Dairy Australia

SMARTER IRRIGATION FOR PROFIT PHASE II

Pre-season Checklist Travelling Irrigators

Is your system well set-up?

A pre-season check of your travelling irrigation system will ensure you are ready to start irrigating *on time* and are set-up well for the season ahead. Remember, delaying irrigating your pasture or crop beyond the first sign of soil moisture depletion will result in loss of production and income.

Simple checks to correct issues evident during the previous season, or that have occurred whilst the system has been idle, will result in more efficient water and power use and may assist to avoid mid-season break downs. A close inspection also identifies items needing maintenance and proactive management of foreseeable issues before they become a costly crisis. These systems perform at their best when operating to specifications.

All pressurised irrigation systems need to have a pump that is properly selected to the system's duty, is operating efficiently and is well maintained. If the pump is not performing properly, the irrigation system won't either.

Ensure the pipe sizes are adequate, especially the suction pipe, ensure the foot-valve and strainer are not blocked, check inside the pump for partial or full blockages, ensure the operating pressure and flow are according to specifications, and have the efficiency checked at regular intervals.

Dairy NZ's **Guide to Good Irrigation** (2011) is well worth consulting prior to each season. It will act as a reminder of the preparations, operations and management considerations which should be addressed. This guide recommends an annual maintenance check by the supplier of your travelling irrigator.

What do I need to check?

A check list is provided on the next page. These are the fundamental items which should be used to guide your site specific system checks. It is always best to do these checks with a second person - the additional labour costs will certainly be returned when your system is having less break-downs, using less energy and correctly applying water over the coming season!

To check your system properly prior to the season and during the season, it is essential to have appropriate gauges and meters. These include a pressure gauge and flow meter at the pump, pressure gauges on either side of the filter, and a pressure gauge at the traveller.

TIPS
Safety First- many items can be fixed on-farm, others require specialist skills or equipment. Know your limits and obligations.
Walk the system with new employees before they operate for the first time and have all operators read the operating instructions prior to start-up.
Strong winds affect spray patterns and may vary application rates Irrigate when conditions are still.
Travelling guns should travel perpendicular rather than parallel to the prevailing wind to minimise the effects of wind on distribution uniformity (DU).
Improve DU by altering lane spacing width depending on wind conditions.
Reduce speed variation to increase DU. Uneven topography, increasing drag length for soft hose machines, and variations as the hose winds-up for hard hose machines contribute to speed variation.
Reducing the sector angle improves DU - 270° to 330° can result in less water wasted along travel lanes and reduces tracking problems.
Trajectory angle of 24° is a good compromise between throw distance and wind effects.
Operating pressure should be the minimum recommended by the manufacturer to ensure optimal pumping costs and good DU.
Taper nozzles are better in windy conditions. Ring nozzles break up the spray trajectory causing smaller droplet sizes and reduced wetted diameters.
For travelling booms, sprinkler selection is also important. Uniformity depends on wetted diameter, height above ground, and sprinkler spacing.
Sprinklers with small wetted diameters are more likely to have problems with high average application rates. Alter the boom height to alter the diameter.
Use a soil moisture probe to help you understand how your soil responds to rainfall and irrigation.
Use a simple water balance tool, such as IrriPasture, to help you better schedule irrigation to avoid applying too much or too little irrigation.
Ensure pumps meet the duty of your travelling system and are operating within the performance curve.

System 'off' checks

Component	Check
Safety	☐ Electrical isolator switch is tagged/locked at irrigator and pump to disable remote start, if fitted
Pump	☐ Clean inside and out, no off-season damage, flow meter and pressure gauge serviceable
	☐ Electrical breakers working
	☐ Belt drive is tight (as applicable)
	☐ Priming pump operable (as applicable)
	☐ Suction line clear of cracks and leaks, foot valves free of corrosion and blockages
Filtration	☐ Rings/screens clean and sound
	☐ Pressure gauges sound
Hose and cable reel	☐ Structure condition, corrosion or damage
	☐ Gearboxes, drive shafts–lubricates according to chart in operating manual
	☐ Cable winch action and ratchets
	☐ Tighten all bolts, check pins
	☐ Lubrication, grease
	☐ Seals and flanges
Gun cart	☐ Structure condition, corrosion or damage
	☐ Wheel nuts, studs, tyre condition and pressure
	☐ Tighten all bolts, check pins
	☐ Condition of all connections
	☐ Lubrication, grease
	☐ Seals and flanges
	☐ Rotating boom turntable not worn, allows free turning
Drag hose	☐ Hose condition for wear, kinks or other damage
	☐ Boots–tighten bands if necessary
Sprinklers (travelling booms)	☐ Nozzle orifice condition–replace if wear detectable
	☐ Ensure rotating nozzles are free turning and cages not damaged
	☐ Splash plate, angle, alignment
	☐ Components for loose fitting, freedom of movement
	☐ Outlet nozzle orifice condition–replace if wear detectable
	☐ Ensure nothing is parked in front of the irrigator

System 'on' checks

Component	Check
Pump	☐ Pressure and flow in accordance with pump specifications
Hose reel and cable reel	☐ Reel(s) turning smoothly
	☐ Hose or cable winding in correctly and even distribution across the drum.
	☐ Inlet pressure gauge – replace if necessary
Drag hose	☐ Turbine functioning
	☐ No leaks
	☐ Not mis-shaped e.g. kinks
Gun cart	☐ Cart moving correctly
	☐ Inlet pressure– replace gauge if necessary
	☐ No leaks
	☐ Speed-test in m/min- is in accordance with nozzle chart
Sprinklers (travelling booms)	☐ Each sprinkler is turning correctly and cage not damaged
	☐ No leaks, repair or replace as necessary
	☐ Pressure above last sprinkler is in accordance with specification (above pressure regulator if fitted)
Gun	☐ Operation to nozzle chart specification
	☐ Gun angles are correct, switches direction at right locations
Travelling indicator jets (soft hose)	☐ Not blocked
Other	☐
	☐
Checked by:	
Date:	

The project wishes to acknowledge that this checklist has been prepared using information from Irrigation New Zealand's Pre-Season Checklist found at **irrigationnz.co.nz** and duly acknowledges the Hunter Smarter Farming: Irrigating for Profit Project for its contribution to this material.

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