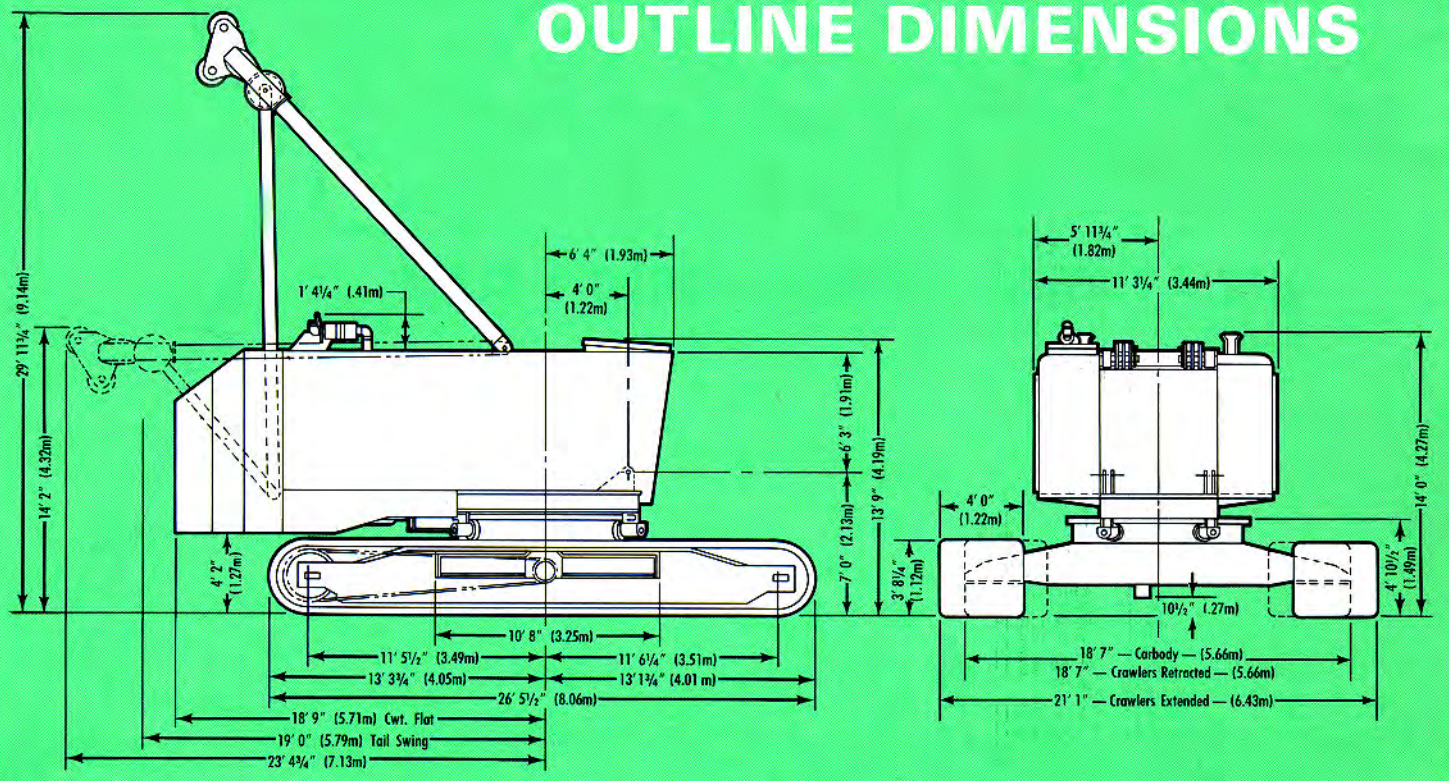
MANITOWOC

4100W

LIFT • TOWER • RINGER • DRAG • CLAM

OUTLINE DIMENSIONS



WEIGHTS

	POUNDS*
LIFTCRANE, complete with 70' No. 22A Boom, gantry and backhitch, boom hoist rigging and pendants, hoist wire rope, 15-ton swivel-type hook and weight ball, basic upperworks package, counterweights, 26' 6" long crawlers (48" wide treads), extendible width from 18' 7" to 21' 1", and outside crawler drive chains	356,660
CRAWLERS, with crawler side frames, crawler treads, and outside crawler chains (each 36,400)	72,800
CARBODY, with center pin, roller path, and travel mechanism, without crawlers	49,500
UPPERWORKS, complete with basic machinery, including drums, but not including gantry and backhitch, front end attachments or counterweights	80,500
GANTRY AND BACKHITCH	7,800

