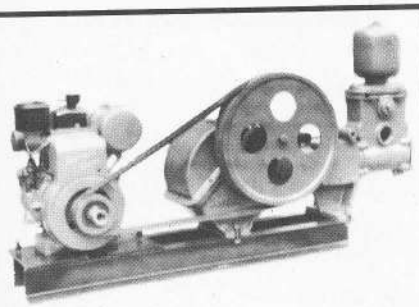
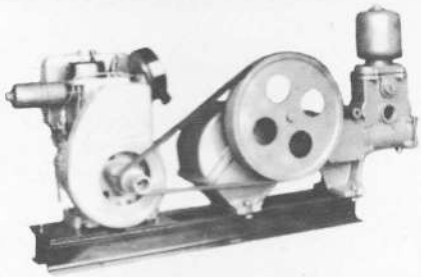
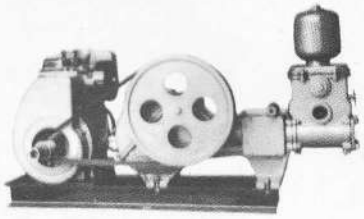
SOUTHERN CROSS AIR COOLED DIESEL ENGINES, VEE BELT DRIVING SOUTHERN CROSS PISTON PUMPS, MOUNTED ON WELDED STEEL BASES, INCLUDING SUCTION CHAMBER.



3½ H.P. EF-D Diesel Engine Driving 2½" Bore x 5" Stroke Piston Pump



6 H.P. EF-E Diesel Engine Driving 5" Bore x 5" Stroke Piston Pump



12 H.P. EF-H Diesel Engine Driving 5" Bore x 5" Stroke Piston Pump

Computer Code	Approx. Capacity G.P.H.	Ft. Hd.	Engine H.P.	Mark	Engine Speed R.P.M.	Pump Speed Stroke/Min.	Pump	Price
PR400/E	585	500	3½	EF-D	1930 3½" PCD x 4A Pulley	60 21½" PCD x 4A Pulley	2½" x 5" KH-E	$655.00
PR401/F	720	500	3½	EF-D	1860 3" PCD x 4A Pulley	50 21½" PCD x 4A Pulley	3" x 5" KH-F	702.00
PR402/G	1195	500	6	EF-E	1700 4" PCD x 4A Pulley	60 21½" PCD x 4A Pulley	3½" x 5" KH-G	869.00
PR403/H	1576	400	6	EF-E	1700 4" PCD x 4A Pulley	60 21½" PCD x 4A Pulley	4" x 5" KH-H	885.00
PR404/W	2493	225	6	EF-E	1700 4" PCD x 4A Pulley	60 21½" PCD x 4A Pulley	5" x 5" KH-J	937.00
PR405/J	2493	300	12	EF-H	1700 4" PCD x 4A Pulley	60 21½" PCD x 4A Pulley	5" x 5" KH-J	1,149.00
PR406/K	1857	500	12	EF-H	1300 6" PCD x 4B Pulley	60 21½" PCD x 6B Pulley	4" x 6" AN-I	1,397.00
PR407/L	2957	400	12	EF-H	1580 5" PCD x 4B Pulley	60 21½" PCD x 6B Pulley	5" x 6" AN-K	1,426.00
PR408/M	4300	300	12	EF-H	1750 4½" PCD x 4B Pulley	60 21½" PCD x 6B Pulley	6" x 6" AN-L	1,471.00

Prices: Net F.O.R. Capital Cities and Townsville, Rockhampton and Toowoomba, or F.O.B. Capital Cities, Townsville and Rockhampton.

Fuel Tanks: The Marks EF-D, EF-E and EF-H Engines are fitted with fuel tanks as standard and the fuel tanks are included in the unit prices.

Starting: All units are for hand starting.

"BY" Air Chamber with Check Valves fitted both sides

AIR CHAMBERS

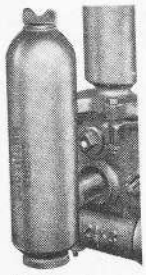
When using a cylinder pump forcing water through a discharge line 200 feet or more long, it is essential to fit an Air Chamber of ample capacity as close as possible to the pump or discharge tee, so that an even flow of water with less friction—and consequently less wear and tear on the pumping plant—will result.

A check valve must always be fitted on the discharge side of the Air Chamber to prevent the water in the pipe running back when the plug in the Air Chamber is opened for draining. A check valve should also be fitted on the inlet side of the Air Chamber in order to relieve the pump valves of the pressure in the Air Chamber.

When an Air Chamber is installed in conjunction with a Syphon Pump, then an AN-E74 Air Valve should be fitted to the Pump; provision for fitting this Valve is made in the Pump body by removing a ¼" BSP plug provided. This valve keeps the Air Chamber charged with air.

The table below sets out the recommended Air Chamber for the various sized Pumping Units where the discharge line is 200 feet or more long.

Used as AIR CHAMBER					Used as SUCTION CHAMBER For use with Syphon Pumps			
Mark	Inlet Screwed Internally	Size Pumping Unit	Size of Pump	Total Head (including Friction)	Size of Pump	Weight	Cap. Cities—Toowoomba, Rockhampton, Townsville	Branch Offices
BY-B	1½ in.	6, 8 and 10 ft. "IZ" Mills and 4 in. HD-C Pumphead	Up to 3"	Up to 100 ft.	Up to and including 2¼ in. pumps for up to 24 in. stroke. 2½", 2¾" and 3" Pumps for up to 12" stroke	21 lb.	**$14.60**	$14.80
BY-C	2 in.	6, 8 and 10 ft. "IZ" Mills and 4 in. HD-C Pumphead	Any	Any	From 2¼" up to and including 4" Pumps for up to 24" stroke. 4½", 5" and 6" Pumps for up to 12" stroke.	60 lb.	**25.00**	25.30
		12 and 14 ft. "IZ" Mills and Mark R Pump-Jacks	Any	Any				
		17 ft. "R" Mills, DJ Pumphead and 6" HD-D Pumphead	Any	Up to 150 ft.				
BY-D	2½ in.	17 ft. "R" Mills, DJ Pumphead and 6" HD-D Pumphead	Any	Any	4½", 5" and 6" Pumps for up to 24" stroke	106 lb.	**34.50**	35.00
		21 ft. "R" Mills	Any	Up to 200 ft.				
BY-E	3 in.	21 ft. "R" Mills	Any	Any				
		25 ft. "R" Mills; 9" HD-E, 12" HD-F, 15" HD-G and 18" HD-H and HD-K Pumpheads	Any	Up to 250 ft.		140 lb.	**49.30**	50.30
BY-F	3 in.	25 ft. "R" Mills; 9" HD-E, 12" HD-F, 15" HD-G and 18" HD-H and HD-K Pumpheads	Any	Any		161 lb.	**58.00**	59.00



Self Priming Suction Chamber as fitted to a Power Pump

Syphon Pump fitted with a "BY" Air Chamber acting as a Suction Chamber

SUCTION CHAMBERS

There are special Suction Chambers available as extras for Power Pumps and one should always be used. The KM-D Suction Chamber is for 2½" × 5" to 5" × 5" pumps and the KM-E is for 5" × 5" to 6" × 6" pumps. 1½" × 1¾", 1¾" × 1¾", and 2½" × 3" Pumps have Suction Chambers fitted as standard.

