



Center Pivot + Towable Pivot + Drivable Mobile Pivot+ Lateral Move
RAINFINE (DALIAN) IRRIGATION CO.,LTD.

Why Rainfine ?

To save people from poverty and hunger
world over, we should work hard everyday.

RAINFINE
Irrigation Solution.

易三集團 EYAN GROUP **RAINFINE**
Irrigation Solution

... **500**
Set/Year

Production 500 sets/year



RAINFINE irrigation

We have started to make pivot irrigation machines since 2002.
 We have good design of toolings and dies for mass production.
 We are certified by ISO9001 system.
 We have a great team for technical development.
 We have efficient installation and training program.
 We have a good team for after sale services.

Our products are mainly supplied to USA,
 Argentina, Australia, Brazil, Chile, Ghana,
 Germany, Ethiopia, France, New Zealand, Libya,
 Mongolia, Iraq, Paraguay, Saudi Arabic, Sudan,
 UAE, Zambia, Kazakhstan and Russia.



- a.** Warehouse in Dalian Free Trade Zone for international market.
- b.** Warehouse in Dalian factory for domestic market.
- c.** COSCO works as our partner for warehousing logistics and shipment management.
- d.** No errors in shipment of all components.



... **800**
Meters

The longest pivot can be 800 meters.



Center Pivot

One end of the machine is fixed and other spans move clock wise by motor driven tires, this system is called fixed center pivot system.

River water or bore well water is supplied from the fixed point, transfered through main pipes and sprinklers, applied to the field. The advantage of this system is to use less labor and water resources to irrigate 13ha- 200ha from one water feeding point.

The specially designed steel structure can satisfy different lengths of the machines. The smallest machine is designed only one span plus one overhang (80m in length) which is for small land operation. The heavy duty design can be extended to more than 19 spans (800m). The angles, bolts and pivot anchors are strong enough to fight windstorm.



... **500**
Meters

500 meters towable center pivot is towing.

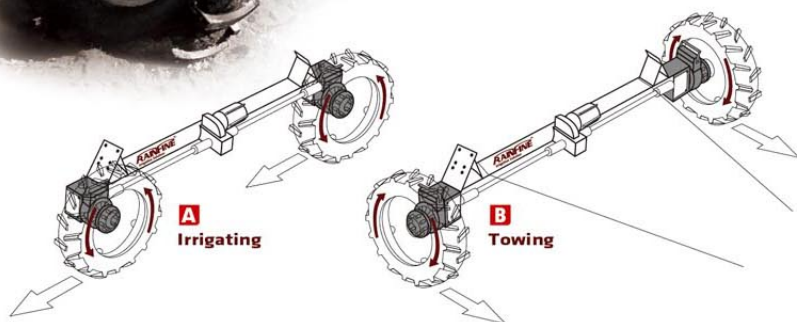


Towing gearbox position

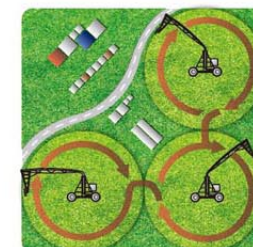


Towable

Three or four wheels are assembled on the center part of pivot. The system can be moved from one place to another by towing main pivot point tower with a tractor. Steel cables are used to secure structure and minimize possibility of damage. This system is called tow-able center pivot (mobile) system. The advantage of this design is to use one machine for two or three different lands. The investment is more economical.



- a.** Generator 10KW-15KW for electric power supply to pivot.
- b.** End gun on/off control at any angle.
- c.** End field barrier as part of auto stop reverse system is used for part circle pivots.





... **800**
Meters

The longest lateral move 800 meters two wings.



4 Wheels cart 1

Lateral cart 8"

4 Wheels cart 2

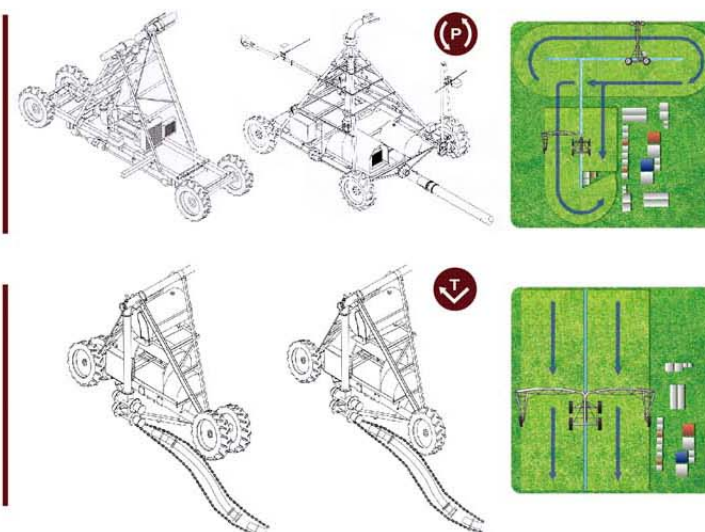
Lateral & Pivoting
cart 8"

Hose feed 1

4 Wheels 8"

Hose feed 2

Lateral & Towable
4 Wheels 8"



Ditch feed:

- Standard lateral
 - Pivoting lateral (require temporary bridges)
- Towable lateral** 2 wheels maximum 250m

Hose feed lateral maximum 450m:

- Standard lateral
- Pivoting lateral

Lateral

All the machine works in linear movement by motor driven wheels to irrigate rectangle area, this system is called lateral move system or linear system. Unlike center pivot systems, where the area irrigated is dependent only on the length of the machine, lateral system area is determined by two factors: system length and travel distance.

This system is mainly used for grasses, grains, vegetables, cotton and sugar cane crops. the length can be from 1 span to 18 spans, normally more than 7 spans system is economical.

Determination of lateral move system capacity is critically important since it is necessary to properly design the following:

- Water source system: bore well capacity/pumps/kw.
- Water supply system: ditch feed / hose feed.
- Lateral move system: pipeline size/power/pump/generator system.



Drivable mobile pivot can be
350 meters long.

... **350**
Meters



Control Panel



16 Wires Collector Ring

Drivable control panel :

- Irrigation operation / Driving operation
- Tire turning / Tire turning back
- Drive / Stop
- Driving indicator
- Emergency stop



Drivable mobile pivot

- a.** Two wheels on the span can be turned automatically by the motor at the center of the drive tube.
- b.** Four wheels on the pivot point can be turned by the motor at the center of the pivot.
- c.** Pivot can be driven by the motors to any place you want.
- d.** All the wheels can be turned back to the irrigation position by motors after towing.

Why Rainfine ?

For superb design quality

Truss design is the most important parts on pivot irrigation system. The structural mechanics are precisely calculated by computer and tested in tough road. It can stand 20 years long lasting work without any bending or breaking.

The quality of the truss structure can not be judged by eyes of the people but by the longer life of working in field.



■ The high quality overhang cable is used in longer overhang. This design can help farmers to increase yield with less investment.



■ Rainfine 500 meters towable pivot in Kazakhstan is used in 3 different fields and is designed to tow every one or two weeks in 400mm furrow potato fields . After 4 years working, the structures and truss rods have no any distortion

Why Rainfine ?

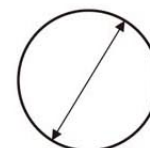
Amazing 22 mm truss rod

Truss rods are the key parts for holding the total weight of the pivot like the bridge sling. The way of processing is very important because if the processing is not correct, the truss rods would be broken when the pivot is working and cause the falling down of the complete machine.

We use high frequency electric heating system to heat the end of the steel rods and use head forging machine to forge both ends of the steel rods.

