All manufacturers complied with the request to list industrial users of the forklift trucks described in their TIPs. User surveys are covered by MERADCOM Report 2230.

IV. CONCLUSIONS

10. Conclusions. It is concluded that:

a. Commercial forklift trucks do not differ significantly from forklift trucks previously procured by the Army using MIL-T-52852.

b. The makes and models of commercial forklift trucks the four major manufacturers will offer to meet the Government specification for commercial material-handling equipment were identified.

c. Industrial users of the various makes/models of commercial forklift trucks were identified.

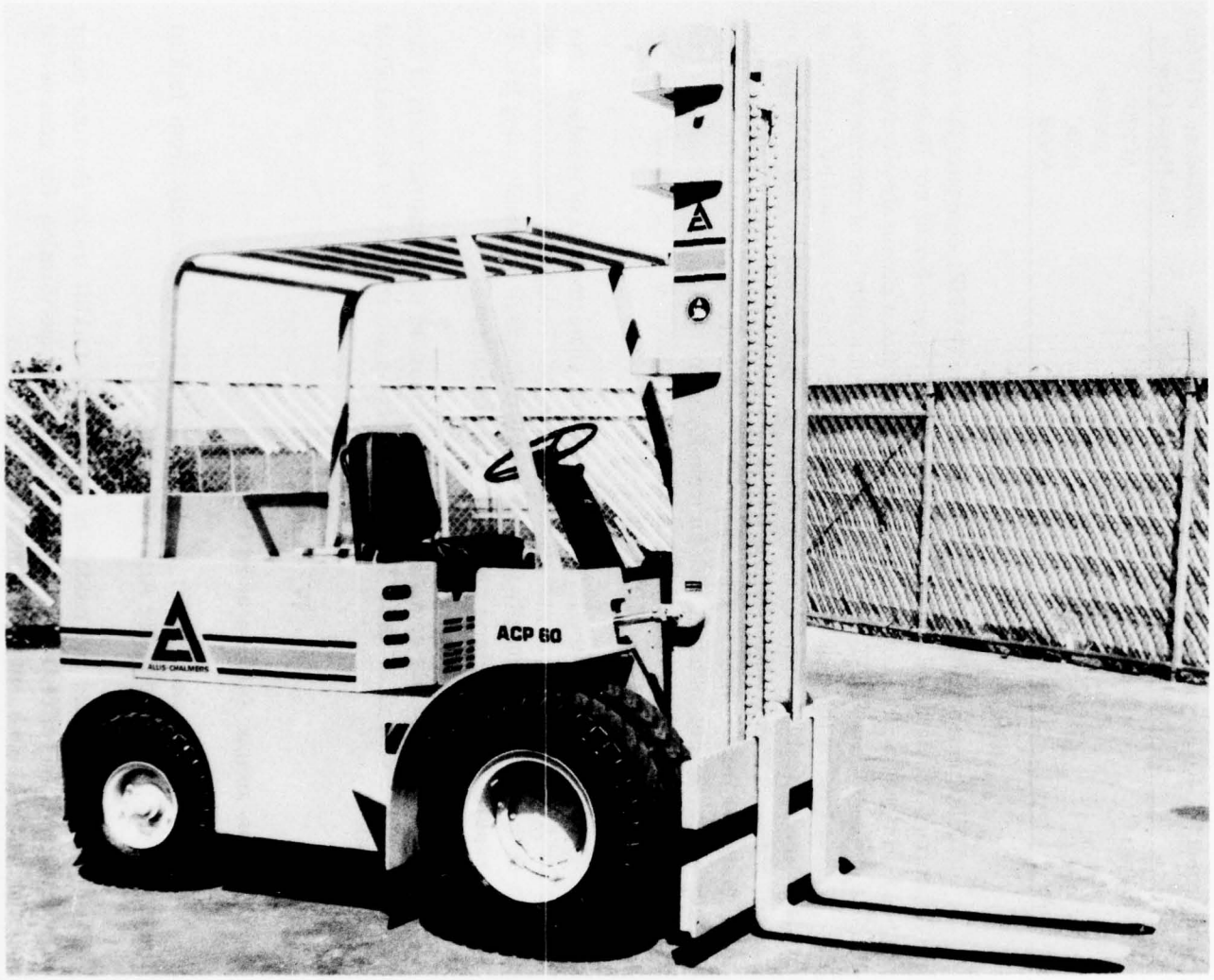


Figure 2. Allis-Chalmers forklift truck similar to Model ACP 70.

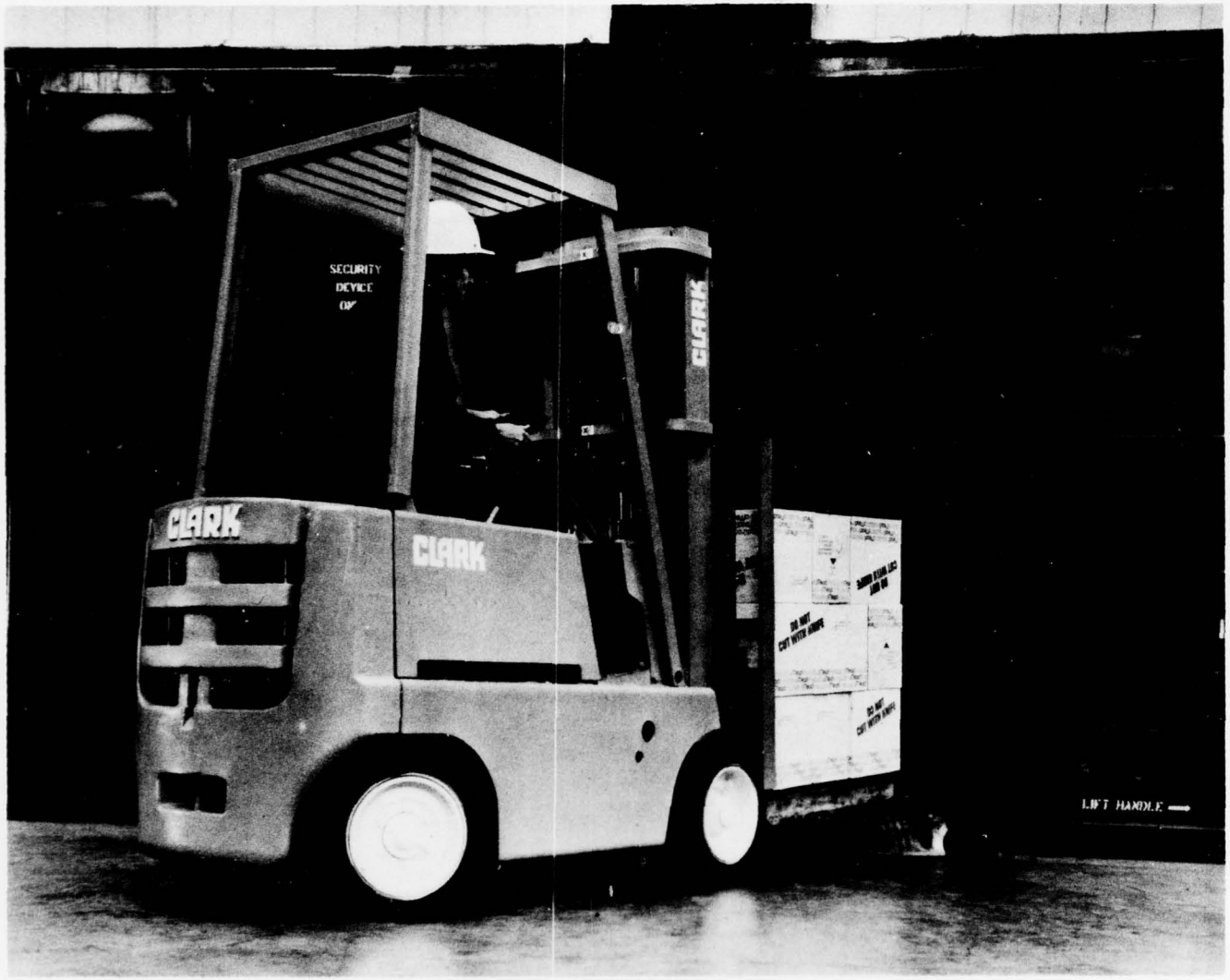


Figure 3. Clark forklift truck, Model C300-40.

Figure 4. Clark forklift truck, Model C500-Y70.

Figure 5. Hyster forklift truck similar to Model S50C.

Figure 6. Hyster forklift truck, Model H70C.

Figure 7. Towmotor forklift truck similar to Model T40B.

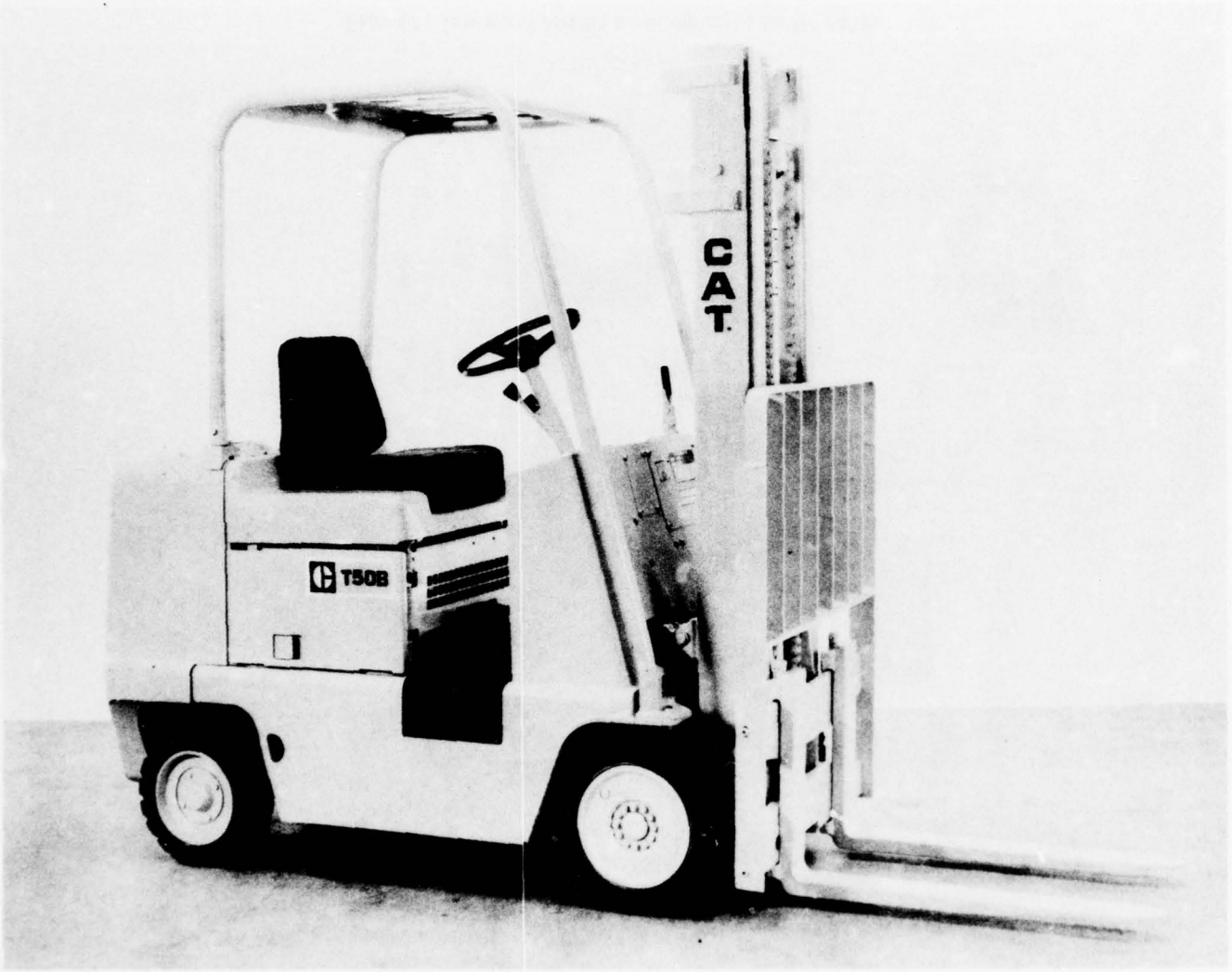


Figure 8. Towmotor forklift truck, Model T50B.