	POUNDS*
SELF-REMOVING COUNTERWEIGHT (3-PC)	
Inner	41,900
Middle	41,500
Outer	39,000
BOOM NO. 22A	
BOOM BUTT: (less wire rope and pendants)	5,980
BOOM TOP: (equipped with lower boom point, sheaves, and pendants)	9,760
Add for upper boom point and sheave	1,460
Total	11,220
BOOM INSERTS:	
Insert — 10' (with pendants)	2,000
Insert — 20' (with pendants)	3,100
Insert — 40' (with pendants)	5,340
DRAGLINE FAIRLEAD — REVOLVING TYPE	1,910
DRAGLINE FAIRLEAD — HINGED TYPE	7,420

** Weights are approximate and may vary between machines as a result of design changes and component variations.*

POWER PLANTS

	Model	Cylinder	Bore	Stroke	Cubic Inch Displacement	Net HP @ RPM (at flywheel)
BASIC	Cummins NTA-855 Diesel	6	5.500"	6.000"	855	333 @ 2000
OPTIONAL	G.M. 12V-71N Diesel	12	4.250"	5.000"	852	360 @ 2000
	Caterpillar D343-TA Diesel	6	5.400"	6.500"	893	364 @ 2000
Air Compressor: 37.5 CFM.					Fuel Tank Capacity: 315 gallons.	

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DRUMS AND LAGGINGS

Application	Drum	Diameter	Drum Width	Type of Lagging	Wire Rope Size	Spooling Capacity		
						First Layer	Layers	Maximum Capacity
TANDEM DRUM SHAFT								
LIFTCRANE								
Hoist	Front	19"	37¼"	None	1⅛"	161'	7	1,505'
Whip	Rear	27⅝"	37¼"	Plain	1⅛"	230'	3	745'
CLAMSHELL								
Closing	Front	27"	37¼"	Grooved	1⅛"	225'		
Holding	Rear	27"	37¼"	Grooved	1⅛"	225'		
DRAGLINE								
Drag	Front	24"	37¼"	Grooved	1¼"	164'		
Hoist	Rear	27"	37¼"	Grooved	1⅛"	225'		
OPTIONAL SPLIT REAR DRUM SHAFT WITH SINGLE FRONT DRUM SHAFT								
LIFTCRANE								
Hoist	Front	19"	37¼"	None	1⅛"	161'	7	1,505'
Whip	Left Rear	21"	*17⅜"	Plain	1⅛"	83' (*76')	6	622' (*575')
Auxiliary	Right Rear	17½"	17⅜"	None	1"	77'	8	847'
CLAMSHELL								
Closing	Right Rear	27"	17⅜"	Grooved	1⅛"	105'	3	340'
Holding	Left Rear	27"	*17⅜"	Grooved	1⅛"	105' (*97')	3	340' (*315')
DRAGLINE								
Drag	Front	24"	37¼"	Grooved	1¼"	164'	4	755'
Hoist	Right Rear	27"	17⅜"	Grooved	1⅛"	105'	3	340'

*Drum width — 16 1/16" with ratchet and pawl.

NOTE: Drum diameters are root diameters. For first layer pitch diameters, add diameter of wire rope.

No. 6105, 11-20-72

LOWER MACHINERY

CARBODY: One-piece, ribbed steel fabrication with integral side wings, permit crawlers to be extended or retracted without reducing bearing area between crawler side frames and carbody wings. Side wings rest on crawler side frames and transmit loads directly to them, eliminating axles and providing lower center of gravity.

RING GEAR AND ROLLER PATH: Cast alloy steel. Integral ring gear and roller path bolted to carbody with single row of high strength bolts. Internal gear teeth machine cut. Roller path 109" outside diameter with 8" face and 4" thick hook roller flange.

