

Applying Liquid Seed Treatments over a Roller Table

1. Qualified and Safe

- All operators should have undertaken the appropriate training. NPTC **PA1** plus NPTC **PA12** certificates.
- Ensure the correct **PPE** is used and worn by all operators.

2. Equipment Serviced and Cleaned

- Certis advise **yearly equipment testing and servicing**.
- *Red tractor requirement for all application equipment to be NSTS tested every 6 years.*
- The Roller table should be **thoroughly cleaned** before use.
 - This applies to the whole grading line
 - Spraying with Jet 5 disinfectant is a good way to achieve this.
 - *Disease transfer from previously handled stocks is a common occurrence. Contamination by Fusarium inoculum can be devastating.*

3. Seed Stock

- Seed should be checked for adequate **skin set and health** - prior to any handling and treatment.
- Check the Temperature of tubers if they're coming out of cold storage. Aim for 7 to 8°C.
- Ensure the **lowest possible level of dirt and dust**.
 - Any soil on the skin prevents full fungicide coverage.
 - Soil can be dislodged post-treatment, exposing a venerable surface - compromising disease prevention and control.
- Aim to **minimise the handling and damage** of the tubers in any pre-treatment grading.
 - Wounds are usually the first place diseases take hold.

4. Record Keeping

- A '**Tubercare Treatment Record**' Form should be completed every time a Roller Table is used.
- Treated and un-treated samples should be retained.

5. Product Recommendation

- **Risk of disease** should be assessed on a stock-by-stock basis.
 - Please see the '**Disease Biology & Risk**' section of the Certis Tubercare website.
- Consult a **BASIS qualified advisor**
- Always read the Product Label

6. Application Timing

- See the **Disease Management Table** on the 'Tubercare Website' to identify the best opportunity for application.

7. Calibration and Coverage

The spray Nozzles and Pump need to be calibrated to the flow rate of tubers traveling over the roller table.

- **Using a Stopwatch, determine the time to fill a 1 Tonne Box.** For increased accuracy, time the filling of Multiple Boxes.
 - Up to 8 Tonnes/Hour - Certis recommend a Single Nozzle Air Treatment Canopy.
 - Above 8 Tonnes/Hour - Certis recommend a Twin Nozzle Air Treatment Canopy.
- 80° hollow cone nozzles at **high pressure** give the best coverage.
- An air treatment canopy with a rotary nozzle[s] delivers superior coverage than a stationary spray bar. Plus, reducing operator and environment exposure.
- **Maintain throughput**
 - As the spray Nozzle applies solution at a constant, fixed rate. It is imperative that the throughput is maintained at an even and continuous flow.

8. Post Treatment

- **Ventilation is advised.** A drying wall, cold storage or good ambient air flow.
 - This helps remove any moisture. Excessive moisture fuels disease development!
- Chemical labels **must be applied** to each box, bag or container in line with **APHA**, **SASA** and **DEFRA** requirements.
- **Regularly monitor the treated seed** - The movement of treating may stimulate eye opening and sprouting.

Certis Potato Seed Treatment Fungicides

Product	Gavel	RhiNo Liquid
Active Ingredient	100 g/L Imazalil	460 g/L Flutolanil
Recommended Application Rate	150ml/T	200ml/T
Pack Size / Tonnes per Pack	5L Treats 33.3T	1L Treats 5T
Total Spray Solution	2L/T = 0.15L Gavel + 1.85L Water	2L/T = 0.20L Rhino + 1.80L Water
Tank Mixing	Gavel may be mixed with Thiabendazole - where fungicide resistance is of concern. Ensure constant agitation or use a twin injection system.	RhiNo Liquid may be mixed with Gavel. When applied in Phase 3 - grading out of store.
Notes:	In <i>cold conditions</i> Certis recommend using a heater to gently warm the tank. Alternatively, mix the spray solution using warm water. If possible, avoid treating seed in a cold environment.	

Roller Table Calibration

Worked example - Spray Solution for Single Nozzle applicator:

- **Stop watch:** To fill Two, 1 Tonne Boxes = 15 minutes
- **Time per 1 Tonne Box:** $15 \div 2 = 7$ minutes, 30 seconds
- **Convert to seconds:** $(7 \times 60) + 30 = 450$ seconds
- **Flow rate per hour:** $3600s \div 450s = 8T/Hour$
- **Total Spray Solution:** 2L/T
- **Application rate needed:** $2L/T \times 8T/Hour = 16L/Hour$
- **Convert units:** $16L/Hour \div 60 = 0.266L/min$

To apply 2L/T at a rate of 8T/Hour, 0.266L/min is achieved with a Pink Nozzle @ 5.5 Bar.

Worked example - Injection Pump:

- Use the Worked example above to calculate;
 - **Flow rate per hour:** 8T/Hour
 - **Total Spray Solution:** 2L/T (of which 200ml will be injected)
 - **Correct Nozzle and Pressure:** Pink Nozzle @ 5.5 Bar
- **Pump output per Tonne:** 200ml/T (RhiNo)
- **Pump output per hour:** $8 \times 200 = 1600ml/Hour$
- **Pump output per minute:** $1600 \div 60 = 27ml/min$

To apply 200ml/T RhiNo Liquid, a Pump output of 27ml/min is required.

Roller Table Calibration Chart

Time to fill 1 Tonne Box (Minutes, Seconds)	Flow Rate (T/Hour)	Total Spray Solution (L/T)	Application Rate (L/Hour)	Application Rate (L/min)	Nozzle ² (Colour)	Pressure (Bar)	Peristaltic Injection Pump ¹ (ml/min)	
							RhiNo @ 200ml/T	Gavel @ 150ml/T
Single Nozzle								
15,00	4	2	8	0.133	White	3.0	13	10
12,00	5	2	10	0.166	White / Pink	4.6 / 2.1	17	13
10,00	6	2	12	0.200	Pink	3.0	20	15
09,14	6.5	2	13	0.217	Pink	3.5	22	16
08,36	7	2	14	0.233	Pink	4.1	23	18
08,00	7.5	2	15	0.250	Pink / Blue	5.0 / 2.7	25	19
07,30	8	2	16	0.266	Pink / Blue	5.5 / 3.0	27	20
07,04	8.5	2	17	0.283	Blue	3.4	28	21
Twin Nozzle								
07,30	8	2	16	0.266 (2x 0.133)	White (x2)	3.0	27	20
07,04	8.5	2	17	0.283 (2x 0.142)	White (x2)	3.5	28	21
06,36	9	2	18	0.300 (2x 0.150)	White (x2)	4.0	30	23
06,00	10	2	20	0.333 (2x 0.166)	White / Pink (x2)	4.6 / 2.1	33	25
05,27	11	2	22	0.367 (2x 0.184)	White / Pink (x2)	5.8 / 2.5	37	28
05,00	12	2	24	0.400 (2x 0.200)	Pink	3.0	40	30
04,37	13	2	26	0.434 (2x 0.217)	Pink	3.5	43	33
04,18	14	2	28	0.466 (2x 0.233)	Pink	4.1	47	35

¹Watson & Marlow Peristaltic Pump

²Lurmark/Hypro Hollow Cone 80° Nozzles - as used on the *Team Sprayers Storemaster Air Treatment Canopy*

Nozzle Guide is for reference only: Check output of nozzle[s] for L/Minute to verify the correct amount is delivered.