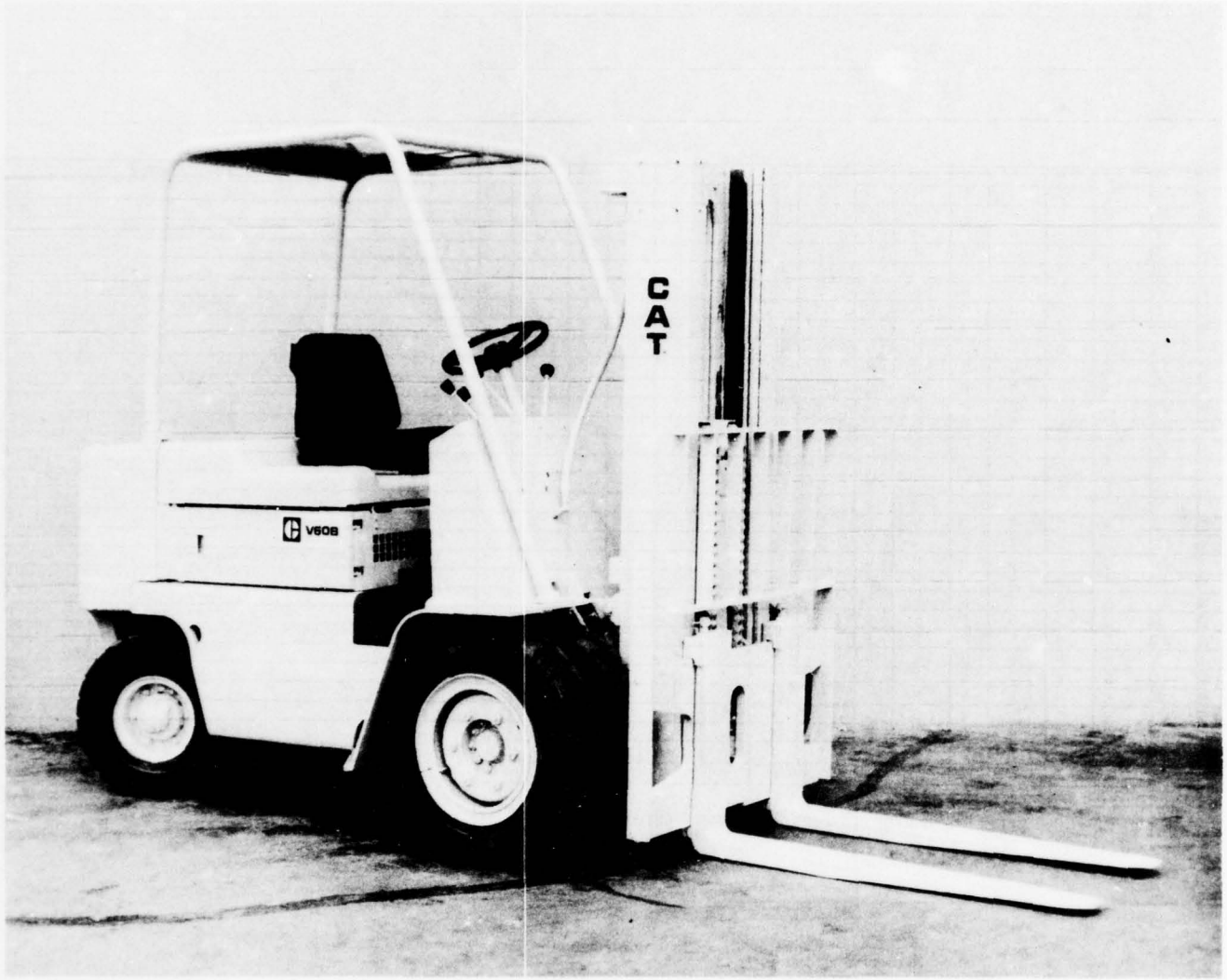


Figure 9. Towmotor forklift truck, Model V60B.

Table 2. Comparison of Standard Optional Features

Misc. Equipment	6000-lb Cap. @ 180-in. Lift Height								4000-lb Cap. @ 144- and 180-in. Lift Heights						4000-lb Cap. @ 144-in. Lift Height		4000-lb Cap. @ 180-in. Lift Height	
	Clark		AC		Hyster		Towmotor		Clark		AC		Hyster		Towmotor		Towmotor	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
1. Alternator Indicator Light	N	N	N	N	N	N	SF	N	N	N	N	N	N	N	SF	N	SF	N
2. Ammeter	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
3. Voltmeter	N	N	N	N	N	N	SF	N	N	N	N	S	N	N	SF	N	SF	N
4. Engine Hourmeter	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
5. Engine Oil Pressure Gauge	S	S	S	S	N	N	S	S	N	N	S	S	N	N	S	S	S	S
6. Engine Oil Low-Pressure Warning Light	N	N	O	N	S	S	SF	N	S	S	O	N	S	S	SF	N	SF	N
7. Engine Coolant Temperature Gauge	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
8. Engine Coolant High-Temperature Warning Light	N	N	O	N	N	N	SF	N	N	N	O	N	N	N	SF	N	SF	N
9. Transmission Oil Temperature Gauge	N	N	N	N	N	N	SF	N	N	N	N	N	N	N	SF	N	SF	N
10. Transmission Oil High-Temperature Warning Light	S	S	O	N	S	S			O	N	O	N	S	S	SF	N	SF	N
11. Fuel Gauge	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
12. Air Cleaner Restriction Indicator	O	N	O	N	N	N	S	S	O	N	O	N	N	N	S	S	S	S
13. Hydraulic Filter Restriction Warning Light									O	N								
14. Key Ignition Switch	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
15. 12-Volt Electrical System	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
16. Instrument Panel Lights	N	N	N	N	N	N	SF	N	N	N	N	N	N	N	SF	N	SF	N
17. Individual Light Switches	O	S	O	N	N	N	SF	S(1)	O	N	O	N	N	N	SF	SF(1)	SF	S(1)
18. Directional Signals	N	N	N	N	N	N	SF	N	N	N	N	N	N	N	SF	N	SF	N
19. Flashing Warning Lights	O	N	O	N	N	N	SF	N	N	N	O	N	N	N	SF	N	SF	N
20. Front Travel Lights	N	N	O	N	N	N	SF	N	N	N	O	N	N	N	SF	N	SF	N
21. Front Flood Lights	O	S(1)	O	N	O	S	SF	S(1)	O	N	O	N	O	S	SF	S(1)	SF	S(1)
22. Rear Backup Lights	N	N	O	N	N	N	SF	N	O	N	N	O	N	N	SF	N	SF	N
23. Electrical Circuit Breakers	N	N	N	N	N	N			N	N	N	N	N	N	N	N	N	N
24. Electrical Fuses	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
25. Stop/Tail Light					O	S	SF	S(1)					O	S	SF	S(1)	SF	S(1)
26. Radiator Guard	S	S	S	S	S	S	S	S	SF	N	S	S	S	S	S	S	S	S
27. Spark-Arresting Muffler	O	N	O	N	S	S	S	S	O	N	N	N	S	S	S	S	S	S
28. Seat Belt	N	N	N	N	N	N	SF	N	SF	N	N	N	N	N	SF	N	SF	N
29. Horn	S	S	S	S	S	S	S	S	N	N	S	S	S	S	S	S	S	S
30. Protecto Seal Fuel Filler Cap.	S	S	S	S	N	N	S	S	S	S	S	S	N	N	S	S	S	S

Table 2. Comparison of Standard Optional Features (Cont'd)

	6000-lb Cap. @ 180-in. Lift Height								4000-lb Cap. @ 144- and 180-in. Lift Heights						4000-lb Cap. @ 144-in. Lift Height		4000-lb Cap. @ 180-in. Lift Height	
	Clark		AC		Hyster		Towmotor		Clark		AC		Hyster		Towmotor		Towmotor	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
31. Fire Extinguisher	O	N	O	N	N	N	SF	N	SF	N	O	N	N	N	SF	N	SF	N
32. Closed Cab	O	N	O	N	N	N	SF	N	N	N	O	N	N	N	SF	N	SF	N
33. Neutral-Start Protective Switch	S	S	S	S	N	N	S	S	S	S	S	S	N	N	S	S	S	S
34. Starter Disconnect Switch	S	S	S	S	N	N		S	S	S	S	S	N	N	S	S	S	S
35. Spring Counterbalanced Hood			N	N	S	S	S	S	N	N	N		S	S	S	S	S	S
36. Positive Hood Hold-Open Device	N	N	S	S	N	N	NA	NA	S	S	S		N	N	NA	NA	NA	NA
37. Windshield Wiper(s)	O	N	O	N	N	N	N	SF	N	N	N		N	N	SF	N	SF	N
38. Cab Heater	O	N	O	N	N	N	SF	N	N	N	N		N	N	SF	N	SF	N
39. Cab Defroster	O	N	O	N	N	N	SF	N	N	N	N		N	N	SF	N	SF	N
40. Noise Control Provisions	S	S			N	N	NA	NA	N	N	N		N	N	NA	NA	NA	NA
	Tempatrol Fan Control		Asbestos Wrapped Muffler								Asbestos Wrapped Muffler							
41. Hydraulic Temp. Indicator Light													S	S				

NOTE: Number in ( ) denotes quantity furnished.

LEGEND:

Column I
- S – Standard
- O – Optional
- N – Not Available
- SF – Special Feature

Column II
- S – Will be supplied
- N – Will not be supplied

Table 3. Comparison of Technical/Automotive Characteristics of Commercial Forklift Trucks

	6000-lb Cap. @ 180-in. Lift Height				4000-lb Cap. @ 144-in. Lift Height	4000-lb Cap. @ 144- & 180-in. Lift Heights	4000-lb Cap. @ 144- & 180-in. Lift Heights	4000-lb Cap. @ 144-in. Lift Height	4000-lb Cap. @ 180-in. Lift Height
	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
Manufacturer	Clark	AC	Hyster	Towmotor	Clark	AC	Hyster	Towmotor	Towmotor
Model No.	C500-Y70	ACP70	H70C	V60B	C300-40	ACC45-B	S550C	T45B	T50B
Date Model Marketed	1970	DNF	DNF	1972	1974	1975	1967	1972	1972
Engine Manufacturer	Continental	Continental	Continental	Continental	Continental	Continental	Continental	Continental	Cont.
Model	F245	F245	F227	F277	F163	F163	F163	F163	F163
Type	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
No. of Cylinders	6	6	6	6	4	4	4	4	4
Bore (In.)	3.4375	3.4375	3.31	3.88	3.44	3.44	3.44	3.44	3.44
Stroke (In.)	4.375	4.375	4.38	5.0	4.38	3.38	4.38	4.38	4.38
Total Displacement (Cu.In.)	244	244	226	226	162	162	162	162.8	162.8
Compression Ratio	7.5:1	7.2:1	7.5:1	7.3:1	7.5:1	7.5:1	7.5:1	7.5:1	7.5:1
Max. Gov. HP @ ---RPM	65@2200	76@2400	80@2600	DNF	40@2350	56@2400	47@2200	62@2700	62@2700
Max. Torque (Lb. Ft.)@ ---RPM	194@1400	184@1400	184@1600	170@1800	105.4@1400	135@1400	133@1400	136@1800	136@1800
Conform to California Code	DNF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gov. Engine Speed---RPM	2400	2600	DNF	2700	2350	2400	2200	2700	2700
Governor Manufacturer	Continental	Hoof	TCM	TCM	TCM	TCM	TCM	TCM	TCM
Type	Mech.Ball	Velocity	Mech.	Centrif.	Fly Ball	Gear-Fixed	Mech.	Centrif.	Centrif.
Air Cleaner Manufacturer	Donaldson	Donaldson	United	United	Fram	Donaldson	Baldwin	United	United
Model	Dry Type	FWG	DNF	106	Dry Cart.	Cyclopac	DNF	105	105
Restriction Indicator	Not. Std.	Optional	None	Yes	None	Not Std.	DNF	Yes	Yes
Mounting Location	N/A	On Air Filter	N/A	Air Cleaner	N/A	N/A	N/A	Air Clean Outlet	Air Clean Outlet
Fuel Pump Manufacturer	AC	AC	Airtex	AC Div GM	Airtex	Airtex	Airtex	AC Div GM	AC Div-GM
Fuel Filters Manufacturer	AC	Tillotson	Carter	Zenith	AC	Tillotson	Carter	Zenith	Zenith
Location	Part of Fuel Pump	On fuel Pump	Next to Fuel Tank	Carb. Mtd.	Between Tank & Pump	Mtd. Off Fuel Pump	Next to Fuel Tank	Fuel Pump	Fuel Pump
Carburator Manufacturer	Zenith	Holley	Bendix-Zenith	Bendix	Marvel	Marvel	Bendix-Zenith	Holley	Holly
Type	Updraft	Down Draft	DNF	Updraft	Updraft	Updraft	DNF	Down Draft	Down Draft
Conform to ANSI B56.4	DNF	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Choke Actuation	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual
Crankcase Vent. System Mfgr.	Continental	Continental	None	AC Div GM	TCM	TCM	None	AC Div GM	AC Div-GM
Type	Draft Tube	Orfice Control	NA	Closed Circuit	Open Sys.	Orfice Control	N/A	Closed Circuit	Closed Circuit
Spark Plugs Manufacturer	Champion	Autolite	Champion	Prestolite	Champion	Champion	Champion	Prestolite	Prestolite