KING PIN: Machined from steel fabrication. Bolted to carbody with high strength bolts. Supports vertical travel shaft and provides pivot for rotating upperworks. Takes horizontal load only, no uplift. Pressure-lubricated bronze bearing in rotating bed.

TRAVEL SHAFTS: Travel power is transmitted from horizontal drive shaft in upperworks to horizontal travel shaft in carbody . . . through intermediate vertical travel shaft bronze bearing mounted in king pin. Horizontal travel shaft is bronze bearing mounted and enclosed in carbody. Ends extended by telescopic couplings provide for crawler extension and retraction. Totally enclosed bevel gear runs in oil; thrust taken by antifriction bearing.

TRAVEL AND STEERING: Accomplished by air controlled jaw clutches. Both are normally engaged for straight travel. Either clutch may be in neutral or locked position for gradual or sharp turns. Interlock keeps one jaw clutch engaged at all times.

TRAVEL LOCKS: Positive, air operated travel locks have dual ratchet and pawl permitting travel in one direction while preventing movement in opposite direction. Can be set to prevent travel in either direction. Travel lock pawls are spring cushioned and engage external teeth on travel jaw clutch. Each pawl can be released separately by independent air control.

CRAWLER SIDE FRAMES: Steel fabrication with integral supports for attachment to carbody. Fourteen, 14" diameter double-flanged intermediate idler rollers mounted between side plates on 4⅜" diameter shafts. Each roller supported by dual bronze bearings with center grease pocket. Abrasion resistant steel slide bars on top of frames support crawler pads.

CRAWLER FRONT IDLER: Double-flanged steel roller; large bronze bearing on each end and grease pocket in center. Mounted on 6¼" diameter stationary shaft supported at both ends in side frame. Tread belt adjusted by hydraulic jack and U-shaped shims which hold shaft in position.

CRAWLER SPROCKET AND TUMBLER: Cast steel, teeth and tumbler rim are flame-hardened. Driving torque transmitted through single-unit integral sprocket and tumbler with large bronze bearings on each end and center grease pocket. Mounted on 6¼" diameter stationary shaft supported at both ends in side frame. Self-cleaning tumbler has alternate sides open. Crawler chain adjusted by hydraulic jack and U-shaped shims which hold shaft in position.

CRAWLER DRIVE: Drive chains are located outside of crawler frame. Drive sprockets self-contained within crawler side frames are joined to horizontal drive shaft by telescoping coupling which allows crawlers to be extended, retracted or completely removed without separating drive chains or tread belts.

CRAWLER PADS: Cast alloy steel. Box section design with large central driving lug, internally ribbed for extra strength. Bottom edges tapered upward. Each pad connected by two high-carbon, wear resistant steel pins.

UPPER MACHINERY

ROTATING BED: One-piece, ribbed steel fabrication with integral machinery side frames forms a rigid deck for power plant, house rollers, rotating machinery, upper structure and boom hinge. Houses travel gear, swing gear, swing lock and boom hoist.

HOUSE ROLLERS: 6
4 Front antifriction bearing mounted.
2 Rear antifriction bearing mounted.

HOOK ROLLERS: 6 mounted on eccentric shaft for adjustment.
2 Front antifriction bearing mounted.
4 Rear antifriction bearing mounted.

UPPER STRUCTURE: Fabricated steel rear column, roof support and vertical center legs. Bar-type front legs. All joints pin-connected. Structure supports gantry, counterweight and rear drum.

POWER PLANTS: See bottom of page 2.

POWER TRANSMISSION, VICON®: The VICON (**V**ariable **I**ndependent **CON**trol — Patented) system provides a stepless variable control power transmission for various machine functions. Engine power is divided at transmission case to two controlled torque converters and hydraulic pump. Through chain drives, front converter powers horizontal travel shaft while the rear converter powers horizontal swing shaft. Hydraulic pump provides separate power for independent boom hoist hydraulic motor.