Suction Chamber	Power Pump Bore × Stroke	Fittings to Connect Suction Chamber to Pump	Weight		
Mark KM-D	2½" × 5"	4" × 1¼" Pipe Screwed Both Ends and 2" × 1¼" Reducing Bush	36 lb.	**$18.20**	$18.50
	3" × 5"	4" × 1½" Pipe Screwed Both Ends and 2" × 1½" Reducing Bush			
	3½" × 5" and 4" × 5"	4" × 2" Pipe Screwed Both Ends			
Mark KM-E	5" × 5" and 4" × 6"	8" × 2½" Pipe Screwed Both Ends and 4" × 2½" Reducing Bush	103 lb.	**41.40**	42.00
	5" × 6"	8" × 3" Pipe Screwed Both Ends and 4" × 3" Reducing Bush			
	6" × 6"	8" × 4" Pipe Screwed Both Ends			

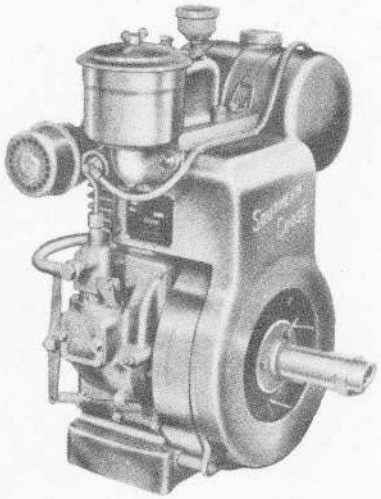
A Suction Chamber **must** be used with Syphon Pumps in all cases when used with Direct Acting Windmills. For Geared Windmills, a Suction Chamber must be used if the pump is more than 100 feet from the water or if the total suction head including friction is more than 15 feet. The Suction Chamber should be placed in the suction line as close to the pump as possible and wherever possible should be placed in line with the flow of water, **as shown in the illustration at left.**

For use with Syphon Pumps, and other cylinder pumps when needed, the "BY" Pattern Air Chambers are used as suction chambers, the sizes to use being shown in the table under "BY" Air Chambers.

AIR COOLED DIESEL ENGINES

SOUTHERN CROSS is Australia's leading air-cooled diesel engine manufacturer whose years of experience, knowledge and technical skill is your assurance of complete satisfaction and the best value for money. All engines drive from the crankshaft and there is a large range of accessories available. Being Australian made, servicing for the lifetime of the engine is assured.

The various precision built components which go into the assembly of SOUTHERN CROSS engines are made from the finest materials to exacting standards which ensure complete reliability in service, easy starting and low operating costs. You can be sure that a SOUTHERN CROSS engine will work faithfully and untiringly whatever the conditions or climate.



3½ H.P. MARK EF-D $378.00

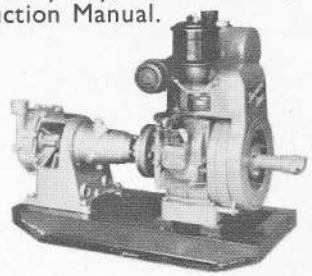
Capital Cities, Townsville, Rockhampton and Toowoomba

3.5 B.H.P. at 2100 R.P.M.
2.0 B.H.P. at 1200 R.P.M.

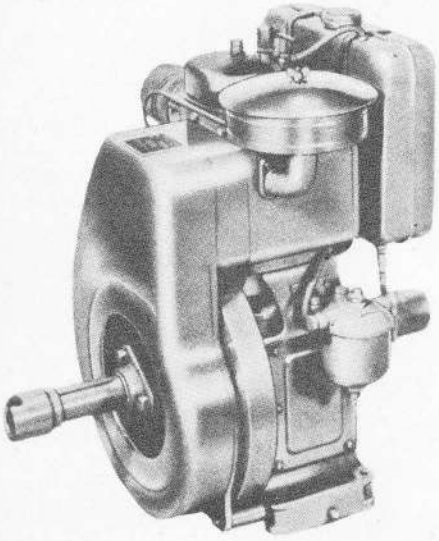
Nett weight	Packed weight	Shipping Measurement
187 lbs.	222 lbs.	6.70 cubic feet

STANDARD EQUIPMENT: Fuel filter, oil bath air cleaner, 10½ pint engine mounted fuel tank, variable speed governor, crankshaft extension for flywheel end, pulley key, crank handle, foundation bolts, set of tools and Instruction Manual.

OPTIONAL EXTRAS: Pulleys, flexible coupling, 2 : 1 reduction box, 18 gallon wall mounting fuel tank, slide rails.



3½ H.P. EF-D Diesel Engine Direct Coupled to Centrifugal Pump



6 H.P. MARK EF-E $485.00

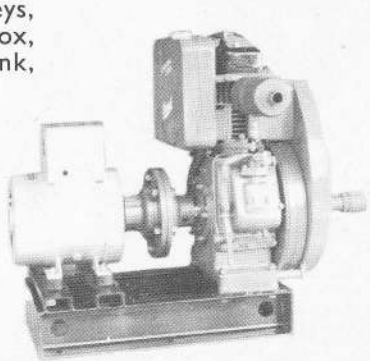
Capital Cities, Townsville, Rockhampton and Toowoomba

6 B.H.P. at 1800 R.P.M.
4 B.H.P. at 1200 R.P.M.

Nett weight	Packed weight	Shipping Measurement
307 lbs.	392 lbs.	10.24 cubic feet

STANDARD EQUIPMENT: Fuel filter, dry element air filter, acoustic type silencer, 17 pint engine mounted fuel tank, variable speed governor, crankshaft extension for flywheel end, pulley key, crank handle, foundation bolts, set of tools and Instruction Manual.

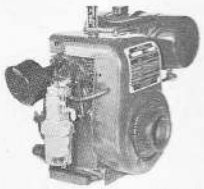
OPTIONAL EXTRAS: Pulleys, flexible coupling, 2 : 1 reduction box, 18 gallon wall mounting fuel tank, fuel transfer pump, automatic stopping fittings, Donaldson air cleaner, electric starting equipment, remote electric starting and stopping equipment, cone type clutch, variable speed control, slide rails.



3 KVA Alternator with 6 H.P. EF-E Diesel Engine

"VILLIERS" FOUR STROKE AIR COOLED PETROL ENGINES

412 H/2


415 HSV

415 HOV

425 H

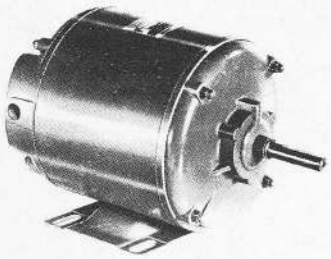
444 H2

Capacity	Villiers Specification	B.H.P.	R.P.M.	Start	Capital Cities—Toowoomba Rockhampton, Townsville	Branch Offices
120 c.c.	Type 412H/2 584X	.9 2.15	1500 3600	Rope	**$95.00**	$98.00
120 c.c.	Type 412H/2 R584X	.9 2.15	1500 3600	Recoil	**100.00**	103.00
120 c.c.	Type 412H/2 625X With 3 : 1 Reduction Gear	.9 2.15	500 1200	Rope	**112.00**	115.00
120 c.c.	Type 412H/2 624X With 6 : 1 Reduction Gear	.9 2.15	250 600	Rope	**120.00**	123.00
147 c.c.	Type 415HSV 702X	1.2 2.75	1500 3600	Recoil	**103.00**	106.00
147 c.c.	Type 415HSV R707X With 4 : 1 Reduction Gear	1.2 2.75	375 900	Recoil	**125.00**	129.00
147 c.c.	Type 415HOV 631X	1.25 3.0	1500 3600	Rope	**122.00**	126.00
147 c.c.	Type 415HOV 635X With 5.2 : 1 Reduction Gear	1.25 3.0	300 720	Rope	**155.00**	159.00
256 c.c.	Type 425H 670X	2.75 4.0	1500 3000	Rope	**157.00**	161.00
256 c.c.	Type 425H 672X With 3 : 1 Reduction Gear	2.75 4.0	500 1000	Rope	**172.00**	177.00
256 c.c.	Type 425H 326X With 5.2 : 1 Reduction Gear	2.75 4.0	300 600	Rope	**183.00**	188.00
433 c.c.	Type 444H2 750X	4.5 8.5	1500 3000	Handle	**241.00**	247.00
433 c.c.	Type 444H2 EL750X With "Siba" Starter Generator fitted	4.5 8.5	1500 3000	Electric	**355.00**	364.00
433 c.c.	Type 444H2 750XRG With 4 : 1 Reduction Gear	4.5 8.5	1500 3000	Handle	**327.00**	336.00

