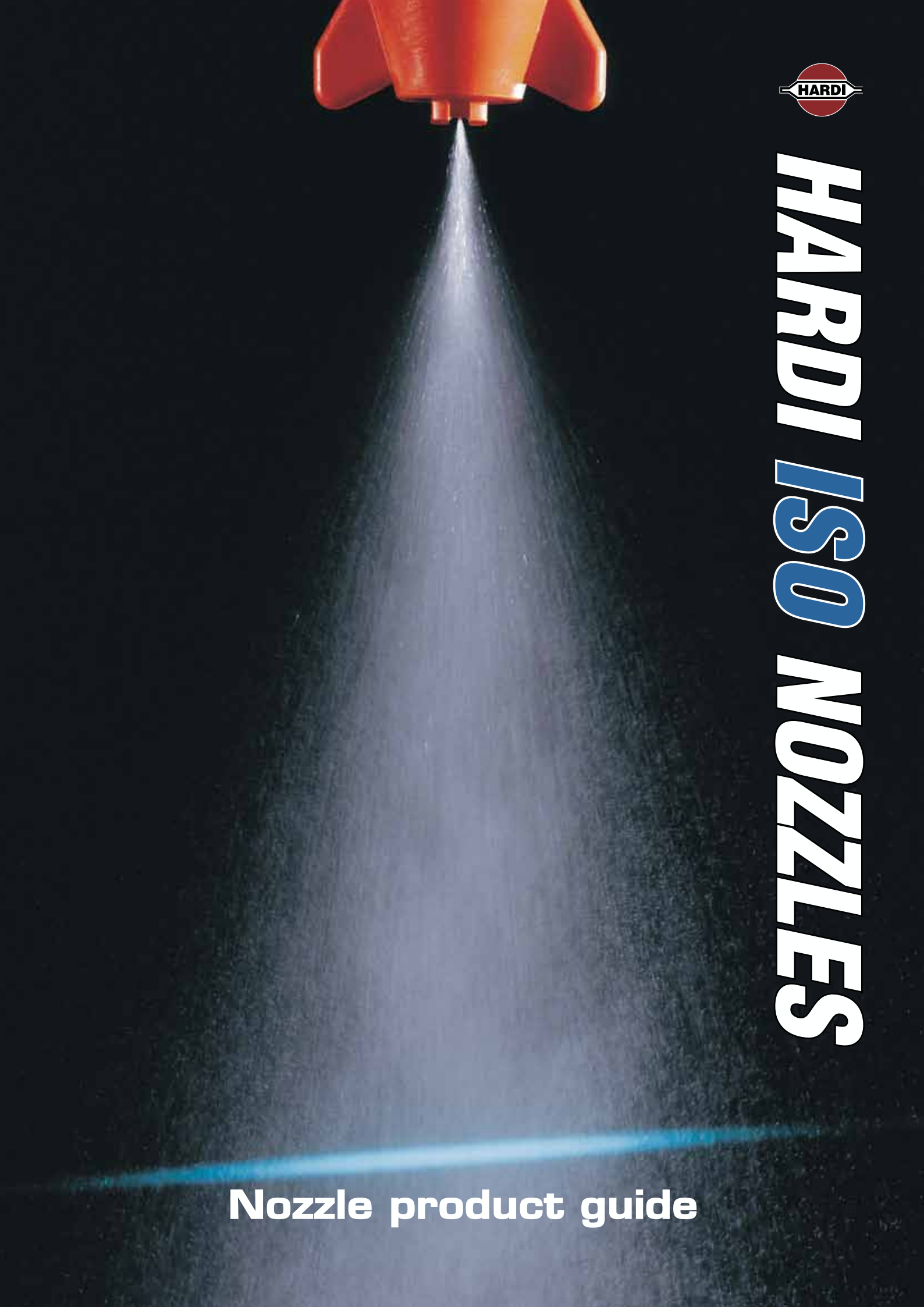


# HARDI ISO NOZZLES

## Nozzle product guide

# Table of contents

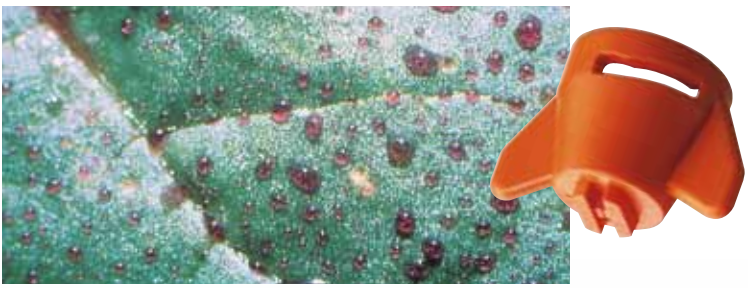
# Hardi nozzle supremacy

*Precise, dependable and accountable*

HARDI has produced sprayers since 1957 - meeting the needs of all farmers and crops worldwide - a key goal that has demanded the world's best nozzles. Today the same basic HARDI philosophy promotes the efficient, effective and responsible plant care that ensures quality food production.
The nozzle can dominate the sprayer performance. All of the sprayer components are important for safe and effective use, but it is the nozzle that can have the major influence on the performance of the plant protecting product that it will apply.

The nozzle controls:

- The throughput [and therefore the dose]
- Quality of distribution
- Drop spectrum and coverage
- Distribution over the target
- Drop retention or reflection
- The degree of drift and downwind fallout



All these functions are considered by HARDI to ensure that the spray liquid is deposited exactly where it is needed, in its most effective form, and is not wasted.

HARDI has combined both design and material selection to produce a range of nozzles that suit the broad demands of both crops and the vast array of agrochemical products available today. This has been the basis for HARDI's worldwide success.

Close co-operation between farmers, advisers, chemical companies, independent and regulatory bodies with HARDI's agronomists has been the backbone of this continuing success.

Quality in production ensures optimal field performance.

HARDI quality nozzle production in Nørre Alslev, Denmark

HARDI's modern production facilities and technical abilities have resulted in the superior precision and durability of HARDI nozzles.

Quality control includes not just laboratory measurements but the use of HARDI nozzles in the field under commercial conditions.
Every drop of spray needs to be both accounted for - and documented - in order to ensure the quality of food delivered onto the dining table, and it meets the demands of the public today.

HARDI quality nozzles meet these increasing demands with world leading research and development.

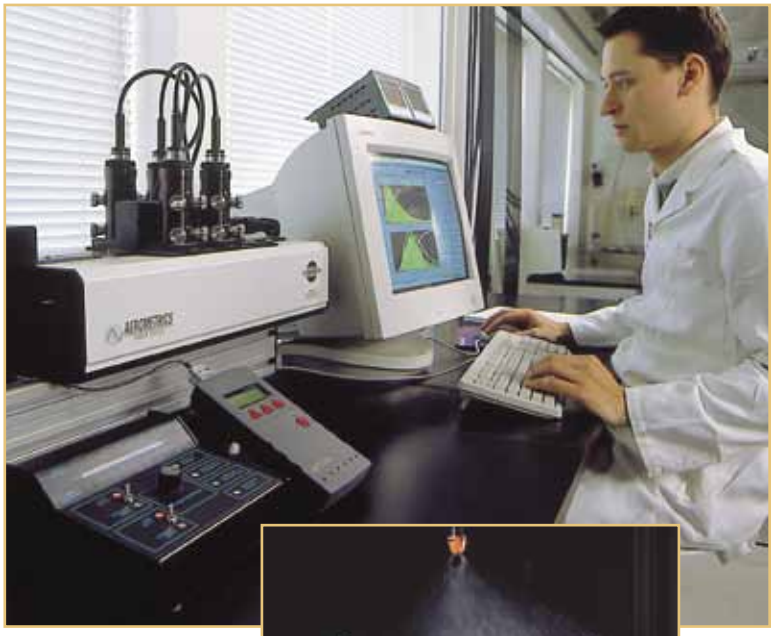
The application of plant protection products to crops involves issues now, which go beyond traditional considerations such as economy and efficiency. Now nozzle choice and performance also relates to broad issues of drift such as airborne losses, downwind fallout and deposits on non-target surfaces within the treated area itself. All of these issues need to be carefully considered.

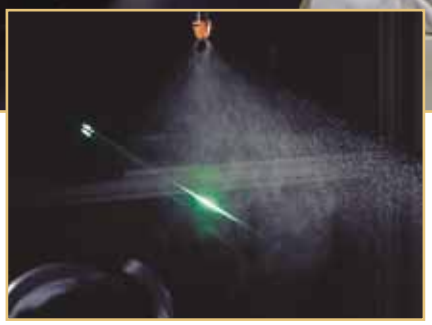
HARDI are world leaders in the understanding of concept of spray accountability and it is this knowledge that underpins its world leadership in today's spraying. Today, HARDI has developed the world's largest ISO nozzle programmes for agriculture, horticulture [including most vegetables], viticulture as well as many more specialist needs. This nozzle guide will help you select the best nozzle for your needs, consider environmental aspects, and help you calibrate it for optimal use to ensure that you meet all of today's needs when using crop protection products.

HARDI INTERNATIONAL A/S Nørre Alslev

# Nozzle technology

Fundamental research with nozzles by "HARDI agro-scientists" is conducted in their own dedicated laboratories and those of independent Research Centres at many key institutions throughout the world. Sites where field research is conducted are very diverse - ranging from the temperate conditions of Northern Europe to the tropical crops of Australia.



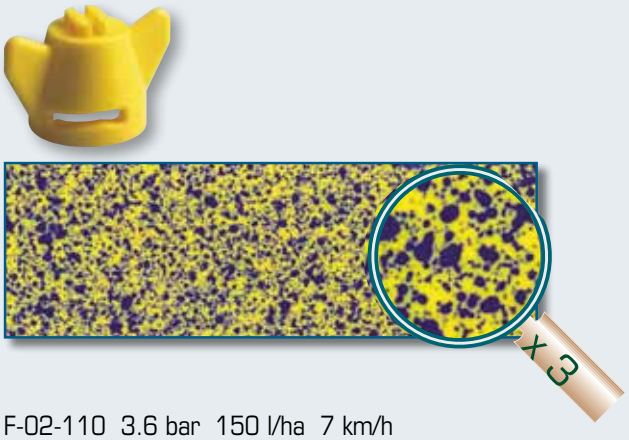


Instrumentation used in HARDI's laboratories is at the leading edge in drop size analysis studies.
It is this broad - but intensive approach - which, when combined with state of the art manufacturing techniques and computerized quality control programmes, guarantees that HARDI nozzles will meet the demands of better crop protection.

## *Measuring droplet sizes*

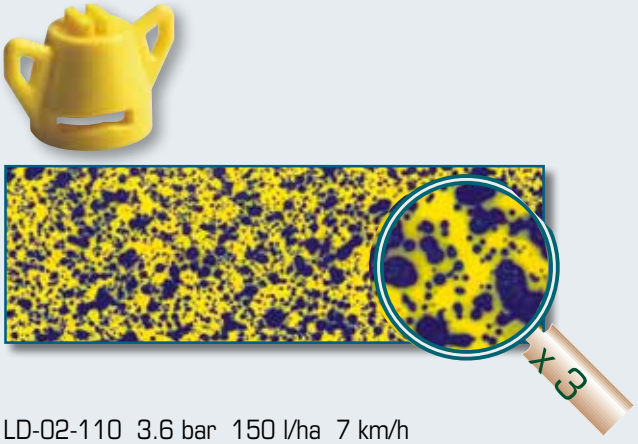
The droplet spectrum is characterized by the average droplet size based on volume (VMD) and the range that indicates the uniformity of the atomization. A laser Phase Doppler Particle Analyser (Aerometrics, PDPA) supplies this information instantaneously and is used to constantly monitor in our laboratory the spray quality of our nozzles.

### HARDI Flat fan nozzles




F-02-110 3.6 bar 150 l/ha 7 km/h

### HARDI LD LowDrift nozzles

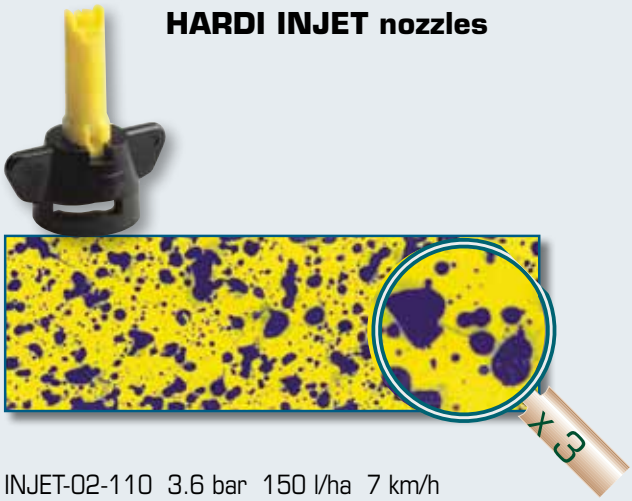



LD-02-110 3.6 bar 150 l/ha 7 km/h

### HARDI MINIDRIFT nozzles


MINIDRIFT-02-110 3.6 bar 150 l/ha 7 km/h

### HARDI INJET nozzles

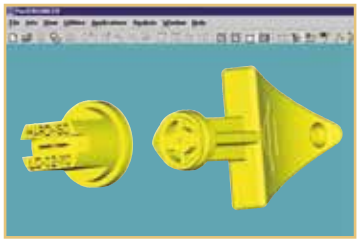



INJET-02-110 3.6 bar 150 l/ha 7 km/h

# Nozzle technology

## *Nozzle development*

Changes in cropping practices, regulatory restraints and the introduction of new agrochemicals are just some of the forces that ensure new nozzle developments, which have and will continue to take place at HARDI. This activity closely involves our agronomists, engineers and specialist tool makers. Farmer's needs are recognized and met with HARDI nozzles designed to provide the precision he demands today

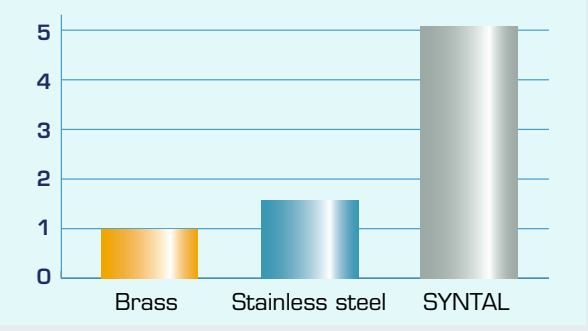


## *Quality control*

Samples of all HARDI nozzles are constantly monitored by Quality Control - using devices such as this state of the art nozzle distribution table.

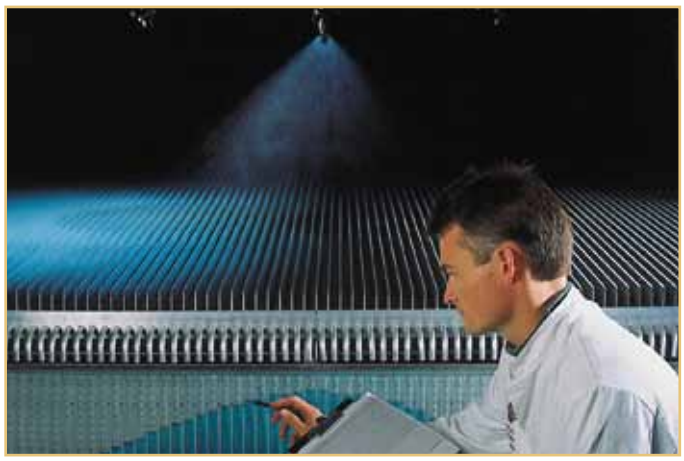

## *High Quality Materials*

HARDI nozzles are produced from high quality SYNTAL plastic that ensures both precision and durability. Where highly abrasive compounds are to be sprayed, the selection of HARDI CERAMIC nozzles will maintain this same level of superior durability.




(Kim Sintorn, Swedish University).

Durability relative to brass flat spray nozzle at the manufacturer's recommended pressure



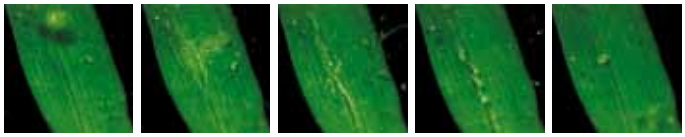
## *Wind Tunnel Studies*

Airborne drift and downwind fallout are tested and documented in the controlled conditions of a wind tunnel for all HARDI nozzles. This leads to approvals as drift reducing equipment for buffer zones in many countries.

Together with field research this has given the HARDI nozzle range approvals in the UK, Holland and Germany to be used closer to waterways than previously allowed with traditional nozzles.

## *High Speed Video*

Modern high-speed video techniques are used to investigate the droplets behaviour on their way to the target and when impacting on a leaf. These tests are done with clean water and with actives to simulate in-field spraying.



## *Deposit tests*

In UK fluorescent dye is used to test the exact amount of liquid that stays on the leaf after spraying. This is the key factor for the biological efficacy of the plant protection products.

## *Efficacy trials*

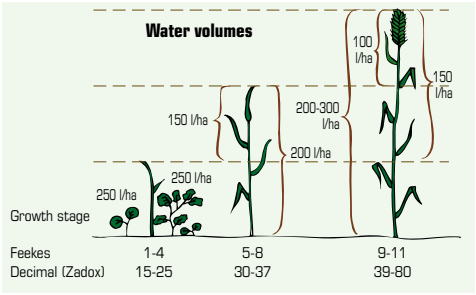
Specialist field equipment is used at the Danish Weed Research Institute to test the efficacy of herbicide performance when using HARDI nozzles.

# Choosing nozzles for arable crops

## *A nozzle for every spray job*

Choice of nozzle type and size may have to balance the need to ensure optimal biological effect with a consideration for wind drift, sprayer capacity – that influences field work rates – as well as forward speed.

Small droplets from STANDARD Flat Fan nozzles may offer an unsurpassed liquid distribution and an effective coverage of the target surface. HARDI TWIN sprayers can safely use these small standard nozzles even when weather conditions are not optimal.

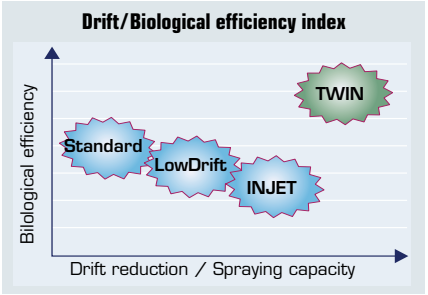


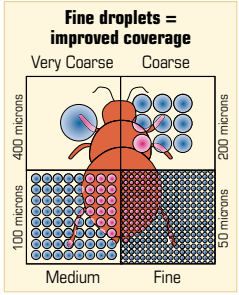

The reduced number of very small droplets produced by LowDrift nozzles makes them less sensitive to wind. Therefore they can be used on conventional sprayers under sub-optimal conditions. In particular, they are popular used when spraying lower water volumes. MINIDRIFT and INJET nozzles mix air with the spray liquid to coarsen the atomisation. Drift is substantially reduced with these nozzles so that field delays – through too high wind speeds – are minimised and timing is improved. The biological advantage gained through this better field timing may mask the use of coarser sprays. Their use has become critical to conventional spraying practice which has to try and meet both environmental needs without risking the effectiveness of the product to be applied.