	Clark	AC	Hyster	Towmotor	Clark	AC	Hyster	Towmotor	Towmotor
Type	Non-Resist.	18.8	DNF	Non-Resist. 18.mm	Non-Resist.	Resistor		Non-Resist.	Non-Resist.
Ignition Wires Mfgr.	Auto Lite	London Harness	Delco-Pack	Packard	London Coil	London Harness	Delco-Pack	Packard	Packard
Type	7MM High Tension Cable	Radio Supp.	Resistance	TVRS	Non-Radio Supp.	Radio Supp.	Resistance	TVRS	TVRS
Resistance per foot (rated)	NA	6K to 10K ohms	3K to 7K ohms	13K1eter ohms	NA	3K to 10K ohms	3K to 7K ohms	13K/ohms	13K/ohms
Distributor Mfgr.	Prestolite	Prestolite	Delco-Remy	Prestolite	Prestolite	Prestolite	Delco-Remy	Prestolite	Prestolite
Ignition Coil Mfgr.	Delco-Remy	Delco-Remy	Gen.Mtrs.	Prestolite	Delco-Remy	Delco-Remy	Gen. Mtrs.	Prestolite	Prestolite
Muffler Mfgr.	Nelson	Nelson	Nelson	Nelson	Nelson	Nelson	Nelson	Nelson	Nelson
Type	Multi-pass	Std. automatic	DNF	Baffled	Tube & Baffle	Int. Baffle	DNF	Baffled-2 pass	Baffled-2 pass
Cooling System Type	Water	Water	Water	Water-Press.	Liquid	Water	Water-Press.	Liquid-Press	Liq-Press
Capacity	15 qts.	14 qts.	16 qts.	16 qts.	11.5 qts.	9 qts.	10 qts.	11 qts.	11 qts.
Type Antifreeze	Perm.	Perm.	Perm.	Perm.	Perm.	Perm.	Perm.	Perm.	Perm.
Radiator Mfgr.	Modine	Chromalloy	Modine	McCord	Long	Gen.Rad.Div.	Modine	Long Gen.	Long Gen.
Type	Fin & Tube	Fin & Tube	Canted Tube	Tube & Fin	Core & Fin	Tube & Fin	Canted Tube	Tube & Fin	Tube& Fin
Capacity	DNF	6.5 qts.	DNF	DNF	DNF	4 qts.	DNF	DNF	DNF
Water Pump Mfgr.	TCM	TCM	TCM	TCM	TCM	TCM	TCM	TCM	TCM
Capacity GPM @ RPM	48 @ 3000	46 @ 2400	Not given	76 @ 2700	34 @ 2500	46 @ 2400		76@ 2700	76@ 2700
Thermostat Mfg.	Harrison Rad.	Continental (Opt.)	Eaton	Robt.Shaw	Harrison Rad.	TCM	Eaton	Robert Shaw	Robert Shaw
Temp. Range (Open & Closed)F°	176-183/202	Open @180°F	167-182°F	167-182°F	175-202°F	180°F	167-182°F	178-200°F	178-200°F
Fan Belt Mfgr.	Gates	Dayco	Gates	Towmotor	Dayco	Dayco	Gates	Gates	Gates
Type	Auto V-Belt	"V"	DNF	Poly Neoprene	V Belt Auto	V Belt Auto	DNF	DNF	DNF
Alternator Belt Mfgr.	Gates	Dayco	Gates	Towmotor	Dayco	Dayco	Gates	Gates	Gates
Type	"	"	"	"	"	"		"	"
Engine Lub. Sys.Type Cyl. Lub.	Spray	Spray	Splash	Spray	Splash & Pressure	Splash	Splash	Splash	Splash
Type Main Bearing Lub.	Full Press.	Pressure	Pressure	Pressure	Pressure	Full Press.	Pressure	Full. Press.	Full.Press
Operating Pressure At Max.Speed	20-30 PSI	30 PSI	30 PSI	30 PSI	30-40 PSI	30-40 PSI	50 PSI	30 PSI	30 PSI
Operating Pressure At Idle "	7 PSI	7 PSI	20 PSI	5 PSI	7 PSI	7 PSI	10 PSI	5 PSI	5 PSI
Capacity	6 qts.	5 qts.	7 qts.	6 qts.	4 qts.	4.5 qts.	4 qts.	5 qts.	5 qts.

	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
Oil Type	Dexron Auto.	Dexron ATF	DNF	NA	Dexron Auto	ATF-Type A	DNF	NA	NA
Oil Capacity (qts.)	DNF	1	DNF	NA	15	11	DNF	NA	NA
Transmission Mfgr.	Clark	Warner Gear	Hyster	Towmotor	Clark	Warner Gear	Hyster	Towmotor	Towmotor
Type	Hydratork	Constant Mesh	Two Speed	Hydrostatic	Hydratork	Constant Mesh	Powershift	Hydrostatic	Hydro-static
No. of Speeds Fwd/Rev	2/2	2/2	2/2	Inf/Inf	1/1	1/1	1/1	Inf/Inf	Inf/Inf
Oil Capacity (qts.)	15	10	12	13	15	11	12	13	13
Oil Type	Dexron Auto.	Dexron ATF	Dexron	Type F Auto	Dexron	ATF	Dexron	Type F Auto	Type F
Type Oil Cooling	Radiator	Radiator	Water To Oil	Air to Oil	Radiator	Radiator	Water over oil	Water to Oil	Water to Oil
Trnasmission Inching	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transmission Disconnect	No	No	No	Yes	Yes	Neutral or Remove Floor Shift	No	Yes	Yes
Filter Element(s) Mfg.	Fram-Pero.	Fram	AC Div GM	Gresen	Fram-Pero.	AC	Fram	UCC Int.Ltd.	UCC Int.
Location	Eng.Compart.	Veh.Frame	Side of Trans.	Frame Mtd.	Eng. Mtd.	Under Seat Deck	L. H. Cyl. Head	Frame Mtd.	Frame Mtd.
Filtration Range (Micron)	10-15	10	25	10	10-15	15		10	10
Drive or Propeller Shafts Mfg.	NA	Borg-Warner	GKN Birfield	Borg-Warner	NA	Borg-Warner	NA	Mechanics	Mechanics
Type	NA	Two Joint Outbd.	Inboard Slide Dbl Cardan	Cardan Non-Constant Vel	NA	Two-Joint Outbd. Slip	NA	Cardan Non-Constant Vel.	Cardan Non Const.Vel
Universal Joints (No. & Type)	NA	Two Cardan	Joint	Two Cardan	NA	2 Cardan Mech	NA	2 Cardan Type	2 Cardan
Front Axle Mfgr.	Clark	AC	Rockwell	Towmotor	Clark	AC	Rockwell	Towmotor	Towmotor
Driven	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type	DNF	Full Floating	Full Floating	Full Floating	DNF	Dbl. Reduction	Multiple Pinion Full Floating	Full Floating	Full Floating
Type Suspension	Rigid	Rigid	DNF	Rigid	Rigid	Rigid	Rigid	Rigid	Frigid
Rear Axle Mfgr.	Clark	AC	Hyster	Towmotor	Clark	AC	Hyster	Towmotor	Towmotor
Driven	No	No	No	No	No	No	No	No	No
Type	Steer Axle	Steer Axle	Steer Axle	Steer Axle	Rigid	Oscillating		NA	NA
Type Suspension	Silent Block	Center Pivot	Unsprung Center Pivot	Sprung	DNF	Oscillating	Unsprung Center Pivot	Sprung	Sprung
Front Wheel Mfgr.	Budd	Goodyear	Multiple Source	Bearcat	Clark	AC	Mult. source	Towmotor	Towmotor
Tire Size	8.25 X 15	8.25 X 15	8.25 X 15	8.15 X 15	18 X 8 X 12.125	18 X 9 X 12.125	18 X 9 X 12	18 X 7 X 12 1/8	18 X 7 X 12 1/8
Ply Rating	12	12	12	12	NA	NA	NA	NA	NA

	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
No. Tires per Axle	2	2	2	2	2	2	2	2	2
Wheel Loading (Unloaded) Lbs.	3227	2781	2750	2470	1760	1540	1760/1850	2050	2050
Wheel Loading (Loaded) Lbs.	8249	8185	7900	7479	5180	5185	5365/5455	5704	5704
Rear Wheel Mfg.	Bearcat	Geneva	Multiple Source	Geneva	Clark	AC	Multiple Source	Towmotor	Towmotor
Tire Size	7.00 X12	7.50 X 10	7.00 X 12	6.50 X 10	18 X 5 X 12.12	16.25 X 5 X 11.25	16 X 6 X 10.5	16 X 45 X 10.5	16 X 45 X 10.5
Ply Rating	12	10	12	10	NA	NA	NA	NA	NA
No. Tires per Axle	2	2	2	2	2	2	2	2	2
Wheel Loading (Unloaded) Lbs.	3117	3512	3300	2723	2000	2420	2400/2390	2391	2391
Steering System Type	Power	Power	Power	Power	Power	Power	Power	Power	Power
Seperate Power Steering Pump	Yes	Yes	Yes	Yes	No	No	No	No	No
Pump Mfgr.	Vickers	Webster	Vickers	Eaton	Vickers	Tyrone Hyd.	NA	NA	NA
Max. Sys. Press. (PSI)	1750	1500	1000	925	1250	1000	1200	1000	1000
Steering Wheel Dia. (In)	17	17	17	15	15	17	17	15	15
No. Turns to Lock	4.6	3.5	3.25	3.5	4.5	3.5	3.5	4	4
Braking System Mfgr.	Goodyear	Bendix	Wagner	Bendix	Clark	AC	Rockwell	Rockwell	Rockwell
Front Brakes	Disc	Drum	Drum	Drum	Drum	Drum	Drum	Drum	Drum
Lining	Rivited	Bonded	DNF	No Fill In	Bonded	Bonded	Bonded	Bonded	Bonded
Length (In)	8.38	12.5	DNF	11.12	8.0	9.71	9.5 sq.in.	11.5	11.5
Width (In)	4.38	2.25	2.5	2.25	3.0	1.75	2.25	1.50	1.50
Thickness (In)	DNF	.375	DNF	.31	.260	.25	.25	.25	.25
Type Adjustment	Self Adj.	Manual	Self Adj.	Self Adj.	Manual	Self Adj.	Manual	Self adj.	Self.adj.
Power Assisted	Yes	No	No	No	No	No	No	No	No
Method of Actuation	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Rear Brakes	None	None	None	None	None	None	None	None	None
Master Brake Valve Mfgr.	Wagner	Bendix	Minnesota	Wagner	Wagner	Wagner	Minnesota	Wagner	Wagner
Parking Brake Mfgr.	Bendix	Bendix	Orscheln	Kelsey Hayes	Orscheln	AC	Orschelin	Kelsey Hayes	Kelsey H.
Type	Band	Shoe	Shoe	Mech. Cal. Disc	Band	Exp. Shoe	Friction	Mech.Cal. Disc	Mech. Cal. Disc
Type of Actuation	Lever	Lever	Lever	Lever	Lever	Lever	Lever	Lever	Lever
Locking Device	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Location of Brake	Trans. Drive Shaft	Drive Shaft	Wheels	Drive Shaft	Transmission	Diff.Shaft	Transmission	Drive Shaft	Drive Shaft
Directional Control Actuation	Left Hand	Left Hand	Left Hand	Left Foot	Left Hand	Left Hand	Right Foot	Left Foot	Left Foot
Location	Steer Col.	Steer Col.	Steer Col.	Floor	Steer Col.	Steer Col.	Floor	Floor	Floor
Lift Control Actuation	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand
Location	Steer Col.	Rt. of Drivers Seat	Off Drivers Rt. Hand	Dash	Cowl	Rt. Side Cowl Frt.	Oprs. Rt. Hand	Dash	Dash