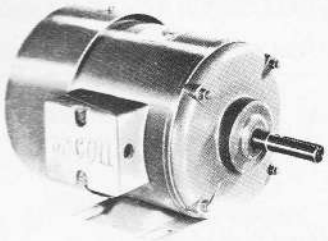
The Shaft Diameters, Keyway Dimensions and Lengths of Shafts are:—

	Type 412H/2	Type 415HSV & Type 415HOV	Type 425H	Type 444H2
Shaft Diameter—inches	.6875 .6870	.7500 .7495	.9995 .9990	1.1245 1.1250
Keyway Width—inches	.188 .187	.188 .186	.188 .187	.250 .252
Keyway Depth—inches	.098 .093	.098 .093	.098 .093	.113 .102
Length of Shaft Approx.—inches	2-3/16	2-1/16	2-1/16	3-5/16

'JUNIOR' FRACTIONAL H.P. MOTORS



Single Phase Drip Proof "Junior"



Single Phase Totally Enclosed Fan Cooled "Junior"

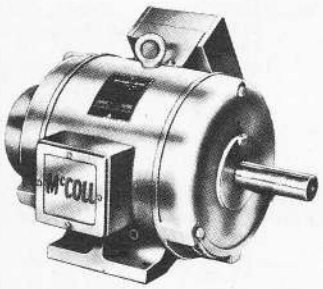
Available in—

Single Phase 230/250 Volts, 50 Cycles

Split Phase, Drip Proof Enclosure:	$\frac{1}{4}$ to $\frac{1}{2}$ H.P.
Split Phase, Totally Enclosed Fan Cooled Enclosure:	$\frac{1}{4}$ to $\frac{1}{2}$ H.P.
Capacitor Start, Drip Proof Enclosure:	$\frac{1}{4}$ to $\frac{3}{4}$ H.P.
Capacitor Start, Totally Enclosed Fan Cooled Enclosure:	$\frac{1}{4}$ to $\frac{3}{4}$ H.P.

Three Phase 400/440 Volts, 50 Cycles

Drip Proof Enclosure:	$\frac{1}{4}$ to 1 H.P.
Totally Enclosed Fan Cooled Enclosure:	$\frac{1}{4}$ to 1 H.P.



Single Phase Drip Proof

SINGLE PHASE MOTORS—

Drip Proof Enclosure

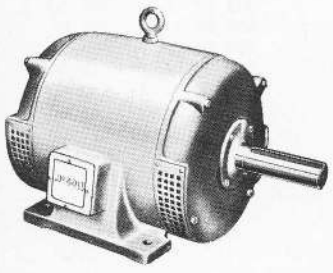
Capacitor Start, 230/240 Volts. 50 cycles: $\frac{3}{4}$ to 1 H.P.

Capacitor Start, Dual Voltage 230/240 Volts, 400/480 Volts } $1\frac{1}{2}$-5 H.P.

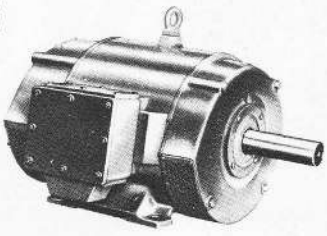
THREE PHASE MOTORS

DRIP PROOF, 400/415 and 440 Volts, 50 Cycle, Squirrel Cage Type

$\frac{1}{2}$-125 H.P.



$\frac{1}{2}$-50 H.P.

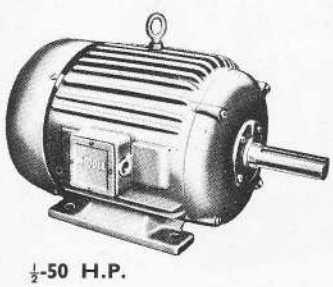


50-125 H.P.

THREE PHASE MOTORS

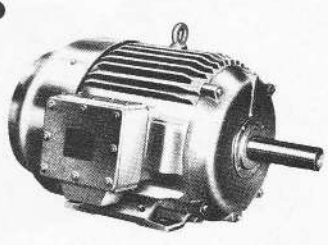
TOTALLY ENCLOSED FAN COOLED 400/440 Volts, 50 Cycles

$\frac{1}{2}$-100 H.P.



$\frac{1}{2}$-50 H.P.

REFER NEXT PAGE FOR MOTOR PRICES



50-100 H.P.

STARTERS FOR ELECTRIC MOTORS ARE NOT LISTED IN THIS BOOK. HOWEVER, WE CAN ADVISE YOU ON THE TYPE BEST SUITED FOR ANY JOB AND CAN SUPPLY.

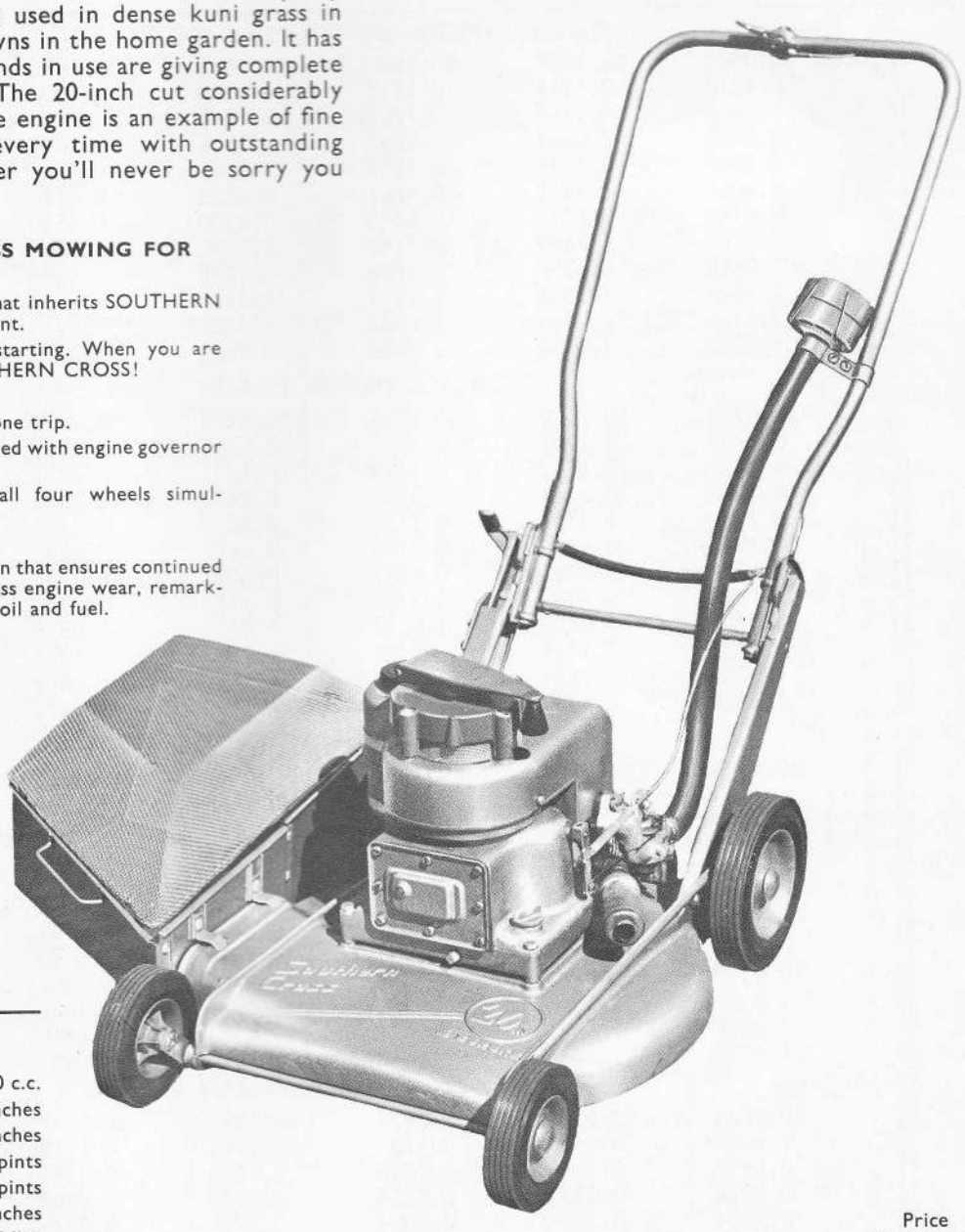
SOUTHERN CROSS 20-INCH 4-STROKE ROTARY POWER MOWER