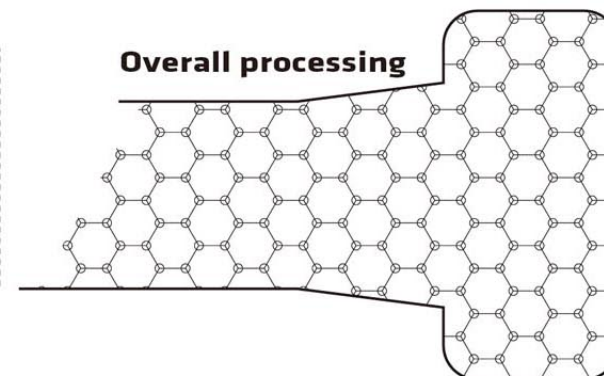
We use 22mm diameter rods instead of 19mm to make them stronger than other manufacturings.

You can find that the steel rod and the headed part are exactly the same Molecular. The quality standard is that this truss rod should be 60,000psi yield strength.



22mm

Overall processing



Yield Strength

60,000 PSI = 421.8 N/mm²

Yield strength of the rod material is 60,000 PSI (421.8 N/mm²)

19mm

Section area:

9.5*9.5*3.14=283.38mm²

Total strength:

421.8mm²*283.38mm²=119,529N

≈12 T

22mm

Section area:

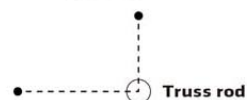
11*11*3.14=379.94mm²

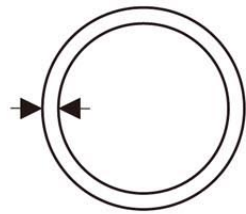
Total strength:

421.8mm²*379.94mm²=160,259N

≈16 T

22mm truss rod can stand 16 tons strength which is 34% higher than 19mm ones.





4 mil
Galvanizing

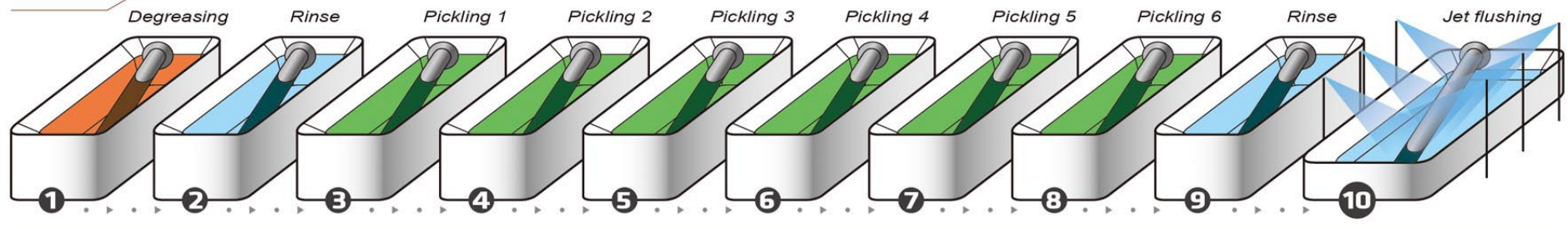


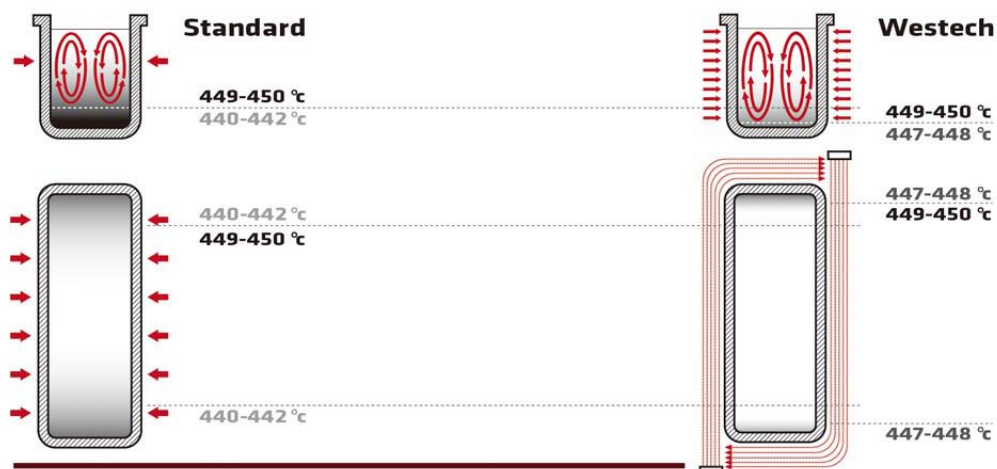
Why Rainfine ?

Galvanizing

All the steel parts are galvanized by hot dip galvanization in the top leading galvanizing plant in China. The thickness is 2.0 – 4.0 mil, which is the US galvanization standard of pivot manufacture ASTM A123/123m-02.

15 Steps | Galvanizing process to ensure quality products.



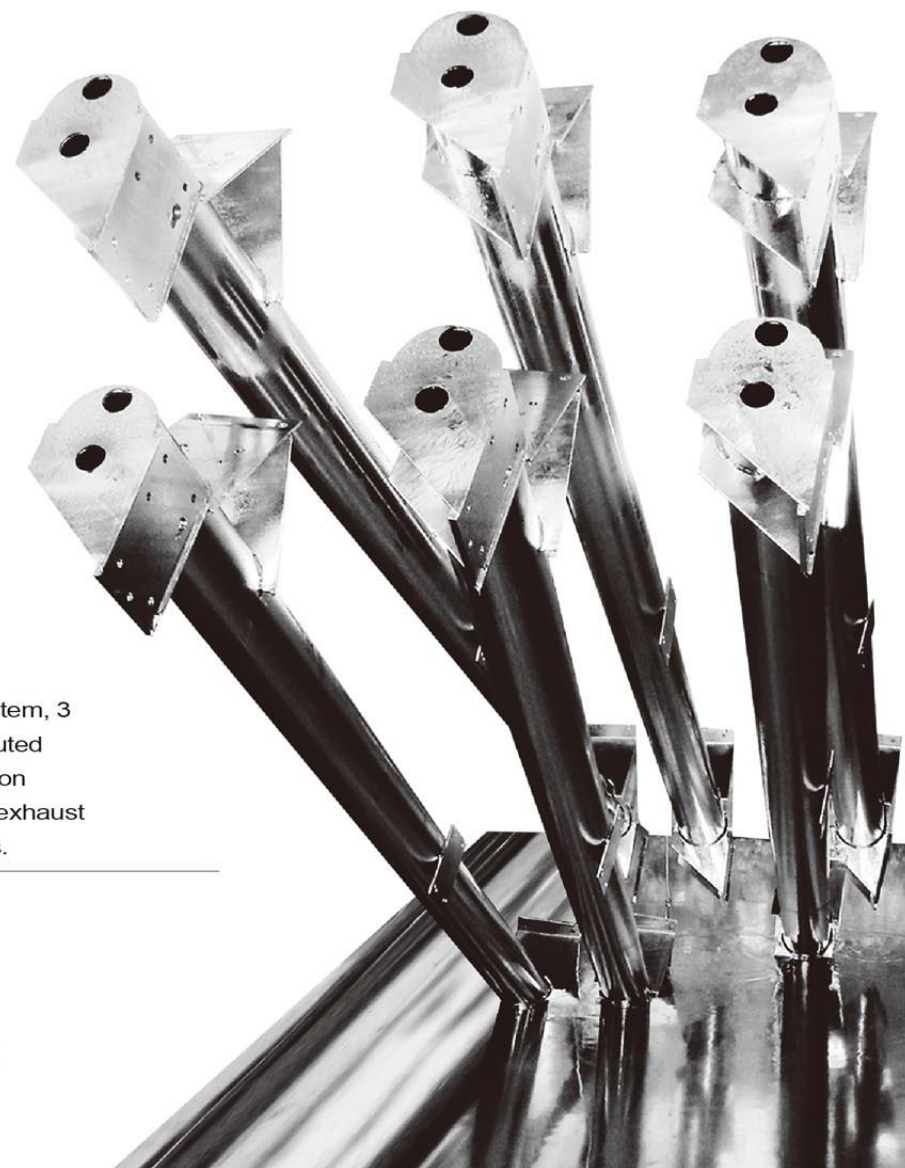
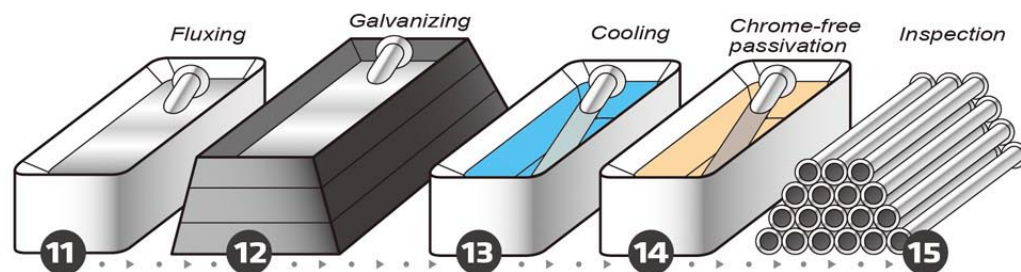