## *Choosing nozzles*

The tables on the next page can be used when choosing the right nozzle for a spray job. Important precondition for the tables:

- Always follow label recommendation for spray quality and volume rate – if nothing is stated the tables on the next page can be used as a guideline.
- To minimise wind drift and maintain even liquid distribution spraying pressure between 1.5 and 2.5 bar is recommended (INJET: 3 to 5 bar). Higher pressures with TWIN air assistance are also acceptable.




- Spraying against grass weeds or on other vertical targets – it is important to use a relative fine spray.
- Small dicot weeds need good coverage either through fine droplets or – if using a coarser spray – by compensating with a higher volume rate.
- For large dicot weeds – coarse atomisation can be used.
- Fungicide treatments are often less sensitive to spray quality; medium drops can be recommended. Remember that the volume rate must be adjusted to crop density and needs for penetration to more basal parts.
- Generally the water rate for conventional spraying should not be less than 150 l/ha and for TWIN not less than 80 – 100 l/ha for optimum efficacy at lower doses.
- When mixing products or using products with more than one mode of action then adjust to the most demanding component of that product mix.

## Spray quality and capacity for HARDI ISO 110° flat fan nozzles

### HARDI ISO F-110

Standard flat fan nozzles

| bar | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
|---|---|---|---|---|---|---|
| ISO size/colour | l/min | | | | | |
| 0075-Pink | 0.21 | 0.24 | 0.27 | 0.30 | 0.35 | 0.39 |
| 01-Orange | 0.28 | 0.33 | 0.37 | 0.40 | 0.46 | 0.52 |
| 015-Green | 0.42 | 0.49 | 0.55 | 0.60 | 0.69 | 0.77 |
| 02-Yellow | 0.57 | 0.65 | 0.73 | 0.80 | 0.92 | 1.03 |
| 025-Lilac | 0.71 | 0.82 | 0.91 | 1.00 | 1.15 | 1.29 |
| 03-Blue | 0.85 | 0.98 | 1.10 | 1.20 | 1.39 | 1.55 |
| 04-Red | 1.13 | 1.31 | 1.46 | 1.60 | 1.85 | 2.07 |
| 05-Brown | 1.41 | 1.63 | 1.83 | 2.00 | 2.31 | 2.58 |
| 06-Grey | 1.70 | 1.96 | 2.19 | 2.40 | 2.77 | 3.10 |
| 08-White | 2.26 | 2.61 | 2.92 | 3.20 | 3.70 | 4.13 |
| 10-Light blue | 2.83 | 3.27 | 3.65 | 4.00 | 4.62 | 5.16 |

### HARDI ISO LD-110

LowDrift nozzles

| bar | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
|---|---|---|---|---|---|---|
| ISO size/colour | l/min | | | | | |
| 01-Orange | 0.28 | 0.33 | 0.37 | 0.40 | 0.46 | 0.52 |
| 015-Green | 0.42 | 0.49 | 0.55 | 0.60 | 0.69 | 0.77 |
| 02-Yellow | 0.57 | 0.65 | 0.73 | 0.80 | 0.92 | 1.03 |
| 025-Lilac | 0.71 | 0.82 | 0.91 | 1.00 | 1.15 | 1.29 |
| 03-Blue | 0.85 | 0.98 | 1.10 | 1.20 | 1.39 | 1.55 |
| 04-Red | 1.13 | 1.31 | 1.46 | 1.60 | 1.85 | 2.07 |
| 05-Brown | 1.41 | 1.63 | 1.83 | 2.00 | 2.31 | 2.58 |

### HARDI ISO MINIDRIFT

Air inclusion nozzles

| bar | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
|---|---|---|---|---|---|---|
| ISO size/colour | l/min | | | | | |
| 015-Green | 0.42 | 0.49 | 0.55 | 0.60 | 0.69 | 0.77 |
| 02-Yellow | 0.57 | 0.65 | 0.73 | 0.80 | 0.92 | 1.03 |
| 025-Lilac | 0.71 | 0.82 | 0.91 | 1.00 | 1.15 | 1.29 |
| 03-Blue | 0.85 | 0.98 | 1.10 | 1.20 | 1.39 | 1.55 |
| 04-Red | 1.13 | 1.31 | 1.46 | 1.60 | 1.85 | 2.07 |
| 05-Brown | 1.41 | 1.63 | 1.83 | 2.00 | 2.31 | 2.58 |

### HARDI ISO INJET

Air inclusion nozzles

| bar | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 |
|---|---|---|---|---|---|---|
| ISO size/colour | l/min | | | | | |
| 01-Orange | 0.40 | 0.46 | 0.52 | 0.57 | 0.61 | 0.65 |
| 015-Green | 0.60 | 0.69 | 0.77 | 0.85 | 0.92 | 0.98 |
| 02-Yellow | 0.80 | 0.92 | 1.03 | 1.13 | 1.22 | 1.31 |
| 025-Lilac | 1.00 | 1.15 | 1.29 | 1.41 | 1.53 | 1.63 |
| 03-Blue | 1.20 | 1.39 | 1.55 | 1.70 | 1.83 | 1.96 |
| 04-Red | 1.60 | 1.85 | 2.07 | 2.26 | 2.44 | 2.61 |
| 05-Brown | 2.00 | 2.31 | 2.58 | 2.83 | 3.06 | 3.27 |
| 06-Grey | 2.40 | 2.77 | 3.10 | 3.39 | 3.67 | 3.92 |
| 08-White | 3.20 | 3.70 | 4.13 | 4.53 | 4.89 | 5.23 |

**Spray quality:** Fine | Medium | Coarse | Verry coarse

## Conventional sprayers

| Spray quality | A Normal spraying conditions - forward speed 6-8 km/h | | | | | | B Normal spraying conditions - forward speed 8-10 km/h | | | | | | C Windy, but can't postpone - forward speed 5-6 km/h | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Standard ISO F-110 | | | LowDrift ISO LD-110 | | MD/INJET | Standard ISO F-110 | | | LowDrift ISO LD-110 | | MD/INJET | Standard ISO F-110 | | LowDrift ISO LD-110 | | MD/INJET |
| | F | M | C | M | C | VC | F | M | C | M | C | VC | M | C | M | C | VC |
| **Herbicides** - soil applied | | 100-200 l/ha | 200 l/ha | 100-200 l/ha | 100-200 l/ha | 100-200 l/ha | | | | | 150-200 l/ha | 100-200 l/ha | | | | 175-200 l/ha | 100-200 l/ha |
| - grass weeds | | 150-200 l/ha | | 150-200 l/ha | | | | | | | | | | | | | |
| - broadleaf weeds up to 2 cm across | | 150-200 l/ha | | 150-200 l/ha | | | | | 200-250 l/ha | | 175-250 l/ha | | | | | 175-250 l/ha | |
| - broadleaf weeds more than 2 cm across | | 150-200 l/ha | | 150-200 l/ha | | | | | 200-250 l/ha | | 150-200 l/ha | 200-250 l/ha | | | | 175-200 l/ha | 200-250 l/ha |
| - Glyphosate | | 100-150 l/ha | | 100-150 l/ha | | | | | | | 150-200 l/ha | 150-200 l/ha | | | | 175-200 l/ha | 150-200 l/ha |
| **Fungicides** - contact | | 150-300 l/ha | | 150-300 l/ha | | | | | | | | | | | | | |
| - systemic | | 150-300 l/ha | | 150-300 l/ha | | | | | 200-300 l/ha | | 175-300 l/ha | | | | | 175-300 l/ha | |
| **Insecticides** - contact | | 150-250 l/ha | | 150-250 l/ha | | | | | | | | | | | | | |
| - systemic | | 100-200 l/ha | | 100-200 l/ha | | | | | 200-250 l/ha | | 175-250 l/ha | | | | | 175-250 l/ha | |

## TWIN air assisted sprayers

| Spray quality | D Normal spraying conditions - forward speed 8-10 km/h | | | | | | E Normal spraying conditions - forward speed 12-15 km/h | | | | | | F Windy spraying conditions - forward speed 10-12 km/h ( forward speed 6-8 km/h - see A ) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Standard ISO F-110 | | | LowDrift ISO LD-110 | | MD/INJET | Standard ISO F-110 | | | LowDrift ISO LD-110 | | MD/INJET | Standard ISO F-110 | | LowDrift ISO LD-110 | | MD/INJET |
| | F | M | C | M | C | VC | F | M | C | M | C | VC | M | C | M | C | VC |
| **Herbicides** - soil applied | | 100-200 l/ha | 200 l/ha | 100-150 l/ha | 100-200 l/ha | | | 100-150 l/ha | 100-250 l/ha | | 100-200 l/ha | 100-200 l/ha | | 150-200 l/ha | | 100-200 l/ha | |
| - grass weeds | 100-150 l/ha | 100-200 l/ha | | 150-200 l/ha | | | | 150-200 l/ha | | 150-200 l/ha | | | | | 150-200 l/ha | | |
| - broadleaf weeds up to 2 cm across | 80-150 l/ha | 100-200 l/ha | | 150-200 l/ha | | | | 150-200 l/ha | | 150-200 l/ha | | | | | 150-200 l/ha | | |
| - broadleaf weeds more than 2 cm across | 80-150 l/ha | 100-200 l/ha | | 150-200 l/ha | | | | 150-200 l/ha | | 150-200 l/ha | | | | 175-250 l/ha | 150-200 l/ha | 150-200 l/ha | 200-250 l/ha |
| - Glyphosate | 80-120 l/ha | 100-150 l/ha | | 100-150 l/ha | | | | 100-150 l/ha | | 100-150 l/ha | | | | 100-150 l/ha | 150-200 l/ha | 150-200 l/ha | 150-200 l/ha |
| **Fungicides** - contact | 100-200 l/ha | 100-200 l/ha | | 150-200 l/ha | | | | 150-200 l/ha | | 150-200 l/ha | | | | | 150-200 l/ha | | |
| - systemic | 80-120 l/ha | 100-200 l/ha | | 150-200 l/ha | | | | 150-200 l/ha | | 150-200 l/ha | | | | | 150-200 l/ha | | |
| **Insecticides** - contact | 100-200 l/ha | 100-200 l/ha | | 150-200 l/ha | | | | 150-200 l/ha | | 150-200 l/ha | | | | | 150-200 l/ha | | |
| - systemic | 80-200 l/ha | 100-200 l/ha | | 100-200 l/ha | | | | 100-200 l/ha | | 100-200 l/ha | | | | | 100-200 l/ha | | |

Best choice  Useful alternative  Under optimum spraying conditions when fine atomisation can be used with no drift hazard

**INJET** The very coarse atomisation from INJET nozzles often requires higher water volume rates to compensate for poor coverage

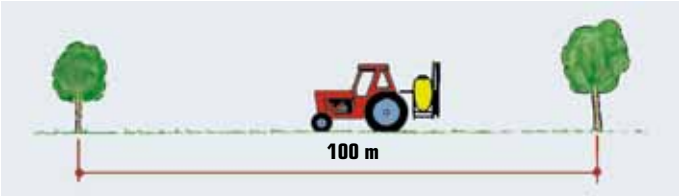
**Spray quality:** Fine  Medium  Coarse  Verry coarse

# Calibration of field crop sprayers

Precise, safe, applications in the field demand that the sprayer is effectively calibrated. Calibration must always be done with clean water and before the use of any crop protection product. Follow these three steps to calibrate your sprayer.

## 1 Check driving speed

Half fill the spray tank with water.




Mark out 100 m – note time to drive the distance.

**Example**

If it takes 50 seconds to drive 100 metres then the spraying speed is 7.2 km/hour.

**Driving speed formula**

$$\frac{\text{Distance driven (m)} \times 3.6}{\text{Time (sec.)}} = \text{km/h}$$

## 3 Check nozzle output

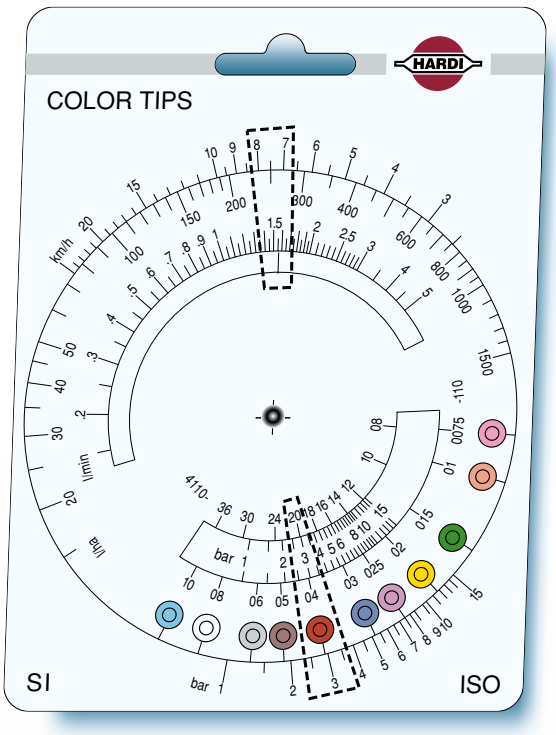
- If actual output is not equal to desired output: Readjust pressure. (alternatively: change nozzle or driving speed)
- If output has increased more than 10% from table value: change all nozzles.

## 2 Select volume rate, nozzle and pressure

For easy selection of nozzles and pressure, use the HARDI calibration disk (order no. 285802).

**Example**

| | | | |
|---|---|---|---|
| Volume rate | 250 l/ha | Pressure | 2.90 bar |
| Driving speed | 7.5 km/h | Nozzle flow | 1.56 l/min |
| Nozzle | ISO F-04-110 | | |




## Nozzle flow

If your water volume rate and spraying speed are known then use this table to identify the flow rate that will be required by the nozzle. The nozzle flow rate [litres/minute] selected from this table can then be used, together with the nozzle tables on the following pages, to identify a suitable nozzle.

| | l/ha | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **km/h** | **25** | **50** | **75** | **100** | **125** | **150** | **175** | **200** | **250** | **300** | **350** | **400** | **450** | **500** | **550** | **600** |
| **3** | | | | 0,25 | 0,31 | 0,38 | 0,44 | 0,50 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,38 | 1,50 |
| **4** | | | 0,25 | 0,33 | 0,42 | 0,50 | 0,58 | 0,67 | 0,83 | 1,00 | 1,17 | 1,33 | 1,50 | 1,67 | 1,83 | 2,00 |
| **5** | | 0,21 | 0,31 | 0,42 | 0,52 | 0,63 | 0,73 | 0,83 | 1,04 | 1,25 | 1,46 | 1,67 | 1,88 | 2,08 | 2,29 | 2,50 |
| **6** | | 0,25 | 0,38 | 0,50 | 0,63 | 0,75 | 0,88 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,25 | 2,50 | 2,75 | 3,00 |
| **7** | | 0,29 | 0,44 | 0,58 | 0,73 | 0,88 | 1,02 | 1,17 | 1,46 | 1,75 | 2,04 | 2,33 | 2,63 | 2,92 | 3,21 | 3,50 |
| **8** | | 0,33 | 0,50 | 0,67 | 0,83 | 1,00 | 1,17 | 1,33 | 1,67 | 2,00 | 2,33 | 2,67 | 3,00 | 3,33 | 3,67 | 4,00 |
| **9** | | 0,38 | 0,56 | 0,75 | 0,94 | 1,13 | 1,31 | 1,50 | 1,88 | 2,25 | 2,63 | 3,00 | 3,38 | 3,75 | 4,13 | 4,50 |
| **10** | 0,21 | 0,42 | 0,63 | 0,83 | 1,04 | 1,25 | 1,46 | 1,67 | 2,08 | 2,50 | 2,92 | 3,33 | 3,75 | 4,17 | 4,58 | 5,00 |
| **12** | 0,25 | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,50 | 3,00 | 3,50 | 4,00 | 4,50 | 5,00 | | |
| **15** | 0,31 | 0,63 | 0,94 | 1,25 | 1,56 | 1,88 | 2,19 | 2,50 | 3,13 | 3,75 | 4,38 | 5,00 | | | | |
| **20** | 0,42 | 0,83 | 1,25 | 1,67 | 2,08 | 2,50 | 2,92 | 3,33 | 4,17 | 5,00 | | | | | | |

# Calibration of field crop sprayers

When calibrating, it is the perfect time to check the distribution of spray across your boom. Here you have clean water in the whole system and a great opportunity to inspect your sprayer for any leaks, blockages, etc.

## *Calibration formulas*

**Speed check**

$$\frac{\text{Distance (m)} \quad 3.6}{\text{Time (s)}} = \text{km/h}$$

**Nozzle output**

$$\frac{\text{Nozzle spacing (m)} \quad \text{l/ha x km/h}}{600} = \text{l/min (per nozzle)}$$

**Application volume**

$$\frac{600 \text{ x l/min (per nozzle)}}{\text{Nozzle spacing (m)} \quad \text{km/h}} = \text{l/ha}$$

**Pressure adjustment**

$$\left(\frac{\text{New output (l/min)}}{\text{Known output (l/min)}}\right)^2 \quad \text{Known pressure (bar)} = \text{New pressure (bar)}$$

## *Cleaning of nozzles*

An even distribution across your boom is critical to the performance of the product you are applying. Dirty and/or blocked nozzles are the most frequently reported problem affecting distribution. Cleaning nozzles is best done using water and a soft brush such as a toothbrush. Never use tools like screwdrivers or nails - they will certainly damage the nozzle and its ability to evenly distribute the sprayed liquid.

A soft brush for nozzle cleaning is included as a part of the HARDI calibration set (818492).


## *Liquid fertilizer*

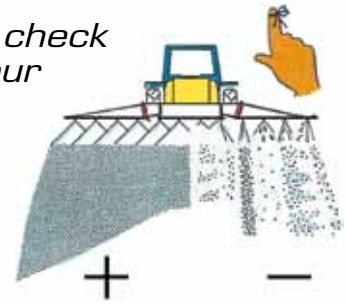
Liquid fertilizers may be of a higher liquid density than water and almost all, normal spray solutions. The density correction table below states the increased pressure that will be needed to reach the required output with such liquids.

**Example**

The nozzle has an output of 2.03 l/min at 3 bar. If the density of the liquid fertilizer is 1.2 g/cm$^3$ you have to multiply the calibration pressure – found when checking the nozzle flow with water – with the density factor. This gives an adjusted pressure of 3.6 bar. The value can be found in the table at 3 bar (calibrated pressure) and a density of 1.2 g/cm$^3$.

| | Density (g/cm$^3$) | | | | |
|---|---|---|---|---|---|
| | 1.10 | 1.15 | 1.20 | 1.30 | 1.40 |
| bar | Adjusted pressure (bar) | | | | |
| 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.4 |
| 1.5 | 1.7 | 1.7 | 1.8 | 2.0 | 2.1 |
| 2.0 | 2.2 | 2.3 | 2.4 | 2.6 | 2.8 |
| 2.5 | 2.8 | 2.9 | 3.0 | 3.3 | 3.5 |
| 3.0 | 3.3 | 3.5 | 3.6 | 3.9 | 4.2 |

## *When did you last check the output from your nozzles?*



1. After every week of spraying check minimum 2 nozzles per boom section
2. If the flow from one or more of these nozzles has increased more than 15% compared to a new nozzle – then change all nozzles.