INDEPENDENT HORIZONTAL TRAVEL SHAFT: Alloy steel shaft, mounted on antifriction bearings. Single-disc clutches, mounted on cast steel hub splined to drive shaft. Clutches applied by axial-pressure, air actuated cam levers. Clutch pressure plates spring released. Cam faces separated by antifriction roller bearings which take axial thrust. Integral clutch spiders and bevel pinions ball bearing mounted. Bevel pinions totally enclosed and oil spray lubricated. These bevel pinions begin gear drive to horizontal travel shaft in carbody. Spur gear on this shaft also begins power source for main drum shafts.

INDEPENDENT HORIZONTAL SWING SHAFT: Located behind horizontal travel shaft. Alloy steel, mounted on antifriction bearings, except for bronze outboard bearing. Double-disc clutches applied by axial-pressure, air actuated cam levers. Clutch pressure plates, spring released. Cam faces separated by antifriction roller bearings which take axial thrust. Integral clutch spiders and bevel pinions antifriction bearing mounted. Bevel gears totally enclosed and run in oil. Bevel pinions drive intermediate vertical swing shaft.

INTERMEDIATE VERTICAL SWING SHAFT: Alloy steel, antifriction bearing mounted. Bevel gear splined to upper end; integral spur pinion on lower end of shaft. Transmits power from horizontal swing shaft to vertical swing shaft. Manually controlled swing brake mounted in center of shaft.

VERTICAL SWING SHAFT: Alloy steel, antifriction bearing mounted. Transmits power from intermediate vertical swing shaft to ring gear.

SWING LOCK: Gear segment engages swing gear by independent air control. Spring loaded lock provides cushioned operation.

FRONT AND REAR DRUM ASSEMBLIES: Heat treated, alloy steel drum shafts mounted on antifriction bearings. Drums antifriction bearing mounted on drum shafts. Cast iron combination clutch and brake flanges. Air applied, internal expanding, band type clutch mounted on right side. Dual, external contracting, band type brakes. Front drum gear driven from horizontal travel shaft. Rear drum chain driven from front drum shaft. Gears and chain totally enclosed and oil spray lubricated.

SPLIT REAR DRUM SHAFT: Optional. Two equal width drums on rear shaft, each with single clutch and brake. Clamshell and dragline capacities are reduced with this combination. Consult factory.

VICON® POWER LOWERING: Controlled power load lowering on both hoist drums for drum line pull in excess of 6,000 LBS is an integral part of the VICON control system. It enables raising, holding or lowering the load by means of stepless variable torque output of hoist converter. Hoist clutches remain in constant engagement, making transfer of load from clutch to brake unnecessary during normal job cycle.

FULL RANGE VICON POWER LOWERING: Optional. An engine driven hydraulic pump powers a hydraulic motor which drives output shaft of hoist controlled converter in a reverse direction of rotation. Provides power lowering (or reversing) for drum line pull less than 6,000 pounds. The hydraulic equipment permits a full range of lowering speeds from empty hook through maximum capacities.

INDEPENDENT BOOM HOIST: Dual drums, heat treated alloy steel drum shaft driven by bronze worm and gear through planetary gear reduction. Gears fully enclosed and run in oil. All rotating shafts antifriction bearing mounted. Boom hoist powered by variable displacement hydraulic motor providing full range speed control. Boom hoist brake, external contracting band type, spring applied, air released. Auxiliary brake, external contracting band type, manually applied from operator's station. Ratchet mounted to worm gear; pawl gravity engaged, air released. Ratchet and pawl mounted inside gear housing. Boom hoist mounted in rotating bed at rear of machine.

GANTRY AND BACKHITCH: Gantry is fabricated plate with parallel box section legs. Supported by A-frame center leg on large pins. Backhitch is three-piece, telescoping, link type construction, anchored to rear of rotating bed. Gantry and backhitch are pin-connected. Vertical backhitch sheaves antifriction bearing mounted. Horizontal sheaves bronze bearing mounted. Floating, vertical boom hoist rope sheaves bronze bearing mounted.

GANTRY LIFTING DEVICE: Electrically powered hydraulic unit used for partially raising gantry prior to erecting into working position. Also controls lowering of gantry into cab roof.

