HAYES SPRAYING P/L

SHIELDED SPRAYER

OPERATION MANUAL

October 2005
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**WARRANTY POLICY**

HAYES SPRAYING P/L, WARRANTS TO THE ORIGINAL PURCHASOR, THAT, EACH NEW HAYES SPRAYING SPRAYER, PART OR ACCESSORY WILL BE FREE FROM DEFECT IN MATERIAL OR WORKMANSHIP FOR TWELVE (12) MONTHS AFTER THE DATE OF DELIVERY. DURING THE WARRANTY PERIOD, THE DEALER, OR HAYES SPRAYING P/L, SHALL REPAIR OR REPLACE, AT HAYES SPRAYING P/L OPTION, WITHOUT CHARGE FOR PARTS AND LABOUR ANY PART OF THE HAYES SPRAYING P/L PRODUCT WHICH FAILS BECAUSE OF DEFECTS IN PARTS OR WORKMANSHIP. PUMPS, ENGINES, CONTROLLERS AND HOSES, ARE ALL WARRANTED DIRECTLY BY THE ORIGINAL MANUFACTURER, PENDING THAT MANUFACTURERS’ WARRANTY APPROVAL.

THIS WARRANTY DOES NOT COVER DAMAGE RESULTING FROM MISUSE, NEGLECT, ALTERATIONS, OR NORMAL WEAR AND TEAR.

IN NO EVENT SHALL THE AUTHORISED DEALER OR HAYES SPRAYING P/L BE LIABLE FOR DOWNTIME EXPENSES, LOSS OF CHEMICAL, LOSS OF MACHINE USE OR OTHER INCIDENTAL DAMAGES.

**EXCLUSIONS**

AT THE DISCRETION OF HAYES SPRAYING P/L, THE DEFECTIVE PART MUST BE RETURNED TO HAYES SPRAYING P/L AT THE OWNER’S COST. TIME FOR WASHDOWN, TRANSPORTATION COSTS, OR INSURANCE COSTS FOR SPRAYERS ARE NOT WARRANTED. TRAVEL AND COMMUNICATION ARE NOT COVERED BY WARRANTY.
2. Product information

Shipping information for delivery.
For 8 row, without optional tank.
Height on legs  2.45 m
Width     1.8 m approx
Length     9m approx
Weight empty       835 kg approx.   Different models will vary

Serial number located on the front support

Specifications
Chassis
Fully welded 150 x 150 box steel construction, painted with chemical resistant two pack paint, end tow, fitted with depth wheels.

Models.
8 row solid bar
12 row solid bar
12 row flexing and folding bar.

Options:
Single or double skip kits
Dropper kits for over the row application
Frame mounted tanks and pumps
3. Safety instructions

Operators responsibilities
- Read and understand the operators manual before using the equipment. All other operators of the sprayer must also read and understand the operator manual.
- Read and follow the chemical labels
- Local laws may require operators to be licensed
- Pressure test the sprayer with water before use
- Wear protective clothing
- Rinse, wash and depressurise equipment after use and before servicing or storage
- Never repair or service the equipment while it is operating.
- Disconnect power before servicing and or welding
- Do not eat drink or smoke while spraying or working with spraying equipment.
- Wash and change clothes after spraying
- Wash tools if they have been contaminated
- If poisoned seek medical advice immediately. Identify the chemicals being used
- Keep children away from spray equipment at all times
- Do not enter the spray tank
- Do not go under any equipment unless properly secured
- Be aware of power lines at all times
- Operators must not be under the influence of drugs or alcohol while operating spraying equipment

Safe chemical use

The hazard
All agricultural chemicals and pesticides, are biologically active. They can be dangerous to all living organisms including humans fish birds bees and domestic animals and plants.

Method of pesticide entry
- Oral – by drinking and splashing into the mouth or by smoking or eating with contaminated hands. Cleaning nozzles by blowing through them with your mouth.
- Inhalation - by nose or mouth of spray drift and mist
- Dermal – absorption through the skin particularly with raw chemical or through cuts and abrasions or while perspiring.