Galvanizing Kettle:

Inside Dimension: 13,500 long x 2,000 wide x 3,000 mm deep
By W. Pilling of Riepe, Germany, the world's leading kettle manufacturer.
50mm wall thickness, European Special Grade Plate (see analysis below)
Typical Analysis: C, .08%; Mn, .5%; P, .02%; S, .02%; Si, traces only

EnviroTherm Pulse Fired High Velocity Galvanizing Furnace:

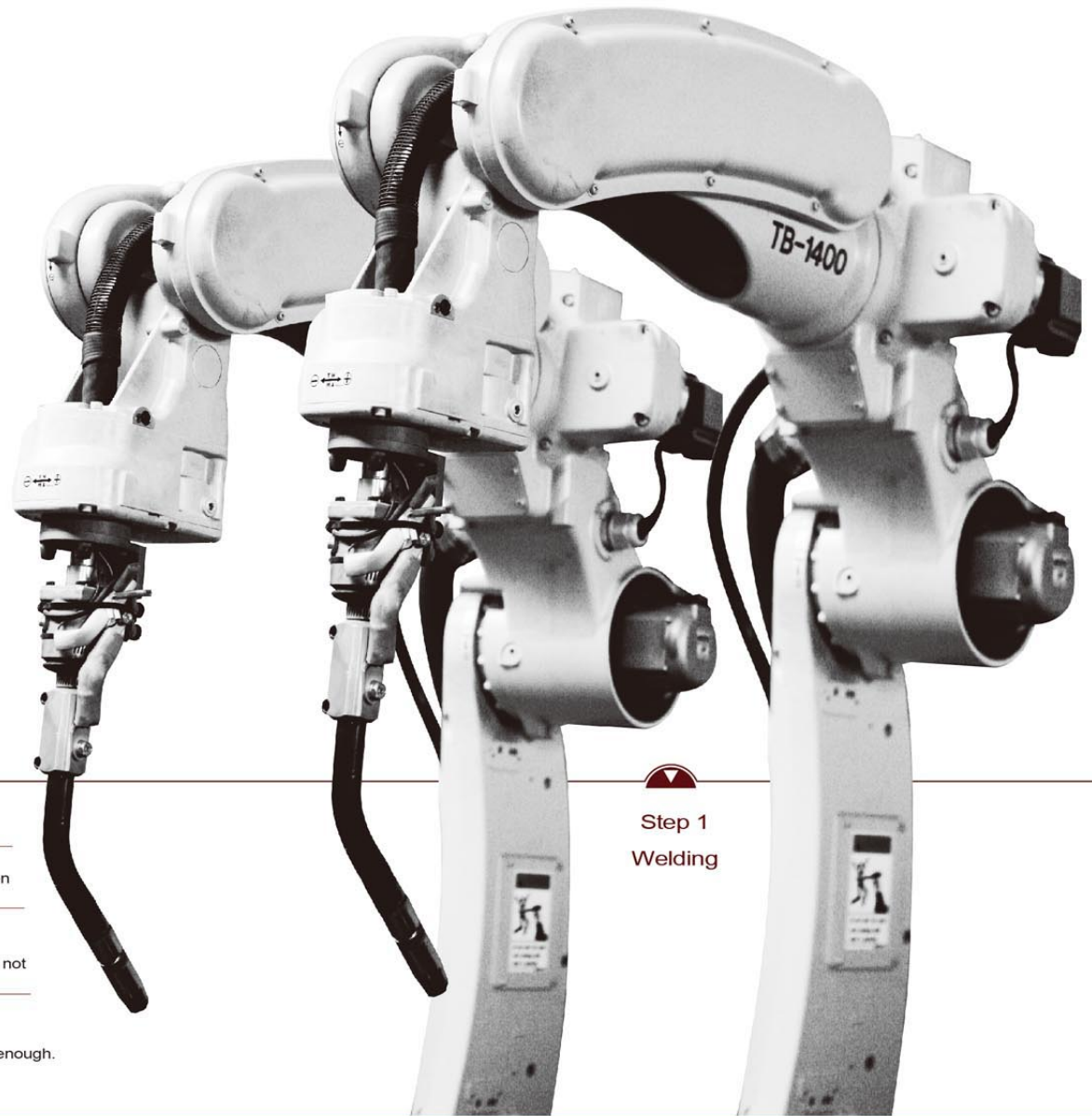
Rated 15.0 mt / hr., Relay Logic Control system, 4 burner high velocity pulse fired LNG system, 3 term PID temperature control system, 150 mm thickness high density ceramic fiber convoluted module insulation system, four radius interior corners, kettle support system, dross protection system, auto melt out program, combustion air fan, sealed burner viewing ports, insulated exhaust duct to 4m, epoxy coating. Includes dimensional layout drawing of furnace pit with loadings.



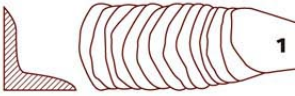


Why Rainfine ?