AUTOMATIC BOOM STOP: Push rod contacts boom actuating valve in air line, automatically stopping air supply to independent boom hoist hydraulic pump positioner. Set to stop hoisting when boom reaches maximum angle determined by style of boom used. Standard on liftcrane and liftcrane-excavator combinations.

TELESCOPIC BOOM STOP: Telescoping tube, air cushioned. Pinned to boom and A-frame. Starts cushioning at 79½° with positive physical stop at 88° from horizontal. Standard on liftcrane and liftcrane-excavator combinations.

FRONT END EQUIPMENT

NO. 22A BOOM: 70' boom (30' butt section and 40' open throat top section); optional 10', 20' and 40' inserts. All welded construction. Inverted angle chords and tubular lacing 100,000 PSI yield steel. Butt, top and inserts 95" wide x 95" deep at pin-connected joints. Each insert matched with two pair of 1⅜" diameter single-length pendants. Lower boom point equipped with six 30" OD antifriction bearing mounted sheaves. Jib adapter available for No. 123 jib assembly. Maximum boom length 260'.

BOOM RIGGING: 12-part line, reeved between gantry and equalizer. Controls boom angle by dual lines from independent boom hoist drums which power boom up and down. Two pair of 1⅜" diameter pendants connect equalizer to boom point. For longer booms, pendants matched to insert lengths.

EQUALIZER: Steel fabrication. Six vertical sheaves, antifriction bearing mounted.

WIRE ROPE GUIDE: Mounted on top side of boom. Two sheaves, bronze bearing mounted.

WIRE ROPE ROLLER GUIDE: Mounted on top side of boom. Induction hardened tubing. Antifriction bearing mounted.

UPPER BOOM POINT: Optional detachable assemblies. Pin-connected to open throat top. Single 36" OD sheave with rope guard for liftcrane. Single 36" OD sheave with cheek plate for dragline. Double 36" OD sheaves with cheek plate for clamshell. All sheaves antifriction bearing mounted.

No. 123 jib adapter cannot be used with detachable upper boom point assemblies on open throat and 4½° offset boom tops.

4½° OFFSET BOOM TOP: Optional. Permits greater clearance between load and boom. Standard No. 22A boom converted by adapter links at boom joint. Jib adapter available for No. 123 jib assembly. Basic length 70'; maximum length 260'. For capacity charts and information, consult factory.

HAMMERHEAD BOOM TOP: Optional. Permits lifting maximum capacity in areas with restricted overhead clearance. Standard No. 22A Boom converted by addition of 30' tapered insert and 10' hammerhead top. Top has lugs for attaching No. 123 jib assembly. Basic length 70'; maximum length 250'.

LIGHT TAPERED TOP: Optional. Permits longer reach with lighter loads. Standard No. 22A Boom converted by addition of 30' tapered insert (same as used for hammerhead) and 50' tapered top. Top has lugs for attaching No. 123 jib assembly. Basic boom length 110'; maximum boom length 280'.

NO. 123 JIB: Optional. 20-ton maximum capacity, 30' length, extendible to 60' with 10' inserts. Jib angle adjustable to 0, 10, and 20 degrees. All welded construction. Tubular chord and lacing members 100,000 PSI yield steel. 30" wide x 30" deep at pin-connected joints. Top section has 24" OD antifriction bearing sheave, cheek plates and anchor for two-part line.

Maximum capacities with inserts: 40' — 15 tons; 50' — 10 tons; 60' — 5 tons. Consult jib lifting capacity charts for specific capacity when used on various boom lengths.

REVOLVING FAIRLEAD: Furnished only on dragline equipped machines. Full revolving, antifriction bearing mounted in its support at front of rotating bed. All joints taper pin-connected for maximum rigidity. Two sheaves mounted on tapered shaft and sleeve for maximum stability. Shaft mounted on bronze bearings. Two large side guide rollers, case hardened and mounted on bronze bearings. Two end guide rollers. For boom lengths 70' through 100', the full revolving fairlead may be used; however, for 90' and 100' boom lengths, a rewrap may occur causing excessive wire rope wear. For continuous dragline service with boom lengths of 90' through 120', the extended hinged fairlead is recommended.