has proved itself under the toughest conditions

This powerful all-Australian mower made entirely by SOUTHERN CROSS is being used in dense kuni grass in New Guinea to fine couch lawns in the home garden. It has been built to last, and thousands in use are giving complete satisfaction all year round. The 20-inch cut considerably reduces mowing time and the engine is an example of fine engineering—easy starting every time with outstanding reliability. This is one mower you'll never be sorry you bought.

THESE FEATURES MEAN LESS MOWING FOR WELL-KEPT LAWNS

- an outstanding 4-stroke engine that inherits SOUTHERN CROSS quality in every component.
- absolute ease and certainty of starting. When you are ready to mow, so is your SOUTHERN CROSS!
- the safest mower you can use.
- big 20" cut mows more grass in one trip.
- throttle control on handle combined with engine governor for non-stop mowing!
- instant height adjustment on all four wheels simultaneously.
- a most effective grass catcher.
- AND MOST IMPORTANT—design that ensures continued saving of money and time with less engine wear, remarkable fuel economy, no mixing of oil and fuel.



MOWER DATA

Engine Swept Volume ..	150 c.c.
Bore	$2\frac{1}{2}$ inches
Stroke	$1\frac{7}{8}$ inches
Fuel Tank Capacity ..	$2\frac{1}{2}$ pints
Oil Sump Capacity ..	$1\frac{3}{4}$ pints
Height Adjustment	$\frac{1}{4}$ inch to 2 inches
Nett Weight (Mower) ..	77 lbs.
Nett Weight (Catcher) ..	9 lbs.
Packed Weight (Mower) ..	88 lbs.
Packed Weight (Catcher) ..	12 lbs.

Shipping Measurements—Mower
$7\frac{1}{2}$ cubic feet approximately
Shipping Measurements—Catcher
$3\frac{3}{4}$ cubic feet approximately

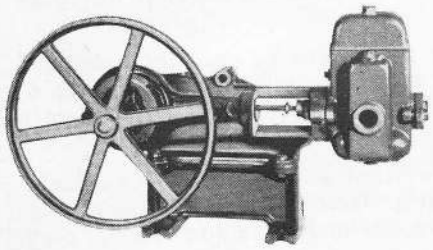
	Price All Branches
20 inch MOWER (less Catcher)	$154.50
SIDE CATCHER	$12.80

Price includes Sales Tax

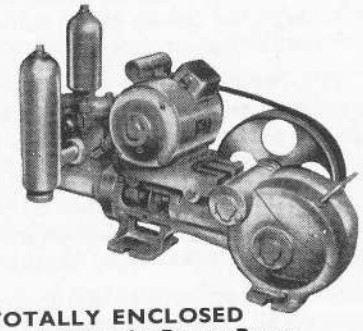
POWER PUMPS—SINGLE CYLINDER—DOUBLE ACTING

Pumping on both the forward and backward strokes

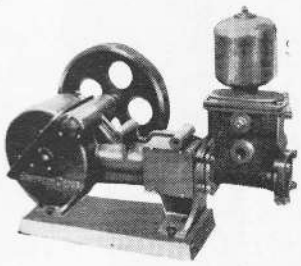
Whenever you decide a pump is needed, consider the advantages of a SOUTHERN CROSS Power Pump—because of its versatility and its capacity to deliver a constant supply against widely varying heads. Generally a Power Pump is used to pump from surface supplies such as creeks, dams, earth tanks, etc., and can be used as a primary unit or as an auxiliary to your SOUTHERN CROSS Windmill Plant during periods when there is no wind. It is particularly suitable for pumping over long distances.



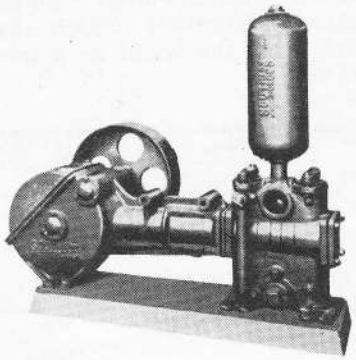
TOTALLY ENCLOSED
1½″ Bore × 1¾″ Stroke Power Pump



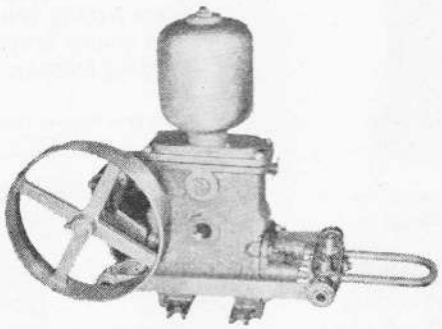
TOTALLY ENCLOSED
2½″ Bore × 3″ Stroke Power Pump



TOTALLY ENCLOSED
Fig. 3187 5″ Stroke Power Pump



TOTALLY ENCLOSED
Fig. 2550 6″ Stroke Power Pump



OPEN GEARED
3″ Bore × 5″ Stroke "KJ" Pattern
Double Acting Power Pump

AIR CHAMBER: All pumps are supplied as standard with an air chamber on the discharge side of the pump, and this evens out the flow of water through the pipe lines and prevents shock loads, particularly when pumping through long discharge lines.

SUCTION CHAMBER: 1½″ × 1¾″, 1¾″ × 1¾″ and 2½″ × 3″ pumps are fitted as standard with a suction chamber. For other sizes the suction chamber is extra, but it is recommended one be always used. This suction chamber maintains a reservoir of water in the pump when stopped and ensures a positive pumping action when restarted. It also evens out the flow of water on the suction side, preventing water hammer. All suction chambers are of the self-priming type. (Refer page 27).