Who is the welder

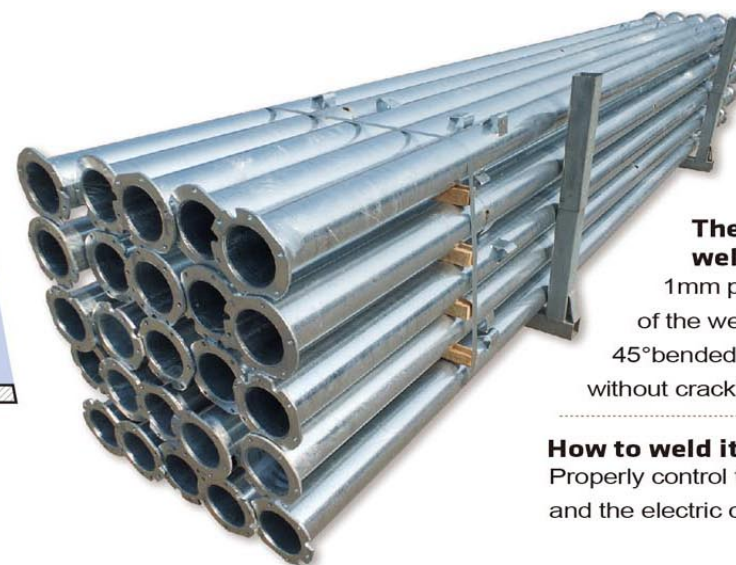
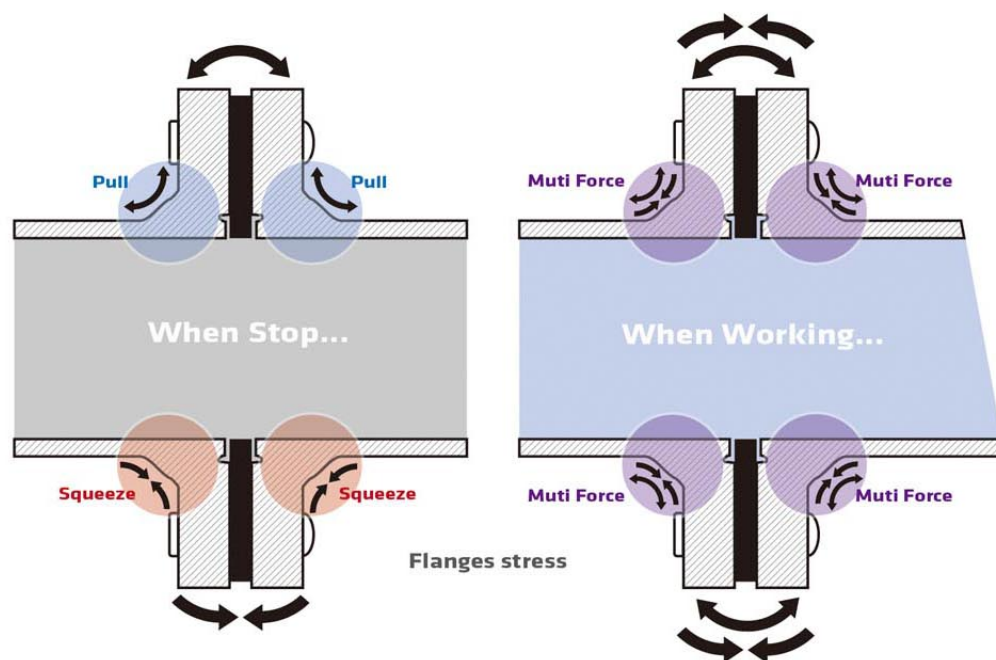
Pivot pipes are the most important parts of the machine. Rainfine uses 8 robots instead of workers to weld the flanges, bracket. This is the guarantee of the quality of all the pipes. On the process of manually welding, it is very difficult to control the welding speed and cause the quality problem as below.



Step 1
Welding

	Welding	Speed	Quality
 1	Manually	Slow	Too much penetration even melt holes on the pipe
 2	Manually	Fast	Too less penetration even not welded.
 3	Robot	Proper	Good penetration, strong enough.

Welding



The best quality flanges welded on pipe

1mm penetration on the section of the welding part.
45°bended hammer impact test without cracking.

How to weld it

Properly control the speed of pipe rotation and the electric current of the welding.



1mm
Penetration

Step 2
Testing



Step 3
Testing

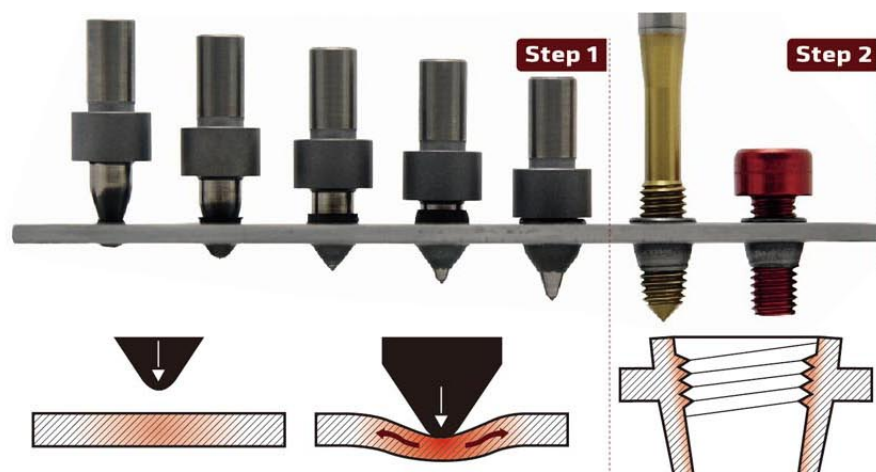
45°
Bended no
cracking



Why Rainfine ?

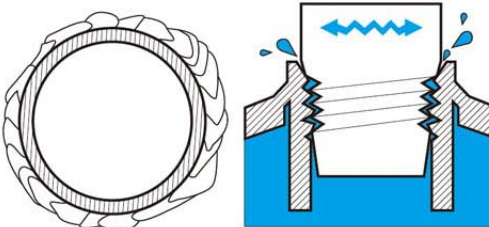
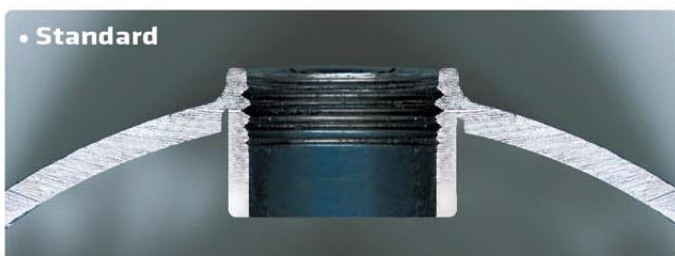
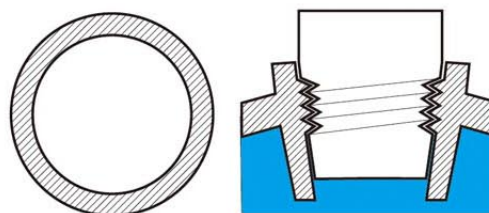
Why formdrill

The Formdrill is a thermal drilling and bush-forming tool that attaches to the chuck of any high-powered drill-press. Rotating the Formdrill at high speed under high axial load (the drill-bit being strongly pushed towards the work piece) generates frictional heat.



1. The temperature of the Formdrill rapidly climbs to around 650-750 °C, while the focal area of metal reaches around 600 °C. This heat softens a small section of the metal's structure and allows the formdrill to penetrate the work piece. There is absolutely no cutting involved during the creation of the hole. Unlike a conventional drill, the strength of the work piece is not compromised by the removal of material. Instead, the heated material Forms away from its original position to form a 360° bush around the periphery of the hole. During initial stages of the Formdrill process, the heated material rises against the tool's leading taper but once the surface is completely penetrated, the bulk of the displaced material forms to the underside of the hole. This underside bush usually projects downwards by three times the thickness of the material, while the raised collar sits only slightly above the surface.

2. Once a bushed hole has been formed in a workpiece, it's quite likely that you'll want to tap a thread into it.



Thread feature :

This can be done using conventional cutting taps or - preferably - with a cold-form Formtap

Again, this process does not involve removal of material. Formtapping results in maximum thread wall strength. Other advantages include quick tapping speed, reduced chance of pitch errors and no straying material.

This is the best way to be sure of the quality of outlet holes on millions of pipes.