HINGED FAIRLEAD: Optional. Stationary fairlead frame mounted at front of rotating bed with tapered pins for maximum rigidity. Hinge lugs on frame move boom 66" ahead and 13" above normal boom hinge, providing greater spooling capacity on drag drum without rewrap of drag rope. Drag rope fully guided through antifriction bearing mounted hinged frame by guide sheaves and rollers. Sheaves extended for greater fleet angle on drag rope and mounted on tapered shaft for maximum stability; shafts antifriction bearing mounted.

TAGLINE: Furnished only on clamshell equipped machines. Three barrel, 30" drum. Mounted on boom.

GENERAL

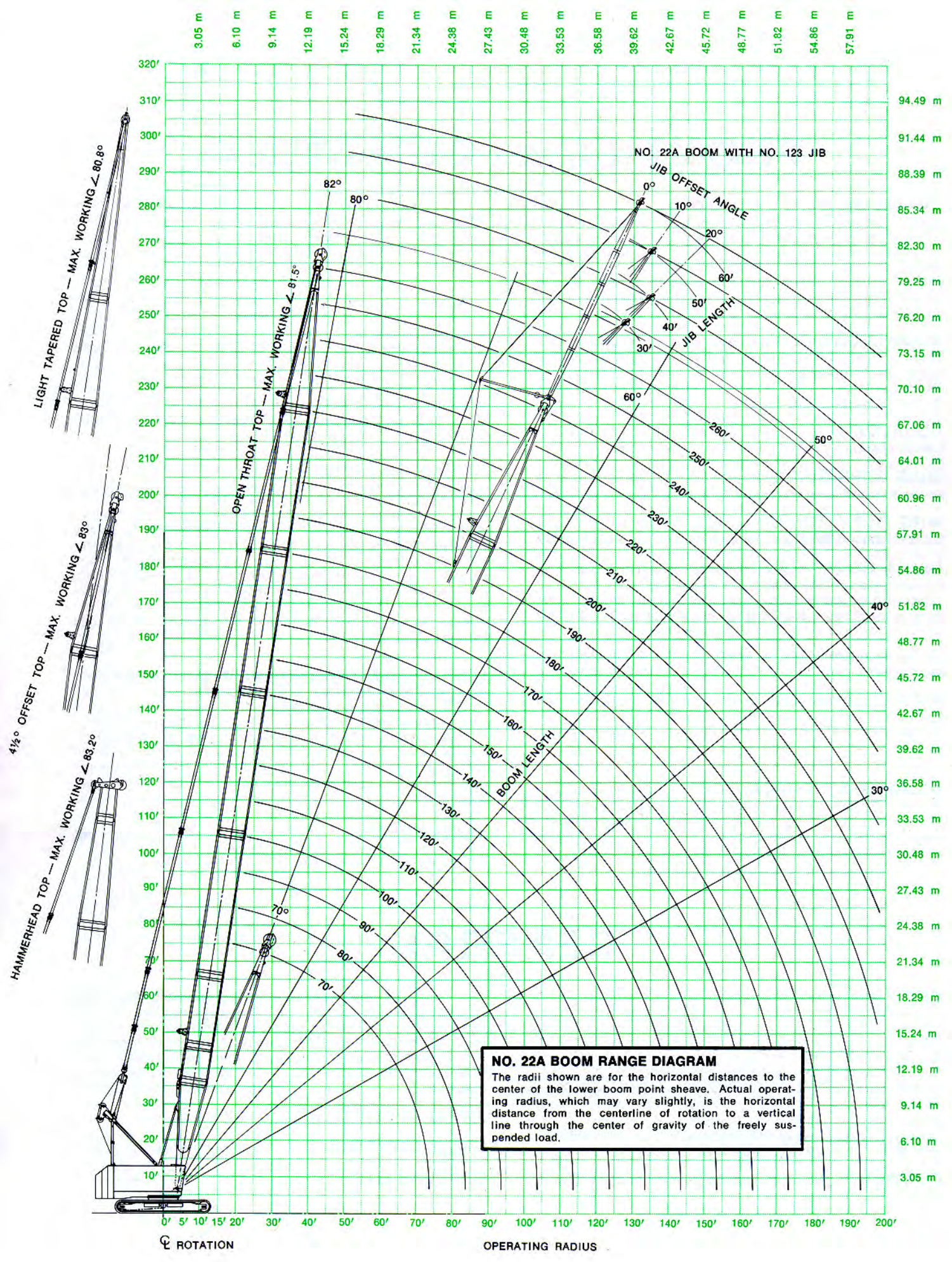
CAB: Fully enclosed with operator's station located in right front corner. Tinted rubber mounted safety glass windows provide wide angle view. Sliding door to outside; sliding window to inside. Overhead window for high boom vision, protected by hinged grill and cover. Insulated door behind operator's seat isolates machinery noise. All controls conveniently arranged. Pull-out battery box compartment at lower right of cab. Sliding service door on left side and in cab roof; hinged service door at left front of cab. Power plant radiator shutter. Ladder to roof. Optional elevated cab available with controls in both cabs; forward of main cab, 26' 6" eye level above ground.