	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
Oil Filter Mfgr.	Purolator	AC (Opt.)	Fram	Purolator	Fram-Puro.	AC	Fram	Purolator	Purolator
Type	Bypass	Partial Flow	Partial Flow	Partial Flow	Partial Flow	Partial Flow	Partial Flow	Partial Flow	Partial
Filtration Range (Micron)	Nom. 10	Nom. 10	DNF	10	DNF	10	DNF	10	10
Battery Mfgr.	Prestolite	Elec. Stor. Btty. Co.	Delco-Remy	Gould	Prestolite	Elec. Stor.	Delco-Remy	Gould	Gould
Ground	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Conform to SAE J537	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hold-Downs Furnished	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hold-Downs & Incl. Acid Resist.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Alternator Mfgr.	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-R.
Rated Output AMPS @ RPM	37 @ 6000	37 @ 6000	32 @ DNF	37 @ 5000	37 @ 7500	37 @ 6500	DNF@ 2400	37 @ 5000	37@ 5000
Ground	Neg.	Neg.	DNF	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Waterproofing	No	No	No	Opt.	None	No	DNF	Opt.	Opt.
Fungus Proofing	No	Inherently Resistant	No	Opt.	None	Inherently Resistant	DNF	Opt.	Opt.
RPM at No-Load Gov. Speed	7320	6942	5800	5025	6195	6410	4790	5035	5035
Voltage Reg. Mfgr.	None	Delco-Remy	GM	Delco-Remy	Delco-Remy	Integral With Alter.	Delco-Remy	Delco-Remy	Delco Remy
Type	In Alt.	Integral w/ Alternator	Seperate	Solid State Int.	Integral	Alternator	Seperate	Integral	Integral
Starter Motor Mfgr.	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-R.
Type	Wet Clutch	Encl. Shift Lever	DNF	10 MT 100	Enclosed	DNF	DNF	10 MT 100	10 MT 100
Fan Mfgr.	Ser. Prod. Corp.	Ser. Prod. Corp.	Schwitzer	Schwitzer	Ser. Prod.	Ser. Prod. Corp.	Hyster	Schwitzer	Schwitzer
Type	Blower	Blower	Pusher	Blower	Blower	Blower	Suction	Blower	Blower
Dia./No. of Blades/Pitch	19/5/32°30'	17/6/30°	17.5/5/	15/6/30°	15.5/6/40°	16/6/30°	16/5/20°	15/6/30°	15/6/30
Viscous Drive	Yes	No	No	Optional	Yes	Non. Std.	No	Optional	Optional
Fuel Tank Mfgr.	Part of Frame	AC	Hyster	Towmotor	Clark	AC	Hyster	Towmotor	Towmotor
Capacity (gals.)	16.2	15	12.8	9.3	8.6	6.5	8.0	8.0	8.0
Shut-Off Valve	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes
Engine Operate on Lead-Free Gasoline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Torque Converter Mfg.	Borg & Beck	Borg & Beck	Borg & Beck	NA	Long	Borg & Beck	Borg & Beck	NA	NA
Size No.	L-11	L-11	DNF	NA	11.0"	S-11TC	DNF	NA	N/A
Max. Input Torque LB.FT. RPM	160@1460	164@1500	DNF	NA	90	116@1400	DNF	NA	N/A
Input Torque Rating Lb.Ft. PRM	250@1460	250	DNF	NA	2.5	250@5500	DNF	NA	N/A
Torque Convert. Stall Speed RPM	1460	1500	1050	NA	1424	1640	1050	NA	N/A
Eng. Vac. @ Torque Conv Stall Speed	1 In HG.	DNF	DNF	NA	0-2.5	DNF	DNF	NA	N/A

	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
Tilt Control Actuation	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand
Location	Steering Col	Rt. Side	"	Dash	Rt. of Lift Col	Rt. of Lift Col	Rt. of Lift Col	Dash	Dash
Side Shift Control Actuation	Right Hand	Right Hand	Right Hand	NA	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand
Standard or Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Seat Conform to SAE J899	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Seat Covered W/Vinyl	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overall Length w/o Forks (In)	110.75	113.4	112.3	106	87.88	82.25	86.0	92.0	95.5
Overall Width Single Dr./Dual Dr.	49.93/68.43	53.0/DNF	54.3/DNF	47.5/DNF	38.0/DNF	40.0 /DNF	41.0/DNF	43.0/DNF	45.0/DNF
Overhead Guard Ht.	87.25	87.0	83.0	88	83.3	83.0	82.6	81.0	81.0
Collapsed Mast Ht.	90.5	87.69	92.0	85	71.0/83.0	67.25/79.25	70.0/82.0	68.0	80.0
Max. Fork Ht.	183	182.0	194.0	186	152.0/188.0	145.75/ 181.75	151.5/ 187.5	147	182
Free Lift Height	67.0	40.5	44.0	57	50.0/62.0	47.15/ 59.5	49.5/59.5	44	59
Wheel Base	69.0	65.0	65.0	66	53.0	50.0	51.0	52	56
Drive Tire Tread Width ℓ to ℓ	40.75	43.38	44.4	38.8	33.5	32.0	32.0	36	37
Steer Tire Tread Width ℓ to ℓ	42.62	41.0	42.5	34.62	32.0	31.5	34	33.5	33.5
Clearance of Drive Tires to Body	2.0	DNF	2.5	2.75	2.0	.5	1.0	1.0	1.0
Maximum Ground Clearance	5.0	6.25	5.0	5.5	3.0	3.25	3.5	3.0	3.0
Lifting Speed (Rated Load) FPM	66	74	70	75	60	87	63	84.0	84.0
Lowering Speed (Rated Load) FPM	60	70	110	105	67	70	95	105.0	105.0
Travel Speed W/Rated Load MPH	12.7	12	7.5/16.4	12	DNF	9.2	8.5	9.5	9.5
Forward Without Load-MPH	13.7	12	7.5/16.4	12	8.7	9.2	8.5	9.5	9.5
Rearward MPH	DNF	12	8.3/18.2	12	8.7	9.2	2.7	9.5	9.5
Slope Ascension W/Rated Load Fwd	30.8%	41.6%	35.0%	16.5%	21.9%	31.3%	25%	21.5%	20.5%
Without Load	28.5%	25.0%	25.0%	18-26%	22.7%	20.0%	17%	21.5/15.5%	23.0/ 16.5%
Stability Forward Stacking	5.25%	6.58%	8.0%	4.8%	7.0%	7.08%	8%/6%	6.4%	7.1%
Lateral Stacking	7.0%	7.49%	17.0%	7.4%	9.0%	9.17%	11%/9%	12.3%	10.4%
Forward Travel	18.5%	24.41%	30.0%	21.8%	29.4%	25.68%	23%/22%	23.9%	27.4%
Lateral Travel	48.5%	DNF	62.0%	61.4%	34.1%	40.00%	38%/38%	69.1%	68.9%
Noise Level-No Load Gov. Speed (dB(A)	88-90	91	96	Max. dB(A) in any mode is 89	93	91	95 @ 2400 RPM	Max. dB(A) in any mode is 89	Max. dB(A in any mode is 89
At Torque Convert. Stall	88-90	83	DNF		84	83	DNF		
Lifting Rated Load @ Max. Speed	88-90	Not avail.	98		83	Not Avail.	95 @ 2400 RPM		

	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
Hydraulic System Reservoir Cap	15 gals.	11.3 gals.	12.5 gals.	24 qts.	6.3 gals.	5.0 gals.	7.0 gals.	5.0 gals.	24 qts.
Oil Level Indicator	Dipstick	Dipstick	Dipstick	Dipstick	Dipstick	Dipstick	Dipstick	Dipstick	Dipstick
Filter(s) Location	Inside Sump Tank	DNF	In Hyd. Tank	Return	Suction	DNF	Return	Return	Return
Type Filter	Suction	Return	Suction	DNF	DNF	Return	DNF	DNF	DNF
In accordance with ANSI B93.31	No	Yes	No	No	No	Yes	No	No	No
Replacement Indicator	No	Opt.	No	Opt.	No	No	Yes	Opt.	Opt.
Hydraulic Pump Mfgr.	Vickers	Webster	Warner	Warner	Vickers	Tryone Hyd.	Vickers	Borg-Warner	Borg-Warn
Type	Vane	Gear	Vane	Gear	Vane	Gear	Vane	Gear	Gear
Capacity-GPM-PSI @ RPM	26-100-2400	22.8-2000-2600	30-1500-2600	17.7-100-2000	18-100-2350	24-0-2400	18-2050-2400	17.7-100-2000	23.7-100-2000
Relief Valve Mfgr.	Vickers	Gresen	Control	Hannifin	Vickers	Vickers	Parker	Hyd. Unit Spec.	Hyd.Unit Spec.
Relief Valve Setting-PSI	2000	1950	1875	1900	2000	1900	2050	2100	2300
Hydraulic Cylinders Mfg.	Clark	Cascade/AC	Cascade	Towmotor	Clark	AC	Cascade	Towmotor	Towmotor
Piston Shaft Corrosion Plated	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tilt Anti-Cavitation Sys. Mfg.	Clark	DNF	Hyster	Hannifin	Clark	AC	Hyster	Hyd.Unit Spec	Hyd. Uni
Type	Counter Bal.	Cyl.Make Up Circuit	Over Center	Ctr. Bal Valve	Ctr. Balance	Check Valve	Over Center	Ctr. Bal. Valve	Ctr. Bal. Valve
Load Lowering Control Mfgr.	Fluid Control	Vonberg Valve	Hyster	Waterman Hyd.	Fluid Control	Vonberg Valve	Hyster	Waterman	Waterman
Do Hoses Conform to SAE J517	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mast Roller Type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rollers Permanently Lubricated	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type Bearings	Ball	Ball	Roller	Ball	Ball	Ball	Roller	Ball	Ball
Type Chains Used	Rollerless	Rollerless	Leaf	Leaf	Leaf	Rollerless	Leaf	Leaf	Leaf
Fork & Fork Carriers Conform to ANSI B56.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fork Carrier Bearings Perm. Lubricated	Yes	Yes	Yes	Yes	N/A	Yes	Yes	Yes	Yes
Type Bearings	Ball	Ball	Roller	DNF	N/A	Ball	Roller	Ball	Ball
Forks Slide Entire Width of Carrier	Yes	Yes	Yes	Yes	Yes	Yes	Not with sideshift	Yes	Yes
Forks Removable w/o Removing Backrest	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Fork Length (In.)	42	40	42	42	42	42	As reqd.	42.0	42.0
Fork Width (In.)	6.0	6.0	5.0	5.0	5.0	4	5.0	5.0	5.0
Backrest Ht . Above Forks (In)	48	48	47.8	48	48	48	49.2	48.0	48.0
Backrest Width (In.)	51	48	49.2	47.25	38	38	38.8	39.38	39.38