WATER BY-PASS: The 5″ and 6″ stroke power pumps are fitted with a water by-pass which enables the engine to be relieved of most of the load when starting. The by-pass is opened before the unit is started up, which allows some of the water to be by-passed from the discharge back into the suction. The by-pass is closed when the engine has attained its correct speed.

ELECTRIC MOTOR MOUNTING: All totally enclosed pumps have provision for electric motor mounting, which can be supplied at an extra price.

PULLEYS: Pulleys are supplied as standard on 1½″ × 1¾″, 1¾″ × 1¾″ and 2½″ × 3″ pumps, but are extra on the other sizes.

WEIGHTS AND PULLEY SIZES—TOTALLY ENCLOSED

Pump Size	Pump Weight	Flat Pulley		Vee Pulley	
		Size	Weight	Size	Weight
1½″ × 1¾″	c qr lb 0 2 14	13½″ × 1″ face	Supplied as standard with pump	* * No Vee Pulley needed.	
1¾″ × 1¾″	0 2 14	13½″ × 1″ face		* Vee belts can drive straight	
2½″ × 3″	1 3 9	12″ × 2½″face		* on to pulley.	
2½″ × 5″	4 1 23	21½″ × 4″ face	48 lb.	21½″ × 4A or 21½″ × 6B	61 lb. 95 lb.
3″ × 5″	4 2 0				
3½″ × 5″	4 2 0				
4″ × 5″	4 2 0				
5″ × 5″	4 1 23				
4″ × 6″	8 0 0	23″ × 6″ face	92 lb.	21½″ × 6B or 28⅜″ × 5C	95 lb. 269 lb.
5″ × 6″	8 1 0				
6″ × 6″	8 1 0				

WEIGHTS AND PULLEY SIZES—OPEN GEARED

Pump Size	Pump Weight	Flat Pulley		Vee Pulley	
		Size	Weight	Size	Weight
3″ × 5″	c qr lb 1 3 18	14¾″ × 2⅞″ face	22 lb.	15⅛ × 4A	40 lb.

Pump	Price Cap. Cities Twba., T'ville. R'ton.	Branch Offices
1¾″ STROKE POWER PUMPS—Totally Enclosed		
1½″ × 1¾″ Pump with suction and air chamber (not including pulley, pump pedestal base, and electric motor base)	**$44.00**	$45.50
1¾″ × 1¾″ Pump with suction and air chamber (not including pulley, pump pedestal base, and electric motor base)	**53.00**	54.50
Electric Motor Base (1½″ × 1¾″ and 1¾″ × 1¾″ pumps)	**2.00**	2.20
Pump Pedestal Base (1½″ × 1¾″ and 1¾″ × 1¾″ pumps)	**2.00**	2.20
Pulley 13½″ dia. × 1″ Face (1½″ × 1¾″ and 1¾″ × 1¾″ Pumps)	**4.00**	4.40
Fig. 3215 3″ STROKE POWER PUMPS—Totally Enclosed		
2½″ × 3″ Pump with suction and air chambers and flat pulley	**187.00**	192.00
Electric Motor Mounting Rails	**11.40**	11.80
Fig. 3187 5″ STROKE POWER PUMPS—Totally Enclosed		
2½″ × 5″ with air chamber	**$229.00**	$235.00
3″ × 5″ with air chamber	**278.00**	285.00
3½″ × 5″ with air chamber	**324.00**	333.00
4″ × 5″ with air chamber	**339.00**	348.00
5″ × 5″ with air chamber	**368.00**	378.00

Pump	Price Cap. Cities Twba., T'ville. R'ton.	Branch Offices
Fig. 3187 5″ STROKE POWER PUMPS (Cont.)		
21½″ × 4″ Face Pulley	**$28.70**	29.50
21½″ P/D × 4 "A" Pulley	**34.70**	35.60
21½″ P/D × 6 "B" Pulley	**54.50**	56.00
Electric Motor Mounting Rails	**6.30**	6.50
Suction Chamber and fittings KM-D (2½″ × 5″, 3″ × 5″, 3½″ × 5″ and 4″ × 5″ pumps)	**18.20**	18.50
Suction Chamber and fittings KM-E (5″ × 5″ Pumps)	**41.40**	42.00
Fig. 2550 6″ STROKE POWER PUMPS—Totally Enclosed		
4″ × 6″ with air chamber	**$587.00**	$602.00
5″ × 6″ with air chamber	**618.00**	634.00
6″ × 6″ with air chamber	**664.00**	681.00
23″ Dia. × 6″ Face Pulley	**42.90**	44.00
21½″ P/D × 6 "B" Pulley	**54.50**	56.00
28⅜″ P/D × 5 "C" Pulley	**76.00**	78.00
Electric Motor Mounting Rails	**6.30**	6.50
Suction Chamber and fittings KM-E (all pumps)	**41.40**	42.00
"KJ" PATTERN 5″ STROKE POWER PUMPS—Open Geared		
3″ × 5″ with air chamber	**$135.00**	$139.00
14¾″ dia. × 2⅞″ Face Pulley	**16.20**	16.70
15⅛″ P/D × 4 "A" Pulley	**25.90**	26.60
Suction Chamber and fittings KM-D	**18.20**	18.50

PUMPING TABLE FOR TOTALLY ENCLOSED POWER PUMPS

Pump Mark	Pump Bore	Pump Stroke	Screwed Suction	Screwed Discharge	Strokes per Minute	Pump Pulley R.P.M.	Gallons per Hour	H.P. Required at Pump Pulley for Heads of: 50 ft.	100 ft.	150 ft.	200 ft.	250 ft.
—	1½″	1¾″	1″	¾″	—	230	290	¼	⅓	½	—	—
—	1¾″	1¾″	1″	¾″	—	210	400	—	½	¾	—	—
Fig. 3215	2½″	3″	1¼″	1¼″	50	250	300	⅓	⅓	½	¾	¾
					70	350	425	⅓	½	¾	¾	1
					90	450	550	⅓	½	¾	1	1¼
					110	550	670	⅓	¾	1	1¼	1½
FIG. 3187 UNITS								150 ft.	225 ft.	300 ft.	400 ft.	500 ft.
KH-E	2½″	5″	1¼″	1¼″	50	260	500	.7	1.0	1.3	1.7	2.1
					70	365	710	.9	1.4	1.8	2.4	3.1
					80	420	820	1.0	1.6	2.1	2.7	3.5
KH-F	3″	5″	1½″	1½″	45	236	660	.8	1.4	1.8	2.3	3.1
					60	315	890	1.1	1.7	2.2	2.9	3.7
					75	404	1120	1.4	2.0	2.6	3.5	4.3
KH-G	3½″	5″	2″	2″	50	260	1010	1.3	1.9	2.5	3.4	4.2
					60	315	1220	1.5	2.3	3.1	4.0	5.1
					70	370	1425	1.7	2.4	3.7	4.6	6.0
KH-H	4″	5″	2″	2″	50	260	1330	1.7	2.5	3.4	4.5	—
					60	315	1600	2.0	3.0	4.0	5.3	—
					70	370	1865	2.3	3.5	4.6	6.1	—
KH-J	5″	5″	2½″	2½″	50	260	2100	2.7	4.0	5.3	—	—
					60	315	2625	3.2	4.8	6.3	—	—
					70	370	2940	3.7	5.6	7.3	—	—
FIG. 2550 UNITS												
AN-1	4″	6″	2½″	2½″	40	245	1280	1.6	2.4	3.1	4.2	5.2
					50	305	1600	2.0	3.0	3.9	5.2	6.5
					60	365	1915	2.4	3.6	4.7	6.3	7.8
AN-K	5″	6″	3″	3″	40	245	2015	2.5	3.8	5.0	6.7	—
					50	305	2520	3.2	4.7	6.3	8.4	—
					60	365	3025	3.8	5.6	7.5	10.0	—
AN-L	6″	6″	4″	4″	40	245	2900	3.7	5.5	7.3	—	—
					50	305	3630	4.6	6.8	9.1	—	—
					60	365	4355	5.5	8.2	10.9	—	—

PUMPING TABLE FOR OPEN GEARED POWER PUMPS

								Max. Head 230 ft.
KJ-F	3″	5″	1½″	1½″	50	233	700	2 H.P.