## *Water sensitive paper*

An important tool to check the spray quality and deposition in the field. Buy it at your HARDI dealer.


25 x 75 mm
50 pcs. no: 893211

# HARDI ISO nozzles

## HARDI ISO F-110 - Standard flat fan nozzles

All-round flat fan nozzle. Recommended for all types of pesticide application where optimum coverage is demanded. This nozzle will give you excellent and uniform liquid distribution at boom heights from 35 to 70 cm (50 cm recommended to take care of uneven terrain or boom movements).

- ISO: Flow, colour and outer dimensions
- Working pressure: 1.5 to 5 bar
- Recommended for TWIN sprayers
- SYNTAL – precision moulded thermoplastic
- CERAMIC – extremely high durability
- COLOR TIPS – for safe and easy handling

### 0075-Pink

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371964 (12 pcs. 750634) **SYNTAL-S** 371963 (12 pcs. 750635) | | | | | | | | | | |
| 1.5 | 0.21 | F | 42 | 36 | 32 | 25 | 21 | 17 | 13 | 10 |
| 2.0 | 0.24 | F | 49 | 42 | 37 | 29 | 24 | 20 | 15 | 12 |
| 2.5 | 0.27 | F | 55 | 47 | 41 | 33 | 27 | 22 | 16 | 13 |
| 3.0 | 0.30 | F | 60 | 51 | 45 | 36 | 30 | 24 | 18 | 14 |
| 4.0 | 0.35 | F | 69 | 59 | 52 | 42 | 35 | 28 | 21 | 17 |
| 5.0 | 0.39 | F | 77 | 66 | 58 | 46 | 39 | 31 | 23 | 19 |

### 01-Orange

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371764 (12 pcs. 755627) **SYNTAL-S** 371706 (12 pcs. 755643) | | | | | | | | | | |
| 1.5 | 0.28 | F | 57 | 48 | 42 | 34 | 28 | 23 | 17 | 14 |
| 2.0 | 0.33 | F | 65 | 56 | 49 | 39 | 33 | 26 | 20 | 16 |
| 2.5 | 0.37 | F | 73 | 63 | 55 | 44 | 37 | 29 | 22 | 18 |
| 3.0 | 0.40 | F | 80 | 69 | 60 | 48 | 40 | 32 | 24 | 19 |
| 4.0 | 0.46 | F | 92 | 79 | 69 | 55 | 46 | 37 | 28 | 22 |
| 5.0 | 0.52 | F | 103 | 89 | 77 | 62 | 52 | 41 | 31 | 25 |

### 015-Green

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371765 (12 pcs. 755628) **SYNTAL-S** 371707 (12 pcs. 755646) **CERAMIC-CT** 371772 (12 pcs. 755635) **CERAMIC-S** 371738 (12 pcs. 755667) | | | | | | | | | | |
| 1.5 | 0.42 | M | 85 | 73 | 64 | 51 | 42 | 34 | 25 | 20 |
| 2.0 | 0.49 | F | 98 | 84 | 73 | 59 | 49 | 39 | 29 | 24 |
| 2.5 | 0.55 | F | 110 | 94 | 82 | 66 | 55 | 44 | 33 | 26 |
| 3.0 | 0.60 | F | 120 | 103 | 90 | 72 | 60 | 48 | 36 | 29 |
| 4.0 | 0.69 | F | 139 | 119 | 104 | 83 | 69 | 55 | 42 | 33 |
| 5.0 | 0.77 | F | 155 | 133 | 116 | 93 | 77 | 62 | 46 | 37 |

### 02-Yellow

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371766 (12 pcs. 755629) **SYNTAL-S** 371708 (12 pcs. 755649) **CERAMIC-CT** 371773 (12 pcs. 755636) **CERAMIC-S** 371739 (12 pcs. 755670) | | | | | | | | | | |
| 1.5 | 0.57 | M | 113 | 97 | 85 | 68 | 57 | 45 | 34 | 27 |
| 2.0 | 0.65 | M | 131 | 112 | 98 | 78 | 65 | 52 | 39 | 31 |
| 2.5 | 0.73 | F | 146 | 125 | 110 | 88 | 73 | 58 | 44 | 35 |
| 3.0 | 0.80 | F | 160 | 137 | 120 | 96 | 80 | 64 | 48 | 38 |
| 4.0 | 0.92 | F | 185 | 158 | 139 | 111 | 92 | 74 | 55 | 44 |
| 5.0 | 1.03 | F | 207 | 177 | 155 | 124 | 103 | 83 | 62 | 50 |

### 025-Lilac

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371950 (12 pcs. 750626) **SYNTAL-S** 371946 (12 pcs. 750628) | | | | | | | | | | |
| 1.5 | 0.71 | M | 141 | 121 | 106 | 85 | 71 | 57 | 42 | 34 |
| 2.0 | 0.82 | M | 163 | 140 | 122 | 98 | 82 | 65 | 49 | 39 |
| 2.5 | 0.91 | M | 183 | 156 | 137 | 110 | 91 | 73 | 55 | 44 |
| 3.0 | 1.00 | M | 200 | 171 | 150 | 120 | 100 | 80 | 60 | 48 |
| 4.0 | 1.15 | F | 231 | 198 | 173 | 139 | 115 | 92 | 69 | 55 |
| 5.0 | 1.29 | F | 258 | 221 | 194 | 155 | 129 | 103 | 77 | 62 |

= Spray quality: Very Fine (VF), Fine (F), Medium (M), Coarse (C), Very Coarse (VC).

### 03-Blue

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371767 (12 pcs. 755630) **SYNTAL-S** 371709 (12 pcs. 755652) **CERAMIC-CT** 371774 (12 pcs. 755637) **CERAMIC-S** 371740 (12 pcs. 755673) | | | | | | | | | | |
| 1.5 | 0.85 | M | 170 | 145 | 127 | 102 | 85 | 68 | 51 | 41 |
| 2.0 | 0.98 | M | 196 | 168 | 147 | 118 | 98 | 78 | 59 | 47 |
| 2.5 | 1.10 | M | 219 | 188 | 164 | 131 | 110 | 88 | 66 | 53 |
| 3.0 | 1.20 | M | 240 | 206 | 180 | 144 | 120 | 96 | 72 | 58 |
| 4.0 | 1.39 | M | 277 | 238 | 208 | 166 | 139 | 111 | 83 | 67 |
| 5.0 | 1.55 | M | 310 | 266 | 232 | 186 | 155 | 124 | 93 | 74 |

### 04-Red

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371768 (12 pcs. 755631) **SYNTAL-S** 371710 (12 pcs. 755655) **CERAMIC-CT** 371775 (12 pcs. 755638) **CERAMIC-S** 371741 (12 pcs. 755676) | | | | | | | | | | |
| 1.5 | 1.13 | M | 226 | 194 | 170 | 136 | 113 | 91 | 68 | 54 |
| 2.0 | 1.31 | M | 261 | 224 | 196 | 157 | 131 | 105 | 78 | 63 |
| 2.5 | 1.46 | M | 292 | 250 | 219 | 175 | 146 | 117 | 88 | 70 |
| 3.0 | 1.60 | M | 320 | 274 | 240 | 192 | 160 | 128 | 96 | 77 |
| 4.0 | 1.85 | M | 370 | 317 | 277 | 222 | 185 | 148 | 111 | 89 |
| 5.0 | 2.07 | M | 413 | 354 | 310 | 248 | 207 | 165 | 124 | 99 |

### 05-Brown

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371769 (12 pcs. 755632) **SYNTAL-S** 371711 (12 pcs. 755658) **CERAMIC-CT** 371776 (12 pcs. 755639) **CERAMIC-S** 371742 (12 pcs. 755679) | | | | | | | | | | |
| 1.5 | 1.41 | C | 283 | 242 | 212 | 170 | 141 | 113 | 85 | 68 |
| 2.0 | 1.63 | C | 327 | 280 | 245 | 196 | 163 | 131 | 98 | 78 |
| 2.5 | 1.83 | M | 365 | 313 | 274 | 219 | 183 | 146 | 110 | 88 |
| 3.0 | 2.00 | M | 400 | 343 | 300 | 240 | 200 | 160 | 120 | 96 |
| 4.0 | 2.31 | M | 462 | 396 | 346 | 277 | 231 | 185 | 139 | 111 |
| 5.0 | 2.58 | M | 516 | 443 | 387 | 310 | 258 | 207 | 155 | 124 |

### 06-Grey

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371770 (12 pcs. 755633) **SYNTAL-S** 371712 (12 pcs. 755661) **CERAMIC-CT** 371777 (12 pcs. 755640) **CERAMIC-S** 371743 (12 pcs. 755682) | | | | | | | | | | |
| 1.5 | 1.70 | C | 339 | 291 | 255 | 204 | 170 | 136 | 102 | 81 |
| 2.0 | 1.96 | C | 392 | 336 | 294 | 235 | 196 | 157 | 118 | 94 |
| 2.5 | 2.19 | C | 438 | 376 | 329 | 263 | 219 | 175 | 131 | 105 |
| 3.0 | 2.40 | C | 480 | 411 | 360 | 288 | 240 | 192 | 144 | 115 |
| 4.0 | 2.77 | C | 554 | 475 | 416 | 333 | 277 | 222 | 166 | 133 |
| 5.0 | 3.10 | C | 620 | 531 | 465 | 372 | 310 | 248 | 186 | 149 |

### 08-White

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371771 (12 pcs. 755634) **SYNTAL-S** 371713 (12 pcs. 755664) | | | | | | | | | | |
| 1.5 | 2.26 | VC | 453 | 388 | 339 | 272 | 226 | 181 | 136 | 109 |
| 2.0 | 2.61 | C | 523 | 448 | 392 | 314 | 261 | 209 | 157 | 125 |
| 2.5 | 2.92 | C | 584 | 501 | 438 | 351 | 292 | 234 | 175 | 140 |
| 3.0 | 3.20 | C | 640 | 549 | 480 | 384 | 320 | 256 | 192 | 154 |
| 4.0 | 3.70 | C | 739 | 633 | 554 | 443 | 370 | 296 | 222 | 177 |
| 5.0 | 4.13 | C | 826 | 708 | 620 | 496 | 413 | 330 | 248 | 198 |

### 10-Light blue

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYNTAL-CT** 371970 (12 pcs. 750636) **SYNTAL-S** 371966 (12 pcs. 750638) | | | | | | | | | | |
| 1.5 | 2.83 | VC | 566 | 485 | 424 | 339 | 283 | 226 | 170 | 136 |
| 2.0 | 3.27 | VC | 653 | 560 | 490 | 392 | 327 | 261 | 196 | 157 |
| 2.5 | 3.65 | VC | 730 | 626 | 548 | 438 | 365 | 292 | 219 | 175 |
| 3.0 | 4.00 | VC | 800 | 686 | 600 | 480 | 400 | 320 | 240 | 192 |
| 4.0 | 4.62 | C | 924 | 792 | 693 | 554 | 462 | 370 | 277 | 222 |
| 5.0 | 5.16 | C | 1033 | 885 | 775 | 620 | 516 | 413 | 310 | 248 |

The nozzles are available both as single nozzles (**S**) and as COLOR TIPS (**CT**), where the nozzle is integrated in the SNAP-FIT.

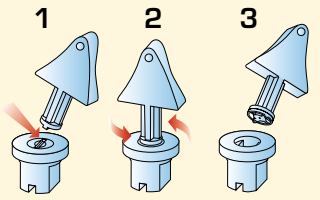
# HARDI ISO nozzles

## HARDI ISO LD-110 - LowDrift nozzles

LowDrift nozzles are recommended when optimum spraying conditions cannot be achieved (risk of drift) and spraying cannot be postponed.

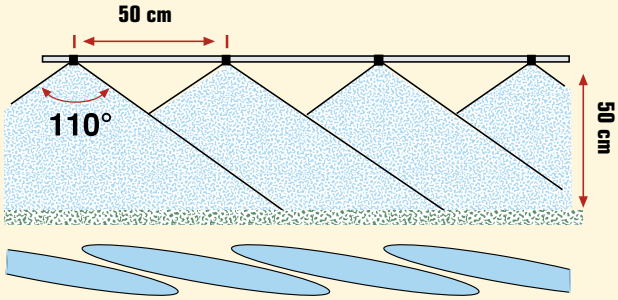
- ISO: Flow, colour and outer dimensions
- Working pressure: 1.5 to 5 bar
- Restrictor designed for minimum chemical residues
- SYNTAL – precision moulded thermoplastic
- CERAMIC – extremely high durability
- COLOR TIPS – for safe and easy handling

This nozzle will give you excellent and uniform liquid distribution at boom heights from 35 to 70 cm (50 cm recommended to take care of uneven terrain or boom movements).




Turn-&-Clean with the HARDI key – easily removable restrictor.

To ensure that the boom distribution is not disturbed by interference, the nozzles are set at an angle of 8° to the boom. This feature is built into all HARDI COLOR TIP and SNAP-FIT caps. This angle has to be set manually if single nozzles are used.




| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **01-Orange** | **SYNTAL-CT** 371837 (12 pcs. 755708) **SYNTAL-S** 371817 (12 pcs. 755698) **CERAMIC-CT** 371842 (12 pcs. 755713) **CERAMIC-S** 371822 (12 pcs. 755703) | | | | | | | | | |
| 1.5 | 0.28 | M | 57 | 48 | 42 | 34 | 28 | 23 | 17 | 14 |
| 2.0 | 0.33 | M | 65 | 56 | 49 | 39 | 33 | 26 | 20 | 16 |
| 2.5 | 0.37 | M | 73 | 63 | 55 | 44 | 37 | 29 | 22 | 18 |
| 3.0 | 0.40 | M | 80 | 69 | 60 | 48 | 40 | 32 | 24 | 19 |
| 4.0 | 0.46 | M | 92 | 79 | 69 | 55 | 46 | 37 | 28 | 22 |
| 5.0 | 0.52 | F | 103 | 89 | 77 | 62 | 52 | 41 | 31 | 25 |

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **015-Green** | **SYNTAL-CT** 371838 (12 pcs. 755709) **SYNTAL-S** 371818 (12 pcs. 755699) **CERAMIC-CT** 371843 (12 pcs. 755714) **CERAMIC-S** 371823 (12 pcs. 755704) | | | | | | | | | |
| 1.5 | 0.42 | M | 85 | 73 | 64 | 51 | 42 | 34 | 25 | 20 |
| 2.0 | 0.49 | M | 98 | 84 | 73 | 59 | 49 | 39 | 29 | 24 |
| 2.5 | 0.55 | M | 110 | 94 | 82 | 66 | 55 | 44 | 33 | 26 |
| 3.0 | 0.60 | M | 120 | 103 | 90 | 72 | 60 | 48 | 36 | 29 |
| 4.0 | 0.69 | M | 139 | 119 | 104 | 83 | 69 | 55 | 42 | 33 |
| 5.0 | 0.77 | M | 155 | 133 | 116 | 93 | 77 | 62 | 46 | 37 |

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **02-Yellow** | **SYNTAL-CT** 371839 (12 pcs. 755710) **SYNTAL-S** 371819 (12 pcs. 755700) **CERAMIC-CT** 371844 (12 pcs. 755715) **CERAMIC-S** 371824 (12 pcs. 755705) | | | | | | | | | |
| 1.5 | 0.57 | M | 113 | 97 | 85 | 68 | 57 | 45 | 34 | 27 |
| 2.0 | 0.65 | M | 131 | 112 | 98 | 78 | 65 | 52 | 39 | 31 |
| 2.5 | 0.73 | M | 146 | 125 | 110 | 88 | 73 | 58 | 44 | 35 |
| 3.0 | 0.80 | M | 160 | 137 | 120 | 96 | 80 | 64 | 48 | 38 |
| 4.0 | 0.92 | M | 185 | 158 | 139 | 111 | 92 | 74 | 55 | 44 |
| 5.0 | 1.03 | M | 207 | 177 | 155 | 124 | 103 | 83 | 62 | 50 |

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **025-Lilac** | **SYNTAL-CT** 371958 (12 pcs. 750630) **SYNTAL-S** 371957 (12 pcs. 750632) | | | | | | | | | |
| 1.5 | 0.71 | C | 141 | 121 | 106 | 85 | 71 | 57 | 42 | 34 |
| 2.0 | 0.82 | C | 163 | 140 | 122 | 98 | 82 | 65 | 49 | 39 |
| 2.5 | 0.91 | M | 183 | 156 | 137 | 110 | 91 | 73 | 55 | 44 |
| 3.0 | 1.00 | M | 200 | 171 | 150 | 120 | 100 | 80 | 60 | 48 |
| 4.0 | 1.15 | M | 231 | 198 | 173 | 139 | 115 | 92 | 69 | 55 |
| 5.0 | 1.29 | M | 258 | 221 | 194 | 155 | 129 | 103 | 77 | 62 |

= Spray quality: Very Fine (VF), Fine (F), Medium (M), Coarse (C), Very Coarse (VC).

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **03-Blue** | **SYNTAL-CT** 371840 (12 pcs. 755711) **SYNTAL-S** 371820 (12 pcs. 755701) **CERAMIC-CT** 371845 (12 pcs. 755716) **CERAMIC-S** 371825 (12 pcs. 755706) | | | | | | | | | |
| 1.5 | 0.85 | C | 170 | 145 | 127 | 102 | 85 | 68 | 51 | 41 |
| 2.0 | 0.98 | C | 196 | 168 | 147 | 118 | 98 | 78 | 59 | 47 |
| 2.5 | 1.10 | C | 219 | 188 | 164 | 131 | 110 | 88 | 66 | 53 |
| 3.0 | 1.20 | C | 240 | 206 | 180 | 144 | 120 | 96 | 72 | 58 |
| 4.0 | 1.39 | M | 277 | 238 | 208 | 166 | 139 | 111 | 83 | 67 |
| 5.0 | 1.55 | M | 310 | 266 | 232 | 186 | 155 | 124 | 93 | 74 |

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **04-Red** | **SYNTAL-CT** 371841 (12 pcs. 755712) **SYNTAL-S** 371821 (12 pcs. 755702) **CERAMIC-CT** 371846 (12 pcs. 755717) **CERAMIC-S** 371826 (12 pcs. 755707) | | | | | | | | | |
| 1.5 | 1.13 | C | 226 | 194 | 170 | 136 | 113 | 91 | 68 | 54 |
| 2.0 | 1.31 | C | 261 | 224 | 196 | 157 | 131 | 105 | 78 | 63 |
| 2.5 | 1.46 | C | 292 | 250 | 219 | 175 | 146 | 117 | 88 | 70 |
| 3.0 | 1.60 | C | 320 | 274 | 240 | 192 | 160 | 128 | 96 | 77 |
| 4.0 | 1.85 | C | 370 | 317 | 277 | 222 | 185 | 148 | 111 | 89 |
| 5.0 | 2.07 | M | 413 | 354 | 310 | 248 | 207 | 165 | 124 | 99 |

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **05-Brown** | **SYNTAL-CT** 371894 (12 pcs. 755815) **SYNTAL-S** 371893 (12 pcs. 755817) **CERAMIC-CT** 371897 (12 pcs. 755816) **CERAMIC-S** 371896 (12 pcs. 755818) | | | | | | | | | |
| 1.5 | 1.41 | C | 283 | 242 | 212 | 170 | 141 | 113 | 85 | 68 |
| 2.0 | 1.63 | C | 327 | 280 | 245 | 196 | 163 | 131 | 98 | 78 |
| 2.5 | 1.83 | C | 365 | 313 | 274 | 219 | 183 | 146 | 110 | 88 |
| 3.0 | 2.00 | C | 400 | 343 | 300 | 240 | 200 | 160 | 120 | 96 |
| 4.0 | 2.31 | C | 462 | 396 | 346 | 277 | 231 | 185 | 139 | 111 |
| 5.0 | 2.58 | C | 516 | 443 | 387 | 310 | 258 | 207 | 155 | 124 |

The nozzles are available both as single nozzles (**S**) and as COLOR TIPS (**CT**), where the nozzle is integrated in the SNAP-FIT.