Decontamination
- Change out of protective clothing after spraying and wash separately
- Wash thoroughly before eating or drinking
- Keep fresh water tank on sprayer full with clean water
- Replace respirator filters regularly
- Clean sprayer regularly
- Fix leaks
- Ensure cab filters are adequate for the job
- Always use the recommended type of protection clothing and equipment.
Safe boomspray operation

- Always read your sprayer manual before operating
- Make sure all other operators have read the sprayers manuals and are suitably trained in the use of the equipment and chemicals being used
- Always wear protective clothing
- Inspect sprayer for faults, leaks, and cracks to avoid contamination
- Personnel only associated with the spraying operation who are suitably trained, should be in the immediate area of operation
- Bystanders must be a safe distance away from the sprayer while operating and in the upwind direction
- Contamination is the responsibility of the operator
- While spraying be aware of the width of the machine particularly while turning or moving around obstacles
- Spray at speeds suitable to the ground conditions for safe operation and extended sprayer life
- Avoid sudden turns or constant direction changes at high speed
4 SHIELDED SPRAYER OPERATION

Hooking up

The standard shielded sprayer is a 3 point linkage implement with a 1 inch spray hose with camlock plumbed to the rear of the tractor. This system requires the tractor to have a front tank and pump.

After attaching the shielded sprayer, the depth wheels must be set at the correct height. If the sprayer is in the end tow configuration, lift the machine slightly taking the weight of the sprayer, onto the linkage, undo the locking nuts that secure the wheels, front stands, and tow hitch. Lift the shielded sprayer, so that the wheels and support legs slide out of their holders.

Replace the depth wheels in the holders at the rear of the sprayer with the wheel on the outside, and lock off at an approximate height. Replace the support legs in the front holders and lock off at the fully raised position. Store the tow hitch.

Setting the depth.

* Lower the shielded sprayer slowly until the shield rubbers are 15mm above the ground. Lock off the depth wheels at this height, taking note of the height at either end of the machine.
* The clearance under the shields should be even over the length of the machine, and from the front to the back.

In the working position, the sprayer should be level from front to back, left to right, and supported equally by the linkage and depth wheels, putting no extra pressure on the three point linkage top link.
* Shield clearance is important to minimize dust and to not excessively wear the rubber skirts.
* Once the depth is correctly set, mark the depth wheel post with a paint pen so that setting up next time is quicker.
8 row shielded sprayer set up for double skip.

15 mm clearance wheels to the outside even depth across the bar

**Going spraying**

- Always consult your agronomist prior to shield spraying, concerning crop stage, weather conditions, nozzle type, water and chemical rates.

- **Do not use automatic spray controllers in auto.** Spray at a set speed and pressure only.

- Typical ground speeds are 8 kmph to 12 kmph.

- Nozzles most used are the DG 11002VG, DG9502EVS, AI110015VS or AI95015EVS.

- Spraying pressures from 130kpa to 200kpa are suitable for the DG11002VG and DG9502EVS, with pressure ranging from 250kpa to 300kpa for the AI 110015VS and AI95015EVS nozzles. A good guide is, the pattern should lightly spray on the bottom of the rubber shield.

- Note that the pressure may vary with different pump, plumbing and solenoid valves used. More pressure is usually required for a solenoid valve in comparison to a ball valve.

- Check nozzles regularly while spraying for any blockages. Spray a small amount on bare ground while stationary, and observe the pattern on the ground for blockages.
Filter maintenance

Filter maintenance is a critical part of your sprayers operation. The number and type of filters may vary from sprayer to sprayer. They will include:

Tank filter basket located in the top of the tank
  18 mesh

Pressure filters located between the pump and spray lines
  80 mesh

Filters located in the nozzle bodies
  50 mesh
Filters require regular cleaning. Regularity will depend on the quality of water being used and type of chemical being used.