	CLARK	AC	HYSTER	TOWMOTOR	CLARK	AC	HYSTER	TOWMOTOR	TOWMOTOR
Protruding Bolts Beyond Side Plane	No	No	Yes	No	No	No	Yes	No	No
Side Shifter	Optional	DNF	NA	NA	Yes	Yes	Yes	Yes	Yes
Travel Left Side of Center (IN)	4	4	NA	NA	4.0	4.0	4.0	4.0	4.0
Travel Rt. Side of Center (In.)	4	4	NA	NA	4.0	4.0	4.0	4.0	4.0
Side Shifter Integral or Added On	Integral	Integral	NA	NA	Integral	Integral	Integral	Integral	Integral
Side Shifter Mfg	Clark	AC	NA	NA	Clark	AC	Hyster	Towmotor	Towmotor
Side Shift Carriage Width (In)	41-49-61	48	NA	NA	37	38.0	38.0	38.0	38.0
Type Bearings	Anti-Friction	Ball	NA	NA	Anti-Friction	Ball	Roller	Steel Backed Bronze Bush.	Steel Back-Bronze Bush
Bearings Perm. Lub.	Yes	Yes	NA	NA	Yes	Yes	Yes	No	No
Engine Mounted on Elastomer Shock Mount	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non-slip walkway Coating Furnished	Yes	Yes	Floor Plates	Yes	Yes	Yes	Floor Plates	Yes	Yes
Operator's Manual Furnished	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maint. Manual Furnished	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Rebuild Manual Furnished	Optional	No	No	Yes	Optional	No	No	Yes	Yes
Repair Parts Manual Furnished	Optional	Yes	Yes	Yes	Optional	Yes	Yes	Yes	Yes
Lub. Manual Furnished	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Training Aids Manual	Optional	No	No	No	Optional	No	No	No	No
System of Updating & Rev. to Manuals	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Preservation & Pkg. for overseas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Comm. Method for Indef. Storage	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Tiedown Provisions	DNF	Yes(3)	Opt(SF)	Yes	DNF	Yes(3)	Spec. Feature	4	4
Lifting Provisions	DNF	None	Opt(4)	Yes	DNF	None	4 std. opt.	4	4
Conform to MIL-STD-209	No	NA	No	No(SF)	NA	NA	DNF	DNF	DNF

Legend: DNF – Did Not Furnish.

APPENDIX A

BASELINE ITEM DESCRIPTIONS FOR THE FORKLIFT TRUCKS

A-1. Item Description for Forklift Truck, Warehouse, 4000-Lb-Capacity, Gasoline-Engine-Driven, Solid-Rubber Tires, 144-Inch Fork Height

A-2 Item Description for Forklift Truck, Warehouse, 4000-Lb-Capacity, Gasoline-Engine-Driven, Solid-Rubber Tires, 180-Inch Fork Height

A-3 Item Description for Forklift Truck, Warehouse, 6000-Lb-Capacity, Gasoline-Engine-Driven, Pneumatic Tires, 180-Inch Fork Height

A-1. ITEM DESCRIPTION FOR FORKLIFT TRUCK, WAREHOUSE, 4000-LB-CAPACITY, GASOLINE-ENGINE-DRIVEN, SOLID-RUBBER-TIRES, 144-INCH FORK HEIGHT

1. **Scope.** This description covers a commercial model warehouse, sit-down rider, counterbalanced forklift truck equipped with a gasoline engine, with a powershift or hydrostatic transmission with a triple-stage roller mast including 4 inches of sideshift each side of center with power steering and with solid-rubber tires. The forklift shall be the latest model of the standard commercial product of the supplier and shall have been in production, marketed, and in use for a minimum of one year prior to the Step I technical proposal opening date. The introduction of normal product improvement changes in this one-year period is acceptable.

2. **Requirements.**

2.1 **General.** The warehouse forklift truck shall be equipped with standard instruments, components, and accessories normally required for the safe and effective operation of the truck. The truck shall be complete with all components that are standard with the supplier's products, whether stipulated herein or not, together with such accessories as may be specified herein. The truck shall be equipped with all other components and parts not specifically mentioned but necessary to provide a functional machine and shall conform in quality to that normally provided to the commercial industry.

2.2 **Operating Temperature.** The truck shall start without preheating and shall be designed for operation in any ambient from 0°F to plus 110° F.

2.3 **Safety.** The truck shall conform to the requirements of ANSI B 56.4, Type G and ANSI B 56.1.

2.4 **Load Capacity.** The forklift truck shall have a rated capacity of 4,000 pounds at 24-inch load center when the forks are raised to maximum fork height.

2.5 **Fork Height.** The forklift truck shall have a fork height of not less than 144 inches when measured from the ground to the top surface of the forks, with the upright in true vertical position and rated load on the forks.

2.6 **Collapsed Mast Height.** The forklift truck shall have a collapsed mast height of not more than 68 inches above ground measured with the upright in true vertical.

2.7 **Overall Height.** The forklift truck shall have an overall height including overhead guard of not more than 83 inches when the lift mechanism is in the fully lowered position.

2.8 Free Lift Height. The forklift truck shall be capable of raising the forks a minimum of 42 inches without any portion of the mast exceeding 68 inches.

2.9 Slope Ascension. With and without rated load, the forklift truck shall be capable of ascending a 20% grade on a dry concrete surface.

2.10 Forks and Fork Carrier. The forks shall be a minimum of 40 inches long. The forks and fork carrier shall conform to ANSI MH 11.4. The fork carrier shall be a minimum of 32 inches wide and shall be free of obstructions to allow the forks to slide across the entire width of the carrier.

2.11 Load Backrest. The truck shall be equipped with a load backrest, flush with the forward vertical surface of the forks, and shall be at least equal to the width of the carriage and at least 48 inches above the load-carrying surface of the forks. There shall be no protruding bolts or appendages beyond the side plane of the load backrest.

2.12 Right-Angle Turn Dimension. The right-angle turn dimension shall be a maximum of 150 inches when carrying rated load on a 48 in. x 48 in. load base.

2.13 Travel Speed. The truck shall be capable of attaining 8-mph minimum speed while carrying rated load.

2.14 Lifting Speed. Speed of lift with rated load shall be not less than 60 feet per minute.

2.15 Upright Tilt. Upright tilt shall be a minimum 2° forward and a minimum 6° rearward without load. Anticavitation means shall be furnished in the hydraulic tilt system.

2.16 Electrical System. The forklift truck shall be equipped with an automatic starter disconnect and a neutral-start interlock.

2.17 Instruments. The forklift shall be furnished with the following instruments:

a. Hour meter.
b. Ammeter, voltmeter, or red alternator indicator light.
c. Fuel gauge.
d. Engine oil pressure gauge or warning light.
e. Engine coolant temperature gauge or warning light.

2.18 Lights. The forklift shall be furnished with the following lights:

a. One adjustable sealed-beam floodlamp.
b. One automotive, red, reflector-type, combination stop-and-tail light.

A-2. ITEM DESCRIPTION FOR FORKLIFT TRUCK, WAREHOUSE, 4000-LB-CAPACITY, GASOLINE-ENGINE-DRIVEN, SOLID-RUBBER TIRES, 180-INCH FORK HEIGHT

1. **Scope.** This description covers a commercial model warehouse, sit-down rider, counterbalanced forklift truck, equipped with a gasoline engine, with a powershift or hydrostatic transmission with a triple-stage roller mast including 4 inches of sideshift each side of center with power steering and with solid-rubber tires. The forklift shall be the latest model of the standard commercial product of the supplier and shall have been in production, marketed, and in use for a minimum of one year prior to the Step I technical proposal opening date. The introduction of normal product improvement changes in this one-year period is acceptable.

2. **Requirements.**

2.1 **General.** The warehouse forklift truck shall be equipped with standard instruments, components, and accessories normally required for the safe and effective operation of the truck. The truck shall be complete with all components that are standard with the supplier's products, whether stipulated herein or not, together with such accessories as may be specified herein. The truck shall be equipped with all other components and parts not specifically mentioned but necessary to provide a functional machine and shall conform in quality to that normally provided to the commercial industry.

2.2 **Operating Temperature.** The truck shall start without preheating and shall be designed for operation in any ambient from 0° to plus 100°F.

2.3 **Safety.** The truck shall conform to the requirements of ANSI B 56.4, Type G and ANSI B 56.1.

2.4 **Load Capacity.** The forklift truck shall have a rated capacity of 4,000 pounds at 24-inch load center when the forks are raised to maximum fork height.

2.5 **Fork Height.** The forklift truck shall have a fork height of not less than 180 inches when measured from the ground to the top surface of the forks, with the upright in true vertical position and rated load on the forks.

2.6 **Collapsed Mast Height.** The forklift truck shall have a collapsed mast height of not more than 83 inches above ground measured with the upright in true vertical.

2.7 **Overall Height.** The forklift truck shall have an overall height including overhead guard of not more than 83 inches when the lift mechanism is in the fully lowered position.

2.8 Free Lift Height. The forklift truck shall be capable of raising the forks a minimum of 57 inches without any portion of the mast exceeding 83 inches.

2.9 Slope Ascension. With and without rated load, the forklift truck shall be capable of ascending a 20% grade on a dry concrete surface.

2.10 Forks and Fork Carrier. The forks shall be a minimum of 40 inches long. The forks and fork carrier shall conform to ANSI MH 11.4. The fork carrier shall be a minimum of 32 inches wide and shall be free of obstructions to allow the forks to slide across the entire width of the carrier.

2.11 Load Backrest. The truck shall be equipped with a load backrest, flush with the forward vertical surface of the forks, and shall be at least equal to the width of the carriage and at least 48 inches above the load-carrying surface of the forks. There shall be no protruding bolts or appendages beyond the side plane of the load backrest.

2.12 Right-Angle Turn Dimension. The right-angle turn dimension shall be a maximum of 150 inches when carrying rated load on a 48 in. x 48 in. load base.

2.13 Travel Speed. The truck shall be capable of attaining 8-mph minimum speed while carrying rated load.

2.14 Lifting Speed. Speed of lift with rated load shall be not less than 60 feet per minute.

2.15 Upright Tilt. Upright tilt shall be a minimum 2° forward and a minimum 6° rearward without load. Anticavitation means shall be furnished in the hydraulic tilt system.

2.16 Electrical System. The forklift truck shall be equipped with an automatic starter disconnect and a neutral-start interlock.

2.17 Instruments. The forklift shall be furnished with the following instruments:

a. Hour meter.
b. Ammeter, voltmeter, or red alternator indicator light.
c. Fuel gauge.
d. Engine oil pressure gauge or warning light.
e. Engine coolant temperature gauge or warning light.

2.18 Lights. The forklift shall be furnished with the following lights:

a. One adjustable sealed-beam floodlamp.
b. One automotive, red, reflector-type, combination stop-and-tail light.

A-3. ITEM DESCRIPTION FOR FORKLIFT TRUCK, WAREHOUSE, 6000-LB-CAPACITY, GASOLINE-ENGINE-DRIVEN, PNEUMATIC TIRES, 180-INCH FORK HEIGHT

1. **Scope.** This description covers a commercial model warehouse, sit-down rider counterbalanced forklift truck, equipped with a gasoline engine, with a powershift or hydrostatic transmission with a triple-stage roller mast with power steering and with pneumatic tires. The forklift shall be the latest model of the standard commercial product of the supplier and shall have been in production, marketed, and in use for a minimum of one year prior to the Step I technical proposal opening date. The introduction of normal product improvement changes in this one-year period is acceptable.

2. **Requirements.**

2.1 General. The warehouse forklift truck shall be equipped with standard instruments, components, and accessories normally required for the safe and effective operation of the truck. The truck shall be complete with all components that are standard with the supplier's products, whether stipulated herein or not, together with such accessories as may be specified herein. The truck shall be equipped with all other components and parts not specifically mentioned but necessary to provide a functional machine and shall conform in quality to that normally provided to the commercial industry.

2.2 Operating Temperature. The truck shall start without preheating and shall be designed for operation in any ambient from 0°F to plus 110°F.