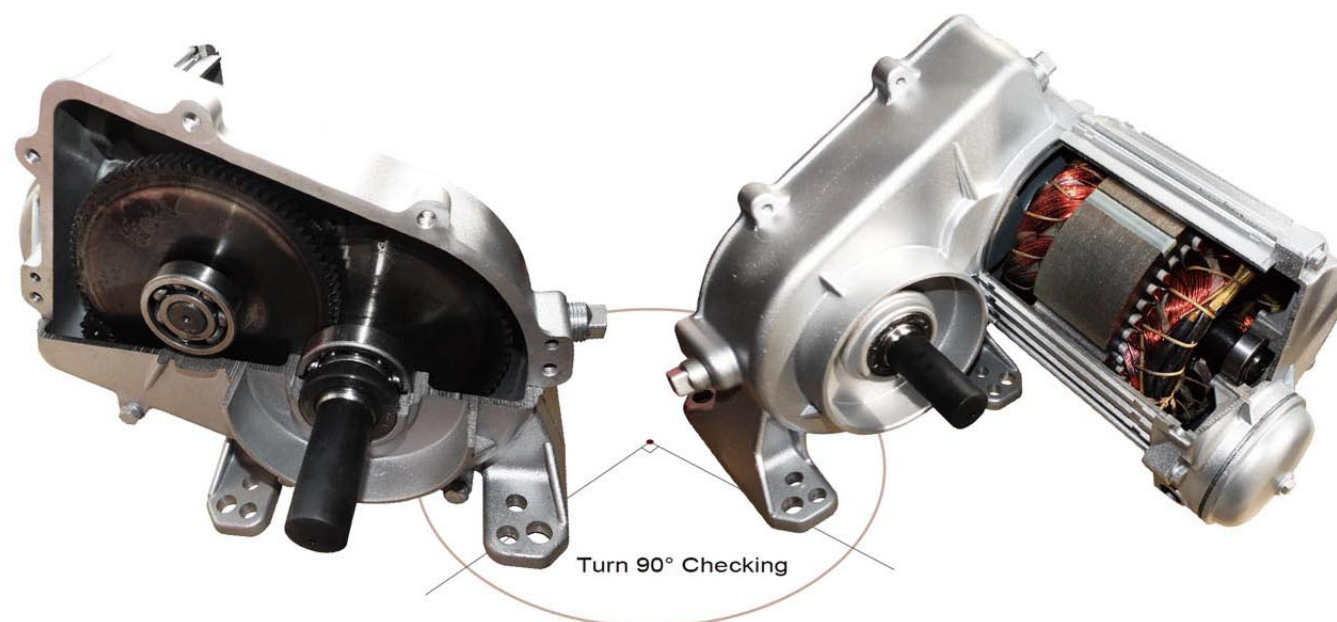


Why Rainfine ?

Heavy duty gearbox

- a.** The worm consists of high strength forged steel with a Brinell hardness of 210 while the worm gear is manufactured from ductile cast iron with a relatively wide variation of hardness. This is totally different from other manufacturers who make it by grey pig iron.
- b.** The worm and gear pressure angle have been designed at 4-1/2 degrees. This angle was selected based upon review of extensive engineering information and has been borne out by extensive testing and proven field result. The 4-1/2 degree pressure angle exceeds the necessary strength requirement while providing a greater efficiency than would be possible with large angle.
- c.** The output shaft is a full 2-1/4" diameter shaft. Although other gearbox may use a larger shaft, the actual strength is determined by the load applied and physical properties of the shaft material. The gearbox overhung load point is relatively small at 1-1/2" from the bearing to the wheel mounting flange. The shaft material is a high-strength, forged steel.
- d.** The worm end caps made from cast iron held by 4 bolts to reduce the possibility of working loose in the field – unlike system using a threaded nut design.
- e.** Ratio: 50:1

Type	Tooth profile	Feature	Region	Efficiency
 a. Standard	Small meshing angle	Less wear strength	30~90days/Year In Russia	40~45%
 b. Heavyduty	Big meshing angle	More wear strength	300days/Year In Africa	55%



Why Rainfine ?
High quality motor

Center motor drive speeds for 50Hz/380V

Motor	Drive speed in 50 Hz (RPM/50Hz)	RATIO	Wheel speed (RPM)	Tire size	Tire perimeter	Speed at 100% timer
a.	25 RPM	40:1	0.5	11.2x24	3.23m	97 m/h
				11.2x38	4.42m	133m/h
				14.9x24	3.60m	108m/h
				16.9x 24	3.81m	114m/h
				11.2x24	3.23m	128m/h
b.	33 RPM	40:1	0.66	11.2x38	4.42m	175m/h
				14.9x24	3.60m	142m/h
				16.9x 24	3.81m	150m/h
				11.2x24	3.23m	190m/h
c.	59 RPM	29:1	0.98	14.9x24	3.60m	212m/h
				16.9x 24	3.81m	224m/h

Center motor drive speeds for 60Hz/480V

Motor	Drive speed in 60 Hz (RPM/60Hz)	RATIO	Wheel speed (RPM)	Tire size	Tire perimeter	Speed at 100% timer
a.	30 RPM	40:1	0.6	11.2x24	3.23m	116.4 m/h
				11.2x38	4.42m	159.6m/h
				14.9x24	3.60m	129.6m/h
				16.9x 24	3.81m	137.4m/h
				11.2x24	3.23m	166.8m/h
b.	43 RPM	40:1	0.86	11.2x38	4.42m	228.6m/h
				14.9x24	3.60m	186m/h
				16.9x 24	3.81m	196.8m/h
				11.2x24	3.23m	229.2m/h
c.	59 RPM	29:1	1.18	14.9x24	3.60m	255m/h
				16.9x 24	3.81m	270m/h

Why Rainfine ?

**Plastic tire:
Say good bye to tire flat.**

RAINFINE Plastic tire

Compare with rubber tire



For center pivot
exclusive use



Multi-material,
solid match



Unique tread design,
greater driving force



Mold manufacturing,
ensure consistency



UV and aging
resistant, extend life

Diameter	1170mm
Width	318mm
Rim	10" x 38"
Weight	128kg

Constructed of super strong composite material, offer you the best solution for center pivot irrigation equipment.

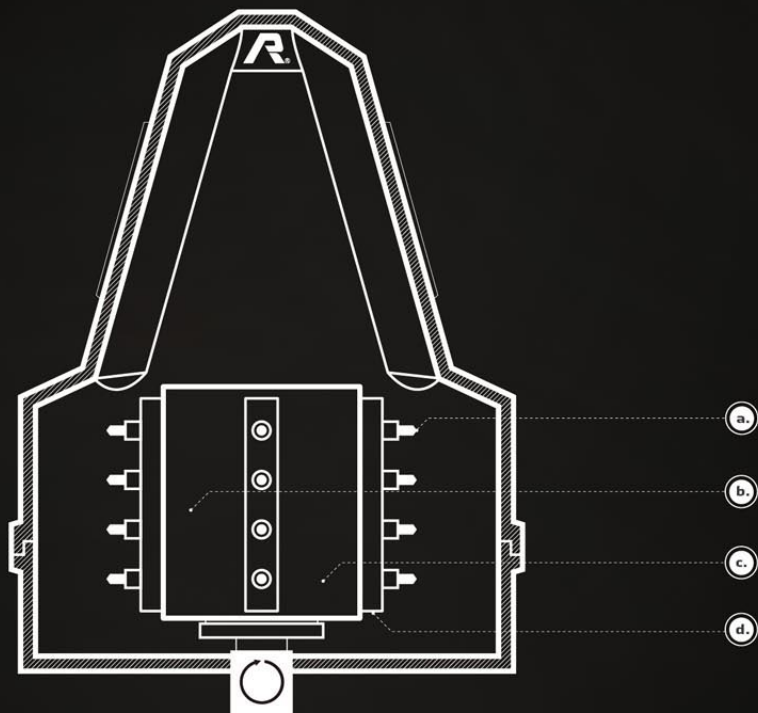
1. No worry for going flat forever.
2. Highest UV protection from sunshine.
3. Self cleaning on muddy soil.
4. Wider tread for better flotation.
5. Offset tread for good traction on terrain field.
6. Fit standard pivot wheel(14.9 x 24).
7. Independent 16 parts for easy replacement.
8. Less slipping design for tough conditions.
9. Long life be 6 years limited warranty.
10. No maintenance for seasons.



Why Rainfine  **RAINFINE**
Irrigation Solution

Collector ring from radar technology

No maintenance.