WEIGHTS & MEASURES

LENGTH

12 inches (ins.) = 1 Foot (ft.)		4 Rods	
3 Feet = 1 Yard (yd.)		22 Yards	= 1 Chain
36 Inches		100 Links	
		8 Furlongs	
5½ Yards = 1 Rod, pole,		80 Chains	= 1 Mile
16½ Feet or perch		320 Rods	
40 Rods = 1 Furlong		1760 Yards	

SQUARE

Square Inches	Square Feet	Square Yards	Square Rods	Square Chains	Acres
144	1	—	—	—	—
1,296	9	1	—	—	—
39,204	272¼	30¼	1	—	—
627,264	4,356	484	16	1	—
6,272,640	43,560	4,840	160	10	1
4,014,489,600	27,878,400	3,097,600	102,400	2,560	640

CUBIC

1 Cubic Ft.	= 1728 cu. ins.	1 Perch of stone	= 24¾ cu. ft.
1 Cubic Yd.	= 27 cu. ft.	1 Bushel	= 1.284 cu. ft.
1 Cord Ft.	= 16 cu. ft.	1 Gall. of water	= 0.161 cu. ft.
1 Cord of wood	= 128 cu. ft.	1 Shipping ton	= 40 cu. ft.

AVOIRDUPOIS

16 Drams	= 1 Ounce (oz.)	= 437.5 Grains
16 Ounces	= 1 Pound (lb.)	= 7,000 Grains
14 Pounds	= 1 Stone	
2 Stone	= 1 Quarter	= 28 Pounds
4 Quarters	= 1 Hundredweight (cwt.)	= 112 Pounds
20 Cwts.	= 1 Ton	= 2,240 Pounds
100 Pounds	= 1 Hundredweight (cwt.) (U.S.A.)	
2,000 Pounds	= 1 Short Ton (U.S.A.)	

CAPACITY

4 Gills =	1 Pint	4 Pecks =	1 Bushel
2 Pints =	1 Quart	8 Bushels =	1 Quarter
4 Quarts =	1 Gallon	5 Quarters =	1 Load
2 Gallons =	1 Peck	1 Bag =	3 Bushels

SURVEYOR'S MEASURE

7.92 inches =	1 link	10,000 square links =	1 sq. chain
25 links =	1 rod	10 square chains =	1 acre
100 links =	1 chain	10 chains square =	10 acres
80 chains =	1 mile		

A CONVENIENT LAND MEASURE

60 ft by 726 ft. =	1 acre	5 yd. by 968 yd. =	1 acre
110 ft. by 396 ft. =	1 acre	10 yd. by 484 yd. =	1 acre
120 ft. by 363 ft. =	1 acre	20 yd. by 242 yd. =	1 acre
220 ft. by 198 ft. =	1 acre	40 yd. by 121 yd. =	1 acre
240 ft. by 181½ ft. =	1 acre	70 yd. by 69⅛ yd. =	1 acre
440 ft. by 99 ft. =	1 acre	80 yd. by 60½ yd. =	1 acre

APPROXIMATE EQUIVALENTS

1 Millimetre =	1/25th of in.	1 Kilogramme =	2¼ lbs.
2½ Centimetres =	1 in.	1,000 Kilogrammes =	1 Ton
1 Metre =	39⅜ ins.	6½ Sq. Centimetres =	1 Sq. in.
1 Kilometre =	5 Fur. (⅝m.)	1 Sq. Metre =	10¾ Sq. ft.

BUSHEL WEIGHTS OF GRAIN & PRODUCE

Names	lb. per bushel	Names	lb. per bushel
Barley	50	Malt	50
Beans	60	Oats	40
Bran	20	Peas	60
Flour	56	Pollard	20
Maize	56	Wheat	60

KITCHEN MEASURES

40-50 drops	1 teaspoon	2 cups butter	1 lb.
3 teaspoons	1 tablespoon	2⅔ cups brown sugar	1 lb.
2 tablespoons	1 fluid ounce	3¾ cups whole wheat flour	1 lb.
16 tablespoons	1 cup	1 square chocolate	1 lb.
2 cups	1 pint	2 cups raisins (heaped)	1 lb.
3 cups corn meal	1 pound	4½ cups coffee	1 lb.
4¾ cups rolled oats	1 pound	8 to 10 average eggs	1 lb.

WEIGHT OF HAY IN STACKS

The size of haystack built should be in accordance with the expected yield. Stacks are usually about as high above the eaves as below when built in correct proportions, and the following table gives an idea of the content of various sized stacks:—

Average Width. Feet	Average Length. Feet	Height to Eaves. Feet	Height of Ridge. Feet	Weight of Hay. Tons
10	20	8	4	5
10	20	10	5	7
13	28	10	10	14
16	30	12	10	20
20	50	14	10	50

AVERAGE DAILY WATER REQUIREMENTS:

Storage tanks are an essential part of your water supply plant. For stock watering purposes, particularly with windmill installations, it is recommended that sufficient storage for 5 to 7 days should be provided with 3 days as the very minimum storage capacity which should be allowed.

Stock	Gallons of Water per Day
Dairy cows	15
Dry cows	10
Beef cattle	10
Calves	5
Working horses	12
Grazing horses	8
Sheep on dry pasture	1½
Sheep on irrigated pasture	¾
Lambs on dry pasture	½
Lambs on irrigated pasture	¼
Pigs (boars and dry sows)	2½
Sows in lactation	5
Poultry (per 100 per day)	7
Turkeys (per 100 per day)	12

Note:
Except for dairy cows and sows in lactation, the winter requirements of other stock in normal winter weather would be about half the figures shown above. Note also that high production dairy cows will consume up to 18 gallons per day.

DOMESTIC REQUIREMENTS:

For kitchen, bathroom, toilet and laundry	60 gallons per person per day
Garden use	200 gallons per hour per sprinkler. (10 galls. will wet about 100 sq. ft., but 20 galls. are required to give it a good soaking.)

ELECTRICITY—FUNDAMENTAL UNITS

The **AMPERE** is the unit in which electric current strength is measured.
The **OHM** is the unit in which resistance to the flow of an electric current is measured.
The **VOLT** is the unit of electric pressure. A pressure of 1 volt is required to force a current of 1 ampere through a resistance of 1 ohm.
WATT.—This is the unit of power or rate of doing work.

$$\text{Watts} = \text{Volts} \times \text{Amperes}.$$

KILOWATT HOUR.—For commercial purposes electrical energy is charged for in units of 1,000 watt hours, and is called the Board of Trade unit or kilowatt hour.

$$\text{K.W.H.} = \frac{\text{Volts} \times \text{Amperes} \times \text{Hours}}{1{,}000} \text{ or } \frac{\text{Watts} \times \text{Hours}}{1{,}000}$$

Example: To find the cost of burning three 60-watt lamps for five hours, assuming the cost per unit to be 5c.

$$\text{Cost} = \frac{60 \times 3 \times 5 \times 5c}{1{,}000} = 4.5c$$

$$\textbf{HORSEPOWER} = \frac{\text{Watts}}{746} \qquad \textbf{KILOWATTS} = \frac{\text{Watts}}{1{,}000}$$

The normal voltage for household appliacnes is 240; for 3-phase motors, etc., 415.