2.3 Safety. The truck shall conform to the requirements of ANSI B 56.4, Type G and ANSI B 56.1.

2.4 Load Capacity. The forklift truck shall have a rated capacity of 6,000 pounds at 24-inch load center when the forks are raised to maximum fork height.

2.5 Fork Height. The forklift truck shall have a fork height of not less than 180 inches when measured from the ground to the top surface of the forks, with the upright in true vertical position and rated load on the forks.

2.6 Collapsed Mast Height. The forklift truck shall have a collapsed mast height of not more than 91 inches above ground measured with the upright in true vertical.

2.7 Overall Height. The forklift truck shall have an overall height including overhead guard of not more than 91 inches when the lift mechanism is in the fully lowered position.

2.8 Free Lift Height. The forklift truck shall be capable of raising the forks a minimum of 57 inches without any portion of the mast exceeding 91 inches.

2.9 Slope Ascension. With and without rated load, the forklift truck shall be capable of ascending a 20% grade on a dry concrete surface.

2.10 Forks and Fork Carrier. The forks shall be a minimum of 40 inches long. The forks and fork carrier shall conform to ANSI MH 11.4. The fork carrier shall be a minimum of 48 inches wide and shall be free of obstructions to allow the forks to slide across the entire width of the carrier.

2.11 Load Backrest. The truck shall be equipped with a load backrest, flush with the forward vertical surface of the forks, and shall be at least equal to the width of the carriage and at least 48 inches above the load-carrying surface of the forks. There shall be no protruding bolts or appendages beyond the side plane of the load backrest.

2.12 Right-Angle Turn Dimension. The right-angle turn dimension shall be a maximum of 196 inches when carrying rated load on a 48 in. x 48 in. load base.

2.13 Travel Speed. The truck shall be capable of attaining 12-mph minimum speed while carrying rated load.

2.14 Lifting Speed. Speed of lift with rated load shall be not less than 60 feet per minute.

2.15 Upright Tilt. Upright tilt shall be a minimum 2° forward and a minimum 6° rearward without load. Anticavitation means shall be furnished in the hydraulic tilt system.

2.16 Electrical System. The forklift truck shall be equipped with an automatic starter disconnect and a neutral-start interlock.

2.17 Instruments. The forklift shall be furnished with the following instruments:

a. Hour meter.
b. Ammeter, voltmeter, or red alternator indicator light.
c. Fuel gauge.
d. Engine oil pressure gauge or warning light.
e. Engine coolant temperature gauge or warning light.

2.18 Lights. The forklift shall be furnished with the following lights:

a. One adjustable sealed beam floodlamp.
b. One automotive, red, reflector-type, combination stop-and-tail light.

APPENDIX B

TECHNICAL INFORMATION PACKAGE FOR TRUCKS, LIFT, FORK, GASOLINE-ENGINE-DRIVEN 4000- TO 6000-POUND-CAPACITY

PREFACE TO THE TECHNICAL INFORMATION PACKAGE

1. **Purpose**: The purpose of this Technical Information Package is to provide a referance document suitable for evaluation of Commercial Material Handling Equipment.

2. **Application.** This Technical Information Package will be utilized in the evaluation of the technical characteristics of commercial material handling equipment which is being considered as replacement for commercial modified equipment used by the Army.

3. **Instructions:**

a. Only one specific make and model shall be entered in any one Technical Information Package.

b. The offerer shall include two copies of the current commercial specification data sheets affixed behind the front cover of this Technical Information Package.

c. Two 8 x 10 glossy photographs of the manufacturer's candidate item shall be affixed behind the front cover of this Technical Information Package.

d. All data in this Technical Information Package shall apply to the manufacturer's candidate item equipped as proposed by the contractor to meet the requirements of the Item Description.

DATE_____

MANUFACTURER_____

MAKE_____

MODEL_____

EVALUATORS:	MANUFACTURER'S REPRESENTATIVES:
NAME	NAME
ORGANIZATION	ORGANIZATION
NAME	NAME
ORGANIZATION	ORGANIZATION
NAME	NAME
ORGANIZATION	ORGANIZATION

MANUFACTURER'S REPRESENTATIVE SIGNATURE_____

TABLE OF CONTENTS

SECTION I.

SEPCIFICATIONS, GENERAL

1. MANUFACTURER_____
2. MODEL NUMBER AND NAME_____
3. COMPLETE NOMENCLATURE_____
   _____
   _____
4. DATE MODEL MARKETED_____

SECTION II.

SPECIFICATIONS, ENGINE AND ENGINE ACCESSORIES

1. MANUFACTURER_____
   Model_____
   Type_____
   Part Number_____
   End Item Manufacturer's Part No._____
2. NUMBER OF CYLINDERS_____
3. BORE (in.)_____
4. STROKE (in.)_____
5. TOTAL DISPLACEMENT (cu. In.)_____
6. COMPRESSION RATIO_____
7. GROSS HORSEPOWER_____at_____rpm
8. INTERMITTENT HORSEPOWER_____at_____rpm
9. CONTINUOUS HORSEPOWER_____at_____rpm
10. MAXIMUM GOVERNED HORSEPOWER_____at_____rpm
11. NET HORSEPOWER_____at_____rpm

Determined by manufacturer with all accessories necessary for engine to perform its intended function in accordance with SAE Standard J816.

12. MAXIMUM TORQUE (lb ft)_____at_____rpm
13. DOES ENGINE CONFORM TO THE CALIFORNIA CODE AS SET FORTH IN TITLE 8 OF THE CALIFORNIA ADMINISTRATIVE CODE_____
14. GOVERNED ENGINE SPEED (No Load)_____rpm
15. GOVERNOR
    - Manufacturer_____
    - Model_____
    - Type_____
    - Part Number_____
    - End Item Manufacturer's Part Number_____
16. AIR CLEANER
    - Manufacturer_____
    - Model_____
    - Part Number_____
    - End Item Manufacturer's Part Number_____
    - Restriction Indicator_____
      - Manufacturer_____
      - Model_____
      - Mounting Location_____
      - Type of Air Cleaner Hose Clamps Furnished_____
17. FUEL PUMP
    - Manufacturer_____
    - Part Number_____
    - End Item Manufacturer's Part Number_____
    - Does Fuel Pump Conform to ANSI B56.4_____
18. FUEL FILTERS
    - Manufacturer_____
    - Part Number_____
    - End Item Manufacturer's Part Number_____
    - Location_____

19. CARBURETOR

Manufacturer_____

Type_____

Part Number_____

End Item Manufacturer's Part Number_____

Do Carburetor and Associated Fuel Lines Conform to ANSI B56.4_____

_____

Choke Actuation_____Manual_____Automatic

20. CRANKCASE VENTILATION SYSTEM

Manufacturer_____

Model_____

Type_____

21. SPARK PLUGS

Manufacturer_____

Type_____

Part Number_____

22. IGNITION WIRES

Manufacturer_____

Type_____

Resistance per Foot (Rated)_____

23. DISTRIBUTOR

Manufacturer_____

Part Number_____

Type_____

24. IGNITION COIL

Manufacturer_____

Part Number_____

25. MUFFLER

Manufacturer_____

Part Number_____

Type_____

Do Muffler and Piping Conform to ANSI B56.4_____

26. COOLING SYSTEM

Type_____

Capacity (U.S. Gallons)_____

Pressure (Operating)_____psi

Type of Antifreeze Furnished_____

27. RADIATOR

Manufacturer_____

Model_____

Type_____

Part Number_____

End Item Manufacturer's Part Number_____

Capacity_____qt

Radiator Construction (Fin and tube, barrel and tube, etc.)_____

_____

Number of fins/in._____

Number of tubes_____

Core Length_____in. Core Width_____in. Core Thickness_____in.

28. WATER PUMP

Manufacturer_____

Part Number_____

Capacity_____gpm at_____rpm

29. THERMOSTAT

Manufacturer_____

Part Number_____

Temperature Range (Open and Closed)_____°F

30. FAN BELT

Manufacturer_____

Type_____

Part Number_____

31. ALTERNATOR BELT

Manufacturer_____

Type_____

Part Number_____

32. ENGINE LUBRICATION SYSTEM

Type Cylinder Lubrication_____

Type Main Bearing Lubrication_____

Operating Pressure_____

at Idle Speed_____psi

at Maximum Rated Speed_____psi

Capacity (qt)_____

33. OIL FILTER

Manufacturer _____

Type_____Full Flow (Bypass)_____Partial Flow

Part Number_____

End Item Manufacturer's Part Number_____

Filtration Range_____Micron

34. BATTERY

Manufacturer_____

Type_____

Model_____

Ground (positive or negative)_____

Battery Capacity_____

Does Battery conform to SAE J537_____

_____

Are battery hold-downs furnished (Yes or No)_____

Is battery hold-down and inclosure acid-resistant? (Yes or No)_____

35. ALTERNATOR

Manufacturer_____

Type_____

Model_____

Rated Output_____amps_____rpm

Ground (positive or negative)_____

Waterproofing_____

_____

Fungusproofing_____

_____

Protection against reverse polarity_____

Alternator rpm at Engine No-Load Governed Speed_____

36. VOLTAGE REGULATOR

Manufacturer_____

Type_____

Part Number_____

Location (integral or separate)_____

37. STARTER MOTOR

Manufacturer_____

Type_____

Part Number_____

38. FAN

Manufacturer_____

Type (Suction, blower)_____

Diameter_____in. No. of Blades_____Pitch_____

Part Number_____

Viscous Drive_____

39. FUEL TANK

Manufacturer_____

Capacity_____gal.

Does Fuel Tank Conform to ANSI B56.4_____

Does Fuel Tank Location Conform to ANSI B56.4_____

Is Tank Equipped with a Shut-Off Valve_____

40. Is engine designed to operate on lead-free gasoline?_____

SECTION III

SPECIFICATIONS, POWER TRAIN

1. TORQUE CONVERTER

Manufacturer_____

Part Number_____

Size_____

Maximum Input Torque_____(lb ft) at_____rpm

Input Torque Rating_____(lb ft) at_____rpm

Maximum Stall Torque Ratio_____

* Torque Converter Stall Speed_____rpm

*Engine Vacuum at Torque Converter Stall Speed_____in. hg

Oil Type_____

Oil Capacity (U.S. Qt)_____

*NOTE: Stall Speed for tractors is at rated DBP.

2. TRANSMISSION

Manufacturer_____

Model_____

Type_____

No. of Speeds_____fwd_____rev

Oil Capacity (qt)_____

Oil Type_____

Type Oil Cooling_____

Transmission Inching Provided_____

Transmission Disconnect Provided_____

Gear Ratios	Fwd	Fwd–mph	Rev	Rev–mph
First				
Second				
Third				

Input Torque Rating_____(lb ft) at_____rpm

Filter Element (s)

Manufacturer_____

Part Number_____

End Item Manufacturer's Part Number_____

Type_____

Physical Location (s)_____

Filtration Range_____microns

3. DRIVE OR PROPELLER SHAFTS

Manufacturer_____

Model_____

Type (Ref SAE J901)_____

Universal Joints (Number and Type)_____

Torque Capacity (lb ft)_____

4. FRONT AXLE

Manufacturer_____

Model_____

Driven_____

Type (Drive Axle Only)_____(Ref. SAE J923)

Capacity Rating

Torque_____(lb ft)

Beam Load_____lb

Type of Suspension_____Sprung_____Rigid

5. REAR AXLE

Manufacturer_____

Model_____

Driven_____

Type (Drive Axle Only)_____(Ref. SAE J923)

Gear Reduction Ratio_____

Torque_____(lb ft)

Beam Load_____lb

Type of Suspension_____Sprung_____Rigid

6. FRONT WHEELS

Rim Type_____

Rim Size_____

Manufacturer_____

Tire Size and Ply Rating_____

Number of Tires per Axle_____

Wheel Loading (End Item Unloaded)_____ lb

Wheel Loading (End Item w/Rated Load)_____ lb

7. REAR WHEELS

Rim Type_____

Rim Size_____

Manufacturer_____

Tire Size and Ply Rating_____

Number of Tires per Axle_____

Wheel Loading (End Item Unloaded)_____ lb

Wheel Loading (End Item w/Rated Load)_____ lb

SECTION IV

SPECIFICATIONS, STEERING AND BRAKES

1. STEERING SYSTEM

Type (Power or Manual)_____

Steering Control Unit Manufacturer_____

Part Number_____

Is separate power steering pump supplied? (Yes or No)_____

Pump Manufacturer_____

Part Number_____

Maximum System Pressure_____psi

Steering Wheel Diameter_____in.