As a guide:

- Pressure filters should be cleaned once a day
- Nozzle filters should be cleaned once a week

**The cleaning process**

- Completely stop all sprayer functions
- Release all pressure from the spray lines
- Unscrew (anticlockwise) bottom filter bowl and remove
- Use a toothbrush to clean filter under running water
- Reseat filter into filter bowl and screw back onto filter body
- Take care not to damage or cross thread the o ring while re-assembling
5. General maintenance

At the end of spraying
- Always flush the booms with water at the end of every day. Note when spraying liquid fertilizers, check for phosphoric acid content. If left in the pump, it can corrode the pump body and galvanized fittings in as little time as a week. Roundup can corrode a pump body in less than two years.

Daily
- Connect fill hose
- Close tank suction hose and agitation / bypass
- Pump water through spray lines
- Spray lines can be cleaned with chemical mix still in the tank

End of spraying session
- Drain any remaining spray mixture from the tank at the appropriate place
- Fill spray tank with 200l of water
- Open agitation line fully
- Set the controller to manual
- Note that if the water flow is low the regulator valve may be closed. Open the valve manually by holding the + key down on the controller
- Spray 50l of water out of the nozzles.

Long term storage
- flush as described previously
- Drain all water from the system
- Drain water from the pump.
- Fill pump with a 50 % mix of water and anti freeze. Take particular care not to have any air in the pump. Note that in frost prone areas- frost can freeze water in the pump and crack the housing
- Clean the outside of the sprayer with appropriate tank cleaner
6. Spraying technique

Mixing chemical
When mixing chemicals, always check and follow the label and agronomists recommendations. If unsure, mix a small amount of concentrate in a jug to observe any reaction between the chemical mix. For example, when mixing glysophate and 24d concentrates together, a chemical reaction can occur causing the chemicals to go hard. When mixing chemical fill the tank half full with water before adding chemical. Add the chemical separately, rinsing the measuring jug and / or vat each time before adding the next chemical.

Decontamination
When changing from one chemical group to another, or from spraying one type of crop to another it may be necessary to decontaminate the tank, boom, and lines. For example, when changing from spraying fallow ground to spraying over a crop, or from spraying a narrow leaf crop to a broad leaf crop.

- Flush all spray lines, agitation lines, delivery hoses, tank, jugs, and vat with clean water.
- Flush again with the recommended cleaner. Different chemicals require different cleaning agents to neutralise the active chemical. Check the chemical label or agronomist to use the correct cleaning agent.
- Flush out the cleaning agent with clean water.
- Be sure to carry out all rinsing and cleaning, on jugs vats, delivery pumps and hoses.
7 Shielded sprayer parts

1. SH-001 jet rail standard without hose and nozzle bodies
2. ½” x 1 ½” unc lock bolt with lock nut
<table>
<thead>
<tr>
<th>No.</th>
<th>Part Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>3</td>
<td>SH-002</td>
<td>shield mount</td>
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<tr>
<td>4</td>
<td>SH-003</td>
<td>top plate</td>
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<tr>
<td>5</td>
<td></td>
<td>150mm x 150mm x ½” U bolt</td>
</tr>
<tr>
<td>6</td>
<td>SH-SHIELD</td>
<td>shield – left and right</td>
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<tr>
<td>7</td>
<td>SHC-RUBSIDE</td>
<td>rubber skirts – kits for irrigation and dryland</td>
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<tr>
<td></td>
<td>SH-004</td>
<td>H bar – with stop</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 x 5/8 unc bolt and nylock nut</td>
</tr>
<tr>
<td>12</td>
<td>SH-005</td>
<td>H bar</td>
</tr>
</tbody>
</table>

1 parallelogram assembly complete without shields. Jet rail (1) will be a different length for single or double skip.
parallelogram assembly complete with irrigation rubber skirts.

Rubber kits

1  SHC-RUB   irrigation rubber
2  SH-0011   dryland rubber
3  SHC-RUBSIDE side skirt rubber (irrigation and dryland)
# Double skip kit

1. **SH-008** joiner bar
2. **SH-006** double skip plate 2150
3. **SCH-RUBDS** 2150 X 400MM double skip rubber
4. **SH-009** jet rail – long (not visible)
5. **SH-0010** single skip plate (not shown)

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**Plumbing Diagram**
Camlock fitting codes.