# HARDI ISO MINIDRIFT

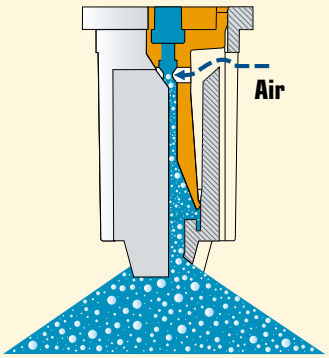
## HARDI ISO MINIDRIFT air inclusion nozzles

The HARDI MINIDRIFT nozzle can be used for spraying at sub-optimal weather conditions, when spraying cannot be postponed. The MINIDRIFT nozzle will at low pressures reduce drift to a minimum.

- Air inclusion nozzle
- Working pressure: 1 to 5 bar
- ISO flow, colours, sizes and nomenclature
- Application rates from 60 to 400 l/ha (at 8 km/h)
- SYNTAL – precision moulded thermoplastic

This nozzle will give you excellent and uniform liquid distribution at boom heights from 40 to 90 cm.

The droplet spectrum is coarse to very coarse; safe for drift control but without risking poor coverage and deposition on leaves.
The venturi can easily be removed for cleaning the nozzle.




Two big air inlets reduce the risk of clogging.

Compact design reduces impact damage.

Meets full ISO specifications.

| | bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 015-Green | **SYNTAL-CT** 372121 (6 pcs. 755850) | | | | | **SYNTAL-S** 372111 (6 pcs. 755840) | | | | | |
| | 1.5 | 0.42 | C | 85 | 73 | 64 | 51 | 42 | 34 | 25 | 20 |
| | 2.0 | 0.49 | C | 98 | 84 | 73 | 59 | 49 | 39 | 29 | 24 |
| | 2.5 | 0.55 | C | 110 | 94 | 82 | 66 | 55 | 44 | 33 | 26 |
| | 3.0 | 0.60 | C | 120 | 103 | 90 | 72 | 60 | 48 | 36 | 29 |
| | 4.0 | 0.69 | M | 139 | 119 | 104 | 83 | 69 | 55 | 42 | 33 |
| | 5.0 | 0.77 | M | 155 | 133 | 116 | 93 | 77 | 62 | 46 | 37 |
| 02-Yellow | **SYNTAL-CT** 372122 (6 pcs. 755851) | | | | | **SYNTAL-S** 372112 (6 pcs. 755841) | | | | | |
| | 1.5 | 0.57 | VC | 113 | 97 | 85 | 68 | 57 | 45 | 34 | 27 |
| | 2.0 | 0.65 | C | 131 | 112 | 98 | 78 | 65 | 52 | 39 | 31 |
| | 2.5 | 0.73 | C | 146 | 125 | 110 | 88 | 73 | 58 | 44 | 35 |
| | 3.0 | 0.80 | C | 160 | 137 | 120 | 96 | 80 | 64 | 48 | 38 |
| | 4.0 | 0.92 | C | 185 | 158 | 139 | 111 | 92 | 74 | 55 | 44 |
| | 5.0 | 1.03 | M | 207 | 177 | 155 | 124 | 103 | 83 | 62 | 50 |
| 025-Lilac | **SYNTAL-CT** 372123 (6 pcs. 755852) | | | | | **SYNTAL-S** 372113 (6 pcs. 755842) | | | | | |
| | 1.5 | 0.71 | VC | 141 | 121 | 106 | 85 | 71 | 57 | 42 | 34 |
| | 2.0 | 0.82 | VC | 163 | 140 | 122 | 98 | 82 | 65 | 49 | 39 |
| | 2.5 | 0.91 | C | 183 | 156 | 137 | 110 | 91 | 73 | 55 | 44 |
| | 3.0 | 1.00 | C | 200 | 171 | 150 | 120 | 100 | 80 | 60 | 48 |
| | 4.0 | 1.15 | C | 231 | 198 | 173 | 139 | 115 | 92 | 69 | 55 |
| | 5.0 | 1.29 | M | 258 | 221 | 194 | 155 | 129 | 103 | 77 | 62 |

| | bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 03-Blue | **SYNTAL-CT** 372124 (6 pcs. 755853) | | | | | **SYNTAL-S** 372114 (6 pcs. 755843) | | | | | |
| | 1.5 | 0.85 | VC | 170 | 145 | 127 | 102 | 85 | 68 | 51 | 41 |
| | 2.0 | 0.98 | VC | 196 | 168 | 147 | 118 | 98 | 78 | 59 | 47 |
| | 2.5 | 1.10 | VC | 219 | 188 | 164 | 131 | 110 | 88 | 66 | 53 |
| | 3.0 | 1.20 | C | 240 | 206 | 180 | 144 | 120 | 96 | 72 | 58 |
| | 4.0 | 1.39 | C | 277 | 238 | 208 | 166 | 139 | 111 | 83 | 67 |
| | 5.0 | 1.55 | C | 310 | 266 | 232 | 186 | 155 | 124 | 93 | 74 |
| 04-Red | **SYNTAL-CT** 372125 (6 pcs. 755854) | | | | | **SYNTAL-S** 372115 (6 pcs. 755844) | | | | | |
| | 1.0 | 0.92 | VC | 185 | 158 | 139 | 111 | 90 | 74 | 55 | 44 |
| | 1.5 | 1.13 | VC | 226 | 194 | 170 | 136 | 113 | 91 | 68 | 54 |
| | 2.0 | 1.31 | VC | 261 | 224 | 196 | 157 | 131 | 105 | 78 | 63 |
| | 2.5 | 1.46 | VC | 292 | 250 | 219 | 175 | 146 | 117 | 88 | 70 |
| | 3.0 | 1.60 | VC | 320 | 274 | 240 | 192 | 160 | 128 | 96 | 77 |
| | 4.0 | 1.85 | C | 370 | 317 | 277 | 222 | 185 | 148 | 111 | 89 |
| | 5.0 | 2.07 | C | 413 | 354 | 310 | 248 | 207 | 165 | 124 | 99 |
| 05-Brown | **SYNTAL-CT** 372126 (6 pcs. 755855) | | | | | **SYNTAL-S** 372116 (6 pcs. 755845) | | | | | |
| | 1.0 | 1.15 | VC | 231 | 148 | 173 | 139 | 115 | 92 | 69 | 56 |
| | 1.5 | 1.41 | VC | 283 | 242 | 212 | 170 | 141 | 113 | 85 | 68 |
| | 2.0 | 1.63 | VC | 327 | 280 | 245 | 196 | 163 | 131 | 98 | 78 |
| | 2.5 | 1.83 | VC | 365 | 313 | 274 | 219 | 183 | 146 | 110 | 88 |
| | 3.0 | 2.00 | VC | 400 | 343 | 300 | 240 | 200 | 160 | 120 | 96 |
| | 4.0 | 2.31 | C | 462 | 396 | 346 | 277 | 231 | 185 | 139 | 111 |
| | 5.0 | 2.58 | C | 516 | 443 | 387 | 310 | 258 | 207 | 155 | 124 |

= Spray quality: Very Fine (VF), Fine (F), Medium (M), Coarse (C), Very Coarse (VC).

The nozzles are available both as single nozzles (**S**) and as COLOR TIPS (**CT**), where the nozzle is integrated in the SNAP-FIT.

# HARDI ISO nozzles

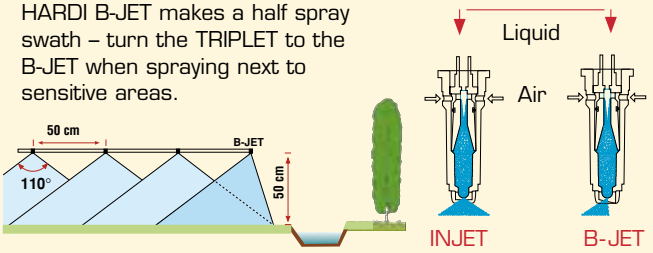
## HARDI INJET Air inclusion nozzles

The HARDI INJET nozzles can be used for spraying at sub-optimal weather conditions, or when spraying cannot be postponed. The HARDI INJET nozzles are recommended for most pesticide applications where reduced risk of drift is demanded.

- Air inclusion nozzles with greater drift reduction
- ISO flow, colours and nomenclature
- Application rates from 60 – 600 l/ha (at 8 km/h)
- Pressure range: 3 – 8 bar
- B-Jet border nozzle for precise application near sensitive areas
- Available in SYNTAL and CERAMIC materials

The HARDI INJET & B-JET nozzles can be mounted using the 334083 ISO/INJET cap.

HARDI B-JET makes a half spray swath – turn the TRIPLET to the B-JET when spraying next to sensitive areas.




### 01-Orange

**SYNTAL-S** 371926 (6 pcs. 750621)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 0.40 | VC | 80 | 69 | 60 | 48 | 40 | 32 | 24 | 19 |
| 4.0 | 0.46 | VC | 92 | 79 | 69 | 55 | 46 | 37 | 28 | 22 |
| 5.0 | 0.52 | VC | 103 | 89 | 77 | 62 | 52 | 41 | 31 | 25 |
| 6.0 | 0.57 | C | 113 | 97 | 85 | 68 | 57 | 45 | 34 | 27 |
| 7.0 | 0.61 | C | 122 | 105 | 92 | 73 | 61 | 49 | 37 | 29 |
| 8.0 | 0.65 | C | 131 | 112 | 98 | 78 | 65 | 52 | 39 | 31 |

### 015-Green

**SYNTAL-S** 371872 (6 pcs. 755801)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 0.60 | VC | 120 | 103 | 90 | 72 | 60 | 48 | 36 | 29 |
| 4.0 | 0.69 | VC | 139 | 119 | 104 | 83 | 69 | 55 | 42 | 33 |
| 5.0 | 0.77 | VC | 155 | 133 | 116 | 93 | 77 | 62 | 46 | 37 |
| 6.0 | 0.85 | VC | 170 | 145 | 127 | 102 | 85 | 68 | 51 | 41 |
| 7.0 | 0.92 | VC | 183 | 157 | 137 | 110 | 92 | 73 | 55 | 44 |
| 8.0 | 0.98 | C | 196 | 168 | 147 | 118 | 98 | 78 | 59 | 47 |

### 02-Yellow

**SYNTAL-S** 371873 (6 pcs. 755802) **SYNTAL-S B-JET** 371930 (2 pcs. 750620)
**CERAMIC-S** 371878 (6 pcs. 755807)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 0.80 | VC | 160 | 137 | 120 | 96 | 80 | 64 | 48 | 38 |
| 4.0 | 0.92 | VC | 185 | 158 | 139 | 111 | 92 | 74 | 55 | 44 |
| 5.0 | 1.03 | VC | 207 | 177 | 155 | 124 | 103 | 83 | 62 | 50 |
| 6.0 | 1.13 | VC | 226 | 194 | 170 | 136 | 113 | 91 | 68 | 54 |
| 7.0 | 1.22 | VC | 244 | 209 | 183 | 147 | 122 | 98 | 73 | 59 |
| 8.0 | 1.31 | VC | 261 | 224 | 196 | 157 | 131 | 105 | 78 | 63 |

### 025-Lilac

**SYNTAL-S** 371874 (6 pcs. 755803) **SYNTAL-S B-JET** 371877 (2 pcs. 755806)
**CERAMIC-S** 371879 (6 pcs. 755808)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 1.00 | VC | 200 | 171 | 150 | 120 | 100 | 80 | 60 | 48 |
| 4.0 | 1.15 | VC | 231 | 198 | 173 | 139 | 115 | 92 | 69 | 55 |
| 5.0 | 1.29 | VC | 258 | 221 | 194 | 155 | 129 | 103 | 77 | 62 |
| 6.0 | 1.41 | VC | 283 | 242 | 212 | 170 | 141 | 113 | 85 | 68 |
| 7.0 | 1.53 | VC | 306 | 262 | 229 | 183 | 153 | 122 | 92 | 73 |
| 8.0 | 1.63 | VC | 327 | 280 | 245 | 196 | 163 | 131 | 98 | 78 |

= Spray quality: Very Fine (VF), Fine (F), Medium (M), Coarse (C), Very Coarse (VC).

### 03-Blue

**SYNTAL-S** 371875 (6 pcs. 755804) **SYNTAL-S B-JET** 371870 (2 pcs. 755799)
**CERAMIC-S** 371880 (6 pcs. 755809)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 1.20 | VC | 240 | 206 | 180 | 144 | 120 | 96 | 72 | 58 |
| 4.0 | 1.39 | VC | 277 | 238 | 208 | 166 | 139 | 111 | 83 | 67 |
| 5.0 | 1.55 | VC | 310 | 266 | 232 | 186 | 155 | 124 | 93 | 74 |
| 6.0 | 1.70 | VC | 339 | 291 | 255 | 204 | 170 | 136 | 102 | 81 |
| 7.0 | 1.83 | VC | 367 | 314 | 275 | 220 | 183 | 147 | 110 | 88 |
| 8.0 | 1.96 | VC | 392 | 336 | 294 | 235 | 196 | 157 | 118 | 94 |

### 04-Red

**SYNTAL-S** 371876 (6 pcs. 755805) **SYNTAL-S B-JET** 371871 (2 pcs. 755800)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 1.60 | VC | 320 | 274 | 240 | 192 | 160 | 128 | 96 | 77 |
| 4.0 | 1.85 | VC | 370 | 317 | 277 | 222 | 185 | 148 | 111 | 89 |
| 5.0 | 2.07 | VC | 413 | 354 | 310 | 248 | 207 | 165 | 124 | 99 |
| 6.0 | 2.26 | VC | 453 | 388 | 339 | 272 | 226 | 181 | 136 | 109 |
| 7.0 | 2.44 | VC | 489 | 419 | 367 | 293 | 244 | 196 | 147 | 117 |
| 8.0 | 2.61 | VC | 523 | 448 | 392 | 314 | 261 | 209 | 157 | 125 |

### 05-Brown

**SYNTAL-S** 371927 (6 pcs. 750622)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 2.00 | VC | 400 | 343 | 300 | 240 | 200 | 160 | 120 | 96 |
| 4.0 | 2.31 | VC | 462 | 396 | 346 | 277 | 231 | 185 | 139 | 111 |
| 5.0 | 2.58 | VC | 516 | 443 | 387 | 310 | 258 | 207 | 155 | 124 |
| 6.0 | 2.83 | VC | 566 | 485 | 424 | 339 | 283 | 226 | 170 | 136 |
| 7.0 | 3.06 | VC | 611 | 524 | 458 | 367 | 306 | 244 | 183 | 147 |
| 8.0 | 3.27 | VC | 653 | 560 | 490 | 392 | 327 | 261 | 196 | 157 |

### 06-Grey

**SYNTAL-S** 371928 (6 pcs. 750623)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 2.40 | VC | 480 | 411 | 360 | 288 | 240 | 192 | 144 | 115 |
| 4.0 | 2.77 | VC | 554 | 475 | 416 | 333 | 277 | 222 | 166 | 133 |
| 5.0 | 3.10 | VC | 620 | 531 | 465 | 372 | 310 | 248 | 186 | 149 |
| 6.0 | 3.39 | VC | 679 | 582 | 509 | 407 | 339 | 272 | 204 | 163 |
| 7.0 | 3.67 | VC | 733 | 628 | 550 | 440 | 367 | 293 | 220 | 176 |
| 8.0 | 3.92 | VC | 784 | 672 | 588 | 470 | 392 | 314 | 235 | 188 |

### 08-White

**SYNTAL-S** 371929 (6 pcs. 750624)

| bar | l/min | | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 3.20 | VC | 640 | 549 | 480 | 384 | 320 | 256 | 192 | 154 |
| 4.0 | 3.70 | VC | 739 | 633 | 554 | 443 | 370 | 296 | 222 | 177 |
| 5.0 | 4.13 | VC | 826 | 708 | 620 | 496 | 413 | 330 | 248 | 198 |
| 6.0 | 4.53 | VC | 905 | 776 | 679 | 543 | 453 | 362 | 272 | 217 |
| 7.0 | 4.89 | VC | 978 | 838 | 733 | 587 | 489 | 391 | 293 | 235 |
| 8.0 | 5.23 | VC | 1045 | 896 | 784 | 627 | 523 | 418 | 314 | 251 |

The nozzles are available as single nozzles (**S**).

# HARDI ISO nozzles

## HARDI ISO F-80 – Flat fan nozzles

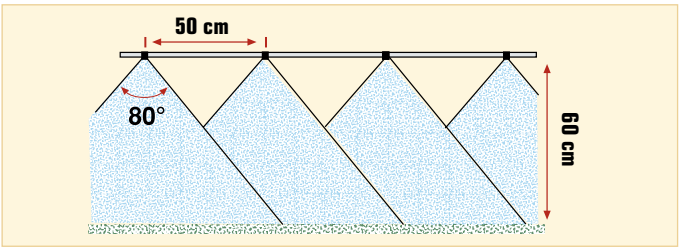
This nozzle has an 80° spray angle. On boom sizes from 24 to 36 m the boom height is often higher than 50 cm above the target. 80° nozzles provide good coverage with reduced drift risk at these higher boom heights and are also adaptable to band spraying.

- ISO: Flow, colour and outer dimensions
- 80° spray angle
- Working pressure: 1.5 to 5 bar
- SYNTAL – precision moulded thermoplastic
- CERAMIC - extremely high durability

The 80° nozzle is suitable for big booms or row crop / band spraying with either low boom or nozzles at droplegs.

For use in cotton, sugar cane, sugar beets etc.