- a.** Radar plug seat: Easy to install, no disconnection.
- b.** Fully enclosed slip ring: No moisture condensation no rust.
- c.** Military standard radar technology: 60,000 circles rotating life.
- d.** 16 wires design for multifunction pivot / towable / drivable, remote control GPS



■ Rainfine No Maintenance Collector Ring



Main panel

- Main switch
- Control transformer
- Start / stop switch
- Main contactor
- Fused disconnect in panel rated 600v at 30 amps
- Forward / backward contactors rated 600v at 30 amps
- Lightning arrestor
- System monitor
- Control power
- Pressure switch
- Last tower movement
- Control circuit power
- Safety circuit status
- Forward control circuit
- Backward control circuit
- Pump control circuit
- Monitors voltage 380V power
- Start / stop with no water
- Running direction (auto-stop/auto-reverse)
- Percentage timer
- Low voltage relay
- Overloading current relay
- Emergency stop
- Low water pressure shut off
- Alignment protection



常规集电环 / Std. Collector Ring

Tower box

- Contactor rated 600v at 16 amp min.
- Micro switches rated 277v at 15 amp tested to 10 million cycles.
- On-off switch rated 600v at 16amps.

Senninger®



Regulator



The function of a pressure regulator in center pivot sprinkler design is to fix a varying inlet pressure to a set outlet pressure regardless of changes in the system pressure due to hydraulic condition, elevation changes, pump scenario, etc. It can uniform depth of water application and control sprinkler performance (droplet size and throw distance).



LDN



Minimized losses to wind drift, evaporation and runoff;
Multiple deflector pad design;
Rugged design for traveling through tall crops;
Low pressure – 6 to 15 psi;
Chemigation Pads produce an upward spray under the crop canopy;
Bubbler Pad applies water in a gentle, aerated pattern ideal for direct-to-furrow irrigation;



Super Spray



Wide variety of color-coded deflector pads to customize distribution pattern;
Full 360° spray pattern;
Low-pressure operation: 6-25 psi;
Chemigation pads and hose barb adapter available.



i-Wobs



Unique off-center rotary action, outstanding uniformity;
Gentle, rain-like application;
Excellent distance of throw;
Low pressure operation from 10 to 20 psi, can mean big energy savings over the course of a year.



Xi-Wob



Large area of coverage
Ultra low pressure
Easy clean, easy change nozzle
Droplet size needed for type of soil.
Uniformity affects
Application intensity
Excellent distance of throw

Nelson®



Regulator



The function of a pressure regulator in center pivot sprinkler design is to fix a varying inlet pressure to a set outlet pressure regardless of changes in the system pressure due to hydraulic condition, elevation changes, pump scenario, etc. It can uniform depth of water application and control sprinkler performance (droplet size and throw distance).



D3000



A fixed-spray sprinkler which produces a variety of patterns dependent upon the specific spray plate;
Flip-over dual spray can allow easy conversion of the spray pattern;
Choose spray plate options to germinate, irrigate, chemigate;
Optional hose drag adapter for Low Energy Precision Application – LEPA;
Part circle available.



O3000



Outstanding uniformity and optimal droplets at low operating pressures;
racket unassembled, eliminate debris hang-up and water-pattern misting common to conventional sprinklers;
Long wear-life, reliable operation and durability;
Excellent water application, 10-20 PSI operating pressure;
Wind resistant, maximum water and energy conservation.



R3000



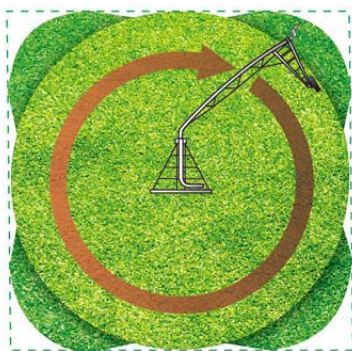
Greater throw radius. The wide water pattern from rotating streams equates to lower average application rates, longer soak time and reduces runoff;
High uniformity. Increase overlap from adjacent sprinklers improves uniformity;
Reduce wind drift and evaporative loss;
Part circle available.



S3000



Gentle rain at low pressure;
Utilize a free-spinning acting to produce a gentle, rain-like water pattern;
Designed for more sensitive crops and soils;
Superior uniformity with better overlap and lower application rates;
Crop-guarded body for low energy, down in the crop application;
Part circle available.



- Extra area covered by end gun.
- Area covered by pivot.

innovation in irrigation™
NELSON [Nelson-SR]

Pressure (Bar)	Nozzle 11.4mm-0.45"			Nozzle 12.7mm-0.5"			Nozzle 14.3mm-0.56"			Nozzle 15.2mm-0.6"			Nozzle 16.5mm-0.65"			Nozzle 17.8mm-0.7"			Nozzle 19.1mm-0.75"			Nozzle 20.3mm-0.8"		
	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m
1.75							9.5	2.64	44	11.4	3.17	48	13.4	3.72	49	15.5	4.3	51	17.7	4.91	54	20.1	5.59	56
2				8.4	2.33	48	10.2	2.82	48	12.2	3.39	51	14.3	3.98	52	16.5	4.59	56	18.9	5.25	58	21.5	5.97	59
2.5	7.6	2.11	47	9.4	2.61	50	11.4	3.16	53	13.6	3.79	55	16	4.45	58	18.5	5.14	60	21.1	5.87	62	24	6.68	64
3	8.3	2.32	50	10.3	2.86	53	12.4	3.46	57	15.9	4.15	59	17.6	4.88	61	20.3	5.63	63	23.1	6.43	66	26.3	7.32	69
3.5	9	2.5	52	11.1	3.09	57	13.4	3.74	60	16	4.48	62	19	5.27	64	21.9	6.08	67	25	6.95	70	28.4	7.9	73
4	9.6	2.67	54	11.9	3.3	59	14.4	3.99	62	17.2	4.79	65	20.3	5.63	67	23.4	6.5	71	26.7	7.43	73	30.4	8.45	76
4.5	10.2	2.84	57	12.6	3.5	62	15.2	4.24	66	18.3	5.08	68	21.5	5.97	71	24.8	6.89	75	28.4	7.88	78	32.3	8.96	80
5	10.8	2.99	60	13.3	3.69	64	16.1	4.46	68	19.3	5.35	70	22.7	6.3	74	26.1	7.26	78	29.9	8.3	80	34	9.45	84
5.5	11.3	3.13	62	13.9	3.87	66	16.9	4.68	70	20.2	5.61	73	23.8	6.6	77	27.4	7.62	81	31.3	8.71	83	35.7	9.9	86
6	11.8	3.27	63	14.6	4.04	68	17.6	4.89	72	21.1	5.86	74	24.8	6.9	79	28.6	7.96	84	32.7	9.09	85	37.2	10.3	87

Taper bore nozzle, 24° Trajectory



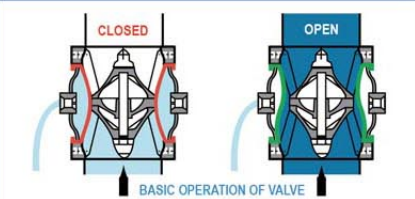
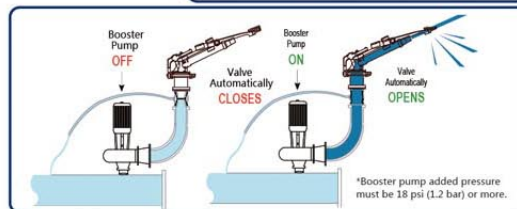
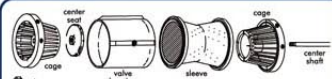


komet® [Twin101/PLUS]