**8 Nozzle Selection**
Reprinted with the permission from Tee – Jet Australia from buyers guide 49m.
## TeeJet Broadcast Nozzle Selection Guide

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Fungicides</th>
<th>Insecticides</th>
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<tr>
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<td>Self</td>
<td>In-crop</td>
<td>Pre-Emergent</td>
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<td></td>
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</table>

### XR TeeJet
- Excellent Good Excellent Good Excellent Good
- Good Good Good Good Good Good
- Good Good Good Good Good Good
- Good Good Good Good Good Good
- Excellent Good Excellent Good Excellent Good
- Good Good Good Good Good Good
- Very Good Very Good Very Good Very Good Very Good
- Excellent Excellent Excellent Excellent Excellent Excellent
- Excellent Excellent Excellent Excellent Excellent Excellent
- Excellent Excellent Excellent Excellent Excellent Excellent

### Turbo TeeJet
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4
- Reference page 4

### Characteristics of Common Spray Tip Materials

- **Ceramic**: Excellent wear life; highly resistant to abrasive and corrosive chemicals
- **Hardened Stainless Steel**: Excellent wear life; good durability and chemical resistance
- **Stainless Steel**: Excellent wear life; excellent chemical resistance; durable orifice
- **Polymer**: Good wear life; good chemical resistance; orifice susceptible to damage when cleaned improperly
- **Brass**: Poor wear life; susceptible to corrosion, especially with fertilizers

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www.TeeJet.com
**Twinjet** (TJ60)

- **Twin Flat Spray Tip**
  - Penetrates crop residue or dense foliage
  - Smaller droplets for thorough spray coverage
  - Nozzle spacing – 20 inches (51cm)
  - Spraying pressure – 30-60 PSI (2-4 bar)
  - Automatic spray alignment with 255854-NYR
  - Quick Teflon® cap and gasket
  - For application rates, see pages 6 and 7

  **How to order:**
  Specify tip number. Examples:
  TJ60-060VSS = Stainless Steel with VisiFlo® color-coding
  TJ60-0002 = Brass

**Teejet** (TP)

- **Standard Flat Spray Tip**
  - Good spray penetration
  - Uniform coverage of crops
  - Nozzle spacing – 20 inches (51cm)
  - Spraying pressure – 30-60 PSI (2-4 bar)
  - Automatic spray alignment with 255854-NYR
  - Quick Teflon® cap and gasket
  - Automatic spray alignment for rates 10 to 20
  - With 255854-NYR Quick Teejet cap and gasket
  - For application rates, see pages 6 and 7

  **How to order:**
  Specify tip number. Examples:
  TP0002VSS = Stainless Steel with VisiFlo® color-coding
  TP10002VSS = Polymer with VisiFlo® color-coding
  TP10002-6SS = Hardened Stainless Steel
  TP0002-VSS = Stainless Steel
  TP0002 = Brass

**Turbo Floodjet** (TF)

- **Wide Angle Flat Spray Tip**
  - Uniform coverage on crops
  - Pre-angled design produces large droplets to reduce drift
  - Nozzle spacing – 20-40 inches (51-100cm)
  - Spraying pressure – 10-40 PSI (0.7-3 bar)
  - Can be used with No. 256000-NYR
  - Quick Teflon® cap for automatic alignment
  - For application rates, see pages 7 and 8

  **How to order:**
  Specify tip number. Examples:
  TF-VSG = Stainless Steel with VisiFlo® color-coding
  TF-VPH = Polymer with VisiFlo® color-coding

**TurfluJet** (TTJ)

- **Wide Angle Flat Fan Spray Nozzle**
  - Very large droplets
  - Better replacement for plastic hollow cone, low-drift nozzles
  - More precise flow and distribution pattern
  - Larger volume reduces clogging
  - Nozzle spacing – 20-40 inches (51-100cm)
  - Spraying pressure – 25-75 PSI (1.8-5 bar)
  - Use Quick Teflon® cap 255764-NYR
  - For application rates, see pages 7 and 8