The 80° nozzles can be fitted on HARDI sprayers using the 334083 ISO/INJET cap.




| | bar | l/min | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 01-Orange | | | **SYNTAL-S** 371931 (12 pcs. 750640) | | | | | | | |
| | 1.5 | 0.28 | 57 | 48 | 42 | 34 | 28 | 23 | 17 | 14 |
| | 2.0 | 0.33 | 65 | 56 | 49 | 39 | 33 | 26 | 20 | 16 |
| | 2.5 | 0.37 | 73 | 63 | 55 | 44 | 37 | 29 | 22 | 18 |
| | 3.0 | 0.40 | 80 | 69 | 60 | 48 | 40 | 32 | 24 | 19 |
| | 4.0 | 0.46 | 92 | 79 | 69 | 55 | 46 | 37 | 28 | 22 |
| | 5.0 | 0.52 | 103 | 89 | 77 | 62 | 52 | 41 | 31 | 25 |

| | bar | l/min | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 02-Yellow | | | **CERAMIC-CT** 371921 (12 pcs. 750603) | | | **SYNTAL-S** 371933 (12 pcs. 750642) **CERAMIC-S** 371907 (12 pcs. 750610) | | | | |
| | 1.5 | 0.57 | 113 | 97 | 85 | 68 | 57 | 45 | 34 | 27 |
| | 2.0 | 0.65 | 131 | 112 | 98 | 78 | 65 | 52 | 39 | 31 |
| | 2.5 | 0.73 | 146 | 125 | 110 | 88 | 73 | 58 | 44 | 35 |
| | 3.0 | 0.80 | 160 | 137 | 120 | 96 | 80 | 64 | 48 | 38 |
| | 4.0 | 0.92 | 185 | 158 | 139 | 111 | 92 | 74 | 55 | 44 |
| | 5.0 | 1.03 | 207 | 177 | 155 | 124 | 103 | 83 | 62 | 50 |

| | bar | l/min | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 015-Green | | | **CERAMIC-CT** 371920 (12 pcs. 750602) | | | **SYNTAL-S** 371932 (12 pcs. 750641) **CERAMIC-S** 371906 (12 pcs. 750609) | | | | |
| | 1.5 | 0.42 | 85 | 73 | 64 | 51 | 42 | 34 | 25 | 20 |
| | 2.0 | 0.49 | 98 | 84 | 73 | 59 | 49 | 39 | 29 | 24 |
| | 2.5 | 0.55 | 110 | 94 | 82 | 66 | 55 | 44 | 33 | 26 |
| | 3.0 | 0.60 | 120 | 103 | 90 | 72 | 60 | 48 | 36 | 29 |
| | 4.0 | 0.69 | 139 | 119 | 104 | 83 | 69 | 55 | 42 | 33 |
| | 5.0 | 0.77 | 155 | 133 | 116 | 93 | 77 | 62 | 46 | 37 |

| | bar | l/min | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|
| 03-Blue | | | **CERAMIC-CT** 371922 (12 pcs. 750604) | | | **SYNTAL-S** 371934 (12 pcs. 750643) **CERAMIC-S** 371908 (12 pcs. 750611) | | | | |
| | 1.5 | 0.85 | 170 | 145 | 127 | 102 | 85 | 68 | 51 | 41 |
| | 2.0 | 0.98 | 196 | 168 | 147 | 118 | 98 | 78 | 59 | 47 |
| | 2.5 | 1.10 | 219 | 188 | 164 | 131 | 110 | 88 | 66 | 53 |
| | 3.0 | 1.20 | 240 | 206 | 180 | 144 | 120 | 96 | 72 | 58 |
| | 4.0 | 1.39 | 277 | 238 | 208 | 166 | 139 | 111 | 83 | 67 |
| | 5.0 | 1.55 | 310 | 266 | 232 | 186 | 155 | 124 | 93 | 74 |

= Spray quality: Very Fine (VF), Fine (F), Medium (M), Coarse (C), Very Coarse (VC).

The nozzles are available both as single nozzles (**S**) and as COLOR TIPS (**CT**), where the nozzle is integrated in the SNAP-FIT.

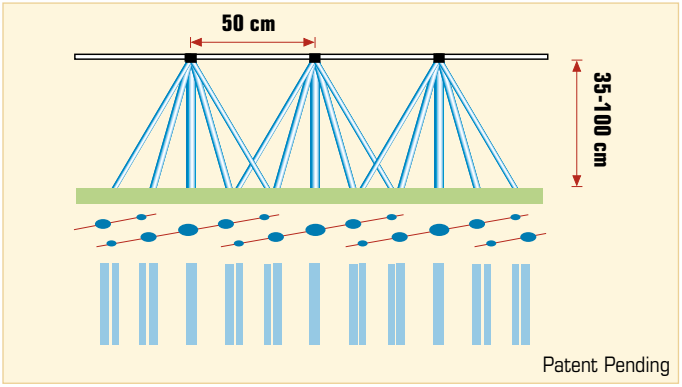
# Liquid fertilizer

## HARDI QUINTASTREAM

Five [5] streams of liquid are distributed at different angles and flows by each Quintastream nozzle. Highest flow is from the middle stream and lowest in the outer, overlapping streams. HARDI QUINTASTREAM can be mounted using the filter casing without gasket (725737).

- The fastest way to convert your sprayer into a high precision fertilizer applicator
- 5 solid streams that minimise crop scorching
- Particularly important for wide booms at fast speeds
- ISO standard for easy calibration
- Turn and Clean key for restrictor removal
- Boom height 35-100 cm

Uniquely, this - patent pending - system allows for boom movements that do not influence distribution.



Patent Pending

| bar | l/min | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|
| **015-Green** | **COLORTIP** 372011 (6 pcs. 750680) | | | | | | | | **SINGLE** 372002 (6 pcs. 750671) |
| 1.5 | 0.42 | – | 85 | 73 | 64 | 51 | 42 | 34 | 25 | 20 |
| 2.0 | 0.49 | – | 98 | 84 | 73 | 59 | 49 | 39 | 29 | 24 |
| 2.5 | 0.55 | – | 110 | 94 | 82 | 66 | 55 | 44 | 33 | 26 |
| 3.0 | 0.60 | – | 120 | 103 | 90 | 72 | 60 | 48 | 36 | 29 |
| 4.0 | 0.69 | – | 139 | 119 | 104 | 83 | 69 | 55 | 42 | 33 |
| 5.0 | 0.77 | – | 155 | 133 | 116 | 93 | 77 | 62 | 46 | 37 |
| **02-Yellow** | **COLORTIP** 372012 (6 pcs. 750681) | | | | | | | | **SINGLE** 372003 (6 pcs. 750672) |
| 1.5 | 0.57 | – | 113 | 97 | 85 | 68 | 57 | 45 | 34 | 27 |
| 2.0 | 0.65 | – | 131 | 112 | 98 | 78 | 65 | 52 | 39 | 31 |
| 2.5 | 0.73 | – | 146 | 125 | 110 | 88 | 73 | 58 | 44 | 35 |
| 3.0 | 0.80 | – | 160 | 137 | 120 | 96 | 80 | 64 | 48 | 38 |
| 4.0 | 0.92 | – | 185 | 158 | 139 | 111 | 92 | 74 | 55 | 44 |
| 5.0 | 1.03 | – | 207 | 177 | 155 | 124 | 103 | 83 | 62 | 50 |
| **03-Blue** | **COLORTIP** 372013 (6 pcs. 750682) | | | | | | | | **SINGLE** 372004 (6 pcs. 750673) |
| 1.5 | 0.85 | – | 170 | 145 | 127 | 102 | 85 | 68 | 51 | 41 |
| 2.0 | 0.98 | – | 196 | 168 | 147 | 118 | 98 | 78 | 59 | 47 |
| 2.5 | 1.10 | – | 219 | 188 | 164 | 131 | 110 | 88 | 66 | 53 |
| 3.0 | 1.20 | – | 240 | 206 | 180 | 144 | 120 | 96 | 72 | 58 |
| 4.0 | 1.39 | – | 277 | 238 | 208 | 166 | 139 | 111 | 83 | 67 |
| 5.0 | 1.55 | – | 310 | 266 | 232 | 186 | 155 | 124 | 93 | 74 |
| **04-Red** | **COLORTIP** 372014 (6 pcs. 750683) | | | | | | | | **SINGLE** 372005 (6 pcs. 750674) |
| 1.5 | 1.13 | – | 226 | 194 | 170 | 136 | 113 | 91 | 68 | 54 |
| 2.0 | 1.31 | – | 261 | 224 | 196 | 157 | 131 | 105 | 78 | 63 |
| 2.5 | 1.46 | – | 292 | 250 | 219 | 175 | 146 | 117 | 88 | 70 |
| 3.0 | 1.60 | – | 320 | 274 | 240 | 192 | 160 | 128 | 96 | 77 |
| 4.0 | 1.85 | – | 370 | 317 | 277 | 222 | 185 | 148 | 111 | 89 |
| 5.0 | 2.07 | – | 413 | 354 | 310 | 248 | 207 | 165 | 124 | 99 |
| **05-Brown** | **COLORTIP** 372015 (6 pcs. 750684) | | | | | | | | **SINGLE** 372006 (6 pcs. 750675) |
| 1.5 | 1.41 | – | 283 | 242 | 212 | 170 | 141 | 113 | 85 | 68 |
| 2.0 | 1.63 | – | 327 | 280 | 245 | 196 | 163 | 131 | 98 | 78 |
| 2.5 | 1.83 | – | 365 | 313 | 274 | 219 | 183 | 146 | 110 | 88 |
| 3.0 | 2.00 | – | 400 | 343 | 300 | 240 | 200 | 160 | 120 | 96 |
| 4.0 | 2.31 | – | 462 | 396 | 346 | 277 | 231 | 185 | 139 | 111 |
| 5.0 | 2.58 | – | 516 | 443 | 387 | 310 | 258 | 207 | 155 | 124 |

| bar | l/min | l/ha at km/h 6 | 7 | 8 | 10 | 12 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|---|
| **06-Grey** | **COLORTIP** 372016 (6 pcs. 750685) | | | | | | | | **SINGLE** 372007 (6 pcs. 750676) |
| 1.5 | 1.70 | – | 339 | 291 | 255 | 204 | 170 | 136 | 102 | 81 |
| 2.0 | 1.96 | – | 392 | 336 | 294 | 235 | 196 | 157 | 118 | 94 |
| 2.5 | 2.19 | – | 438 | 376 | 329 | 263 | 219 | 175 | 131 | 105 |
| 3.0 | 2.40 | – | 480 | 411 | 360 | 288 | 240 | 192 | 144 | 115 |
| 4.0 | 2.77 | – | 554 | 475 | 416 | 333 | 277 | 222 | 166 | 133 |
| 5.0 | 3.10 | | 620 | 531 | 465 | 372 | 310 | 248 | 186 | 149 |
| **08-White** | **COLORTIP** 372017 (6 pcs. 750686) | | | | | | | | **SINGLE** 372008 (6 pcs. 750677) |
| 1.5 | 2.26 | – | 453 | 388 | 339 | 272 | 226 | 181 | 136 | 109 |
| 2.0 | 2.61 | – | 523 | 448 | 392 | 314 | 261 | 209 | 157 | 125 |
| 2.5 | 2.92 | – | 584 | 501 | 438 | 351 | 292 | 234 | 175 | 140 |
| 3.0 | 3.20 | – | 640 | 549 | 480 | 384 | 320 | 256 | 192 | 154 |
| 4.0 | 3.70 | – | 739 | 633 | 554 | 443 | 370 | 296 | 222 | 177 |
| 5.0 | 4.13 | – | 826 | 708 | 620 | 496 | 413 | 330 | 248 | 198 |
| **10-Light blue** | **COLORTIP** 372018 (6 pcs. 750687) | | | | | | | | **SINGLE** 372009 (6 pcs. 750678) |
| 1.5 | 2.83 | – | 566 | 485 | 424 | 339 | 283 | 226 | 170 | 136 |
| 2.0 | 3.27 | – | 653 | 560 | 490 | 392 | 327 | 261 | 196 | 157 |
| 2.5 | 3.65 | – | 730 | 626 | 548 | 438 | 365 | 292 | 219 | 175 |
| 3.0 | 4.00 | – | 800 | 686 | 600 | 480 | 400 | 320 | 240 | 192 |
| 4.0 | 4.62 | – | 924 | 792 | 693 | 554 | 462 | 370 | 277 | 222 |
| 5.0 | 5.16 | – | 1033 | 885 | 775 | 620 | 516 | 413 | 310 | 248 |
| **15-Light green** | **COLORTIP** 372019 (6 pcs. 750688) | | | | | | | | **SINGLE** 372010 (6 pcs. 750679) |
| 1.5 | 4.24 | – | 849 | 727 | 636 | 509 | 424 | 339 | 255 | 204 |
| 2.0 | 4.90 | – | 980 | 840 | 735 | 588 | 490 | 392 | 294 | 235 |
| 2.5 | 5.48 | – | 1095 | 939 | 822 | 657 | 548 | 438 | 329 | 263 |
| 3.0 | 6.00 | – | 1200 | 1029 | 900 | 720 | 600 | 480 | 360 | 288 |
| 4.0 | 6.93 | – | 1386 | 1188 | 1039 | 831 | 693 | 554 | 416 | 333 |
| 5.0 | 7.75 | – | 1549 | 1328 | 1162 | 930 | 775 | 620 | 465 | 372 |

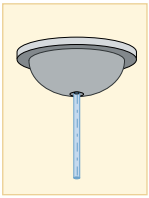
**NOTE:** Remember to adjust the pressure according to the density of the liquid fertilizer. See page 9.

# Liquid fertilizer

## 1553 Solid stream nozzle

HARDI 1553 Cone nozzles are used without swirl plates for solid stream and with swirl plates for hollow cone and full cone spraying.
Use the solid stream for liquid fertilizer on boom sprayers.

- For application of liquid fertilizer at 25 cm nozzle spacing, with a minimum risk of scorching
- Flow rates from 0.29 – 22 l/min (at 1 –10 bar)
- SYNTAL – precision moulded thermoplastic: precise, resistant and durable

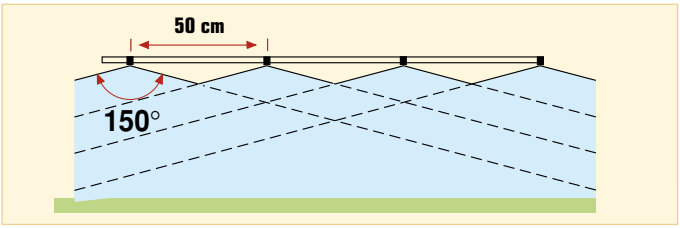


| bar | l/min | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1553**-8 | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -24 | -30 | -35 | -40 |
| 1.0 | 0.29 | 0.42 | 0.65 | 0.85 | 1.12 | 1.39 | 1.71 | 2.03 | 2.37 | 3.61 | 5.18 | 7.01 |
| 1.5 | 0.36 | 0.51 | 0.79 | 1.04 | 1.37 | 1.70 | 2.09 | 2.48 | 2.90 | 4.42 | 6.34 | 8.59 |
| 2.0 | 0.41 | 0.59 | 0.92 | 1.20 | 1.58 | 1.96 | 2.42 | 2.87 | 3.35 | 5.10 | 7.32 | 9.92 |
| 3.0 | 0.50 | 0.72 | 1.12 | 1.46 | 1.94 | 2.40 | 2.96 | 3.51 | 4.10 | 6.25 | 8.97 | 12.15 |
| 5.0 | 0.65 | 0.93 | 1.45 | 1.89 | 2.50 | 3.10 | 3.82 | 4.53 | 5.29 | 8.07 | 11.58 | 15.68 |
| 6.0 | 0.71 | 1.02 | 1.59 | 2.07 | 2.74 | 3.40 | 4.18 | 4.96 | 5.79 | 8.84 | 12.69 | 17.18 |
| 10.0 | 0.92 | 1.32 | 2.05 | 2.67 | 3.54 | 4.38 | 5.40 | 6.41 | 7.48 | 11.41 | 16.38 | 22.17 |
| 15.0 | 1.13 | 1.61 | 2.51 | 3.27 | 4.33 | 5.37 | 6.62 | 7.85 | 9.16 | 13.98 | 20.06 | 27.16 |
| 25.0 | 1.45 | 2.08 | 3.24 | 4.23 | 5.59 | 6.93 | 8.54 | 10.13 | 11.83 | 18.05 | 25.89 | 35.06 |
| No. | 370016 | 370027 | 370031 | 370042 | 370053 | 370064 | 370075 | 370086 | 370097 | 370101 | 370112 | 370123 |
| 12 pcs. | 750256 | 755031 | 755382 | 755064 | 755385 | 755065 | 755097 | 755066 | 755123 | 750257 | 755067 | 755068 |

## Large drop flat spray nozzle

HARDI foam nozzles are excellent for application of liquid fertilizers. Choose foam nozzles for broad leaf application - the large air inclusion bubbles will be reflected on the leaves and minimize crop damage.
The nozzle is used in combination with the 1553 Solid Stream nozzle.