No. of Turns Lock to Lock_____

2. BRAKING SYSTEM

Front Brakes (None, Drum, Disc)_____

Manufacturer_____

Lining (Bonded, Riveted)_____

Length_____in. Width_____in. Thickness_____in.

Drum Diameter_____

Type of Brake Adjustment (Manual, Self-Adjusting)_____

Power Assisted (Yes or No)_____

Method of Actuation (Hydraulic, Vacuum, Etc.)_____

Rear Brakes (None, Drum, Disc)_____

Manufacturer_____

Lining (Bonded, Riveted)_____

Length_____in. Width_____in. Thickness_____in.

Drum Diameter_____

Type of Brake Adjustment (Manual, Self-Adjusting)_____

Power Assisted (Yes or No)_____

Method of Actuation (Hydraulic, Vacuum, etc.)_____

Master Brake Valve (Master Cylinder)

Manufacturer_____

Part Number_____

Parking Brake

Manufacturer_____

Type (Friction, Shoe, Shear, Band, etc.)_____

Type of Actuation (Lever, Sear)_____

Equipped with Locking Device (Yes or No)_____

Location of Brake (Wheels, Drive Shaft, Transmission, etc.)_____

_____

SECTION V

SPECIFICATIONS, OPERATORS COMPARTMENT

1. DIRECTIONAL CONTROL

   Actuation_____Left-Hand_____Right-Hand

   Location_____

   Position markings (Yes or No)_____

   Type:_____Decal_____Embossed_____Embedded

   Does forward actuation correspond to forward travel?

   (Yes or No)_____

2. LIFT CONTROL

   Actuation_____Left-Hand_____Right-Hand

   Location_____

   Position markings (Yes or No)_____

   Type:_____Decal_____Embossed_____Embedded

   Does direction of motion conform to ANSI B56.1?

   (Yes or No)_____

3. TILT CONTROL

   Actuation_____Left-Hand_____Right-Hand

   Location relative to lift control_____

   Position markings (Yes or No)_____

   Type:_____Decal_____Embossed_____Embedded

   Does direction of motion conform to ANSI B56.1?

   (Yes or No)_____

4. SIDE-SHIFT CONTROL

   Actuation_____Left-Hand_____Right-Hand

   Location relative to tilt control_____

   Position markings (Yes or No)_____

   Type:_____Decal_____Embossed_____Embedded

   Does direction of motion conform to ANSI B56.1?

   (Yes or No)_____

5. SEAT

Does seat conform to all the minimum dimensional requirements of SAE J899?

(Yes or No)_____

If no, specify which dimensions do not conform to SAE J899_____

_____

Is seat covered with slip coated vinyl upholstery?

(Yes or No)_____

If not, specify type of covering furnished_____

6. DIMENSIONS

a. Vertical distance between lowest point on steering wheel rim and highest point of the unoccupied seat cushion_____ in.

b. Height of seat above floorboard_____ in.

c. Height of floorboard above ground_____ in.

d. Height of first step above ground_____ in.

e. Distance between near edge of seat and parking brake_____ in.

f. Distance between inner edge of accelerator and brake pedal_____ in.

g. Dimensions of brake pedal_____ in.

SECTION VI

SPECIFICATIONS, DIMENSIONAL

1. OVERALL LENGTH (without forks)_____in.
2. OVERALL WIDTH_____in.
3. OVERHEAD GUARD HEIGHT_____in.
4. COLLAPSED MAST HEIGHT_____in.
5. MAXIMUM FORK HEIGHT_____in.
6. FREE LIFT HEIGHT_____in.
7. WHEEL BASE_____in.
8. DRIVE TIRE TREAD WIDTH (c to c)_____in.
9. STEER TIRE TREAD WIDTH (c to c)_____in.
10. CLEARANCE OF DRIVE TIRES TO BODY_____in.
11. MINIMUM GROUND CLEARANCE_____in.
12. HEIGHT OF EXHAUST OUTLET_____in.
13. COMPLETE ALL DIMENSIONAL REQUIREMENTS IN FIGURE A-1.

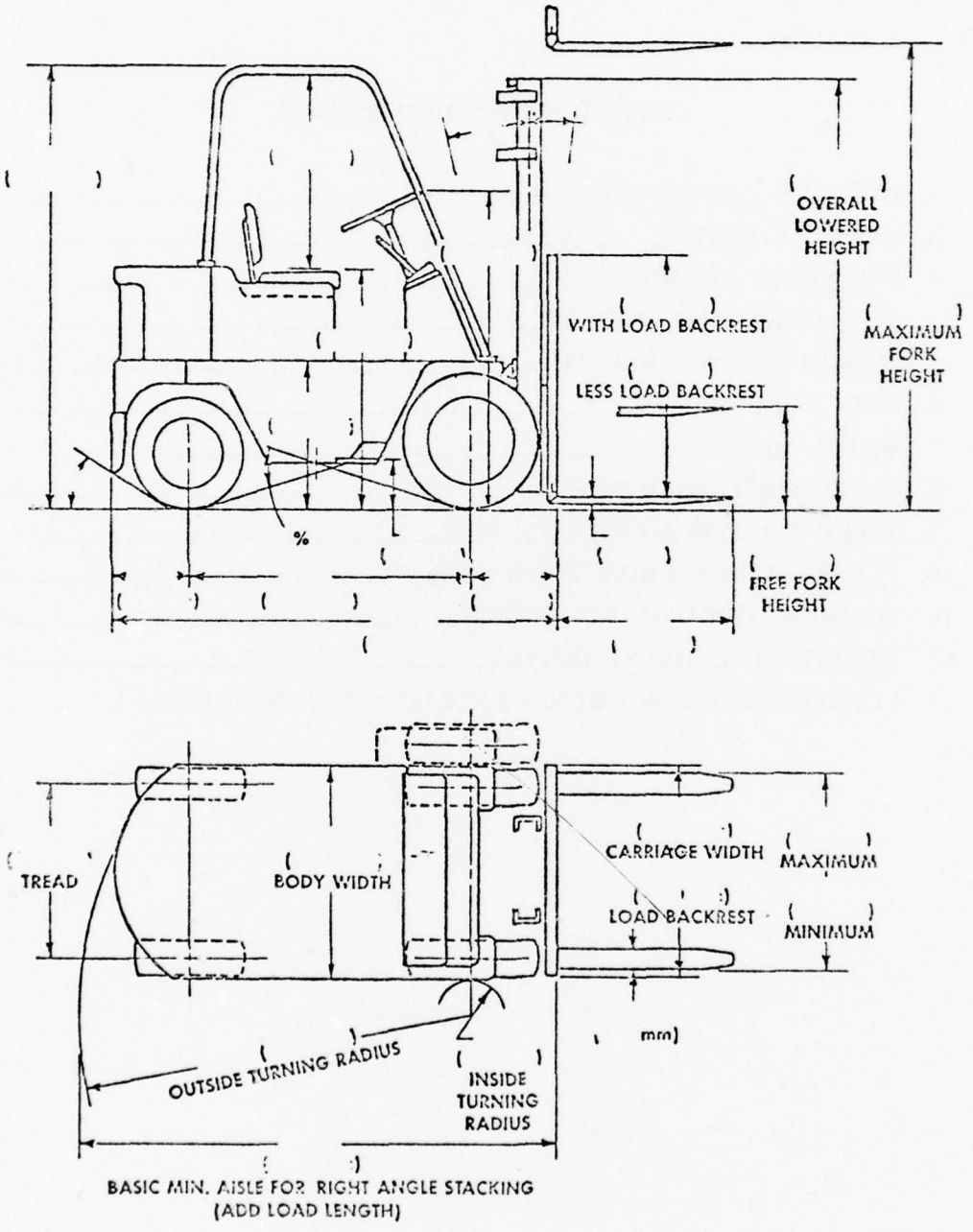

OVERALL
LOWERED
HEIGHT
WITH LOAD BACKREST
LESS LOAD BACKREST
MAXIMUM
FORK
HEIGHT
%
FREE FORK
HEIGHT
TREAD
BODY WIDTH
CARRIAGE WIDTH
MAXIMUM
LOAD BACKREST
MINIMUM
mm)
OUTSIDE TURNING RADIUS
INSIDE
TURNING
RADIUS
BASIC MIN. AISLE FOR RIGHT ANGLE STACKING
(ADD LOAD LENGTH)

Figure A-1.

SECTION VII

SPECIFICATIONS, PERFORMANCE

1. Lifting Speed (rated load)_____fpm
2. Lowering speed (rated load)_____fpm
3. Travel speed with rated load_____mph
   Forward_____mph, Rearward_____mph
4. Slope Ascension, forward direction
   With rated load_____%, without load_____%
5. Stability (reference ANSI B56.1)
   Forward stacking_____%, forward travel_____%
   Lateral stacking_____%, lateral travel_____%
6. Acceleration (40-foot distance, engine initially at low idle)_____seconds
7. Vehicle Noise Levels (Microphone located 6 in. from operator's ear)
   At no-load governed speed_____db (A)
   At torque converter stall_____db(A)
   Lifting rated load at maximum speed_____db (A)
8. Will the vehicle start and perform to manufacturer's specifications in temperatures ranging from 0°F to 110°F? (Yes or No)_____

SECTION VIII

MISCELLANEOUS EQUIPMENT

The purpose of this section is to determine: (1) What equipment is supplied as standard equipment, what is available as optional equipment, and what equipment is not available. Indicate in Column I below if the following is standard (S), optional (O), not available (N), or special feature (SF). (2) What equipment will be supplied on the end item as being proposed. Indicate in Column II below if the following will be supplied (S) or will not be supplied (N).

1. INSTRUMENTATION	I	II
Alternator Indicator Light	_____	_____
Ammeter	_____	_____
Voltmeter	_____	_____
Engine Hourmeter	_____	_____
Engine Oil Pressure Gauge	_____	_____
Engine Oil Low-Pressure Warning Light	_____	_____
Engine Coolant Temperature Gauge	_____	_____
Engine Coolant High-Temperature Warning Light	_____	_____
Transmission Oil Temperature Gauge	_____	_____
Transmission Oil High-Temperature Warning Light	_____	_____
Fuel Gauge	_____	_____
Air Cleaner Restriction Indicator	_____	_____
Other Warning Lights and Buzzers (specify)	_____	_____
_____		
_____		
2. LIGHTS AND ELECTRICAL SYSTEM		
(State Quantity of Lights when Applicable)	_____	_____
Key Ignition Switch	_____	_____
12-Volt Electrical System	_____	_____
(If other than 12-V system, state voltage)	_____	_____
Instrument Panel Lights	_____	_____

Individual Light Switches _____ _____

Directional Signals _____ _____

Flashing Warning Lights _____ _____

Front Travel Lights _____ _____

Front Flood Lights _____ _____

Rear Backup Lights _____ _____

Electrical Circuit Breakers _____ _____

Electrical Fuses _____ _____

3. PROTECTIVE AND SAFETY EQUIPMENT

Radiator Guard _____ _____

Spark-Arresting Muffler _____ _____

Seat Belt _____ _____

Horn _____ _____

Protecto Seal Fuel Filler Cap _____ _____

Fire Extinguisher _____ _____

Closed Cab _____ _____

Neutral-Start Protective Switch _____ _____

Starter Disconnect Switch to prevent starter engagement after engine has been started (Describe)_____