  **How to order:**
  Specify tip number. Examples:
  IJTJ-04-VS = Stainless Steel with VisiFlo® color-coding
  IJTJ-04-VP = Polymer with VisiFlo® color-coding

**Optimum Spray Heights**

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<tr>
<th>Angle</th>
<th>Min</th>
<th>Max</th>
<th>Wet</th>
<th>(Wet)</th>
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<tr>
<td>60°</td>
<td>90cm</td>
<td>125cm</td>
<td>—</td>
<td>—</td>
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<tr>
<td>80°</td>
<td>75cm</td>
<td>115cm</td>
<td>—</td>
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<tr>
<td>110°</td>
<td>50cm</td>
<td>75cm</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Full</td>
<td>75cm*</td>
<td>100cm*</td>
<td>125cm*</td>
<td>—</td>
</tr>
<tr>
<td>FloodJet TK, TF</td>
<td>90cm*</td>
<td>75cm*</td>
<td>100cm*</td>
<td>—</td>
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</table>

*Angle height based on a 30 to 45 degree angle of orientation
**Wet area spray tip weight is in contact to nozzle operation
The critical factor is to obtain a double spray pattern overlap.
<table>
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<tr>
<th>Model Code</th>
<th>4 ft/min</th>
<th>6 ft/min</th>
<th>8 ft/min</th>
<th>10 ft/min</th>
<th>12 ft/min</th>
<th>15 ft/min</th>
<th>18 ft/min</th>
<th>20 ft/min</th>
<th>25 ft/min</th>
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Note: Always check your application area.
<table>
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<tr>
<th>TT</th>
<th>Turbo TeetJet (1-6 bar)</th>
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<tbody>
<tr>
<td>TT</td>
<td>All TeetJet (2-8 bar)</td>
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<tr>
<td>AIC</td>
<td>ACC TeetJet (2-8 bar)</td>
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<td>XIC</td>
<td>XIC TeetJet (1-4 bar)</td>
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<td>XEC</td>
<td>XEC TeetJet (1-4 bar)</td>
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<td>TeetJet Standard (2-4 bar)</td>
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<td>TG</td>
<td>DC TeetJet (2-4 bar)</td>
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<td>TG2</td>
<td>Turbo TeetJet 2-4 bar</td>
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<tr>
<td>TF</td>
<td>Turbo FlexTeetJet 6.7-3 bar</td>
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<tr>
<td>TJ</td>
<td>TeetJet 1.5-2 bar</td>
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### Recommended Spraying Pressure Range

<table>
<thead>
<tr>
<th>Pressure Range</th>
<th>6 l/min</th>
<th>8 l/min</th>
<th>10 l/min</th>
<th>14 l/min</th>
<th>18 l/min</th>
<th>25 l/min</th>
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<td>1652.3</td>
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**Note:** Values double check your manufacturers notes.
Nipple selection is often based upon droplet size. The droplet size from a nozzle becomes very important when the efficacy of a particular crop chemical is dependent on coverage, or the prevention of spray leaching the target area is a priority.

The majority of the nozzles used in agriculture can be classified as producing either fine, medium, or coarse droplets. Nozzles which produce fine droplets are usually recommended for post-emergence applications which require excellent coverage on fast-growing crops. The most common nozzle used in agriculture are those which produce medium-sized droplets. Nozzles producing medium-sized droplets can be used for contact and pre-emergence herbicides, pre-emergence, and post-emergence treatments.

An important point to remember when choosing a spray nozzle which produces a droplet size is one of the six categories, is that one nozzle can produce different droplet size classifications at different pressures. A nozzle might produce medium droplets at one pressure, while producing fine droplets at a higher pressure.

Droplet size classifications are based on ISO 16703:2003 and ASAE Standard S5.7-17. The size of droplets in these classifications is subject to change.

**TeeJet® Drop Size**

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<td>XC</td>
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**Turbo TeeJet® (TT)**

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**Al TeeJet® (AI) and AIC TeeJet® (AIC)**

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**Turbo FloodJet® (TF)**

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**TurfJet® (TJS)**

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**DGE TeeJet® (DG EVEN)**

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