- Spray angle up to 150°
- Extremely coarse droplet spectrum
- Superior distribution
- Can work at nozzle spacing up to 100 cm




**Large drop flat spray nozzle** (371551) + 1553-14 Grey (370042)

| bar | l/min | l/ha at km/h 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 0.84 | 253 | 202 | 169 | 145 | 127 | 112 | 101 | 84 | 63 |
| 1.5 | 1.03 | 310 | 248 | 207 | 177 | 155 | 138 | 124 | 103 | 77 |
| 2.0 | 1.19 | 358 | 286 | 239 | 204 | 179 | 159 | 143 | 119 | 89 |
| 3.0 | 1.46 | 438 | 351 | 292 | 250 | 219 | 195 | 175 | 146 | 110 |
| 4.0 | 1.69 | 506 | 405 | 337 | 289 | 253 | 225 | 202 | 169 | 127 |
| 5.0 | 1.89 | 566 | 453 | 377 | 323 | 283 | 251 | 226 | 189 | 141 |

**Large drop flat spray nozzle** (371551) + 1553-16 Grey (370053)

| bar | l/min | l/ha at km/h 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1.15 | 346 | 277 | 231 | 198 | 173 | 154 | 138 | 115 | 87 |
| 1.5 | 1.41 | 424 | 339 | 283 | 242 | 212 | 188 | 170 | 141 | 106 |
| 2.0 | 1.63 | 490 | 392 | 326 | 280 | 245 | 218 | 196 | 163 | 122 |
| 3.0 | 2.00 | 600 | 480 | 400 | 343 | 300 | 267 | 240 | 200 | 150 |
| 4.0 | 2.31 | 692 | 554 | 462 | 396 | 346 | 308 | 277 | 231 | 173 |
| 5.0 | 2.58 | 774 | 619 | 516 | 422 | 387 | 344 | 310 | 258 | 194 |

**Large drop flat spray nozzle** (371551) + 1553-18 Grey (370064)

| bar | l/min | l/ha at km/h 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1.38 | 415 | 332 | 277 | 237 | 208 | 185 | 166 | 138 | 104 |
| 1.5 | 1.69 | 508 | 407 | 339 | 291 | 254 | 226 | 203 | 169 | 127 |
| 2.0 | 1.96 | 587 | 470 | 391 | 336 | 294 | 261 | 235 | 196 | 147 |
| 3.0 | 2.40 | 719 | 575 | 479 | 411 | 360 | 320 | 288 | 240 | 180 |
| 4.0 | 2.77 | 830 | 664 | 554 | 474 | 415 | 369 | 332 | 277 | 208 |
| 5.0 | 3.09 | 928 | 743 | 619 | 530 | 464 | 413 | 371 | 309 | 232 |

**Large drop flat spray nozzle** (371551) + 1553-20 Grey (370075)

| bar | l/min | l/ha at km/h 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1.86 | 558 | 446 | 372 | 319 | 279 | 248 | 223 | 186 | 139 |
| 1.5 | 2.28 | 683 | 546 | 455 | 390 | 341 | 303 | 273 | 228 | 171 |
| 2.0 | 2.63 | 788 | 631 | 526 | 451 | 394 | 350 | 315 | 263 | 197 |
| 3.0 | 3.22 | 966 | 773 | 644 | 552 | 483 | 429 | 386 | 322 | 241 |
| 4.0 | 3.72 | 1115 | 892 | 743 | 637 | 558 | 496 | 446 | 372 | 279 |
| 5.0 | 4.16 | 1247 | 997 | 831 | 712 | 623 | 554 | 499 | 416 | 312 |

**Large drop flat spray nozzle** (371551) + 1553-22 Grey (370086)

| bar | l/min | l/ha at km/h 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 2.23 | 688 | 534 | 445 | 382 | 334 | 297 | 267 | 223 | 167 |
| 1.5 | 2.73 | 818 | 654 | 545 | 467 | 409 | 364 | 327 | 273 | 204 |
| 2.0 | 3.15 | 945 | 756 | 630 | 540 | 472 | 420 | 378 | 315 | 236 |
| 3.0 | 3.86 | 1157 | 925 | 771 | 661 | 578 | 514 | 463 | 386 | 289 |
| 4.0 | 4.45 | 1336 | 1069 | 891 | 763 | 668 | 594 | 534 | 445 | 334 |
| 5.0 | 4.98 | 1493 | 1195 | 996 | 853 | 747 | 664 | 597 | 498 | 373 |

**Large drop flat spray nozzle** (371551) + 1553-24 Grey (370097)

| bar | l/min | l/ha at km/h 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 2.60 | 780 | 624 | 520 | 446 | 390 | 347 | 312 | 260 | 195 |
| 1.5 | 3.19 | 956 | 765 | 637 | 546 | 478 | 425 | 382 | 319 | 239 |
| 2.0 | 3.68 | 1104 | 883 | 736 | 631 | 552 | 491 | 441 | 368 | 276 |
| 3.0 | 4.51 | 1352 | 1081 | 901 | 772 | 676 | 601 | 541 | 451 | 338 |
| 4.0 | 5.20 | 1561 | 1249 | 1041 | 892 | 780 | 694 | 624 | 520 | 390 |
| 5.0 | 5.82 | 1745 | 1396 | 1163 | 997 | 873 | 776 | 698 | 582 | 436 |

**NOTE:** Remember to adjust the pressure according to the density of the liquid fertilizer. See page 9.

# Calibration of mistblowers

## 1 *Calibration of forward speed*

See page 8: Calibration of field sprayers (note that the tractor PTO should be 540 rpm, which will allow the blower to operate at its maximum capacity)

## 2 *Calculation of nozzle size and pressure*

After determining your forward speed and choosing your application rate according to the recommendations on the chemical container, the total nozzle capacity can be calculated on the following formula (based on driving in each row):

$$\frac{\text{Row spacing (m) x l/ha x km/h}}{600} = \text{total l/min}$$

**Example**

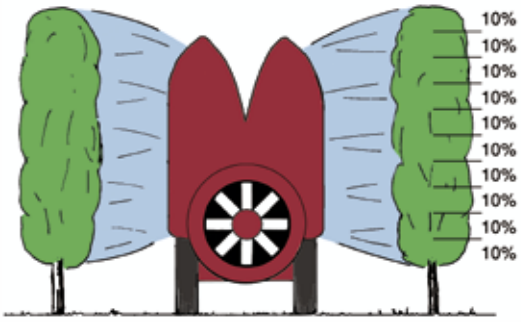
Row spacing: 5 m
Application rate: 600 l/ha
Forward speed: 4 km/h

$$\frac{5 \text{ m x } 600 \text{ l/ha x } 4 \text{ km/h}}{600} = 20 \text{ l/min}$$

The total nozzle capacity is 20 l/min. This amount has to be divided between all the nozzles on the mistblower. Two examples are described below:

**a** Nozzle calibration when equal output from each nozzle is desired.

From the drawing you can see that, because the foliage to be sprayed is evenly distributed, the output from each of the 20 nozzles are the same. This is calculated as follows:




$$\frac{\text{Total l/min}}{\text{Number of nozzles}} = \text{capacity of single nozzle in l/min}$$

**Example**

$$\frac{20 \text{ l/min}}{20 \text{ nozzles}} = 1 \text{ l/min}$$

In the 1299 nozzle chart you will find the nozzle closest to the desired output at a suitable pressure – Orange nozzle at 6 bar has a capacity of 1.07 l/min.

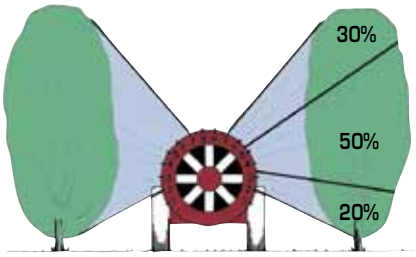
We recommend that you double-check the nozzle output with a measuring jug (with clean water in the sprayer). You can do this by disconnecting the blower and directing the water into the jug, using a hose. If exactly 1 l/min is desired, the pressure can be adjusted with the pressure adjustment formula:

$$\left(\frac{\text{New output (l/min)}}{\text{Known output (l/min)}}\right)^2 \text{ Known pressure (bar)} = \text{New pressure (bar)}$$

**Example**

$$\left(\frac{1.00 \text{ l/min}}{1.07 \text{ l/min}}\right)^2 \text{ 6 bar} = 5.24 \text{ bar}$$

**b** Nozzle calibration when nozzle output must be adapted to the crop




The drawing shows 8 nozzles pointing to each side. We can use the same example as in (**a**), with a row spacing of 5 metres, forward speed of 4 km/h and desired application rate of 600 l/ha.

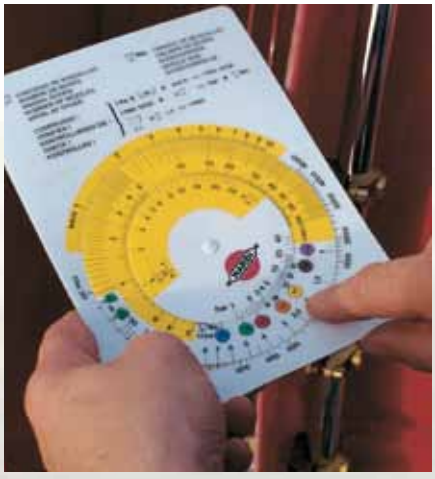
In this case nozzles 1 and 8 are shut off
2 and 3 apply 20 % = 4 l/min (each nozzle applies 1 l/min)
4 and 5 apply 50 % = 10 l/min (each nozzle applies 2.5 l/min)
6 and 7 apply 30 % = 6 l/min (each nozzle applies 1.5 l/min)

Chosen from the flow table on page 18 giving the following combination at 6 bar:

Nozzle 2 and 3: 1299-14 orange (1.07 l/min)
Nozzle 4 and 5: 1299-20 blue (2.68 l/min)
Nozzle 6 and 7: 1299-16 red (1.51 l/min)
This yields a total of 21.08 l/min. The pressure needs to be adjusted according to the pressure adjustment formula to get the correct volume of 20 l/min. A pressure of 5.4 bar is chosen.

$$\left(\frac{20.00 \text{ l/min}}{21.08 \text{ l/min}}\right)^2 \text{ 6 bar} = 5.4 \text{ bar}$$

Use the HARDI calibration disk (order No: 284554) for easy nozzle selection and calibration. (see "Mistblower technique" for further information)



# Ceramic hollow cone nozzles

## HARDI 1299 Hollow cone nozzles

These nozzles are superior in fine droplet delivery for optimal coverage of plant protection compounds. The high durability of the ceramic material makes this nozzle extensively used in orchard / mistblower applications at high working pressure or when applying abrasive materials.

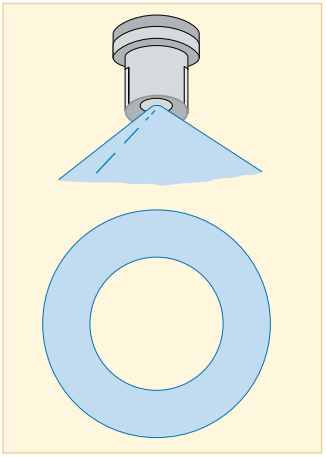
- High efficiency nozzles
- Best choice for orchard applications
- Flow rates from 0.21 – 4.24 (at 3 – 15 bar)
- Working pressure from 3 to 25 bar
- CERAMIC – superior durability at high working pressure

Useful on droplegs for under leaf spraying where turbulence is required for good coverage. Also used on hand-held sprayers for insecticide and fungicide application and for band spraying.

| bar | | l/min |
|---|---|---|
| **1299-06 White** 371507 | | |
| 3.0 | VF | 0.21 |
| 5.0 | VF | 0.27 |
| 6.0 | VF | 0.30 |
| 8.0 | VF | 0.34 |
| 10.0 | VF | 0.38 |
| 15.0 | VF | 0.47 |

| bar | | l/min |
|---|---|---|
| **1299-12 Yellow** 371510 | | |
| 3.0 | F | 0.57 |
| 5.0 | VF | 0.74 |
| 6.0 | VF | 0.81 |
| 8.0 | VF | 0.94 |
| 10.0 | VF | 1.05 |
| 15.0 | VF | 1.28 |

| bar | | l/min |
|---|---|---|
| **1299-17 Grey** 371972 | | |
| 3.0 | F | 1.16 |
| 5.0 | F | 1.50 |
| 6.0 | F | 1.64 |
| 8.0 | F | 1.90 |
| 10.0 | VF | 2.12 |
| 15.0 | VF | 2.60 |



| **1299-08 Lilac** 371508 | | |
|---|---|---|
| 3.0 | VF | 0.29 |
| 5.0 | VF | 0.37 |
| 6.0 | VF | 0.41 |
| 8.0 | VF | 0.47 |
| 10.0 | VF | 0.52 |
| 15.0 | VF | 0.64 |

| **1299-14 Orange** 371511 | | |
|---|---|---|
| 3.0 | F | 0.76 |
| 5.0 | VF | 0.98 |
| 6.0 | VF | 1.07 |
| 8.0 | VF | 1.24 |
| 10.0 | VF | 1.39 |
| 15.0 | VF | 1.70 |

| **1299-18 Green** 371513 | | |
|---|---|---|
| 3.0 | F | 1.37 |
| 5.0 | F | 1.77 |
| 6.0 | F | 1.94 |
| 8.0 | F | 2.24 |
| 10.0 | VF | 2.50 |
| 15.0 | VF | 3.07 |

| bar | | l/min |
|---|---|---|
| **1299-20 Blue** 371514 | | |
| 3.0 | M | 1.90 |
| 5.0 | M | 2.45 |
| 6.0 | F | 2.68 |
| 8.0 | F | 3.10 |
| 10.0 | F | 3.46 |
| 15.0 | F | 4.24 |

| **1299-10 Brown** 371509 | | |
|---|---|---|
| 3.0 | VF | 0.37 |
| 5.0 | VF | 0.48 |
| 6.0 | VF | 0.53 |
| 8.0 | VF | 0.61 |
| 10.0 | VF | 0.68 |
| 15.0 | VF | 0.83 |

| **1299-16 Red** 371512 | | |
|---|---|---|
| 3.0 | F | 1.08 |
| 5.0 | F | 1.39 |
| 6.0 | F | 1.52 |
| 8.0 | VF | 1.76 |
| 10.0 | VF | 1.97 |
| 15.0 | VF | 2.41 |

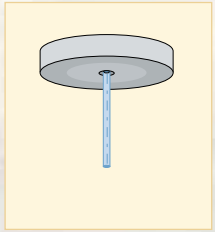
| **1299-19 Black** 371973 | | |
|---|---|---|
| 3.0 | F | 1.55 |
| 5.0 | F | 2.00 |
| 6.0 | F | 2.19 |
| 8.0 | F | 2.53 |
| 10.0 | F | 2.83 |
| 15.0 | VF | 3.46 |

= Spray quality: Very Fine (VF), Fine (F), Medium (M), Coarse (C), Very Coarse (VC).

## 1099 Solid stream nozzle - CERAMIC

This nozzle disperses the spray liquid in a concentrated stream. Its main use is calibration of flows, often in connection with other nozzle components.

The capacity can be changed by placing the nozzle with or against the direction of flow.



| **1099** | 1099-8 | | 1099-10 | | 1099-12 | | 1099-15 | | 1099-18 | | 1099-20 | | 1099-23 | | 1099-30 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | | | | | | | | | |
| 2.0 | 0.54 | 0.43 | 0.91 | 0.65 | 1.14 | 0.94 | 1.88 | 1.42 | 2.54 | 1.98 | 3.09 | 2.46 | 3.98 | 3.18 | 6.43 | 5.18 |
| 5.0 | 0.83 | 0.68 | 1.38 | 1.01 | 1.78 | 1.47 | 2.89 | 2.23 | 4.03 | 3.13 | 4.86 | 3.92 | 6.40 | 5.03 | 10.47 | 8.45 |
| 8.0 | 1.04 | 0.86 | 1.71 | 1.28 | 2.25 | 1.86 | 3.59 | 2.82 | 5.10 | 3.96 | 6.13 | 4.98 | 8.17 | 6.37 | 13.44 | 10.86 |
| 10.0 | 1.15 | 0.95 | 1.89 | 1.42 | 2.51 | 2.07 | 3.99 | 3.15 | 5.70 | 4.43 | 6.85 | 5.58 | 9.17 | 7.12 | 15.13 | 12.23 |
| 15.0 | 1.39 | 1.16 | 2.27 | 1.74 | 3.06 | 2.53 | 4.82 | 3.85 | 6.98 | 5.42 | 8.37 | 6.87 | 11.31 | 8.72 | 18.77 | 15.19 |
| 20.0 | 1.59 | 1.34 | 2.59 | 2.00 | 3.52 | 2.92 | 5.51 | 4.44 | 8.06 | 6.26 | 9.65 | 7.95 | 13.13 | 10.07 | 21.87 | 17.71 |
| 30.0 | 1.92 | 1.63 | 3.11 | 2.44 | 4.30 | 3.56 | 6.65 | 5.43 | 9.88 | 7.67 | 11.80 | 9.78 | 16.20 | 12.33 | 27.13 | 21.99 |
| 50.0 | 2.43 | 2.09 | 3.91 | 3.13 | 5.52 | 4.58 | 8.44 | 6.99 | 12.76 | 9.90 | 15.20 | 12.68 | 21.12 | 15.92 | 35.59 | 28.89 |
| No | 371309 | | 371310 | | 371311 | | 371312 | | 371313 | | 371314 | | 371315 | | 371884 | |

# 1553 cone nozzle

HARDI 1553 Cone nozzles are used with one of the four available swirl plates for hollow cone and full cone spraying. The hollow cone nozzle can be used for pesticide application on boom sprayers, mistblowers or knapsack sprayers. The HARDI 1553 cone nozzle can also be used without swirl plates for solid stream application (se page 16).

## *Drop sizes*

The difference between the 4 swirl plates is the droplet size. The blue swirl plate has a very fine droplet spectrum, the grey a fine droplet spectrum and the black swirl plate has a medium droplet spectrum. The white swirl plate has a medium droplet spectrum and is giving a full cone spray.

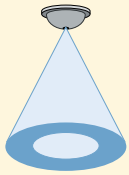
## *Large drop adaptor*

A large drop adaptor (371077) is available for the grey swirl plate.

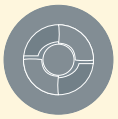
This adaptor changes the droplet spectrum to very large droplets.

| 1553 | -8 | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -24 | -30 | -35 | -40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | | | | | |
| 2.0 | 0.20 | 0.25 | 0.31 | 0.36 | 0.44 | 0.49 | 0.54 | 0.57 | 0.61 | 0.72 | 0.80 | 0.85 |
| 3.0 | 0.24 | 0.31 | 0.38 | 0.44 | 0.54 | 0.60 | 0.66 | 0.70 | 0.75 | 0.88 | 0.98 | 1.04 |
| 5.0 | 0.32 | 0.40 | 0.49 | 0.57 | 0.70 | 0.77 | 0.85 | 0.90 | 0.96 | 1.14 | 1.26 | 1.34 |
| 6.0 | 0.35 | 0.43 | 0.54 | 0.62 | 0.76 | 0.85 | 0.94 | 0.99 | 1.06 | 1.25 | 1.39 | 1.47 |
| 8.0 | 0.40 | 0.50 | 0.62 | 0.72 | 0.88 | 0.98 | 1.08 | 1.14 | 1.22 | 1.44 | 1.60 | 1.70 |
| 10.0 | 0.45 | 0.56 | 0.69 | 0.80 | 0.98 | 1.10 | 1.21 | 1.27 | 1.36 | 1.61 | 1.79 | 1.90 |
| 15.0 | 0.55 | 0.68 | 0.85 | 0.99 | 1.20 | 1.34 | 1.48 | 1.56 | 1.67 | 1.97 | 2.19 | 2.33 |
| 20.0 | 0.64 | 0.80 | 0.98 | 1.14 | 1.40 | 1.54 | 1.70 | 1.80 | 1.92 | 2.28 | 2.52 | 2.68 |
| 25.0 | 0.71 | 0.88 | 1.10 | 1.27 | 1.56 | 1.73 | 1.91 | 2.02 | 2.16 | 2.55 | 2.83 | 3.01 |
| No. | 370016 | 370027 | 370031 | 370042 | 370053 | 370064 | 370075 | 370086 | 370097 | 370101 | 370112 | 370123 |
| 12 pcs. | 750256 | 755031 | 755382 | 755064 | 755385 | 755065 | 755097 | 755066 | 755123 | 750257 | 755067 | 755068 |

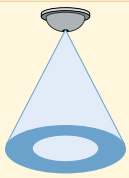
370156
12 pcs. 755182



| 1553 | -8 | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -24 | -30 | -35 | -40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | | | | | |
| 2.0 | 0.40 | 0.52 | 0.67 | 0.85 | 1.04 | 1.17 | 1.34 | 1.43 | 1.60 | 1.88 | 2.15 | 2.35 |
| 3.0 | 0.49 | 0.64 | 0.82 | 1.04 | 1.27 | 1.43 | 1.64 | 1.75 | 1.96 | 2.30 | 2.63 | 2.88 |
| 5.0 | 0.63 | 0.82 | 1.06 | 1.34 | 1.64 | 1.85 | 2.12 | 2.26 | 2.53 | 2.97 | 3.40 | 3.72 |
| 6.0 | 0.69 | 0.90 | 1.16 | 1.47 | 1.80 | 2.03 | 2.32 | 2.48 | 2.77 | 3.26 | 3.72 | 4.07 |
| 8.0 | 0.80 | 1.04 | 1.34 | 1.70 | 2.08 | 2.34 | 2.68 | 2.86 | 3.20 | 3.76 | 4.30 | 4.70 |
| 10.0 | 0.89 | 1.16 | 1.50 | 1.90 | 2.33 | 2.62 | 3.00 | 3.20 | 3.58 | 4.20 | 4.81 | 5.25 |
| 15.0 | 1.10 | 1.42 | 1.83 | 2.33 | 2.85 | 3.20 | 3.67 | 3.92 | 4.38 | 5.15 | 5.89 | 6.44 |
| 20.0 | 1.26 | 1.64 | 2.12 | 2.68 | 3.28 | 3.70 | 4.24 | 4.52 | 5.06 | 5.94 | 6.80 | 7.44 |
| 25.0 | 1.41 | 1.84 | 2.37 | 3.01 | 3.68 | 4.14 | 4.74 | 5.06 | 5.66 | 6.65 | 7.60 | 8.31 |
| No. | 370016 | 370027 | 370031 | 370042 | 370053 | 370064 | 370075 | 370086 | 370097 | 370101 | 370112 | 370123 |
| 12 pcs. | 750256 | 755031 | 755382 | 755064 | 755385 | 755065 | 755097 | 755066 | 755123 | 750257 | 755067 | 755068 |