_____

_____

4. OTHER

Spring Counterbalanced Hood _____ _____

Positive Hood Hold-Open Device _____ _____

Windshield Wiper(s) (How many?) _____ _____

Cab Heater _____ _____

Cab Defroster _____ _____

Noise Control Provisions (Describe) _____ _____

_____

_____

Electromagnetic radiation limits in accordance with SAE J551 _____ _____

SECTION IX

SPECIFICATIONS, HYDRAULIC SYSTEM

1. RESERVOIR

   Capacity_____U.S. gal

   Oil level indicator:_____gage_____dipstick

   _____sightglass_____none

   Breather, Replaceable element (Yes or No)_____

   Micron rating_____

   Filler neck strainer (Yes or No)_____, _____mesh

   Filler neck opening_____in. diameter

2. FILTER(S)

   Location:_____suction_____return_____pressure

   Manufacturer_____part number

   End item manufacturer's part number_____

   Has filter been evaluated in accordance with ANSI B93.31 (Yes or No)_____

   If yes, Beta 10 ratio is_____at_____gpm

   If no, manufacturer's micron rating_____at_____gpm

   Filter replacement indicator (Yes or No)_____

   Where located_____

   Inlet port type_____Outlet port type_____

3. STRAINER(S)

   Is strainer(s) furnished? (Yes or No)_____

   Location_____

   Manufacturer_____part number_____

   End item manufacturer's part number_____

   Filtration rating_____mesh, or_____micron

4. HYDRAULIC PUMP

   Manufacturer_____

   Type (vane, gear, piston, etc.)_____

   Model_____Part Number_____

End item manufacturer's part number_____

Capacity_____gpm_____psi @_____rpm (governed speed)

Inlet port type_____pressure port type_____

5. RELIEF VALVE

Location_____

Manufacturer_____part number_____

System relief valve setting_____psi

6. CONTROL VALVE

Manufacturer_____part number_____

Model_____

Inlet port type_____cylinder port type_____

Outlet port type_____

Exposed spools corrosion plated? (Yes or No)_____

7. HYDRAULIC CYLINDERS

Cylinder Function	Lift	Tilt	Sideshift
Manufacturer			
Mfr Part Number			
End Item Mfr Part Number			
Port Type			
Piston Shaft Corrosion Plated			

8. TILT ANTICAVITATION SYSTEM

Type (overcenter valve, orifice, etc.)_____

Manufacturer_____Model_____

Part Number_____

End item mfr part number_____

9. LOAD LOWERING CONTROL

Describe provision furnished to control lowering load in the event of any hose failure_____

_____

_____

Manufacturer_____ Model_____

End item mfr part number_____

10. SYSTEM PLUMBING

Does hose conform to SAE J517? (Yes or No)_____

If not, which hoses do not?_____

List all hose inside diameters used_____

_____

Does pressure tubing conform to SAE J524 or J525 (Yes or No)_____

List all tubing sizes used_____

_____

Are all fittings, other than suction fittings, either 37° flare, "O" ring boss, or 4-bolt split-flange (Yes or No)_____

If no, describe_____

_____

Describe suction line fittings_____

_____

11. HOSE REELS

Manufacturer_____ part number_____

Is hose reel mounted within plan outline of the truck? (Yes or No)_____

12. SYSTEM DIAGRAM

Attach a diagram of the relative location of the above-listed components with plumbing and additional components necessary to make the system functional.

SECTION X

SPECIFICATIONS, UPRIGHTS, FORKS, FORK CARRIER, AND LOAD BACKREST

1. UPRIGHTS

Is mast roller type? (Yes or No)_____

Are rollers permanently lubricated? (Yes or No)_____

Type bearings (ball, roller, etc.)_____

Type chains used (leaf, roller, etc.)_____

Chain size_____

Manufacturer_____ part number_____

End item manufacturer's part number_____

2. FORKS AND FORK CARRIER

Do forks and carrier conform to ANSI B56.1? (Yes or No)_____

Do forks and carrier conform to ANSI MH11.4? (Yes or No)_____

Are fork carrier bearings permanently lubricated? (Yes or No)_____

Type bearings (ball, roller, etc.)_____

Are forks capable of sliding across entire width of carrier? (Yes or No)_____

Are forks capable of being removed without removing load backrest? (Yes or No)

_____

Fork length_____ in., width_____ in.,

Thickness at tip_____ in., length of taper_____ in.

Fork construction (welded, forged, etc.)_____

3. LOAD BACKREST

Height above forks_____ in., width_____ in.

Method of attachment to carrier_____

_____

Spacing between vertical members_____ in.

Manufacturer's part number_____

Are there any protruding bolts beyond the side plane of the backrest? (Yes or No)

_____

4. SIDE SHIFTER

Travel left side of center_____in.

Travel right side of center_____in.

Is side shifter integral or add-on carriage?_____in.

Manufacturer_____part number_____

End item manufacturer's part number_____

Side-shift carriage width_____in.

Side-shift carriage thickness_____in.

Type bearings_____

Are bearings permanently lubricated? (Yes or No)_____

Are forks capable of sliding across entire width of carriage? (Yes or No)_____

Are forks capable of being removed without removing load backrest? (Yes or No)

_____

SECTION XI

MISCELLANEOUS

1. Do all screw threads on end item conform to National Bureau of Standards Handbook H28 (Yes or No)_____
2. Do all lubrication fittings conform to SAE J534? (Yes or No)_____
3. Are all lubrication fittings accessible to a hand-operated grease gun without use of hand tools? (Yes or No)_____
   If no, specify_____
4. Are engine and transmission mounted on elastomer shock mounts? (Yes or No)_____
5. List and describe all identification, instruction, and warning plates, including methods of attachment to end item normally furnished. (Drawings are desirable)_____
6. What color is end item painted?_____
7. Is yellow finish color No. 13538 in accordance with Fed-Std-595 a commercial option? (Yes or No)_____
8. Type of non-slip walkway coating furnished_____

SECTION XII

PRODUCT RELIABILITY

1. State, in terms of service hours, intervals for all maintenance functions. In lieu of above, end item manufacturer can furnish copy of commercial lubrication and maintenance guide.
2. State conditions of the standard warranty issued to commercial contractors upon purchase of this item. Attach a copy of your standard warranty issued to commercial contractors._____
3. Do you intend to furnish your standard warranty for this item? Yes_____ No_____. If no, specify the reason for the differences._____
4. State the number of mandatory field campaigns relating to the end item since beginning model-series production._____

   Describe briefly the reason for the campaigns, time out of service, and correction required for each._____
5. Describe all product changes made on end item since 1 January 1976. (Included under product changes are product improvements, field fixes or repairs, retrofits, etc.)_____
6. State date series production began._____

SECTION XIII

OPERATOR, MAINTENANCE, AND PARTS MANUAL DATA

1. Are the following furnished for the end item?

Operator's Manual	Yes_____	No_____
Maintenance Manual	Yes_____	No_____
Rebuild Manual	Yes_____	No_____
Repair Parts Manual	Yes_____	No_____
Lubrication Instructions	Yes_____	No_____
Training Aids	Yes_____	No_____

2. Does the manufacturer have manuals containing information in accordance with MIL-M-7298C for all assemblies and components supplied by the manufacturer?

Operator's Manual	Yes_____	No_____
Maintenance Manual	Yes_____	No_____
Rebuild Manual	Yes_____	No_____
Repair Parts Manual	Yes_____	No_____
Training Aids	Yes_____	No_____

3. Is the installation and use of options adequately explained in these manuals or are separate manuals required? (Yes or No)_____
   Are they available? (Yes or No)_____

4. Do the manuals designate and describe the need and use of special tools? (Yes or No)_____

5. Is there a system of updating and making revisions to manuals after issue? (Yes or No)_____

SECTION XIV

SPECIFICATIONS, LUBRICATION

1. ENGINE

   What detrimental effect is there in using MIL-L-2104 or MIL-L-46167 lubricants?_____

2. TRANSMISSION (Including Torque Converter)

   What detrimental effect is there in using MIL-L-2104 or MIL-L-46167 lubricants?_____

3. DRIVE AXLE

   What detrimental effect is there in using MIL-L-2104, MIL-L-2105 or MIL-L-46167 lubricants?_____

4. STEERING SYSTEM

   What detrimental effect is there in using MIL-L-2104 or MIL-L-46167 lubricants?_____

5. GREASE LUBRICATION PROVISIONS

   What detrimental effect is there in using MIL-G-10924 lubricants?_____

6. HYDRAULIC SYSTEM

   What detrimental effect is there in using MIL-L-2104 or MIL-L-46167 lubricants?_____

7. BRAKE SYSTEM

   What detrimental effect is there in using VV-B-680 lubricants?_____

SECTION XV

QUALITY ASSURANCE SYSTEM

1. PRODUCTION BACKGROUND:
   a. Has the manufacturer provided similar equipment to the government in the past two years? (Yes or No)_____
   b. If answer is yes, state:
      (1) Model Number_____
      Standard Commercial (Yes or No)_____
      Modified Commercial (Yes or No)_____
      (2) Quantity_____
      (3) Military specification(s) applying to contract(s)._____
      _____
      (4) Contract Number(s)_____
      (5) State quality control system used.
         (a) MIL-I-45208 (Yes or No)_____
         (b) MIL-Q-9858 (Yes or No)_____
         (c) Other (Specify)_____
      (6) State government testing performed.
         (a) PPT (Preproduction Tests) (Yes or No)_____
         (b) IPT (Initial Production Tests (Yes or No)_____
         (c) ICT (Inspection Comparison Tests) (Yes or No)_____
2. COMMERCIAL QUALITY ASSURANCE PROCEDURES:
   a. State if the current plan is similar to any of the established Military systems listed:
      (1) MIL-I-45208 (Yes or No)_____
      (2) MIL-Q-9858 (Yes or No)_____
      (3) Other (Specify)_____
   b. Please attach a copy of manufacturer's plan (if available).

SECTION XVI

PREPARATION FOR DELIVERY

1. PRESERVATION AND PACKAGING

   a. Does the manufacturer have a commercial procedure for preservation for overseas shipment and indefinite open storage? (Yes or No)_____
   If so, state below how item is prepared._____

   b. Does the manufacturer have a commercial procedure for preservation and packaging for covered storage (indefinite) and multiple handling? (Yes or No)_____
   If so, state below how item is prepared._____

   c. Does the manufacturer have a commercial procedure for preservation and packaging for immediate use upon receipt of the equipment at the first destination? (Yes or No)_____
   If so, state below how item is prepared._____

2. MARKING

   a. Describe address marking_____

   b. Describe nomenclature marking_____

   c. Describe special marking (U.S.A. number)_____

3. TREATMENT AND PAINTING (Commercial)

   a. Describe treatment_____

   b. Describe painting_____

4. DEPROCESSING INSTRUCTIONS

   a. Is deprocessing of the end item or any component or system, or drive assembly required upon receipt of the end item at its final destination? (Yes or No)_____

   b. If yes, describe (be specific)_____

   c. Are the deprocessing instructions affixed to the end item prior to shipment? (Yes or No)_____.

SECTION XVII

SPECIFICATIONS, TRANSPORTABILITY

1. TIEDOWN PROVISIONS

   Number_____

   Capacity of Each_____

   Location_____

2. LIFTING PROVISIONS

   Number_____

   Capacity of Each_____

   Location_____

   Are these provisions in accordance with MIL-STD-209? (Yes or No)_____

   How is the end item lifted for shipboard loading?_____

   _____

SECTION XVIII

LOGISTIC SUPPORT DATA

The purpose of this section is to provide data as to the support capability of the manufacturer relative to the requirements of the mission profile.

1. List below all manufacturing facilities, parts depots, distributors, and service training facilities both in the United States and worldwide. Use the following symbols for marking:

   * Manufacturing facility of end items.
   ○ Parts depots capable of supplying end items, repair parts, or replacement parts.
   △ Distributors of end item.
   □ Service training facility of end item.

2. What facilities listed above are company-owned or subsidiary organizations?

3. What facilities are franchised dealers?

SECTION XIX

DEPLOYMENT DATA

The purpose of this section is to show where user field experience data may be obtained on the end item.

1. Provide a representative list of users of this end item. Include the following information for each user:

    a. Name of user of the end item(s).
    b. Address of user.
    c. Contact personnel with telephone number(s).
    d. The quantity of end items purchased.
    e. The year of manufacture of each end item.
    f. The dealer that services the end item (include the dealers address, contact personnel, and telephone numbers.)