HINTS:
Do NOT take risks with electricity.
Do NOT use frayed or damaged cords or flexibles on portable appliances—THEY ARE DANGEROUS.
WATER is injurious to most electrical equipment.
Do NOT handle wet or damp metal-clad switchgear unless it is effectively EARTHED. If in doubt, have it inspected by a competent electrician, or cover the hand with a rubber glove, several thicknesses of dry cloth, or similar material before attempting to touch.

USEFUL RULES AND INFORMATION

By doubling the diameter of a pipe or cylinder its capacity is increased four times.
To find the area of a circle or pipe, square the diameter and multiply by .7854.
To find the circumference of a circle multiply the diameter by 3.1416.
To find the diameter of a circle multiply the circumference by .3183.
Sharp angles in a pipe line cause a large increase in friction, therefore use bends and easy curves instead of elbows.
A column of water 1 ft. in height exerts a pressure of .433 lbs. per sq. inch.
One Imperial Gallon of water at 62 deg. F. weighs 10 lbs. and contains 277.274 c. inches.
One Imperial Gallon of SEA WATER weighs approximately 10.33 lbs.
One Imperial Gallon of water equals 1.2 United States Gallon.
One cubic foot of water equals 6¼ Imperial Gallons.
One inch of water over an acre equals 22,610 gallons.
One inch of vacuum is equal to 1.13 ft. To convert inches vacuum to feet suction, multiply by 1.13.
STATIC HEAD is the vertical height of a column of water. Head is always expressed in feet.
FRICTION is the resistance which the walls and irregularities inside pipes offer to the flow of water.

NOTE: Throughout the Catalogue the gallons referred to are IMPERIAL GALLONS.
Convert to U.S. gallons by multiplying the number of Imperial gallons by 1.2.

Number of Gallons Discharged per Minute Through New Wrought Iron Pipe Lines 1,000 Feet Long

HEAD (or Fall in Feet)	INTERNAL DIAMETER OF PIPE												HEAD (or Fall in Feet)
	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	
1	.05	.1	.45	1	1.5	3	6	10	14	20	35	50	1
2	.08	.25	.75	1.5	2.5	5	10	16	22	31	60	100	2
4	.16	.45	1.25	2.2	3.6	8	15	25	36.6	49	90	150	4
6	.2	.6	1.5	2.8	4.5	10	18.5	30	46.1	64	120	190	6
9	.25	.75	2.1	3.7	5.75	12.5	23.5	38	57	79.5	150	236	9
12	.3	.9	2.5	4.3	6.9	15	27.5	44	67	95	173	276	12
16	.39	1.15	2.75	5	8.2	17.5	32	52	77	110	200	330	16
20	.46	1.4	3.1	5.6	9.1	19.4	36	58	86	126	225	373	20
25	.55	1.65	3.5	6.3	10.5	22	40	65	96	140	256	418	25
30	.65	1.9	3.9	7	11.5	24.2	44.2	72	105	156	282	458	30
40	.75	2.25	4.5	8	13.3	28.3	52.4	83	124	180	330	524	40
50	.85	2.5	5.2	9	15	32.3	58.5	93.5	139	204	372	580	50
75	1.1	3	6.4	11.25	18.5	40.3	72	118	173	256	463	713	75
100	1.3	3.7	7.5	13.8	22.4	45.5	80.7	133	198	285	527	823	100
150	1.46	4.25	9	16	26.6	56.5	103	167	246	364	637	1013	150
200	1.6	4.8	10.3	18.7	31.3	66.5	120	193	288	428	737	1160	200
250	1.9	5.5	11.7	21.25	35.2	75	136	220	328	480	825	1303	250
500	2.8	8	17	31	51	110	198	326	440	670	1166	1840	500

FOR NEW WROUGHT IRON PIPES LONGER OR SHORTER THAN 1,000 FEET

When Pipe Line is more or less than 1,000 feet long, multiply the factor given below by the corresponding number in table above to calculate the correct number of gallons

Length	50′	100′	150′	200′	300′	400′	500′	750′	1000′	1250′	1500′	1750′	2000′
Factor	4.907	3.396	2.738	2.351	1.895	1.627	1.445	1.165	1.0	.888	.806	.743	.692
Length	2500′	3000′	4000′	5000′	6000′	7000′	8000′	9000′	2 mls.	3 mls.	4 mls.	5 mls.	10 mls.
Factor	.615	.558	.479	.426	.387	.353	.332	.311	.287	.230	.198	.172	.122

FOR POLYTHENE PIPE—MULTIPLY BY 1.36 FOR APPROX. GALLS.

CAPACITIES OF ROUND VESSELS 1 FOOT DEEP

Diameter	Gallons	Diameter	Gallons	Diameter	Gallons	Diameter	Gallons	Diameter	Gallons
6 in.	1.2	1 ft. 10 in.	16.5	4 ft. 3 in.	88.4	8 ft. 3 in.	333.1	13 ft. 0 in.	827.1
7 in.	1.7	1 ft. 11 in.	18.0	4 ft. 6 in.	99.1	8 ft. 6 in.	353.6	14 ft. 0 in.	959.4
8 in.	2.2	2 ft. 0 in.	19.6	4 ft. 9 in.	110.4	8 ft. 9 in.	374.7	15 ft. 0 in.	1101.3
9 in.	2.7	2 ft. 1 in.	21.2	5 ft. 0 in.	122.4	9 ft. 0 in.	396.5	16 ft. 0 in.	1240.0
10 in.	3.4	2 ft. 2 in.	23.0	5 ft. 3 in.	134.9	9 ft. 3 in.	418.8	17 ft. 0 in.	1406.0
11 in.	4.1	2 ft. 3 in.	24.8	5 ft. 6 in.	148.1	9 ft. 6 in.	441.8	18 ft. 0 in.	1575.0
1 ft. 0 in.	4.9	2 ft. 4 in.	26.6	5 ft. 9 in.	161.8	9 ft. 9 in.	465.3	19 ft. 0 in.	1756.0
1 ft. 1 in.	5.7	2 ft. 5 in.	28.6	6 ft. 0 in.	176.2	10 ft. 0 in.	489.5	20 ft. 0 in.	1950.0
1 ft. 2 in.	6.7	2 ft. 6 in.	30.6	6 ft. 3 in.	191.2	10 ft. 3 in.	514.3	21 ft. 0 in.	2148.0
1 ft. 3 in.	7.6	2 ft. 8 in.	34.8	6 ft. 6 in.	206.8	10 ft. 6 in.	539.6	22 ft. 0 in.	2356.0
1 ft. 4 in.	8.7	2 ft. 10 in.	39.3	6 ft. 9 in.	223.0	10 ft. 9 in.	565.6	23 ft. 0 in.	2575.0
1 ft. 5 in.	9.8	3 ft. 0 in.	44.1	7 ft. 0 in.	239.8	11 ft. 0 in.	592.2	24 ft. 0 in.	2806.0
1 ft. 6 in.	11.0	3 ft. 3 in.	51.7	7 ft. 3 in.	257.3	11 ft. 3 in.	619.5	25 ft. 0 in.	3044.0
1 ft. 7 in.	12.3	3 ft. 6 in.	60.0	7 ft. 6 in.	275.3	11 ft. 6 in.	647.3	26 ft. 0 in.	3294.0
1 ft. 8 in.	13.6	3 ft. 9 in.	68.8	7 ft. 9 in.	294.0	11 ft. 9 in.	675.6	27 ft. 0 in.	3582.0
1 ft. 9 in.	15.0	4 ft. 0 in.	78.3	8 ft. 0 in.	313.3	12 ft. 0 in.	704.8	28 ft. 0 in.	3825.0