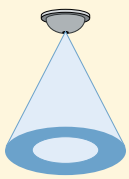


370134
12 pcs. 755156

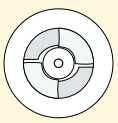


| 1553 | -8 | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -24 | -30 | -35 | -40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | | | | | |
| 2.0 | 0.41 | 0.55 | 0.72 | 0.92 | 1.15 | 1.28 | 1.54 | 1.68 | 1.90 | 2.26 | 2.65 | 3.10 |
| 3.0 | 0.50 | 0.67 | 0.88 | 1.13 | 1.41 | 1.57 | 1.89 | 2.06 | 2.33 | 2.77 | 3.25 | 3.80 |
| 5.0 | 0.65 | 0.87 | 1.14 | 1.45 | 1.82 | 2.02 | 2.43 | 2.66 | 3.00 | 3.57 | 4.19 | 4.90 |
| 6.0 | 0.71 | 0.95 | 1.25 | 1.59 | 1.99 | 2.22 | 2.67 | 2.91 | 3.29 | 3.91 | 4.59 | 5.37 |
| 8.0 | 0.82 | 1.10 | 1.44 | 1.84 | 2.30 | 2.56 | 3.08 | 3.36 | 3.80 | 4.52 | 5.30 | 6.20 |
| 10.0 | 0.92 | 1.23 | 1.61 | 2.06 | 2.57 | 2.86 | 3.44 | 3.76 | 4.25 | 5.05 | 5.93 | 6.93 |
| 15.0 | 1.12 | 1.51 | 1.97 | 2.52 | 3.15 | 3.51 | 4.22 | 4.60 | 5.20 | 6.19 | 7.26 | 8.49 |
| 20.0 | 1.30 | 1.74 | 2.28 | 2.90 | 3.64 | 4.04 | 4.86 | 5.32 | 6.00 | 7.14 | 8.38 | 9.80 |
| 25.0 | 1.45 | 1.94 | 2.55 | 3.25 | 4.07 | 4.53 | 5.44 | 5.94 | 6.72 | 7.99 | 9.37 | 10.96 |
| No. | 370016 | 370027 | 370031 | 370042 | 370053 | 370064 | 370075 | 370086 | 370097 | 370101 | 370112 | 370123 |
| 12 pcs. | 750256 | 755031 | 755382 | 755064 | 755385 | 755065 | 755097 | 755066 | 755123 | 750257 | 755067 | 755068 |

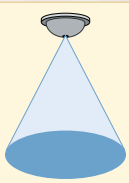
370145
12 pcs. 755157



| 1553 | -8 | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -24 | -30 |
|---|---|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | | | |
| 2.0 | 0.41 | 0.60 | 0.89 | 1.24 | 1.56 | 2.16 | 2.33 | 2.58 | 2.90 | 3.45 |
| 3.0 | 0.50 | 0.73 | 1.09 | 1.52 | 1.91 | 2.65 | 2.85 | 3.16 | 3.55 | 4.23 |
| 4.0 | 0.58 | 0.84 | 1.26 | 1.78 | 2.20 | 3.06 | 3.30 | 3.64 | 4.10 | 4.88 |
| 5.0 | 0.65 | 0.95 | 1.41 | 1.96 | 2.47 | 3.42 | 3.68 | 4.08 | 4.59 | 5.45 |
| 6.0 | 0.71 | 1.04 | 1.54 | 2.15 | 2.70 | 3.74 | 4.04 | 4.47 | 5.02 | 5.98 |
| 8.0 | 0.82 | 1.20 | 1.78 | 2.48 | 3.12 | 4.32 | 4.66 | 5.16 | 5.80 | 6.90 |
| 10.0 | 0.92 | 1.34 | 1.99 | 2.77 | 3.49 | 4.83 | 5.21 | 5.77 | 6.48 | 7.71 |
| 12.0 | 1.00 | 1.46 | 2.18 | 3.04 | 3.82 | 5.30 | 5.70 | 6.32 | 7.10 | 8.46 |
| 15.0 | 1.12 | 1.64 | 2.44 | 3.40 | 4.27 | 5.92 | 6.38 | 7.07 | 7.94 | 9.45 |
| No. | 370016 | 370027 | 370031 | 370042 | 370053 | 370064 | 370075 | 370086 | 370097 | 370101 |
| 12 pcs. | 750256 | 755031 | 755382 | 755064 | 755385 | 755065 | 755097 | 755066 | 755123 | 750257 |



370167
12 pcs. 755158

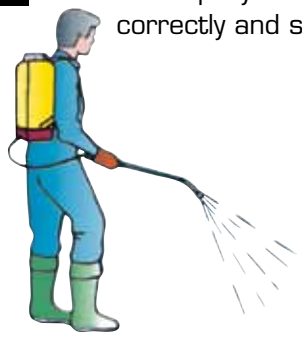


# Calibration of hand operated sprayers

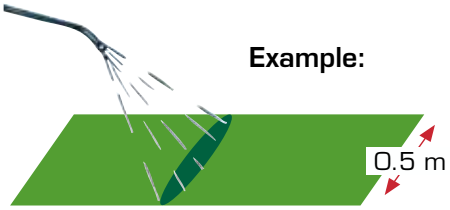
To ensure precise and safe applications in the field, effective calibration is essential. Calibration must always be done with clean water and before the use of any crop protection product. Follow this guide to calibrate your hand sprayer.

**1** Add clean water, to the **clean** sprayer.


**2** Check that sprayer operates correctly and safely.



**3** Use correct nozzle height and measure swath width.




**4** Practise spraying at comfortable walking speed and with correct nozzle height.

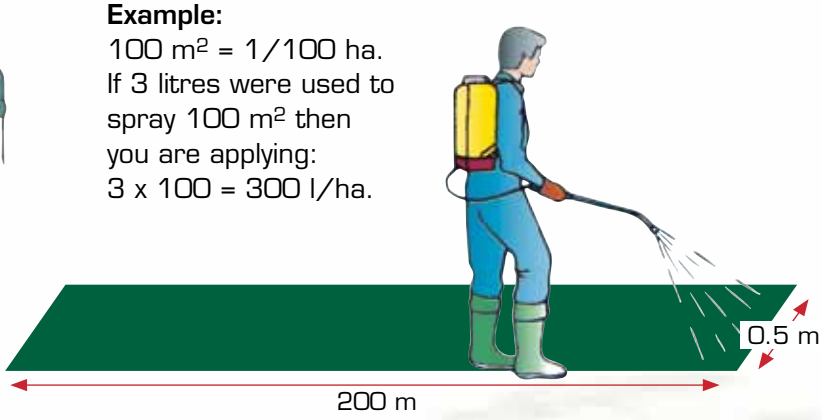
**5** Fill up with clean water.


**6** Spray 100 $m^2$ (100 square metres).

| Swath width m | Spraying distance m |
|---|---|
| 0.5 | 200 |
| 0.7 | 143 |
| 1.0 | 100 |
| 1.2 | 83 |
| 1.5 | 67 |

**7** To find application rate (litres/ha), multiply the amount of spray missing in the tank by 100. (Measure when refilling).

**Example:**
100 $m^2$ = 1/100 ha.
If 3 litres were used to spray 100 $m^2$ then you are applying:
3 x 100 = 300 l/ha.





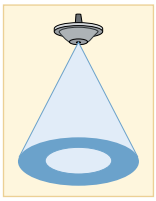
## *HARDI KALIBOTTLE*

As a quick and easy alternative to the above method, you can use the HARDI KALIBOTTLE to calibrate your sprayer. Instructions for use are printed on the bottle and the order No. is: 390638 (10 pcs: 893212)

# Nozzles for hand operated sprayers

## HC – Hollow cone nozzle – SYNTAL

- Very wide spray angle
- One piece construction
- SYNTAL

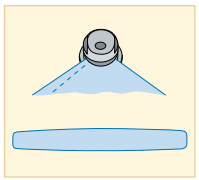


This nozzle is designed for knapsack sprayers. The restrictor and the nozzles are clicked together to avoid loosing parts when taken apart for cleaning.

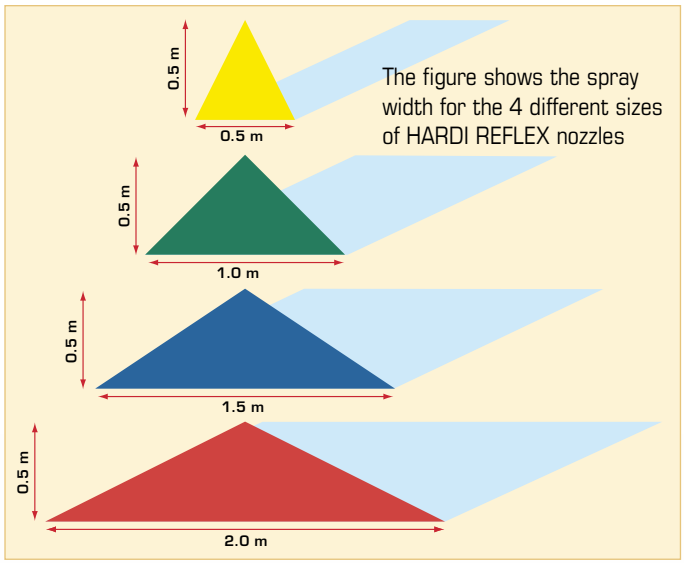
| | Yellow | Red | Brown | Grey |
|---|---|---|---|---|
| bar | l/min | | | |
| 1.0 | 0.46 | 0.81 | 1.04 | 1.39 |
| 1.5 | 0.57 | 0.99 | 1.27 | 1.70 |
| 2.0 | 0.65 | 1.14 | 1.47 | 1.96 |
| 2.5 | 0.73 | 1.28 | 1.64 | 2.19 |
| 3.0 | 0.80 | 1.40 | 1.80 | 2.40 |
| 4.0 | 0.92 | 1.62 | 2.08 | 2.77 |
| no. | 371694 | 371682 | 371695 | 371696 |

## HARDI REFLEX nozzle – SYNTAL

- Spray width from 0.5 to 2 m
- Even distribution across the swath
- 200 l/ha at 1 bar



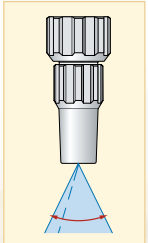
These nozzles are designed so the application volume is the same for all sizes at 1 bar and a normal walking speed (1 m/s), only the spray width changes.




| | Yellow | Green | Blue | Red |
|---|---|---|---|---|
| bar | l/min | | | |
| 1.0 | 0.60 | 1.20 | 1.80 | 2.40 |
| no. | 372020 | 372021 | 372022 | 372023 |

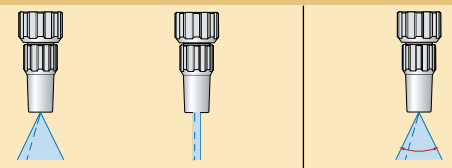
## Adjustable nozzle - SYNTAL

- Adjustable by turning the tip
- From solid stream to hollow cone
- Available with M18 thread



These nozzles can be used on knapsack sprayers or spray guns, where you want to change the characteristics of the spray cone and the demands for precision is less important.

**No. 755835**



| bar | l/min | | Spray angle |
|---|---|---|---|
| 1.5 | 0,69 | 1,25 | 80° |
| 2.0 | 0,71 | 1,40 | 85° |
| 3.0 | 0,88 | 1,65 | 90° |
| 4.0 | 0,95 | 1,85 | 90° |
| 5.0 | 1,10 | 2,18 | 95° |

# Band spraying

In many crops, band spraying provides an efficient way of reducing chemical consumption. HARDI produces both conventional and air assisted special sprayers for row crops.

## *CALIBRATION FOR BAND SPRAYING*

**1** Forward speed

See page 8 – calibration of field sprayers

**2** l/ha in band

Label recommendations usually state total l/ha rates, also called broadcast rates. When band spraying we only want to apply this broadcast rate in the bands, so instead we will here call it: **l/ha in band.**

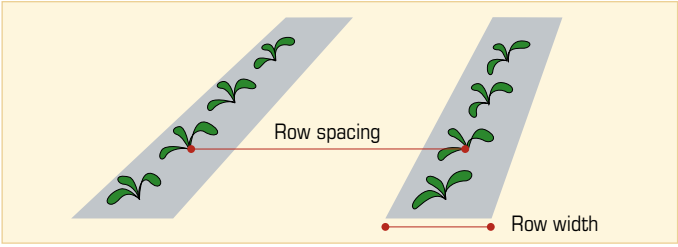
**3** Calculation of nozzle capacity

$$\frac{\text{l/ha in band x band width (m) x km/h}}{600} = \text{l/min per band}$$

If 200 l/ha is to be applied at 6 km/h in a 0.2 m wide band, the necessary output will be: 0.4 l/min/per band. If, for instance, 1 nozzle per band is used, every nozzle should apply 0.4 l/min. Nozzles and pressures can then be found in the relevant tables.

**4** Calculation of total required volume of spray mix

$$\frac{\text{area of field (ha) x l/ha in band x band width (m)}}{\text{row spacing (m)}} = \text{spray mix (total l/field)}$$




If the row spacing is 0.5 m; band width 0.2 m; field 5 ha; and l/ha in band = 200 l/ha – the total required volume will be:

$$\frac{5 \times 200 \times 0.2}{0.5} = 400 \text{ l}$$

**5** Calculation of amount of chemical per tank

$$\frac{\text{litres of water in tank x chemical dose desired (l/ha)}}{\text{l/ha in band}} = \text{litres of chemical per tank}$$

If the tank holds 400 l and 2 l of chemical products are required per ha when 200 l/ha in band is applied, the following calculation should be used:

$$\frac{400 \times 2}{200} = 4 \text{ l chemical product per tank}$$

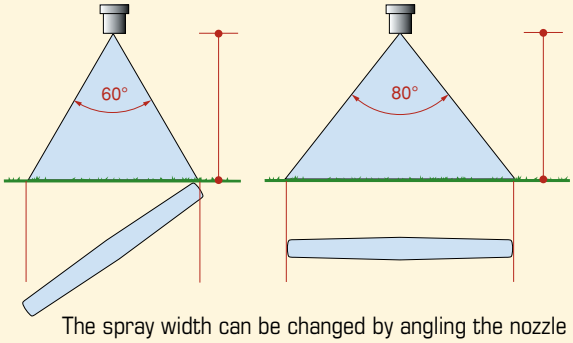
# HARDI Even spray nozzle

## HARDI 4680E 80° Even spray nozzle – SYNTAL

- Even distribution is ideal for band spraying
- Use the 4680E on hand operated sprayers, when only one nozzle is used
- Application range: 0.22 – 3.98 l/min
- Pressure range 1.5 – 5 bar

Because of the even spray distribution from this nozzle, it is especially well suited for row and inter-row spraying. It is used on hand operated sprayers or on a spray boom where chemicals need to be applied over a narrow area.

| 4680E | -7E | -9E | -11E | -13E | -15E | -21E | -25E | -27E | -37E |
|---|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | | |
| 1.5 | 0.22 | 0.30 | 0.43 | 0.61 | 0.82 | 1.23 | 1.52 | 1.86 | 3.03 |
| 2.0 | 0.25 | 0.35 | 0.50 | 0.70 | 0.95 | 1.42 | 1.75 | 2.15 | 3.50 |
| 2.5 | 0.28 | 0.39 | 0.56 | 0.78 | 1.06 | 1.59 | 1.94 | 2.39 | 3.89 |
| 3.0 | 0.31 | 0.43 | 0.61 | 0.86 | 1.16 | 1.74 | 2.14 | 2.63 | 4.29 |
| 4.0 | 0.35 | 0.49 | 0.71 | 0.99 | 1.34 | 2.01 | 2.47 | 3.04 | 4.95 |
| 5.0 | 0.40 | 0.55 | 0.79 | 1.11 | 1.50 | 2.25 | 2.77 | 3.40 | 5.53 |
| No. | 371576 | 371577 | 371578 | 371579 | 371580 | 371581 | 371582 | 371583 | 371585 |




The spray width can be changed by angling the nozzle

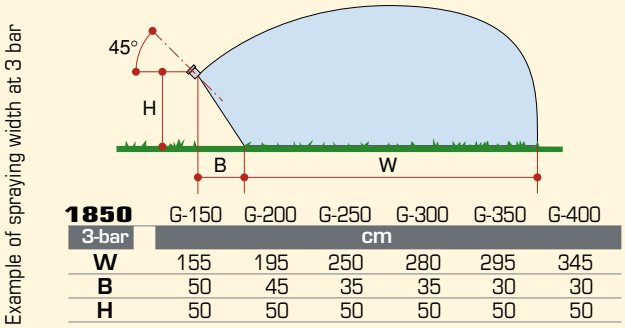
# End nozzles

Off centre SYNTAL spray nozzle. These nozzle types give an asymmetric spray pattern and disperse the product at a certain distance from the nozzle. If fitted to the end of a boom they give extra spray width. They are ideal for applications such as fence line spraying. These nozzles can also be fitted on the frame of the spray tank when not using a boom for under tree spraying in vineyards and orchards.

## 1850
## End nozzle 3/8" – SYNTAL

- Off centre spray nozzle
- 3/8"
- Pressure range: 1 to 6 bar
- Spray width up to 3.5 m
- SYNTAL precision moulded thermoplastic

This nozzle is mounted on the end of the boom tube using the 730076 mounting kit.