Pressure (Bar)	Nozzle 12mm-0.47"			Nozzle 14mm-0.55"			Nozzle 16mm-0.63"			Nozzle 18mm-0.71"			Nozzle 20mm-0.79"			Nozzle 22mm-0.87"			Nozzle 24mm-0.94"		
	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m	Flow m³/h	l/s	Radius m
2.0				10.6	2.96	26	13.9	3.86	27.9	17.6	4.89	29.7	21.7	6.04	31.5	26.3	7.3	33.1	31.3	8.69	34.7
2.5				11.9	3.31	28.3	15.5	4.32	30.4	19.7	5.47	32.4	24.3	6.75	34.3	29.4	8.17	36.1	35	9.72	37.8
3.0	9.6	2.66	27.9	13	3.62	30.3	17	4.73	32.6	21.6	5.99	34.7	25.6	7.39	36.7	32.2	8.95	38.7	38.3	10.65	40.5
3.5	10.4	2.87	29.5	14.1	3.91	32.1	18.4	5.11	34.5	23.3	6.47	36.8	28.7	7.99	38.9	34.8	9.66	41	41.4	11.5	43
4.0	11.1	3.07	31.1	15.1	4.18	33.8	19.7	5.46	36.3	24.9	6.91	38.7	30.7	8.54	41	37.2	10.33	43.1	44.3	12.29	45.2
4.5	11.7	3.26	32.5	16	4.44	35.3	20.9	5.8	38	26.4	7.33	40.5	32.6	9.05	42.8	39.4	10.96	45.1	46.9	13.04	47.3
5.0	12.4	3.44	33.8	16.8	4.68	36.8	22	6.11	39.5	27.8	7.73	42.1	34.4	9.54	44.6	41.6	11.55	46.9	49.5	13.74	49.2
5.5	13	3.6	35.1	17.7	4.91	38.1	23.1	6.41	41	29.2	8.11	43.7	36	10.01	46.2	43.6	12.11	48.7	51.9	14.42	51
6.0	13.6	3.76	36.3	18.4	5.12	39.4	24.1	6.69	42.4	30.5	8.47	45.1	37.6	10.46	47.8	45.5	12.65	50.3	54.2	15.06	52.7
6.5	14.1	3.92	37.4	19.2	5.33	40.6	25.1	6.96	43.6	31.7	8.81	46.5	39.2	10.88	49.3	47.4	13.17	51.9	56.4	15.67	54.4

Taper bore nozzle, 24° Trajectory

Booster Pump
of RAINFINE®



Upstream water is applied to the outer sleeve chamber, the sleeve becomes hydraulically balanced and the flow passage is closed off by the sleeve pressing against the center seat.

The added pressure from the booster pump forces the sleeve outward. Water in the sleeve chamber is evacuated back into the system and the end gun begins to operate.

RF booster pump		Power		Inlet	Outlet	Max.Flow	Max.Head	Max.Suction	Dim.	G.W.(kg)		20' Loading Qty
Single-Phase	Three-Phase	kW	HP	(Inch)	(Inch)	(m³/h)	(m)	(m)	(mm)	G(s)	G(t)	(pcs)
	RFB30	1.5	2.0	2.0	2.0	30	22.5	7.0	425x250x295	25	24.5	800
	RFB72	2.2	3.0	3.0	3.0	72	18.5	7.0	520x295x355	37	37	540



[Span size]

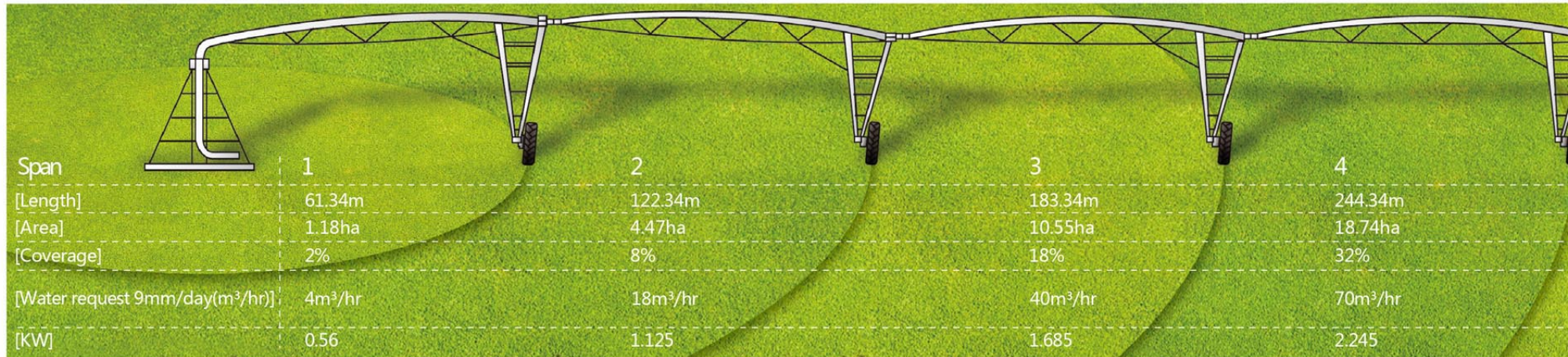
Pipe Size	Span Length	A	B	C	D	E
10"-254mm	135'-41.15m	13'2"-4.01m	135'9"-41.37m	9'2"-2.79m	14'2"-4.32m	135'-41.15m
8"-203mm	135'-41.15m	12'10"-3.91m	136'1"-41.47m	9'7"-2.92m	14'7"-4.45m	135'2"-41.20m
8"-203mm	157'-47.85m	12'10"-3.91m	158'-48.16m	9'10"-3.00m	14'10"-4.52m	157'-47.85m
8"-203mm	179'-54.56m	12'10"-3.91m	180'2"-54.91m	9'6"-2.90m	14'10"-4.52m	178'11"-54.53m
6-5/8"-168mm	135'-41.15m	12'10"-3.91m	136'-34.57m	9'8"-2.95m	14'10"-4.52m	135'-41.15m
6-5/8"-168mm	157'-47.85m	12'10"-3.91m	158'1"-48.18m	9'11"-3.02m	15'2"-4.62m	157'1"-47.88m
6-5/8"-168mm	179'-54.56m	12'10"-3.91m	180'2"-54.91m	9'6"-2.90m	14'10"-4.52m	178'11"-54.53m
6-5/8"-168mm	201'-61.26m	12'10"-3.91m	201'3"-61.34m	10'1"-3.07m	15'1"-4.60m	200'2"-61.01m
5-9/16"-141mm	157'-47.85m	12'10"-3.91m	158'-48.16m	9'9"-2.97m	15'1"-4.60m	157'6"-48.01m
5-9/16"-141mm	179'-54.56m	12'10"-3.91m	180'-54.86m	9'6"-2.90m	14'10"-4.52m	179'-54.56m