CONTROLS: Air-controlled travel locks, steering and swing lock. Manually controlled main drum brakes, latched foot pedal operated. Graduated air controls for travel, swing, drum clutches and hydraulic boom hoist. Combination clutch and throttle controls for travel, swing and main drum clutches; first 10° movement of hand lever engages clutch; further movement increases controlled converter output torque permitting variable speed control of operation.

SWING SPEED: Variable, 4.00 RPM maximum.

TRAVEL SPEED: Variable, 1.33 MPH maximum.

GRADEABILITY: 30%.



NO. 22A BOOM RANGE DIAGRAM

The radii shown are for the horizontal distances to the center of the lower boom point sheave. Actual operating radius, which may vary slightly, is the horizontal distance from the centerline of rotation to a vertical line through the center of gravity of the freely suspended load.

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ONLY MANITOWOC OFFERS THIS ON-JOB VERSATILITY WITH THE SAME CRANE!

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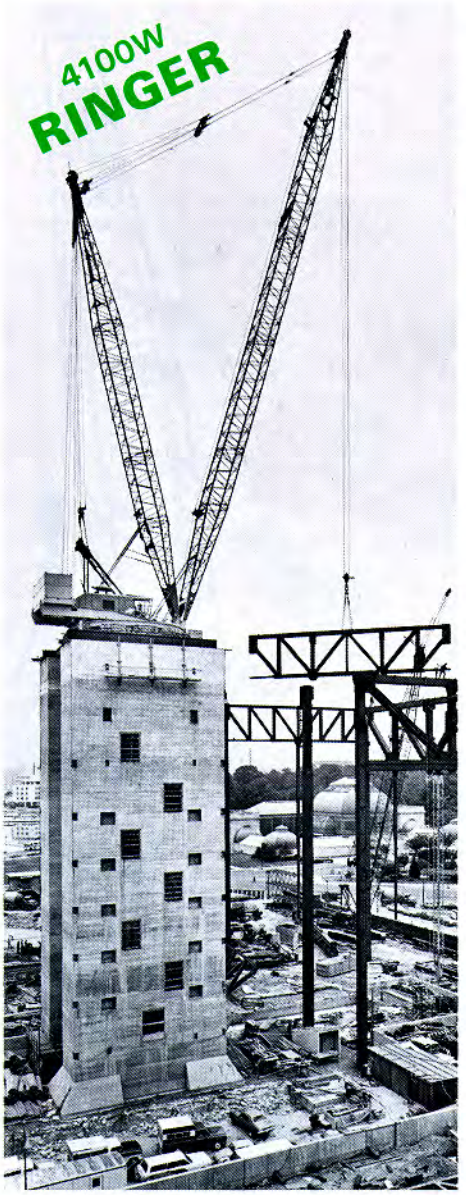

Because of a program of continuing improvements, Manitowoc Engineering Co. reserves the right to change this description at any time, without notice.

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