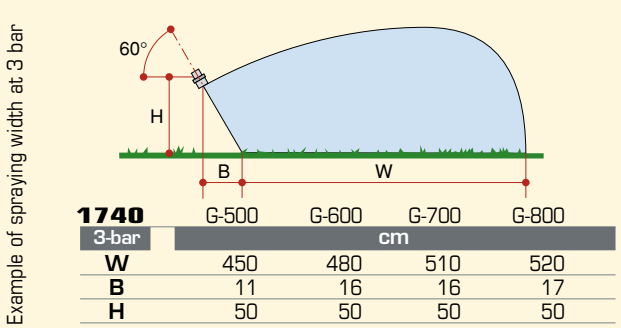

| 1850 | G-150 | G-200 | G-250 | G-300 | G-350 | G-400 |
|---|---|---|---|---|---|---|
| 3-bar | cm | | | | | |
| W | 155 | 195 | 250 | 280 | 295 | 345 |
| B | 50 | 45 | 35 | 35 | 30 | 30 |
| H | 50 | 50 | 50 | 50 | 50 | 50 |

| 1850 | G-150 | G-200 | G-250 | G-300 | G-350 | G-400 |
|---|---|---|---|---|---|---|
| bar | l/min | | | | | |
| 2.0 | 0.83 | 1.36 | 2.36 | 2.95 | 4.50 | 6.20 |
| 3.0 | 1.02 | 1.67 | 2.89 | 3.61 | 5.51 | 7.59 |
| 4.0 | 1.18 | 1.92 | 3.34 | 4.18 | 6.36 | 8.76 |
| 5.0 | 1.31 | 2.15 | 3.73 | 4.66 | 7.12 | 9.80 |
| 6.0 | 1.44 | 2.36 | 4.09 | 5.11 | 7.79 | 10.74 |
| No. | 370366 | 370377 | 370381 | 370392 | 370403 | 370414 |

## 1740
## End nozzle 1/2" – SYNTAL

- Off centre spray nozzle
- 1/2"
- Pressure range: 1 to 6 bar
- Spray width up to 5.2 m
- SYNTAL precision moulded thermoplastic

This nozzle is mounted on the end of the boom tube using the 72023300 mounting kit.




| 1740 | G-500 | G-600 | G-700 | G-800 |
|---|---|---|---|---|
| 3-bar | cm | | | |
| W | 450 | 480 | 510 | 520 |
| B | 11 | 16 | 16 | 17 |
| H | 50 | 50 | 50 | 50 |

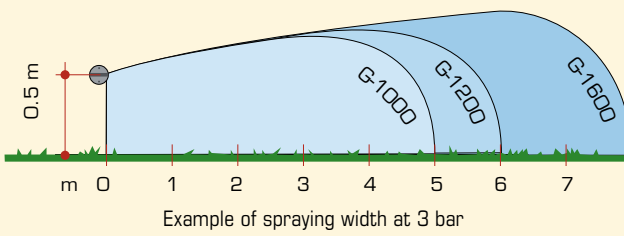
| 1740 | G-500 | G-600 | G-700 | G-800 |
|---|---|---|---|---|
| bar | l/min | | | |
| 2.0 | 7.80 | 9.00 | 10.60 | 12.40 |
| 3.0 | 9.55 | 11.02 | 12.98 | 15.19 |
| 4.0 | 11.04 | 12.72 | 15.00 | 17.54 |
| 5.0 | 12.33 | 14.23 | 16.76 | 19.61 |
| 6.0 | 13.51 | 15.59 | 18.36 | 21.48 |
| No. | 370425 | 370436 | 370447 | 370451 |

## G - Giant end nozzle – SYNTAL

- Off centre spray nozzle
- Pressure range: 1.5 to 5 bar
- Spray width up to 8 m
- SYNTAL precision moulded thermoplastic

This nozzle is mounted on the end of the boom using a special mounting kit – ask your HARDI dealer.

| | G-1000 Red | G-1200 White | G-1600 Blue |
|---|---|---|---|
| bar | l/min | | |
| 1.5 | 12.70 | 14.80 | 19.80 |
| 2.0 | 14.70 | 17.20 | 22.90 |
| 3.0 | 18.00 | 21.00 | 28.00 |
| 4.0 | 20.80 | 24.30 | 32.40 |
| 5.0 | 23.00 | 27.00 | 36.00 |
| No. | 371556 | 371557 | 371558 |

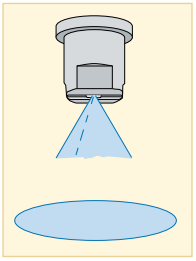


# Special nozzles

HARDI can supply a range of nozzles for special applications such as tank and container cleaning. If you do not find what you need in this product guide, please contact your HARDI dealer.

## 4665 65°
## Flat spray nozzle – SYNTAL

- Recommended pressure range: 1.5 to 5 bar
- Recommended boom height above target: 70 to 80 cm.
- SYNTAL

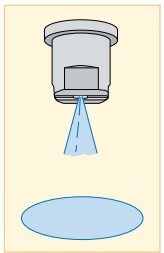


This nozzle provides an elliptical spray pattern (FlatFan) with a 65° angle. A uniform distribution is obtained, with correct overlap between spray patterns from adjacent nozzles.
This nozzle has additional applications for industrial purposes.

| 4665 | 4665-10 | 4665-12 | 4665-14 | 4665-16 | 4665-20 | 4665-24 | 4665-30 |
|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | |
| 1.5 | 0.33 | 0.48 | 0.64 | 0.84 | 1.11 | 1.47 | 2.08 |
| 2.0 | 0.38 | 0.55 | 0.74 | 0.97 | 1.28 | 1.70 | 2.40 |
| 3.0 | 0.47 | 0.67 | 0.91 | 1.19 | 1.57 | 2.08 | 2.94 |
| 4.0 | 0.54 | 0.78 | 1.04 | 1.38 | 1.82 | 2.40 | 3.40 |
| 5.0 | 0.60 | 0.87 | 1.17 | 1.53 | 2.02 | 2.69 | 3.79 |
| 10.0 | 0.85 | 1.23 | 1.65 | 2.17 | 2.86 | 3.80 | 5.37 |
| No. | 370285 | 370296 | 370307 | 370311 | 370322 | 370333 | 370344 |

## 4625 25°
## Flat spray nozzle – SYNTAL

- Pressure range: 2 to 25 bar
- SYNTAL

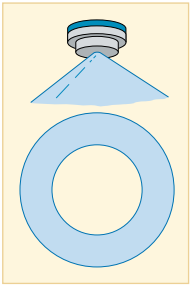


This nozzle provides an elliptical spray pattern (flat fan) with a 25° angle. The narrow spray angle results in a high impact spray, which is well suited for cleaning as well as for spraying trees and bushes, where a long range is very useful.

| 4625 | 4625-20 | 4625-24 | 4625-30 | 4625-36 | 4625-46 | 4625-54 |
|---|---|---|---|---|---|---|
| bar | l/min | | | | | |
| 2.0 | 1.50 | 2.00 | 2.60 | 3.90 | 5.50 | 6.20 |
| 4.0 | 2.12 | 2.82 | 3.68 | 5.25 | 7.78 | 8.76 |
| 6.0 | 2.60 | 3.46 | 4.50 | 6.75 | 9.53 | 10.74 |
| 10.0 | 3.35 | 4.47 | 5.81 | 8.72 | 12.30 | 13.86 |
| 25.0 | 5.30 | 7.07 | 9.19 | 13.79 | 19.45 | 21.92 |
| No. | 370506 | 370517 | 370521 | 370532 | 370543 | 370554 |

## 5131
## Misting nozzle – SYNTAL

- Pressure range: 2 to 5 bar
- Hollow Cone nozzle
- Very Fine droplets
- SYNTAL

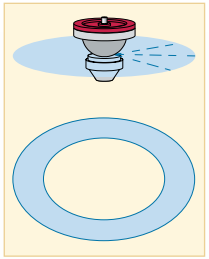


This nozzle consists of a synthetic tip and a blue swirl plate (370156).
The droplet spectrum is very fine.
The low capacity and extremely fine atomization make this nozzle useful for special purposes such as adjustment of air temperature and humidity in hot climates.

| 5131 | 5131 |
|---|---|
| bar | l/min |
| 2.0 | 0.20 |
| 3.0 | 0.25 |
| 4.0 | 0.28 |
| 5.0 | 0.32 |
| No. | 370963 |

## 3600
## Deflector spray nozzle – SYNTAL

- Pressure range: 1 to 10 bar
- SYNTAL



Deflector spray nozzle of synthetic material. This nozzle type produces a round spray pattern (360°).

The speed of the droplets is low, producing a slowly dispersing cloud. The atomization and dispersion are optimal between 1 to 5 bar. Useful for raising humidity in greenhouses etc.

| 3600 | 3600-30 | 3600-35 | 3600-40 |
|---|---|---|---|
| bar | l/min | | |
| 1 | 1.34 | 1.63 | 1.98 |
| 1.5 | 1.65 | 1.99 | 2.42 |
| 2.0 | 1.90 | 2.30 | 2.80 |
| 3.0 | 2.33 | 2.82 | 3.43 |
| 4.0 | 2.68 | 3.26 | 3.96 |
| 5.0 | 3.00 | 3.64 | 4.43 |
| 6.0 | 3.29 | 3.98 | 4.85 |
| 8.0 | 3.80 | 4.60 | 5.60 |
| 10.0 | 4.25 | 5.14 | 6.26 |
| No. | 703054 | 703065 | 703076 |

# Special nozzles

## Container rinsing nozzles – SYNTAL

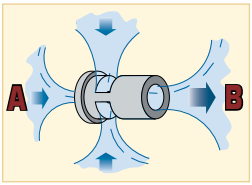
- Multi hole rinsing nozzle
- 40 solid streams
- Pressure range: 1.5 to 5 bar
- SYNTAL

- Rotary rinsing nozzle
- Rotary spray swaths
- Pointed top for easy foil opening
- SYNTAL

These nozzles are mainly used for washing out residues in chemical containers and bags. Can also be used for some irrigation purposes. Tests have shown that the most efficient way of cleaning chemical containers is by using these rinsing nozzles.

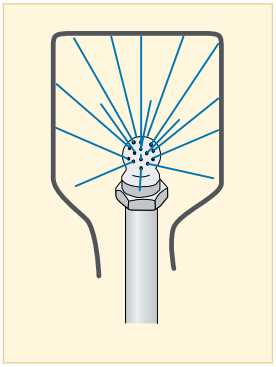
## 5066
## Agitation nozzle - SYNTAL

- Pressure range: 1 to 15 bar
- SYNTAL




This nozzle type is used for tank agitation.
The venturi effect of the nozzle increases the agitation **B** several times in relation to the liquid passing through the calibrated part of the nozzle **A**.

Useful for a fast and continuous mixing of for example pesticides in suspension.



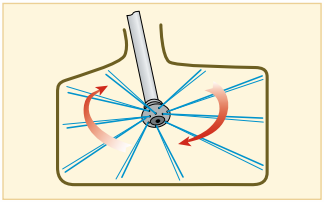
| | Multi hole | Rotary |
|---|---|---|
| bar | l/min | |
| 1.5 | 14.2 | – |
| 2.0 | 16.4 | – |
| 3.0 | 20.1 | – |
| 4.0 | 23.2 | – |
| 5.0 | 25.9 | – |
| No. | 371552 | 72317300 |

| 5066 | 5066-1.5 | | 5066-2.0 | | 5066-2.5 | | 5066-3.0 | |
|---|---|---|---|---|---|---|---|---|
| bar | l/min | | | | | | | |
| | A | B | A | B | A | B | A | B |
| 1 | 1.20 | 7.35 | 1.84 | 9.12 | 3.04 | 11.74 | 5.09 | 15.13 |
| 1.5 | 1.47 | 9.01 | 2.25 | 11.17 | 3.72 | 14.38 | 6.24 | 18.53 |
| 2.0 | 1.70 | 10.40 | 2.60 | 12.90 | 4.30 | 16.60 | 7.20 | 21.40 |
| 3.0 | 2.08 | 12.74 | 3.18 | 15.80 | 5.27 | 20.33 | 8.82 | 26.21 |
| 5.0 | 2.69 | 16.44 | 4.11 | 20.40 | 6.80 | 26.25 | 11.38 | 33.84 |
| 6.0 | 2.94 | 18.01 | 4.50 | 22.34 | 7.45 | 28.75 | 12.47 | 37.07 |
| 10.0 | 3.80 | 23.26 | 5.81 | 28.85 | 9.62 | 37.12 | 16.10 | 47.85 |
| 15.0 | 4.66 | 28.48 | 7.12 | 35.33 | 11.78 | 45.46 | 19.72 | 58.61 |
| No. | 370462 | | 370473 | | 370484 | | 370495 | |

## Tank cleaning nozzle

- Rotating nozzle for tank cleaning
- 8 solid streams at high velocity
- SYNTAL

This nozzle is made for cleaning the insides of sprayer tanks. The different angle of the 8 solid streams ensures a excellent rinsing of the entire inside surface of the sprayer tank.

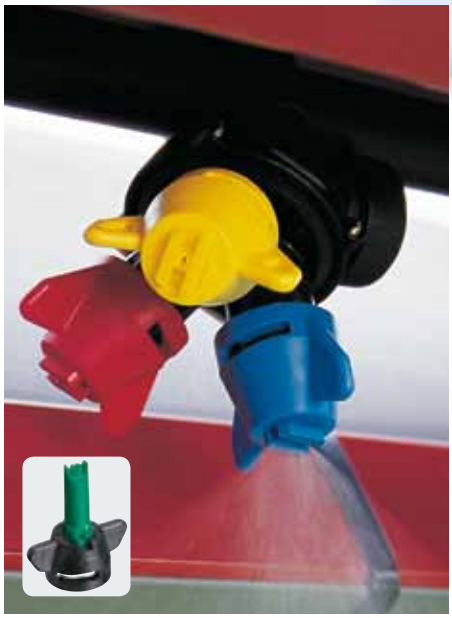


| Tank cleaning nozzle | |
|---|---|
| bar | l/min |
| 5 | 83 |
| 10 | 117 |
| No. | 728014 |

HARDI recommends the use of a cleaning agent to ensure sufficient cleaning of the tank.

# HARDI nozzles on all liquid systems

HARDI ISO nozzles fulfil ISO (International Standards Organization) standards regarding flow, numbers, colours and outer dimensions. This ensures that it is easy to fit HARDI ISO nozzles on all sprayer brands. You can see below the fittings, which allow you to adapt HARDI ISO nozzles to your sprayer.

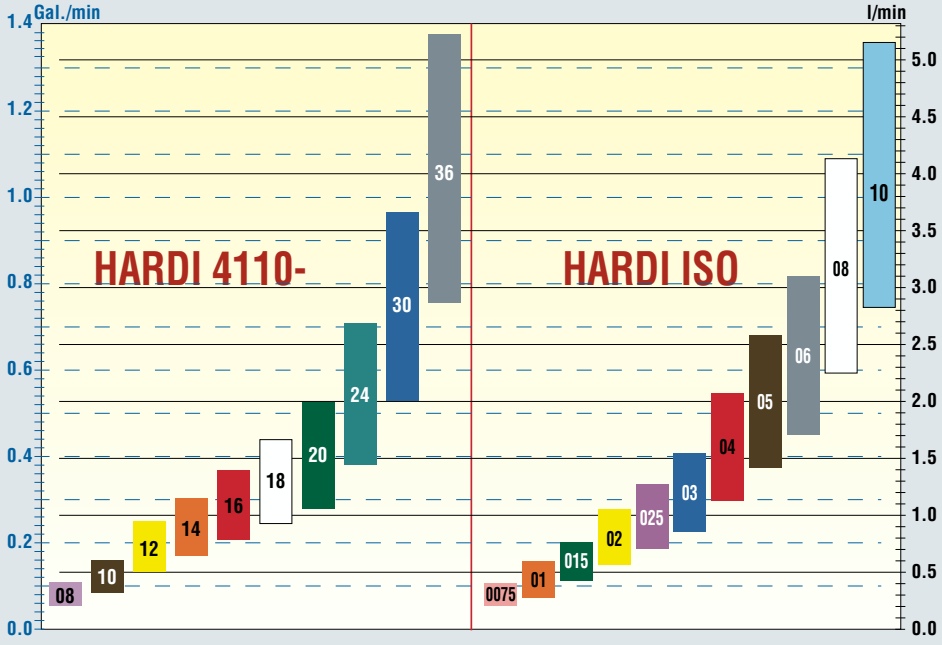


On sprayers with HARDI SNAP-FIT systems the HARDI COLOR TIPS (**CT**) are recommended for safe and easy handling. For INJET and MINIDRIFT nozzles use the 334083 black nozzle cap.

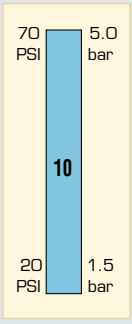
On sprayers with TeeJet or compatible systems use Single nozzles (**S**) and the 334862 black cap. The same cap is used for INJET and MINIDRIFT nozzles. (gasket: 242222).

On all other systems use the ISO cap delivered with your sprayer together with Single nozzles (**S**) or INJET (INJET require a special 10 mm cap).

## *Conversion table for HARDI 4110 and HARDI ISO nozzles*




Flows at pressure from 1.5 to 5 bar (20 to 70 PSI)




You can use these figures to check which HARDI ISO nozzles that may replace your 4110 nozzles.

# Filters

The HARDI filter range ensures optimal filtration of spray liquid on its way from the tank to the nozzles. The filtration system is a 4-step process:

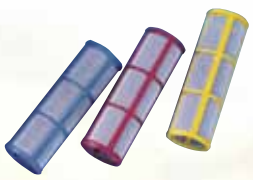

**1** The top mounted suction or EasyClean filter with a standard size of 30 mesh.

**2** The self-cleaning or ClyoneFilter. In this filter a by-pass system ensures that the filter screen is always clean. The standard size is 80 mesh.

**3** In-line filters. These filters reduce nozzle filter blockages and make filter cleaning quicker.

**4** The nozzle filters. These filters make sure that particles that would block the nozzles are captured. With these the total filtration process is completed.
Available in 50, 80 and 100 mesh.

It is essential that the filters are chosen according to the nozzles used.



| Mesh | 30 | 50 | 80 | 100 |
|---|---|---|---|---|
| mm | 0.58 | 0.30 | 0.18 | 0.15 |

# Fittings

TRIPLET provide ease of switching between different nozzle types and sizes.

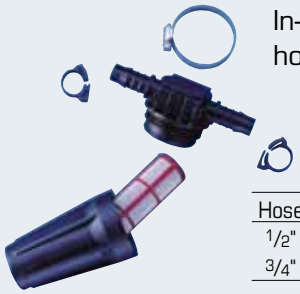
Order No: 725078

For mounting special nozzles such as the large drop flat spray nozzle and hollow cone nozzles use the 322068 adaptor piece together with 3/8" union nuts.

**1** ISO and INJET nozzles use the white 3/8" union nut (321517)

**2** black HARDI SNAP-FIT cap (334083)

**3** the black TeeJet cap, (334862) (gasket: 242222)

In-line filter complete with housing etc. - ready to fit!

| Hose | Mesh 50 | 80 | 100 |
|---|---|---|---|
| 1/2" | 845205 | 845206 | 845207 |
| 3/4" | 845208 | 845209 | 845210 |

| Mesh | No. | | | | | |
|---|---|---|---|---|---|---|
| | 1 pcs | 1 pcs | 1 pcs | 1 pcs | 12 pcs | 12 pcs |
| 30 | 72278800 | 615415 | – | – | – | – |
| 50 | 72278900 | 615416 | 635681 | 615443 | 750229 | 755410 |
| 80 | 72279000 | 615417 | 635397 | 615444 | 750228 | 755215 |
| 100 | – | – | 635677 | 615445 | 750234 | 755411 |

www.hardi-nozzles.com

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