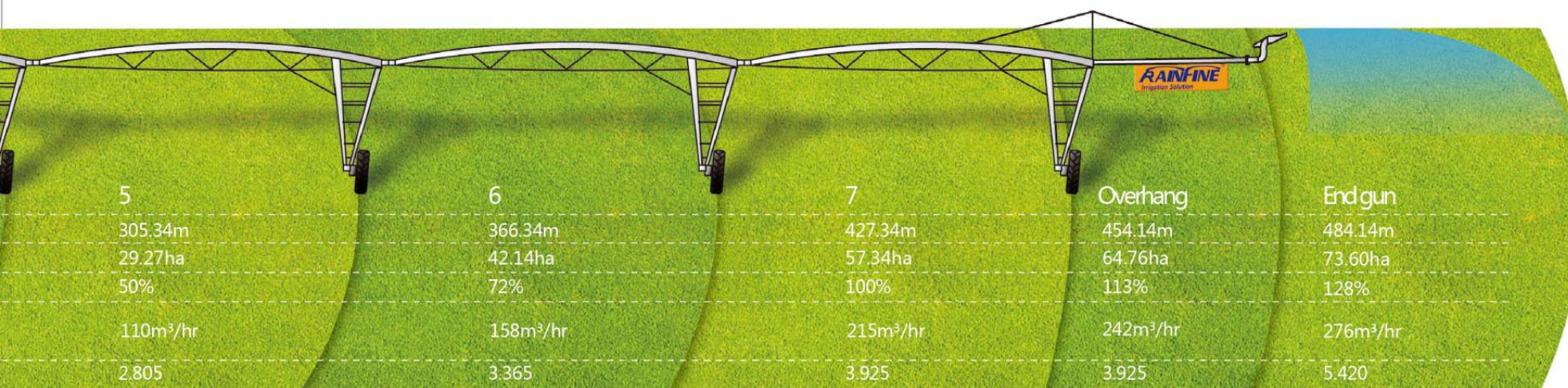
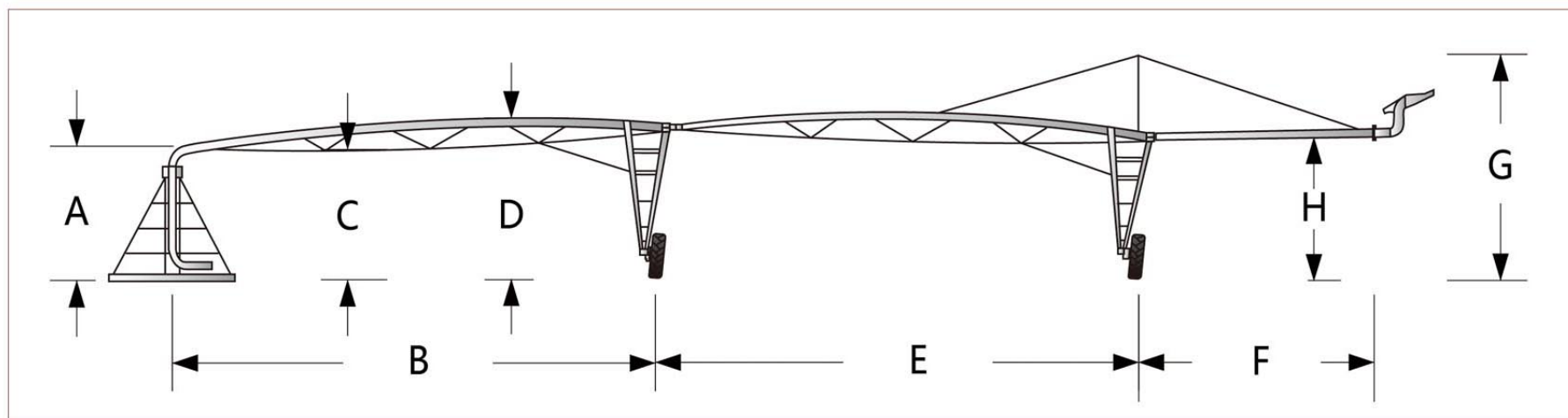
[Overhang size]

Overhang length	F	G	H
22'- 6.71m	25' - 7.62m	17'6"-5.33m	11'5"-3.48m
44' -13.41m	47' - 14.32m	17'6"- 5.33m	11'5"-3.48m
66'- 20.12m	69' - 21.03m	22'- 6.70m	
88' -26.82m	91' -27.73m	22'- 6.70m	

The coverage of a pivot is decided by:

a. Span **b.** Overhang **c.** End gun





[Slop 1]

$$A = \sqrt{3.962^2 - 0.5^2} = 3.930$$

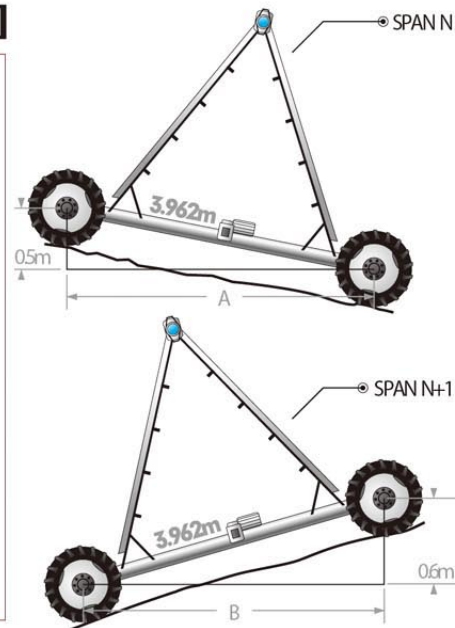
$$\text{SlopN} = \frac{0.5}{3.930} \times 100\% = 12.7\%$$

$$B = \sqrt{3.962^2 - 0.6^2} = 3.916$$

$$\text{SlopN+1} = \frac{0.6}{3.916} \times 100\% = 15.3\%$$

$$\text{SlopTotal} = 12.7\% + 15.3\% = 28\%$$

The maximum allowable slop in this situation is 30%



[Slop 2]

$$A = \sqrt{54.56^2 - 10^2} = 53.63$$

$$\text{Slop} = \frac{10}{53.63} \times 100\% = 18\%$$

$$A = \sqrt{41.15^2 - 3^2} = 41.04$$

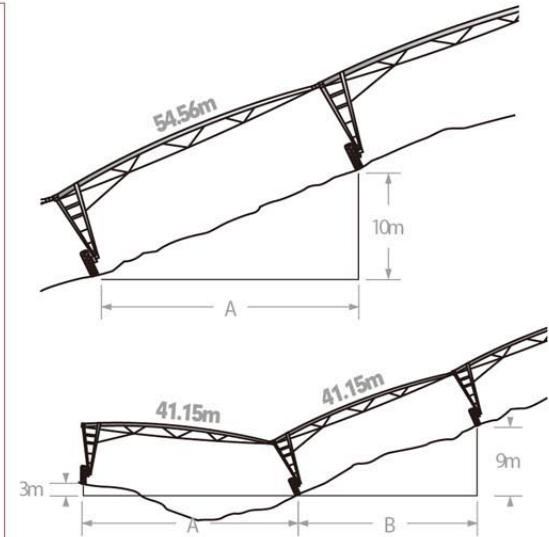
$$\text{SlopA} = \frac{3}{41.04} \times 100\% = 7.3\%$$

$$B = \sqrt{41.15^2 - 9^2} = 40.15$$

$$\text{SlopB} = \frac{9}{40.15} \times 100\% = 22.4\%$$

$$\text{SlopTotal} = 7.3\% + 22.4\% = 29.7\%$$

The maximum allowable slop in this situation is 30%



[Slop 3]

$$A = \sqrt{48^2 - 5^2} = 47.74$$

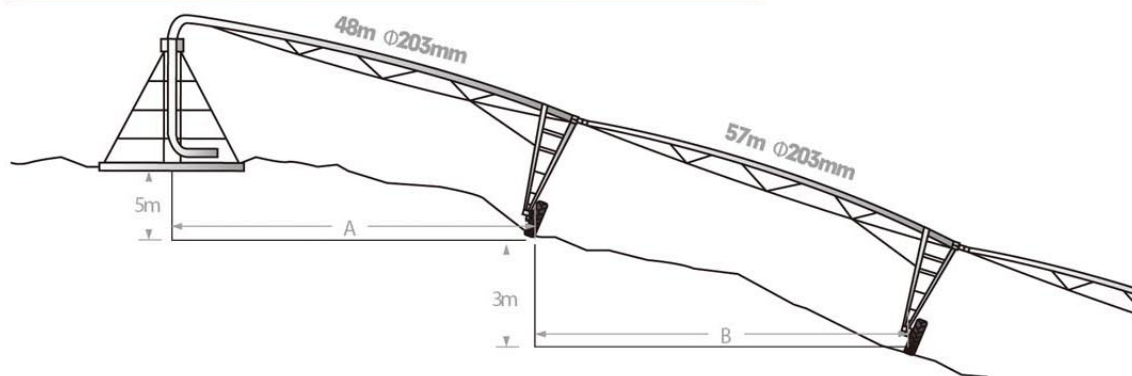
$$B = \sqrt{57^2 - 3^2} = 56.92$$

$$\text{SlopA} = \frac{5}{47.74} \times 100\% = 10.47\%$$

$$\text{SlopB} = \frac{3}{56.92} \times 100\% = 5.27\%$$

The total continuous slop is slopA+slopB+...

Pipe diameter	Maximum lateral force allowed(kg)
141mm	2727
168mm	4091
203mm	5682
254mm	5682



To save people from poverty and hunger world over, we should work hard everyday.



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