HYDRAULIC CONVERSIONS

One Imperial Gallon =
277.274 cubic inches
.16 cubic foot
10.00 lbs.
4.536 litres
1.2 U.S.A. gallon

One cubic inch of water =
.03607 lb.
.003607 imperial gallons

One cubic foot of water =
6.23 imperial gallons
7.48 U.S.A. gallons
28.317 litres
.0283 cubic metre
62.35 lb.
.028 ton

One pound of water =
27.72 cubic inches
.10 imperial gallon
.4536 kilogram

One ton of water =
35.9 cubic feet
224 imperial gallons
1000 litres (approx.)
1 cubic metre (approx.)

One kilo of water =
2.204 lbs.

One atmosphere =
14.7 lbs. per sq. inch

One imperial gallon crude petroleum =
8.2 lbs. (approx.)

One ton petroleum =
275 imperial gallons (approx.)

One foot of water at 39.1° F. =
62.425 lbs. per sq. foot
0.433 lbs. per sq. inch
.0295 atmosphere

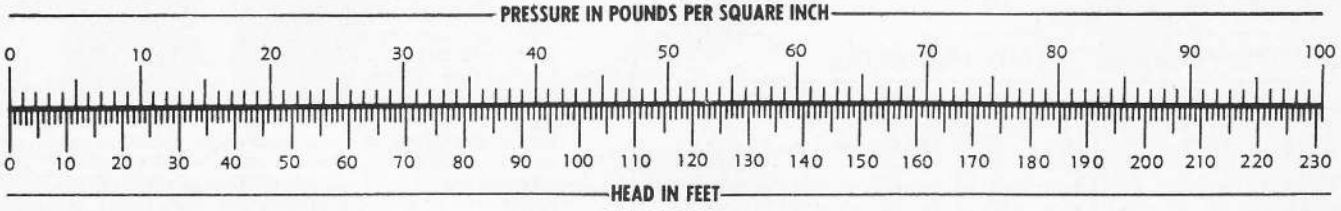
One lb. per sq. inch =
27.7 inches of water

CAPACITIES PER FOOT OF PIPING AND CASING

Size of Piping ..	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	3 in.	3½ in.	4 in.
No. of Gallons ..	.012	.023	.038	.067	.086	.144	.238	.337	.449	.585

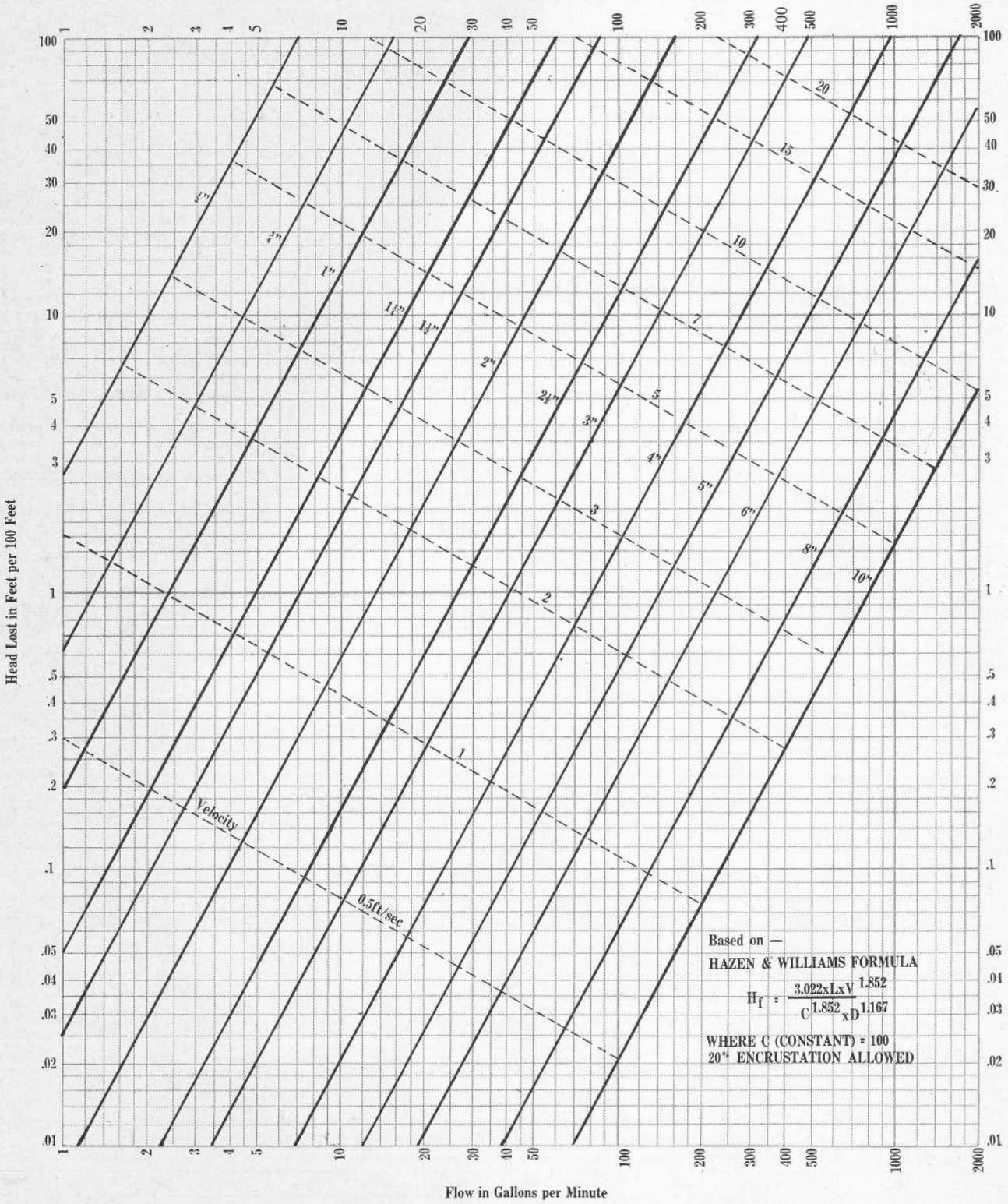
Size of Casing ..	4 in.	5 in.	6 in.
No. of Gallons ..	.477	.765	1.076

PRESSURE HEAD CONVERSION TABLE



FRICTION HEAD IN PIPE FITTINGS

The figures shown are the equivalent length of straight pipe in feet on which Friction Head is calculated.

FITTINGS	Pipe Size									
	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.
Malleable Tee	4	5	6	8	9	12	14	17	23	28	35
Malleable Elbow	2	2	3	4	5	6	7	8	12	14	18
Footvalve and Strainer ..	—	—	—	10	12	15	18	21	30	38	48
Bend	2	2	3	3	4	4	6	7	9	12	15
Swing Check Valve	—	—	—	8	9	10	15	18	25	33	40
Gate Valve—Fully Open ..	1	1	1	1	1	2	2	2	3	3	4

FRICTION LOSS AND VELOCITY IN MEDIUM GALVANISED PIPE